Global gains, local costs? evaluating the nexus of industrial agriculture, conservation science, and rural livelihoods in the African tropics

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ERAMAT© is the first in a series of culturally anchored eco-games™ (CAGE) held by Dr. Jennifer Coffman, Dr. Mike Deaton, and Jacob Mayani of James Madison University.
I dedicate this thesis to the Longido families who welcomed me into their homes and into their lives this past summer. The innumerable lessons they taught me have shaped my understanding of human-environment interactions and cultural change, and I hope to pay it forward.
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Abstract

Industrial agriculture and protected areas for biodiversity conservation are two major drivers of land use policy in the African tropics, with consequences for both biodiversity and rural human populations. In Tanzania, conservation and development have led to the marginalization of pastoralists, including and especially rural Maasai. I examine how local perceptions of land use and livelihoods are influenced by recent and historical expansion of protected areas and large-scale industrial crop plantations in Longido, northern Tanzania. Using the framework of political ecology, I situate the emergence of industrial agriculture, especially that of palm oil, and protected areas in the African tropics within the historical context of international power struggles over access to and control over natural resources. Through ethnographic interviews, ERAMAT© game play, and focus group discussions, I find that shifting gender dynamics, increased sedentarization, and the lack of opportunities to participate in and receive benefits from conservation activities have resulted in local participants favoring industrial agriculture over conservation, though land and water scarcity remain among their top concerns. This paper encourages the integration of local knowledges into land use planning to improve environmental, social, and economic outcomes in the region.
Introduction

Across taxa, habitat loss constitutes the most significant threat to global biodiversity, accounting for the majority of extinctions over the past hundred years (Laurence 2010, Brooks et al. 2002). Agricultural expansion, wood extraction, and infrastructure development have been the leading drivers of habitat loss, with agriculture leading the way (Geist and Lambin 2002, Phalan 2013). While commercial agriculture has been responsible for much of the deforestation around the world since the onset of industrialization, agriculture in the African tropics has remained largely dominated by smallholders (Fisher 2010). More recently, however, agricultural development in Africa has become increasingly driven by large-scale agribusinesses, which rely on highly mechanized production methods and mass conversion of natural habitat into plantations (Rudel et al. 2009, Butler and Laurence 2008).

This shift in cultivation techniques from small-scale to industrial farming poses a serious threat to Africa’s biodiversity, as the continent contains a number of biodiversity “hotspots” of high species and ecosystem endemism (Myers et al. 2000, Mittermeier et al. 1999). This makes the effects of land conversion especially problematic, as even small reductions in biodiversity can significantly reduce ecosystem resilience (Hooper et al. 2005). In spite of their ecological consequences, industrial systems of production and extraction have articulated with local economies in tropical regions, such that a lot of people have come to depend on them as a major source of income. A growing body of research in agroforestry and social sciences has revealed, however, that these industrial systems have pernicious effects on rural livelihoods as well, thus complicating the simple human-environment dichotomy prevalent in international development research.
Simultaneously, environmental organizations around the world have prioritized the protection of biodiversity in tropical regions, demanding in some cases nothing less than a complete separation of humans from selected ecosystems. These conservation efforts can create negative outcomes for local people, as many groups become marginalized as protected areas dictate human-environment interactions within their boundaries. The goal of this study is to elucidate how these complex systems of development and conservation inform the ways in which local people in the African tropics understand and relate to their surrounding ecosystems. By exploring local perceptions of human-environment interactions in tropical areas where both industrial development and conservation programs intersect with local communities, I analyze and contribute to the body of research that seeks to reconcile the goals of conservation with those of local people.

My guiding question in conducting this research is: how do local people in these critical areas interact with the environment in ways that are meaningful to them, and how is this vision facilitated or restricted by industrial development and/or conservation projects in their area? As one avenue for answering these questions, I conducted a field study in Longido, Tanzania, in conjunction with JMU’s East Africa Field School. I collected data on local perspectives of the environment through semi-structured interviews, ERAMAT® game play, and focus-group discussions to elucidate local perceptions and use of the environment, as well as how these relationships have changed over time in response to conservation and development projects that each incite and prioritize different ways of engaging with the surrounding ecosystem.

The ethnographic data from Longido serves as an area case study to explore changing livelihoods and landscapes in the African tropics, which I combine with an industry case study of palm oil. To this end, I examine the scientific, peer-reviewed literature surrounding palm oil
agribusiness, a burgeoning industry that is an example of many of the same development and conservation challenges that impact the varied landscapes of the African tropics (land concessions, displacement of locals, land tenure conflict, and ecological disturbance). The literature survey will assess the socioeconomic impacts of industrial oil palm expansion on local communities, and examine how such developments influence land use and resource availability for locals. A critical approach combining the area and industry case studies is best suited to showing the ways in which large-scale changes in land use in mainland Tanzania can have far-reaching influence over environmental outcomes, especially where the livelihood vulnerabilities associated with water scarcity are concerned. I examine these relationships through the framework of political ecology, a critical approach that, as Michael Watts explains in *A Companion to Economic Geography*, “seeks to understand the complex relations between nature and society through a careful analysis of what one might call the forms of access and control over resources and their implications for environmental health and sustainable livelihoods” (257). Political ecology is an ideal approach to study the intersection of industrial agriculture, conservation, and livelihoods because it helps elucidate global patterns of resource appropriation while also problematizing the tendency of macro-level economic and historical analyses to obscure complex local responses on the ground.

The goal of this research project is to contribute to a constructive, engaged dialogue between local and scientific communities, with the aim of informing both development and conservation practitioners in hopes that projects will increasingly integrate local value systems with sustainable ecosystem management.
Chapter 1: The rise and spread of industrial agriculture in the African tropics, including the consequences of foreign direct investment and unequal exchange

Plantation agriculture in the African tropics, and the export economies that govern them, can be traced back to the mercantile colonial regimes led by European nations beginning in the 1730s (Kirey 2015). Europe was undergoing rapid industrialization and required raw material inputs to feed the accelerating metabolism of its urban centers. This came on the heels of so-called “age of discovery,” during which European settlers came to the African tropics and also with a focus on harvesting raw materials and humans for slavery (for a more detailed discussion of colonial economies and the slave trade, see Lovejoy 2012). While the entire colonial history of Tanzania is beyond the scope of this analysis, I attempt to situate the emergence of contemporary industrial agricultural production systems within the historical context of the colonial and neocolonial regimes that have influenced human-environment interactions and development pathways in the larger region.

In general, Tanzanian economic history reveals a common thread in terms of large-scale agricultural development: programs and policies reflecting colonial interests in cash-crop production did not end with national independence, but continues to this day in neocolonial, market-oriented economies. I apply an ecostructural approach to foreign investment dependence highlighting the potential ecological consequences of “collective human activities” (Jorgenson et. al 2007, Jorgenson 2008, Jorgenson 2009) and the concept of unequal exchange (Barbosa 2009, Shandra et al 2009) to the history of industrial agriculture in the African tropics, and in Tanzania specifically, with a special focus on the ways in which structural adjustment policies in the 1980s perpetuated colonial biases favoring cash-crop monoculture. These policies have in turn exacerbated a number of preexisting resource scarcities that rural residents are
disproportionately forced to contend with relative to their more affluent counterparts. These biases towards industrial agriculture and urbanization have been accompanied by parallel biases towards “fortress conservation” approaches to biodiversity management, which I discuss in chapter 2.

An enormous and ever-growing body of literature in postcolonial studies explicitly addresses the ways colonial cash-crop economies have become translated over time into capitalist ventures through which wealthy nations externalize the labor and environmental costs of production to low-income nations (Robbins 2012, Edwards 2014, Barbosa 2009, Pellow and Brehm 2013, Rudel et al. 2011, Gould, Pellow, and Schnaiberg 2008). Critical to this body of work is world systems theory, a conceptual framework which describes the flow of wealth and raw materials from poor nations to historically powerful and wealthy nations—and the flow of the global waste stream and environmental degradation from wealthy nations to poor (Barbosa 2009). World system theory built on dependency theory, which political ecologist Paul Robbins (2012:56) described as a theoretical framework emphasizing that “the marginal conditions of the world’s poorest nations were directly the result of the terms of trade established during the colonial period, when most colonized countries were forced to produce primary products, rather than more valuable industrial and craft goods.” Contemporary applications of dependency theory focus specifically on the effects of foreign direct investment on both economic organization of the host country (Bornschier and Chase-Dunn 1985) and on the environmental degradation that results from this organizational structure (Jorgenson et al. 2007). Dependency theory has been heavily critiqued by scholars, however, for its failure to portray the complexity of local actions and responses to economic transition, and fails to account for government corruption at both local and national levels. As I will show in chapters 3, what constitutes
“development” and what it should look like is often highly contested within the host country itself, within rural communities, and even individual households. This chapter, which relies heavily on the language of dependency theorists to articulate global trends in primary sector exports and the social and ecological consequences that can result from those patterns, is meant to highlight these macro-level trends and the discourses circulating around them. In the area case study of Longido, Tanzania, I show how actions and relationships on the ground complicate the narratives of dependency prevalent in FDI research.

*Foreign direct investment and the creation of the “developing” world*

Generally speaking, foreign direct investment (FDI) is the process by which a corporate entity in one country gains “control or a significant degree of influence on the management of an enterprise that is resident in another economy; ownership of 10 percent or more of the ordinary shares of voting stock is the criterion for determining the existence of a direct investment relationship” (World Bank 2015). FDI increased in prevalence in African nations following the “age of structural adjustment” in the 1980s (Edwards 2014), a period during which the International Monetary Fund (IMF) called for recently independent African nations to break down protective trade barriers and open themselves up to foreign investors, especially in the primary commodities sector of farming, logging, and mining, to pay off their rapidly accruing international debts. The increasingly stringent labor laws and environmental regulations in the western world made the prospect of externalizing production to developing countries with fewer corporate control mechanisms appealing to corporations in Europe, the U.S, and, more recently, middle-income countries such as China, Brazil, and Indonesia.

The externalization of production to economically vulnerable regions has increased dramatically within the last 40 years. Jorgenson (2008) cites data from the UN and OECD to
illustrate the rapid upswing in transnational ownership: “The presence of foreign investment stocks within less-developed countries increased from 4% of their overall GDP in 1980 to approximately 28% in 2000.” Given that the proportion of foreign ownership increased sevenfold in such a short period of time, the potential socioeconomic and environmental impacts of FDI warrant more attention in the international policy arena.

Barbosa, Jorgenson, Shandra, and others have expanded on FDI research, focusing on the ways in which transnational ownership in both primary and secondary/manufacturing sectors in tropical nations has led to disproportionate environmental degradation in those host countries. Central to this body of research is the concept of ecologically unequal exchange, which holds that wealthy nations are able to externalize their resource demands onto developing nations via “vertical export flows” (Shandra et al. 2009). In a cross-national analysis of forestry export flows, Shandra and colleagues investigate the extent to which low-income nations characterized by higher proportions of foreign ownership in the primary sector experience higher levels of deforestation. Their analysis, which builds on research by Jorgenson, as well as other environmental sociologists and political economists, used a sample of 60 countries and conducted cross-national regression models of forest loss from 1990-2005. Their findings supported and expanded upon previous research in this area, showing that forestry exports to wealthy nations from poor ones are associated with higher rates of deforestation. This is where the idea of unequal exchange comes in: because the activity in the forestry sector is controlled by entities in a foreign country, the more capital the host country tends to lose. The reason for this is that the recipient nation is more likely to control the secondary processing and refining industries needed to turn the raw materials into products, thus increasing the market value of what was essentially pulled from the ground in a developing nation. As the authors explain,
“Consequently, it takes more and more natural resource (e.g. forestry) or other primary product (e.g. agriculture and mining) exports to buy imports from rich nations” (Muradian and Martinez-Alier 2001 via Shandra et al. 2009). This is not to say that the host countries have nothing to “gain” from FDI in the primary sector: they gain foreign revenue, which could theoretically be invested in value-added industries in a more localized market economy. This system of exchange, however, is embedded in the “progress narrative” assumptions of modernization theory: the idea that industrialization, mechanization of labor, and urbanization of populations is what constitutes “development.” Modernization theory has been heavily critiqued for the ways in which it imposes western notions of progress and development on non-western production systems and perpetuates unsustainable resource consumption (Brahmba 2007, Coffman 2015).

What Shandra and others emphasize is that market diversification appears to decrease as cash crop and forestry exports flow disproportionately to wealthy nations: indicating that these low-income nations producing primary sector exports are buying into the “comparative advantage” mentality, often with severe consequences for their domestic economies. In “Political Ecology of Famine” (2004), Mike Davis argues that the integration of small-scale cultivators into the global economy led to the rapid deterioration of the terms of trade, resulting in the market value of products coming out of tropical nations to decrease dramatically. Davis cites Arthur Lewis’s observation that: “With the exception of sugar, all the commodities whose price was lower in 1913 than in 1883 were commodities produced almost wholly in the tropics” (59). It is from this context of ecologically unequal exchange, Davis argues, that the categorical divide between “developing” and “developed” nations emerged—monikers that are unfortunately still prevalent in international development and conservation literatures. These categories, which became formalized in the economic policies under Victorian reign in England
and the Grant administration in the U.S, reflect strong biases towards built infrastructure and urbanization in what it means to be “developed.” These biases are both culturally salient and historically rooted in the extractive regimes of colonial empires, which is why terms like “developing” nations need to be problematized and yet are so difficult to avoid.

Thus, we can see what environmental sociologists have called the treadmill of production (Gould, Pellow and Schnaiberg 2008) inherent in the structure of FDI: low-income nations are forced to harvest their natural resources at increasingly unsustainable rates in order to remain afloat in the global market. Indeed, the percentage of forest loss in the so-called “developing” nations from 1990-2005 was almost twice that of the global average during the same period: 3.5 and 6 percent, respectively (Jorgenson 2008). I argue that this pattern extends to the community level and that degradation is progressively nested: “developed” nations benefit at the expense of “developing nations,” which benefit, at the national level in terms of GDP/foreign earnings, at the expense of rural communities living in proximity to agricultural, logging, mining concessions, and, as I argue in chapter 2, tourism from conservation areas. While the government officials and urban elites who support these foreign concessions and accompanying land conversions are able to buffer their environmental consequences, rural residents whose livelihoods rely directly on the health of that particular ecosystem cannot, and are thus more vulnerable to the “shifting risk ecology” of these altered landscapes (Robbins 2012: 110).

While the focus of this analysis is limited to activities in the primary sector, the same trend applies to the secondary, manufacturing sector as well (Jorgenson 2009). Transnational corporations are less likely to retrofit their technologies for eco-efficiency and reduced emissions, and are more likely to use outdated and highly polluting technologies due to relaxed environmental standards in the host countries, leading in many cases to higher rates of infant and
child mortality (Jorgenson 2009, Prechel and Zheng 2012). The tendency of industrial centers and waste repositories to map onto those areas inhabited by the poorest segments of society in any nation (Bullard and Johnson 2000), demonstrate the ways in which the far-reaching socio-ecological consequences of FDI are disproportionately felt by historically marginalized populations, thus making its continued proliferation a significant issue from an environmental justice perspective.

The literatures regarding FDI and ecologically unequal exchange demonstrate the viability of deforestation and CO₂ emissions as indices of both ecological and social degradation. Rates of deforestation index livelihood stability not only because of the critical role forests play in food security and nutrient and water cycling (see Cotula 2009, Balanchandran et al. 2013, Laurence et al. 2014), but for the ways in which these ecological factors influence social ones. Shandra and colleagues (2009) cite Thomas Homer-Dixon’s 1999 book Environment, Scarcity, and Violence, which highlights the role of resource scarcity and deforestation in marginalizing indigenous communities, spreading disease, and increasing rural violence. Mike Davis (2004) argues that it was “subsistence adversity,” or the chronic food insecurity brought on by large-scale production systems, that encouraged people to turn to cash crop cultivation—not entrepreneurial opportunity (Davis 2004:58). My own field experience in rural Tanzania bears out these findings in full, as does the literature on the impacts of industrial oil palm on rural livelihoods in the nations in which it is produced for export. With this in mind, the collective findings of research in this field, which lends support to the hypothesis that countries with higher proportions of foreign ownership of primary sector products are more likely to experience high levels of deforestation and pollution, strongly suggest that current patterns of FDI are both ecologically and socially unsustainable. Analyses of the role of FDI in Tanzania’s primary sector
and in the palm oil industry demonstrate strong support for the argument that FDI is a structural mechanism used to serve neocolonial interests in the African tropics, and that it ultimately leads to severe environmental degradation and, consequently, the marginalization of rural populations. Further, attempting to resolve one FDI crisis by incorporating another is likely to exacerbate problems, as the industry case study of palm oil will demonstrate.

*FDI and unequal exchange in Tanzania’s primary sector and implications for rural livelihoods*

The economy of mainland Tanzania has undergone a series of dramatic structural changes since its independence from Great Britain in 1961, which have resulted in the prioritization of industrial agriculture at the expense of smallholder production systems, including and especially pastoralism, which has been a critical source of food security as the reliance on livestock for nutrition has been historically more reliable than other forms of production in Tanzania’s semi-arid landscapes. Prior to Tanzania’s independence, the colonial export economy in the form of coffee and sisal plantations began with the Germans in former Tanganyika, and increased in prevalence and scale during British rule when the Germans lost their colonies at the end of WW1 (Kirey 2015). The key driver of this scale increase, according to Tanzanian historian Reginald Kirey, is the high proportion of absentee land ownership in the British colonial state. While German-controlled Tanganyika had a relatively strong settler economy, plantation management under the British was characterized by oversight from Europe. This tendency towards absentee land ownership was likely influenced in part by the Dual Mandate governance system employed by the British in Tanganyika, in which Africans deemed “traditional” leaders from the mainland were charged with enforcing British rule among the colony’s various ethnic groups (Lugard 1922).
This system of indirect rule, which was portrayed by Lugard and other members of the colonial government to be for the benefit of the colonies, created a fundamental separation between the land and land management in regards to the export economy. Arguably, in other words, the beginnings of the capitalistic externalization of labor and agricultural production were manifest in the absentee land ownership of British colonialism in Tanzania. Living in Western urban centers and “managing” plantations over seven thousand miles away closely resembles the structure of transnational corporations today, which as many researchers in the Marxist tradition have critiqued for their inherently counter-ecological nature. In Gould, Pellow and Schnaiberg’s *The Treadmill of Production*, the authors draw attention to the ways in which market-oriented economies such as that which emerged in Tanzania with the advent of absentee land ownership during British colonial rule ignore ecological principles of carrying capacity, limiting factors, and minimum thresholds of stressors. They are “able” to do so until the resource in question is depleted or severely compromised because their management is physically and mentally not there. An absentee government official does not experience and is not personally affected by the impacts of large-scale agriculture on water and nutrient cycling in the African tropics, does not feel the strain of resource scarcity it produces, and thus expanding the profit margins by expanding production is regarded as the only desirable option in a climate of fierce competition with other nations or corporate entities. This is not to say that corporate irresponsibility in regards to land management needs to be foreign-owned and managed in order to have severe negative ecological and social consequences. There are, for example, numerous cases of government-controlled and parastatal enterprises being equally problematic (Edwards 2014, Kherallah et al. 2002). Again, however, these parasitic state-owned enterprises are usually located in places geographically distant from the affected region.
Under discussion here is the emergence of economies of scale; the idea that a corporate entity can increase its profit margins by spreading “fixed” production costs over more units of output (Coffman 2015). In other words, it literally “pays” for a corporate entity to be bigger, because the cost associated with production (labor, material inputs) are treated as static or at least able to be reduced per unit of output, even if the price per unit declines somewhat as well. To use plantation agriculture as an example, if it costs X amount of money to purchase the land, maintain a labor population, and transport the product to its recipient country, the managing entity would maximize profit from the venture by increasing crop yields, having the same area of land produce twice as much product. The solution, then, from a market-oriented perspective, is to intensify agricultural production on that same plot of land, and that has happened most recently through monoculture, the use of fertilizers and herbicides, and the mechanization of labor and resulting fossil fuel reliance. The ways in which economies of scale were imposed on the landscape of Tanzania in colonial times laid the foundation for the neocolonial transnational development schemes that would emerge following Tanganyika’s independence in 1961 and the merging of Zanzibar to form the United Republic of Tanzania in 1964.

Tanzania’s post-colonial history is notable for its socialist organization under the nation’s first president, Julius Nyerere, whose goal was to foster a unified national identity as opposed to ethnic ones through expanding agricultural “peasant” production (Kirey 2015, Iliffe 1979). Central to his approach was the policy of villagization, or “Ujamaa” in Kiswahili, which mandated the movement of millions of people to government-owned agricultural centers from 1965-1985 (Edwards 2014). Nyerere’s philosophy behind the collectivization of agricultural production, which he detailed in the Arusha Declaration of 1965, included the desire for “equitable economic production and distribution, national ‘self-reliance,’ and non-exploitative
development” (Ibhawoh and Dibua 2003). As Sebastian Edwards explains in *Toxic Aid: Economic Collapse and Recovery in Tanzania*, Nyerere was deeply ambivalent about the role of the Bretton-Woods institutions in shaping Tanzania’s economic profile, and wanted to achieve what he envisioned as relative economic independence from donor nations through the establishment of protective trade barriers and government control over primary production (Edwards 2014). While a full examination regarding the impacts of Nyerere’s socialism on the Tanzanian economy is beyond the scope of this analysis, the collectivization of agriculture under the nation’s first president highlights two key factors regarding industrial agriculture and rural livelihoods. The first is that even in Nyerere’s concentrated efforts to prioritize “Tanzanian” interests, rural residents were forced out of their traditional livelihood patterns and were made to participate in Nyerere’s agrarian vision, which did not, as we will see in our discussion of Maasai livestock herding practices, necessarily reflect the reality of peasant production in the post-colonial state. Going back to the idea of progressively nested degradation, Nyerere sought to expand the primary sector for “development” at the national level, but used colonial-style measures to suppress rural opposition, as seen with the Land Acquisition Act of 1967, which gave the president the power to seize any land for any public purpose, greatly reducing smallholder property rights (Legum and Mmari 1995, Edwards 2014). This act is one representative of environmental conflict and exclusion (Robbins 2012) that took place during Nyerere’s administration, as resources were appropriated for state operations and wrested from local control. As Edwards explained regarding the Land Acquisition Act: “Owners whose properties were chosen for purchase had no legal recourse and were forced to sell; compensation was contemplated, but in almost every case it was merely nominal” (75). The tenuous nature of smallholder land rights is the common thread that unites Nyerere’s socialist policies with the
foreign land concessions of today, a connection that re-emerges in discussions of both palm oil and conservation areas.

Nyerere’s socialist approach did have a number of positive outcomes, including significant reductions in child and infant mortality and increases in life expectancy, on average, from 37 years in 1960 to 52 years in 1984 (Legum and Mmari 1995). In spite of the many benefits accrued at the national level, there were a number of significant unintended consequences for rural residents. Longido, as I detail in chapter 3, is one such legacy of Nyerere’s policy, as the Maasai in that area were moved there from other regions and were concentrated there from a previously wider distribution during the time of villagization. The second reason I want to draw attention to the collectivization of agriculture under Nyerere is to demonstrate that the bias towards agriculture (particularly large-scale operations) over other forms of primary production was already manifest in socialist Tanzania, even though the mechanisms of control were located in the national government rather than in foreign corporate entities. This prioritization of large-scale agriculture, combined with the outbreak of war with Uganda in 1978 and preexisting inequalities in the global market, led to the collapse of sisal and coffee plantation economies in the 1970s (Edwards 2014). This in turn created severe economic instability in Tanzania, making the national government vulnerable and more open to accepting the stipulations of austerity measures by the Bretton-Woods institutions in the 1980s.

By 1978, almost 60% of Tanzania’s development budget was financed by foreign aid, (much of which came from the Nordic countries, the U.S., and Europe) and tensions were mounting rapidly between the Nyerere administration and the donor community. IMF officials led by Bo Karlstrom met with Nyerere in 1979 in an attempt to persuade him to devalue the Tanzanian shilling, which had a black market/official exchange rate difference of almost 200%
in 1977 (Edwards 2014). At this meeting, Nyerere refused to accept the terms of devaluation and expelled the IMF from the country. Edwards quotes Nyerere stating in an allocution to the diplomatic corps: “The IMF has an ideology of social and economic development which it is trying to impose on poor countries irrespective of their own clearly stated policies. And when we reject IMF conditions we hear the threatening whisper: ‘without accepting our conditions you will not get our money, and you will get no other money,” (2014: 97).

In spite of the rift between Nyerere and the IMF, foreign aid and its attendant—and often competing, depending on where the aid was coming from—development ideologies continued to flow into the country through the 1980s, particularly from the Nordic countries and, perhaps more significantly from an ecological perspective, China. Chinese development projects, including and especially railway lines, including the Tanzania Zambia Railway Authority (TAZARA), brought the demand for wildlife products such as ivory to the global market, resulting in massive outbreaks of poaching that still continue today (Challender and MacMillan 2014, Warchol et al 2003). After a series of failed “homegrown” structural adjustment programs aimed at reforming the state-owned primary sector activities and adjusting producer prices (National Economic Survival Program- NESP in 1981, NESP 2 in 1982, and the Structural Adjustment Program of 1983) a group of Tanzanian officials chaired by member of Parliament Simon Mbilinyi released a report critiquing the poor performance of the primary sector, recommending greater protection of smallholder property rights and (ironically) the encouragement of commercial farms, with a reduction of government controls along the supply chain (Edwards 2014). The irony of promoting both the protection of smallholder property rights and the expansion of commercial agriculture at the same time is that the latter often results in the displacement of the former in practice, as legal recourse mechanisms to reclaim land are often
only nominal (Cotula 2009, Klopp 2000, Southall 2005). What this did was set the stage for the exploration of different pathways through which to increase foreign revenue earnings, and one of the pathways that gained ground during this time was to increase foreign revenue through the privatization of government-owned industries. Export crops were liberalized, and by 1994 the private sector accounted for over 90% of trade, and export crops, such as tea, coffee, cotton, cashews, pyrethrum, and tobacco, increased by 68% (Mans 1994).

Among the major drivers of the liberalization of cash crops is the notion of comparative advantage, the idea that “resource-rich” previously colonized nations can capitalize on their natural resources through export economies in the primary sector (Edwards 2014). The problem with this links back to the critiques of ecologically unequal exchange research: international economic institutions like the IMF and World Bank, as well as other multinational finance agencies, tell multiple developing countries that same message, making the global market prices fall dramatically as the number of low-income nations exporting raw materials and cash crops increases. Meanwhile, wealthy countries continue to dominate the value-added manufacturing industries, and sell the finished products of those raw materials at higher prices (Gould, Pellow, and Schnaiberg 2008, Coffman 2015). In spite of its neocolonial, extractive tendencies, the notion of comparative advantage in agriculture and natural resource extraction has continued to drive sectorial policy in Tanzania, resulting in a number of implications for smallholder production systems and rural livelihoods.

The spread of large-scale production in Tanzania’s primary sector continued to expand under Presidents Mwinyi (1985-1995) and Mkapa (1995-2005), both of whom focused on combating the economic stagnation left in Nyerere’s wake through market-oriented reform initiatives (Edwards 2014). Encouraging FDI was a major part of these approaches, and both the
agricultural and mining sectors quickly attracted private investors hoping to export cash crops and valuable minerals such as Tanzanite (Helliesen 2012, Robbins et al 2012).

The election of Jakaya Kikwete in 2005 further solidified Tanzania’s gradual change towards market orientation in the primary sector. Pivotal in this transition was the creation of Vision 2025, which called for substantial economic growth in order to achieve middle-income status by 2025 and significantly reduce poverty (Edwards 2014). One of the main features of Vision 2025 was the National Strategy for Growth and Poverty Reduction, of MKUKUTA, which was launched by president Kikwete in 2009. This document, which was drafted in collaboration with the Bretton Woods institutions, outlined a set of implementation plans through which Tanzania would achieve the targets set forth by Vision 2025. Beneath MKUKUTA lies yet another layer of the bureaucratic hierarchy of Tanzania’s emerging administrative regime: the Kilimo Kwanza, or “Agriculture First” program, which as Edwards explains is geared towards encouraging the development of the private sector, including FDI, in large-scale agriculture, and expanding food production for both domestic consumption and exports (225). By this time, agriculture comprised over 80% of the workforce and accounted for 27% of national income (227).

As Maasai elder and International Panel on Climate Change (2011) representative Alais Morindat explained, the stated principles of Kilimo Kwanza directs sectorial policies, including “Quick Results Now” (QRN): a bilateral partnership between Tanzania and Malaysian economic advisers in which Malaysian economists advise Tanzania on “how to develop the nation through large-scale agriculture” (Morindat 2015). The potential social and ecological implications of Malaysia being the country influencing Tanzania’s development trajectory are profound. Malaysia achieved its position in the global market through the systematic conversion of the
nation’s tropical forests and peat swamps into industrial oil palm monocultures, with approximately 880,000 hectares of tropical peatlands having been converted to oil-palm plantations by the early 2000’s (Koh et al. 2011). Additionally, studies have shown that almost 60 percent of this palm oil development in Malaysia occurred directly at the expense of intact forest (Koh and Wilcove 2008, Koh et al. 2011, Pye 2009).

There is new evidence that Tanzania is looking to break into the palm oil market, although there is no empirical or scholarly research to date exploring the mechanisms and implications of this proposed market entry. As reported on 11 October 2015 via African Echo:

Tanzania is keen to tap Malaysian expertise to help develop its palm oil industry, especially for the production of bio-fuels. Patricia Mhondo, the investment promotion manager of the Tanzania Investment Centre, said more than 160,000 hectares suitable for oil palm and jatropha production have already been identified (Tanzmania 2015).

The Tanzania Investment Centre (TIC), which was created in 1997 through the Tanzania Investment Act, is “the Primary Agency of the Government to coordinate, encourage, promote and facilitate investment in Tanzania and to advise the Government on investment policy and related matters” (TIC 2015). The report quoted Patricia Mhondo stating: “We chose Malaysia because it is the second largest crude palm oil producer in the world. Only six percent of the cultivated land in Tanzania was under palm oil plants, which was why Dar es Salaam was looking for Malaysian expertise to increase palm oil cultivation” (Tanzania 2015). As a crop native to the tropical forest ecosystems of West Africa that requires high water inputs, the further proliferation of large-scale oil palm development schemes on the other side of the continent could have serious ecological costs, especially given the already-severe water scarcity issues in the region.
This bilateral partnership between Tanzania and Malaysia is yet another example of agricultural bias in the national agenda that continues to persist in decisions of program development and policy structure, and it is facilitated by the existence of official entities like TIC, which explicitly encourage foreign direct investment. Does this kind of export-oriented cash crop and mining system “make sense” from an ecological standpoint? In other words, how does it work within the context of the semi-arid savanna/steppe ecosystems of East Africa relative to other primary production systems, including and especially pastoralism?

Pioneering research by ecologist Robin Reid indicates that agriculture in East Africa is in many ways ecologically “mismatched” to the environment in which it is situated. As she explains in *Savannas of Our Birth: People, Wildlife, and Change in East Africa*, East African semiarid grassland ecosystems, specifically those of Kenya and Tanzania, have been characterized by a bimodal pattern of rainfall for the past 3,000 years (Reid 2012). Bimodal rainfall means that there is a short and a long rainy season, interspersed with dry seasons. Reid argues that the pastoral mode of production evolved along with this ecosystem over thousands of years for the reason that rains are temporally “spread out,” which keeps grass growing and animals fed. From an energetics perspective, it is more ecologically efficient to maintain livestock, especially cattle, because bimodal rainfall allows them to produce milk continuously for longer periods of time (49). Moreover, the inherent mobility of pastoralism allows the people to sustain their production while simultaneously preventing any one area from being overgrazed. Mobility is a critical aspect of pastoralism, and one that has been greatly curtailed, as I discuss in chapter 3.

Agriculture, conversely, was not prevalent in this region historically because it is better suited to ecosystems with unimodal rainfall patterns, which sustain crop yields with one long,
heavy rainy season (49). Furthermore, crop cultivation requires sedentary, rather than mobile, patterns of residence. During dry seasons, people could not move their crops to areas with more rainfall, and it was not until the advent of modern irrigation systems that large-scale crop cultivation was even a possibility. Reid supplements this contemporary ecological evidence with archaeological evidence, which shows that during the Bantu expansion (c. BC 2000 – AD 1000), West African migrants began to adopt pastoral subsistence practices over farming as they moved eastward from the tropical forest ecosystems of what is now Nigeria and Cameroon (Reid 2012, Coffman 2015).

The basic ecological and human resource inputs of industrial agriculture greatly impact and even reconfigure the land and local people. Perhaps the most pressing resource demands created by agriculture are water-related: Döll and Siebert estimate that almost 90% of the global water consumption is for irrigation purposes, and more than 40% of the crops are produced under irrigated conditions (Döll and Siebert 2002), a figure that has likely grown in recent years. Broadly speaking, agriculture on a large scale requires the systematic collection and transport of vast quantities of water from one place to another. The consequences of this diversion will be felt more strongly in drought prone areas like those of East Africa, and research by Dr. Madaka Tumbo of the Institute of Resource Assessment at the University of Dar es Salaam supports this prediction. The Ruaha river basin, as she explained, covers about 20% of Tanzania, and hydroelectric power plants along the river supply about 50% of the nation’s electricity. The basin has been experiencing severe drying trends since the 1990s due to global and regional changes in climate, and her research team is currently investigating what appears to be a disruption of the bimodal rainfall pattern discussed above, and which Reid described as an essential component of the grassland ecosystem. Within the last 20 years, the short rains have often failed and the long
rains have become increasingly erratic and severe, resulting in periods of drought and flash flooding. There is also a general trend in temperature increase, with wet seasons becoming “warmer and wetter” and dry seasons becoming “warmer and drier” (Tumbo 2015). Furthermore, these disruptive patterns are also inciting conflict between irrigation agriculturalists, herders, and hydropower suppliers, who must deal with the scarcities produced by the drying trends. Based on previous discussion of primary sector investment and export reliance, it is unsurprising that industrial agriculture is the largest controller of water, followed by hydroelectric power suppliers. Tumbo explains that local people who suffer from rural poverty rely on water extraction to meet their daily needs, and yet they are often prohibited from using water sources. As a result, they continue to do so illegally. The trends indicated by Dr. Tumbo’s research in the Ruaha river basin are borne out on the national level: aggregate freshwater withdrawal data from the World Bank and CIA for Tanzania show that roughly 89% of total freshwater withdrawal is for agricultural purposes, while domestic usage accounts for only 10% (CIA 2015, World Bank 2015). With a rural population of 35 million—more than double the urban population of roughly 16 million (World Bank 2015)—Tanzania’s citizenry experiences vastly disproportionate rates of water consumption, which reflect competing and structurally incommensurate interests in the national policy arena. In addition, the preexisting vulnerability of the land and its inhabitants to droughts is exacerbated by both global and regional changes in climate. These changes are in turn worsened and perpetuated by the appropriation of large quantities of water for large-scale agriculture, which may not be well suited to the ecological contours of the region to begin with (Reid 2012).

Alais Morindat held a similar view: “agriculture cuts up the earth. It takes at least 25 years for the land to heal itself—and that is with good management” (Morindat 2015). While the
exact number of years soil repair actually takes in East Africa after cropping is highly variable, depending on area and use, studies have shown that cropping in the semi-arid environments of sub-Saharan Africa can lead to severe nutrient depletion and erosion (Sanchez 2002, Vanlauwe and Giller 2006). Morindat echoed Jorgenson and Barbosa when he claimed, “Poor countries and marginal communities need to be prepared for powerful economic forces influencing government decisions.” As a Maasai elder, Morindat is an advocate for the pastoral mode of production. Along with its deep cultural significance, he points out that pastoralism is also “the backbone of the commercial livestock center for both domestic and foreign markets.” According to Morindat, pastoralists remain severely under-represented in the policy arena due to their historically subaltern position in post-colonial society. National policies geared towards agriculture have led to the landscape becoming increasingly partitioned, as land and water are appropriated for industrial agriculture, leading to the disruption of pastoral mobility and traditional grazing patterns, resulting in negative ecological and social outcomes. He stated: “Pastoralists live in drought-prone areas. But over time, pastoralists have developed complex strategies to mitigate the effects of environmental uncertainties.” This echoes the central point Dr. Tumbo emphasized in her discussion of climate change and freshwater withdrawal: the risks associated with living in the semiarid ecosystems of East Africa are 1) becoming more severe and 2) disproportionately felt by rural residents—both as a direct result of industrial agriculture. Morindat provided evidence from Longido District to illustrate the consequences of these imposed water scarcities: “Longido did not get sufficient rains this year (2015), and are headed into the second dry season. Last year they lost 70% of their livestock” (Morindat 2015).

Manifest in the phenomena Morindat describes is a kind of “shifting baseline syndrome” (Coffman 2015) or positive feedback loop due to climate change combining with increasing land
enclosure and appropriation. Water withdrawal by industrial agriculture worsens the effects of global climate change, which is compounded as water withdrawal continues and increases as more land is converted to large-scale farming operations. The breakdown of critical social “safety nets” which have historically helped to absorb the impacts of naturally-occurring vulnerabilities resulting from the uneven distribution of water, accelerate the process of ecological degradation and socioeconomic marginalization by forcing rural residents to rely on increasingly resource-depleted environments. Population growth compounds these resource scarcities by making more people rely on diminishing resources. While per-capita needs have not changed (in terms of food security, social wellbeing, etc.), per-capita land holdings are going to continue to decline as more people are born. In Chapter 3, I show the ways in which rural residents in Longido, Tanzania, are responding to the pressures of population growth. Many worry about how they will divide their land and other assets among their children—especially as the land becomes increasingly susceptible to severe droughts. Morindat emphasizes that drought is “common—not a crisis.” Morindat thus acknowledges what Robin Reid and others have articulated in the scientific literature—that cyclical drought events are a natural part of the East African landscape, but that those cycles have been accelerating and becoming more severe (Reid 2012, Mayani et al. 2012). The “crisis,” then, is rather the combination of worsening drought conditions and the scarcities imposed by the disruption of residential mobility patterns. Morindat’s overall message is essentially that agricultural practices and production systems are prioritized in national development schemes, resulting in the appropriation of land for agribusiness and the restriction of pastoral mobility. This in turn forces many pastoral families to adopt farming practices—the very mode of production that produced the resource scarcities in the first place. Industrial agriculture represents a very powerful set of interests in Tanzania that are consistently reinforced in spite of their social and ecological consequences. The long history
of export-oriented economies of scale originated with imperial mercantilism, was fostered post-independence through Nyerere’s agrarian vision and the influence of the donor community, and continues today through foreign direct investment and its emphasis on the so-called “comparative advantage” of primary sector activities such as palm oil production in low-income tropical nations like Tanzania.

As the focus of this thesis is the confluence of conservation and industrial agricultural development in the African tropics, I outline consequences the industrial palm oil sector has had on rural livelihoods in other tropical regions from the peer-reviewed scientific and grey literatures, from which I extrapolate the potential future consequences facing rural livelihoods as the sector makes its way into East Africa. I argue that based on the evidence from the palm oil literature regarding negative impacts on tropical ecosystems and on rural livelihoods, combined with site-specific issues of water scarcity, historical patterns of primary sector export economies, and contested land tenure with the development of conservation areas, the adoption of a large-scale palm oil industrial complex in Tanzania would eventually prove disastrous for both rural residents and the environment.

As a materialist perspective that prioritizes historically situated power struggles over access to and control over resources, political ecology can lend insights into the development and expansion of industrial oil palm plantations in the humid tropics. Specifically, the degradation and marginalization thesis can be used to critically examine the development trajectory of this global, non-food, export crop in tropical regions because of its attention to the ways in which patterns of environmental degradation line up with historical patterns of marginalization, which often occur along class, ethnic, and gender lines, and the framework of environmental conflict and exclusion helps draw out the ways in which environmental spaces are contested both within
and between local interest groups (Robbins 2012). While these theses offer valuable insights into macro-level environmental and economic processes, they run the risk of obscuring the everyday resistance of people involved, and can flatten groups of individuals with often conflicting voices into “interest groups” and “communities” (what Jennifer Coffman calls “unnatural collectives”) in an effort to simplify the neocolonial narrative of rapacious capitalist extraction and production. As ethnographic data collection in areas in proximity to palm oil plantations was not a part of this research, the scope of analysis regarding palm oil development is necessarily limited to macro-level trends collated from the existing literature. In spite of these limitations, the section regarding local perceptions of land use and livelihood in Longido illustrates the complexity (and often discord) of local responses to large-scale development projects—although palm oil has only recently made its way into the Tanzanian national agenda.

Even a cursory historical overview of palm oil development reveals the processes of degradation and marginalization and environmental conflict and exclusion at work. As a plant species native to West and Central Africa, archaeological evidence suggests humans began experimenting with oil palm cultivation about six thousand years ago (Lynn 2002). It was not until the onset of imperialist contact in the 1700s, however, that the purposeful conversion of land for oil palm cultivation scaled-up, as European powers used oil palm products to fuel their rapidly industrializing economies (Lynn 2002, Hartley 1988, Law et. al 2013). The multinational consumer goods corporation, Unilever, provides an example of a present-day capitalist enterprise that has its roots in the colonial regime, as Sir William Lever obtained the original Lever Brothers land concession for palm oil cultivation in Belgian-controlled Congo in 1911, which was seized from the local population (Duignan and Gann 1975, Oosterveer 2015, Linder and Palkovitz 2016 forthcoming). Colonial export thus formalized processes of resource extraction
that had already begun to unfold in the region, and indigenous people were expelled and
relocated to make room for migrant workers living in corporate-owned settlements with poor
living conditions (Linder 2013, Linder and Palkovitz 2016 forthcoming). This process continues
today in Southeast Asia and the Congo basin, as political unrest has led to the establishment of
mass transmigration programs by national governments (Konings 1993, Njoh 2002, McCarthy

Palm Oil was then introduced to Indonesia and Malaysia, where it quickly began to thrive
due to the ideal climate conditions of the Southeast Asian tropical rainforests. By 1975, Malaysia
surpassed the entire African continent in palm oil production (Teoh 2002). This was made
possible by international development schemes in the 1960’s that encouraged foreign investors,
and by the following decade 60% of the land area dedicated to palm oil plantations was in the
hands of private enterprises, 30% owned by the government, and a mere 10% managed by
smallholders (Teoh 2002). In 2005, Malaysia’s palm oil production was six times what it was in
1975, and the same 30-year period saw the country’s forest cover reduced by 20% (Wicke 2011,
exports in the region also came at the expense of domestic food production: Indonesia has spent
more money on importing food since 2011 than it made in palm oil exports (Rhein 2014).

Together, Malaysia and Indonesia accounted for 85% of the world’s palm oil production
in 2013 (FAO 2015), as the African palm oil sector has, until recently, remained largely
controlled by smallholder producers (Poku 2002, Corley and Tinker 2003, Rudel 2013, Wich et
al. 2014, Linder and Palkovitz 2016 forthcoming). This has begun to change over the past 30
years, however, with what primatologist Joshua Linder (2013) has called a “new wave” of
industrial oil palm taking hold in the crop’s native continent. National governments in West and
Central African nations facilitate this “new wave” through economic policies geared towards increasing GDP by attracting foreign investors: allowing corporations rights to timber, water, and minerals in the concession areas, and requiring only low rent payments (Hawkins and Chen 2011, Nguiffo and Schwartz 2012), often to the exclusion of local residents (Dewiet et al. 2005, Colchester et al. 2006, Cote and Cliche 2011, Cramb and Curry 2012).

This prioritization of primary-sector foreign investment in the form of large-scale oil palm plantations underway in West and Central Africa mirrors the conditions that led to the rapid deforestation and concurrent displacement of rural residents in Southeast Asia, leading to growing concerns regarding the ecological and socioeconomic sustainability of these endeavors (Fentrenie 2012, Rival and Levang 2014, Friends of the Earth 2008, Rainforest Action Network 2014). Despite these well-publicized concerns, palm oil has been described by development advocates in corporate and government arenas alike as being “liquid gold” (Oladipo 2008): a boon to so-called “developing nations” in equatorial regions that promises entry into a long-awaited position in the global market. What constitutes a state’s well-being is clearly contested, and political ecology offers ways to put these divergent perspectives in direct conversation.

The legacy of colonialism in the so-called “development” of Sub-Saharan Africa has not been the only shaper of land use in these areas, however. The rise of protected areas—that is, land set aside for biodiversity conservation purposes—has also contributed to changing social and ecological landscapes in the African tropics. In the next chapter, I outline the development of protected areas around the world (though focusing on the African tropics) and attempt to situate their activities within the historical context of globalization, population growth, and rural livelihoods.
Chapter 2: Protected areas: balancing biodiversity conservation and human livelihoods in the African tropics

According to the World Bank (2015), 14.3% of the terrestrial area on Earth is considered “protected,” which the World Bank defines as:

Totally or partially protected areas of at least 1,000 hectares that are designated by national authorities as scientific reserves with limited public access, national parks, natural monuments, nature reserves or wildlife sanctuaries, protected landscapes, and areas managed mainly for sustainable use. Marine areas, unclassified areas, littoral (intertidal) areas, and sites protected under local or provincial law are excluded.

As this definition excludes local, community-based conservation projects as well as areas covering less than 1000 hectares, these figures likely underestimate the amount of land under some form of purposeful designation as an area that to some extent excludes land conversion.

A comparison of protected area coverage and average annual deforestation rates between the U.S. and Tanzania reveals disparities informed by a complex web of economic and ecological factors. In total, 32.2% of Tanzania’s terrestrial land area is under protected area management (up from 27.3% in 1990). To put this in perspective, the U.S. has only 13.8% of its terrestrial land area protected, though it is nearly ten times as large as Tanzania (CIA World Factbook 2014). In addition, while Tanzania’s average annual deforestation rate is 1.13%, the U.S. is actually reforesting, with an average annual deforestation rate of -0.13%: over a hundred percent less forest conversion than Tanzania. In a strictly ecological sense, these disparities seem consistent: Tanzania has a much higher rate of species and ecosystem endemism, which when coupled with higher deforestation rates equates to more biologically “rare” species being more highly threatened by habitat loss associated with land conversion for agricultural or other forms
of industrial development (Mittermeier et. al 1999, Myers et. al 2000, Brooks et. al 2002).

Recalling the larger macroeconomic trends of wealthy nations like the U.S. externalizing production to low-income countries and the positive feedback loop of ecologically unequal exchange in the primary sector, however, the political contours of protected area development begin to emerge.

The goal of this chapter is to provide a brief topical overview of protected area development and the environmental discourses surrounding perceptions of human-environment interactions in the African tropics. Site-specific data for conservation areas in Tanzania are detailed in chapter 3.

Not all conservation areas are created equal in term of their levels of separation from human activities, and thus potential for local conflict. In northern Tanzania, for example, Wildlife Management Areas (WMAs) often surround core conservation areas and/or national parks, such as Ngorongoro Conservation Area and Tarangire National Park. Ngorongoro is a multi-use conservation area that allows local pastoralists to inhabit the area and graze their cattle, but prohibits crop cultivation above subsistence level, which has been argued by some social scientists to provide insufficient means for the local Maasai to maintain healthy levels of nutrition (McCabe et. al 1992). Over 20 years after McCabe and colleagues conducted their research, conditions have only worsened for the Maasai of Ngorongoro, as the human population has increased significantly and the Maasai are not allowed to live in the crater, but in designated villages on the periphery (Coffman 2015). In light of these emerging conflicts between conservation activities and rural livelihoods, I explore the ways in which the land use policies of the international conservation regime are situated within historical power struggles between interest groups. I argue that protected areas have, in some cases, evolved over time to create an
ever-more exclusive and prescribed set of relationships between humans and their environment, with significant implications for local people living in proximity to prioritized ecosystems.

*Environmental discourses informing global perceptions of local human-environment interactions*

Environmental sociologist Robert Brulle delineates seven environmental discourses that have been prevalent throughout U.S/Western European history and that have shaped the kinds of environmental interactions perceived as beneficial or harmful: manifest destiny, conservationism, preservationism, ecocentrism, deep ecology, political ecology, and ecofeminism (Brulle 1996). Each comes with a set of expectations regarding the ideal relationship between humans and the environment, and each was borne out of a very specific set of historical circumstances and reflect global relationships between powerful (and less powerful) interest groups around the world. Conservationist policies, for example, developed following the industrial revolution and define a utilitarian and techno-managerial approach to nature. Preservationist policies, which emerged in the 1930’s with the national parks movement spearheaded by John Muir and President Theodore Roosevelt, aim to separate humans from “natural” space, and view humans as a threat to ecosystem health. Ecocentrism defines human beings as being a part of the ecosystem, emphasizes the interconnected systems of life forms and abiotic elements, and explicitly connects ecosystem health to human wellbeing.

For the purposes of this analysis, we will turn to the environmental discourse of political ecology, which understands environmental problems as resulting from deep structural inequalities in our rapidly industrializing and globalizing social systems. I argue that political ecology, as discourse and practice, is most useful for understanding the intersection of industrial agriculture, conservation, and rural livelihoods in the African tropics because it explicitly prioritizes the relevant power struggles that inform environmental decision-making at every level.
of social organization. From the household of a single Maasai family in Longido, to the larger rural community, to the nation-state, to the international policy arena, decisions are being made that prioritize different aspects of ecosystems and, they are often in conflict with one another. The way these interests are managed by powerful entities (governments, international conservation and development organizations, etc.) is reflected in the historically salient environmental discourses they use in framing their respective approaches to human-environment interactions in these so-called “biodiversity hotspots.” I will begin by outlining the positive role that protected areas have played in promoting and maintaining biodiversity, and then examine the critiques of the protected area paradigm as they relate to human-environment interactions and rural livelihoods.

Ecological benefits of protected areas

Protected areas (P.A.s) have been called the “cornerstones of conservation efforts” for their documented success in preventing deforestation and urban development within their boundaries, which in turn has helped to slow species extinction rates as well as promote genetic diversity within species groups (Brooks et al. 2009, Bruner et al. 2001, Beaudrot et al. 2015, Geldmann et al. 2013, Watson et al. 2014). Beaudrot and colleagues (2015) analyzed population-level data from 15 protected areas representing 3 continents and 244 species, and found that wildlife population declines were less severe in protected areas than they were outside protected areas (Beaudrot et al. 2015). According to Brooks et al. (2009), the sum of conservation actions in protected areas has prevented one-fifth of the bird extinctions that would have happened without them.

Protected areas have also been shown to significantly reduce logging, mining, and other forms of forest clearing, and to a lesser extent prevent subsistence activities such as hunting and
grazing (Bruner et al. 2001, Geldmann et al. 2013). While I would argue that these findings are at least partially site-specific in terms of what has made the protected areas under investigation successful, they provide examples of an overarching benefit of protected areas: preventing land conversion. These ecological benefits of protected areas have been disputed in area-specific contexts, however. For example, Clark et al. (2013) found that rates of deforestation in South Asian protected areas are virtually indistinguishable from rates outside the parks. In regards to alternative conservation strategies, Brooks et al. (2009: 1448) stated: “Interventions to promote tropical conservation by supporting education and livelihoods, providing incentives, and furthering capacity building are all thought to be important, but their extent and effectiveness remain poorly known.” Thus, while other methods may be effective or may support the goals of P.A.s, most research is focused on populations within protected areas and may be underrepresented in the conservation literature. Bruner et al. (2001) found a correlation between a park’s ability to provide compensation for locals and overall park effectiveness, demonstrating the interconnectedness of local human and wildlife populations.

The human-dimensions of protected area development have received increasing scrutiny in recent decades, as reports of human rights violations and inadequate compensation have become documented and publicized (Colchester 2004). I will highlight a few of these key socioeconomic concerns through literature regarding what is known in political ecology as “conservation and control.”

*Conservation and control thesis of political ecology: pushing back against the bioeconomic* “*tragedy of the commons*” narrative

Garrett Hardin’s oft-quoted and oft-misused pastoral analogy from his 1968 analysis of the human “population problem,” has transformed the way conservation scientists talk about
human-environment interactions. In reaction to this, the conservation and control thesis of political ecology describes a body of scholarship that explicitly problematizes the so-called Western tradition of environmental conservation, which often demands the displacement of indigenous people and/or rural residents from their historic range for protected area development. This process is itself a product of the idealization of “wilderness” as devoid of human activity— in a neocolonial exercise of control over the region’s natural resources (Robbins 2012, Coffman 2007). Central to this thesis is the incompatibility between this socially constructed wilderness ideology and the geopolitical landscape upon which it is imposed in top-down, international conservation efforts. From a political-ecological perspective, the preservationist discourse, which calls for an ideological separation of humans and nature (Brulle 1996), is imposed on non-western landscapes that have in some cases been inhabited by people throughout our evolutionary history, and may be characterized by localized systems of production that can work well within the carrying capacity of that ecosystem. Human population growth further compounds these issues, as more people facing resource scarcity as a result of these interacting forces means more people who will have to rely on the surrounding ecosystem to balance their losses (Robbins 2012). Furthermore, it must be noted that the degree to which protected areas are responsible for the displacement of local people remains highly contested within the conservation literature (Berkes 2007, Linder 2016). In addition, Western (or even international) interests do not drive all conservation efforts, as localized conservation efforts have been documented across multiple regions (Linder 2016). With these distinctions in mind, I will present a brief survey of scientific literature that has critiqued the protected area paradigm on both social and ecological grounds.
Glen Martin’s *Game Changer*, Robin Reid’s *Savannas of Our Birth*, and Dan Brockington’s *Fortress Conservation: The Preservation of the Mkomazi Game Reserve, Tanzania* all address the ways in which the preservationist environmental discourse in particular have led wildlife management policies that increase human-wildlife conflict and local resistance to protected area development rather than mitigate it. In doing so, all authors add to the growing body of research in conservation and control and adds to the global conversation about finding more locally-sustainable protected area management strategies.

Glenn Martin’s *Game Changer: Animal Rights and the Fate of Africa’s Wildlife* (2012), focuses on the ways in which the animal rights movement—a discourse of wealthy “global north” nations resulting from centuries of artificial separation from the environment following the industrial revolution—has been used by government officials and power-players in the conservation world to call for stringent policies that treat local people as the only “problem” facing ecosystem health while ignoring the larger global market pressures that increase the demand for wildlife products. Martin argues regarding the CITES 1989 ban on ivory: “The 1989 ivory ban stands in opposition to history. Ivory has never been a commodity in Africa; it has always been, literally, a currency, one that has sometimes even exceeded gold as a store of value” (26). Here, Martin draws attention to the criminalization of the “poachers” despite the fact that the ivory trade—indeed, trade for wildlife products in general—is driven by urban centers in geographically distant regions: including and especially China. Martin’s book also focuses on protected area development and the ways in which marginalized ethnic groups were forced out of their homes in the creation of several (not all) African national parks, thus increasing the reliance of those groups on increasingly scarce resources. Martin’s critique of CITES is relevant to the discussion of protected area development through the critical framework of conservation and
control because the convention is closely linked to conservation, as well as animal welfare organizations: including the International Fund for Animal Welfare (IFAW) (Wijnstekers 2003), which as Martin explains imposes Western wilderness ideologies on animals that can have conflict with people who actually live in close proximity to them.

Similarly, Robin Reid’s *Savannas of our Birth: People, Wildlife, and Change in East Africa* addresses the problematic nature of hard-boundary conservation areas from both social and ecological standpoints. As she explains, humans and the East African Savanna ecosystem have coevolved with one another in a kind of “conflicting coexistence” such that the grasslands become overburdened by their own biomass in the absence of moderate human disturbance. Controlled fire-setting is one example she uses to demonstrate the importance of moderate levels of human activity in the savanna ecosystem (132), and cites a study by ecologist Jim Ellis, in which he estimates that the majority of the Acacia trees in south Turkana, which play a significant role in soil moisture retention and thus plant growth as well as serving as a habitat for arthropods and bats, originated in abandoned livestock corrals (139). As Reid argues in the section “When Parks Exclude People,” these “nutrient hotspots” created by abandoned livestock corrals and homesteads begin to fade with the advent of permanent and increasingly population-dense settlements (140). Thus, Reid’s critique of the national park systems in East Africa echoes the principles of the conservation and control thesis of political ecology, as she concludes that ecosystem resilience in the East African savanna is enhanced by moderate levels of human disturbance. This balance evolved over millions of years of selection pressures shaping both human and non-human existence in the region, and is disrupted by the removal of rural production systems for what Paul Robbins would call “tourist landscapes of consumption” (Robbins 2012) that, in spite of the money they bring in, do not enhance ecosystem productivity
and in fact may do more harm than good in some cases (Buckley and Pannell 1990). Studies have shown, for example, that the ecological costs associated with tourists’ travel, lodging, and waste removal constitute serious threats to ecosystem health, especially when there is a tradeoff between tourist activities and lower-impact rural activities (Buckley 2004, Ceballos-Lascurain 1996, Boo 1990, Mieczcowskie 1995, Simmons and Beckman 2004). In addition to the ecological costs of tourist activities, protected areas that exclude local people also force them into more densely-packed settlements, which may in turn cause increased wildlife conflict—especially when coupled with rapid population growth (Reid 2012, Robbins, 2012, Martin 2011). Reid’s analysis builds on the growing body of research that highlights the ecological and social problems associated with protected area development in low-income rural areas by demonstrating the ecological basis for more socially sustainable biodiversity management projects.

Similarly, Dan Brockington’s book, “Fortress Conservation: The Preservation of the Mkomazi Game Reserve, Tanzania” explores the ways in which protected area development has had negative impacts on rural populations in north-eastern Tanzania. As he explains, thousands of local residents and tens of thousands of livestock were evicted from the area following the decision in 1988 by Tanzania’s Department of Wildlife that asserted that the area was becoming “degraded” by pastoralists. The eviction campaign was supported by a number of well-known international organizations, including the George Adamson Wildlife Preservation Trust based in the U.K. and the Tony Fitzjohn/George Adamson Wildlife Preservation Trust in the U.S. Furthermore, these organizations had powerful connections in wealthy nations that allowed them to garner public support for the eviction, as well as the requisite funding to move thousands of people and their herds, with corporate support from Tiffany’s, Cartier, and British Petroleum (2).
Brockington’s analysis highlights the disproportionate influence of government and corporate interests over local ones, as well as the tenuous nature of ethics in the international conservation community. Corporate sponsorship by extractive industries, such as mining and petroleum, that have caused massive ecological disruption around the world but particularly in the African tropics illustrates the irony that the international conservation community is, despite its normative claims of ecological integrity, deeply entrenched in the capitalist regime of globalization and economies of scale—all with an abundance of negative externalities. Furthermore, Brockington points out that the concept of “degradation,” the raison d’etre of the entire operation, is itself problematic in that it contains Western-biased assumptions of how ecosystems work. The “degradation” of the grassland ecosystem by pastoralists is challenged by a growing number of ecologists (as discussed in Robin Reid’s analysis), including and especially Joseph Connell’s intermediate disturbance hypothesis. As Brockington explains: “the disturbance caused by grazing and burning does not necessarily cause damage; it is more likely to result in disturbances that foster biodiversity” (56). What both Brockington and Reid emphasize is that the received view of rangeland dynamics—as an “equilibrium model” that predicts a strong coupling between livestock and area productivity—is likely incorrect. More research supports a stochastic, non-equilibrium model of rangeland dynamics, which is “primarily dependent upon precipitation and the physical environment, not grazing, browsing, or trampling” (56). What is left out of Brockington’s analysis is a discussion of the role human population growth plays in influencing environmental outcomes around protected areas—a phenomenon which is itself influenced by a number of factors. The causes and consequences of rural population growth and its implications for biodiversity management will be discussed in chapter 3, but in the context of Brockington’s argument, I would argue that the mass eviction only compounded the issue by
displacing the residents, as a positive relationship between displacement and population growth has been documented in other regions (Heath and Binswanger 1996).

The critical framework of conservation and control highlights the problems of what Brockington refers to as “fortress conservation,” or the development of protected areas that exclude local residents from prioritized ecosystems and in doing so often accelerate damage to both livelihoods and the ecosystem health upon which they depend. The three books discussed above, by Martin, Reid, and Brockington, all reacted to these established patterns of exclusion by demonstrating the ways in which macro-level power struggles dating back to the colonial regime inform conservation outcomes in protected areas. In doing so, each highlights key issues in what Miller and colleagues (2011) have called the “New conservation debate” regarding approaches to biodiversity management. The debate focuses on two divergent approaches to biodiversity conservation as they have been portrayed in scholarly journals following the emergence of backlash against fortress conservation in the 1990s. Miller et al. distinguish between “nature protectionists,” who defend conservation policies that strictly limit human activity in protected areas, and “social conservationists” who advocate sustainable use and prioritize conservation-oriented development and goals relating to human wellbeing such as social justice and poverty alleviation (Miller et al 2011).

The key differences between the two camps, the authors contend, lie in the normative claims of “nature first” versus “people first” ethical positions, not in the empirical findings of case studies that have revealed the strengths and shortcomings of both protected areas and integrated conservation and development projects (ICDPs). In other words, projects borne out of both theoretical perspectives have succeeded and failed in various contexts, but the normative discourses surrounding the different positions are so highly charged that proponents of each side
in the debate focus only on those case studies that demonstrate the pressing need for either more 
or less severe restrictions of human activity in prioritized ecosystems. As the authors explain, 
this has led to the so-called “nature preservationists” and “social conservationists” appearing to 
be completely opposed to one another, though arguably the maintenance of biological diversity 
via the protection of natural selection forces (Primack 1995) as well as the maintenance of 
human life, made possible by these same forces, lies at the heart of both approaches. 

If we understand human beings within the socioecological context for which Robin Reid 
calls—as a species that has evolved over millions of years alongside and indeed in concert with 
other species and that are subject to the laws of ecological carrying capacity—we arguably 
cannot presume that the biological diversity of non-human species and physical landscapes is not 
ultimately critical to our survival as well. The problem, then, lies in the differential treatment of 
“humans” as being the biggest threat to biodiversity conservation. As conservation and control 
scholars point out, and as anyone who visits national parks in the African tropics can see, not all 
humans are restricted from prioritized ecosystems in protected areas, only some of the most 
economically disenfranchised and historically marginalized local ones. Just about everyone else 
can come in, walk around or ride through in large vehicles, take pictures, and stay in nearby 
lodges with gas stoves and running water. This is not to say that illegal grazing, collecting, and 
poaching are not perennial problems in and around protected areas. Indeed, the conservation and 
control framework places these phenomena front and center, just as Miller and colleagues’ 
garden-variety “nature-protectionists” would. Rather than pointing to local people and their 
small-scale production systems as the ultimate source of ecological degradation, however, the 
political ecological approach to protected area conflict points to human social structure and 
historical patterns of inequality to understand the flow of natural resources across space.
Glen Martin’s example of the ivory trade illustrates the conservation and control framework and its applicability to the resolution of the “new conservation debate” because it deliberately widens the scope of the analysis from the immediate present of local “poachers” to include the larger picture of Chinese development projects and the concurrent commodification of animal products on a scale previously unknown to the region. Not all commercialization of natural resources results directly from global market influence, however. For example, the large quantities of animals being removed from the Gulf of Guinea Forest in Cameroon are either consumed by local hunters and their families directly or are being sold in localized markets as bushmeat (Fa et al. 2005). In such cases, local behaviors that had historically been relatively sustainable became effectively commercialized with the advent of urban centers, rural poverty, and improved hunting technology that allowed people to harvest large numbers of animals with little expertise—and the driving force behind this is human population growth (Linder 2016).

Even when population growth is largely to blame for the tensions between conservation and local populations, it is still the case that negative social and economic outcomes are unequally distributed among communities. It tends to be the poorest and most politically marginalized groups that are asked to pay the costs of conservation, regardless of their relative contribution to the problem. Carolyn Jost-Robinson’s studies of human health among BaAka hunter-gatherers in Dzanga Sangha Protected Areas (APDS) in the Central African Republic revealed that groups living in closer proximity to protected areas were more nutrient deficient relative to groups living in areas further away from the protected area—and adult women were disproportionately impacted within these groups (Remis and Jost-Robinson 2014, Jost-Robinson 2016).

Yet another layer of conflict is added when large-scale agricultural operations and extractive industries (such as logging and mining) seek to lay claim to areas that conservation
groups are attempting to delineate as protected areas, or when these industries develop in proximity to P.A.s, squeezing local populations out to an even greater extent. These industries are often able to offer higher rates of immediate compensation, even though the short-term economic gains may come in some cases at the expense of long-term ecosystem resilience (Balanchandran et al. 2013, Phalan et al. 2013, Shoneveld 2013). In other words, much of the conservation and development literature indicates that people in low-income areas are more likely to support an agricultural or extractive industry concession because of the immediate payoffs, while the long-term benefits that healthy ecosystems provide for rural livelihoods are less visible in the immediate present. These literatures often do not capture the full complexity of local responses to conservation and development issues, however, which could lead to scientific reports being misleading in some cases. As I will demonstrate in chapter 3, through the area case study of Longido District, there can be a high degree of discord among local voices regarding land use and livelihood, making clear-cut categorizations of local motivations to support or oppose protected area development unrealistic and insufficient. (Brechin et al. 2002, Persha et al. 2011, Coffman 2004)

_Ecosystem Services as a “sales pitch” for protected-area development in low-income regions_

The notion of “ecosystem services,” the livelihood and or food/water security benefits an unconverted ecosystem can provide to people living in close proximity to the area in question, has a long history of politically charged usage and application to conservation issues (Kull et. al 2015). A political ecological approach to the ecosystem services concept highlights the historically situated and power-laden contingencies of “ecosystem services” as such. The authors explain the ways in which the environmental narratives or “discourses” that factor into the creation of the term ecosystem designates an integrated non-human nature that constitutes what
Wolfgang Sachs would call a “supra-individual reality,” which all together provides “services” necessary to human survival and prosperity (Sachs 1992). Kull et al. argue that the conservation community uses this loaded term as a rhetorical strategy, in some cases at the expense of local people. I would argue that this is more often not the case, especially if we privilege long-term ecosystem resilience over Net Present Value (the economic system of valuation for land areas which attempts to convert the landscape into monetary units of exchange value) (Ross 1995).

The functional ecological basis of ecosystem services—especially as it applies to food and water security—has been well documented (Daily 1997, de Groot et. al 2002, Duralappah 2005, Balvanera et. al 2006, Boyd and Banzhaf 2007). The concerns Kull and colleagues express remain valid, however: we must pay attention to the power-laden discourses packed into “ecosystem services,” and problematize its indiscriminate usage insofar as it is a tool used by powerful fortress conservation institutions that draws on ecocentric and conservationist discourses (Brulle 1996) to rationalize preservationist policies that call for the eviction of local residents. That being said, there are many examples of protected areas that have not called for the eviction of local residents (Colchester 2004) Thus, while the ecosystem services concept may be in need of revision, it cannot be thrown out entirely—as it is (in spite of being embedded in power struggles between the conservation community and local people) one of the few frameworks that attempts to quantify the benefits of unconverted land to local residents.

*Protected areas: a paradigm in transition*

When thoroughly contextualized within the political situation of the area in question, an ecosystem services framework can help local people make informed decisions when presented with the competing interests of powerful industrial development and conservation entities. In sum, the protected area system has led to significant positive outcomes for biodiversity.
conservation, but has increased resource conflict among many local populations as population densities increase and commercial economies inject themselves into the landscape. As human populations continue to expand, the already-tenuous balance between the wellbeing of rural residents and biodiversity management will become increasingly strained. Thus, the P.A. system needs serious reform if it is going to meet these demands and continue to protect biodiversity. Revenue sharing must happen more often and must be distributed more equitably. More locals need to be included in conservation projects and capacity-building must become a priority. Finally, and perhaps most importantly, the scope of threats to biodiversity must be broadened to account for distant land uses and structural imbalances in the economic system, not just local residents. It is an exercise in creative fiction to discuss threats to biodiversity without talking about urban markets, primary sector export economies, top-down transnational development projects, and, especially, population growth. To local human populations facing severe resource scarcities, the concept of biodiversity conservation often appears less attractive than the immediate benefits of industry under conditions of severe economic insecurity.
Chapter 3: Conservation, Agricultural Development, and Rural Livelihoods in Longido, Tanzania

INTRODUCTION

Fidelis Ole Kashe, a Maasai from northern Tanzania and manager of Manyara Ranch Conservancy, stated: “When you are talking about livestock to the Maasai, you are talking about everything” (Ole Kashe, personal comm.). Encapsulated in this statement is the idea which has been receiving increased attention in the critical development and conservation literatures of East Africa: that the pastoral production system itself is the unifying feature of Maasai populations, even as they come to embrace different lifestyles in response to the pressures of globalization. In spite of the strong identity-building capacity of pastoralism, which has been practiced in the landscapes of East Africa for hundreds of years (Reid 2012), this mode of production is experiencing increased pressure as a result of the appropriation of land for both industrial development and conservation purposes, as well as the rapid growth of rural populations, including the Maasai and their neighbors. This has led to negative outcomes for both rural Maasai and the ecosystems in which they play a vital role. Tanzania has a rural population growth rate of 2.14%, having increased steadily since 2007 (World Bank 2015) which means that the number of people living outside of urban centers is expected to increase rapidly in upcoming years. This will inevitably put more pressure on the already severe livelihood instability of rural populations, especially when compounded by regional and global climate change (Tumbo 2015).

I draw on perspectives from wildlife management officials and community leaders and local residents from the region to contextualize local responses to conservation and development issues in northern Tanzania. To situate Longido within the larger story of changing land uses and
their implications for rural livelihoods in northern Tanzania, I begin with a cursory analysis of the shifting socioecological relationships among the Maasai of northern Tanzania as it is presented in the conservation research literature and by field experts in wildlife management from Manyara Ranch multi-use wildlife management area, and EcoScience Science Center near Tarangire National Park. I assess local perspectives of land use and livelihood in Longido based on ethnographic data collected in the summer of 2015. Finally, I explore the ways in which these local responses add to and complicate the story of ecological and social change in East Africa, which has been designated as a target of the expanding palm oil industrial complex, and simultaneously as a region in need of increased conservation efforts. I argue that local perspectives on conservation and development in Longido are vying with powerful national and international interests in the face of massive land conversions, in nuanced and perhaps unexpected ways.

**Literature Review:** “Conflicting Coexistence?” Analyzing shifting socioecological relationships among Maasai of northern Tanzania.

Robin Reid explains in *Savannas of Our Birth* that pastoralism “makes sense” in the context of the semi-arid grassland landscapes of East Africa, the “give and take” patterns of which she describes as “conflicting coexistence” (Reid 2012). Following the Bantu expansion from West Africa, agriculturalists increasingly adopted the practices of their pastoral neighbors, with whom they began to intermingle as the Nilotic population from the area around what is now called South Sudan after the Neolithic Revolution (49). This transition to the pastoral subsistence economy, Reid argues, was no accident. Because the East African savanna ecosystems are characterized by a bimodal rainfall pattern, with one long and one short rainy season as opposed to one long rainy season and dry season characteristic of West Africa, cattle provide a more
energy-efficient way to obtain nutrients, as the bimodality of rainfall allows cattle to produce milk for longer periods of time. Crop cultivation, conversely, is better suited to areas with unimodal rainfall patterns, and thus becomes increasingly energy-intensive and unreliable in semi-arid ecosystems (49).

The ecological viability of pastoralism is further enhanced by the moral economies that have developed around it, integrating Maasai culture with the ebbs and flows of the East African savanna. As both Robin Reid and Maasai elder Alais Ole Morindat argue, Maasai pastoralism was historically characterized by a high degree of mobility, as well as complex relationships of reciprocity between families and larger populations, a system that as Katherine Homewood demonstrates in Staying Maasai is still in place today in spite of the myriad challenges it faces due to globalization (Homewood et al 2009). Geographically distant yet socially interconnected groups of Maasai communities allow for rotational grazing of livestock herds, promoting resilience to the environmental uncertainties that go along with living in a semi-arid ecosystem (Reid 2012, Morindat 2015).

Given the evidence supporting the ecological viability of the pastoral mode of production, to what forces do we attribute the increasing and much-publicized conflicts between Maasai communities and wild faunal species, the decreasing populations thereof, and the socioeconomic impoverishment of the people themselves? As Ole Morindat explained, there are two potential explanations: 1) pastoralism is a fundamentally flawed production system that must be replaced, or 2) pastoralism is an ecologically viable and resilient way of interacting with the environment, meaning that there are larger global forces contributing to the decline of wildlife and Maasai prosperity. From a political ecological perspective, the first explanation is unsatisfactory because of its apolitical nature: it does not account for the ways in which the
global economic system has produced structural imbalances of power that inform patterns of resource extraction and allocation (Robbins 2012). More specifically, apolitical critiques of pastoralism commonly employ the bioeconomic or “tragedy of the commons” narrative discussed in chapter 2. This way of framing environmental issues places blame on local people for environmental exploitation, when in fact the ecological changes are being driven by powerful interest groups pushing historically marginalized groups, which are often formed along “racialized” ethnic lines, into increasingly peripheral ecological spaces: a process known in the political ecology literature as degradation and marginalization (Robbins 2012).

Ole Morindat describes the East African savanna as a “disequilibrium” environment that is characterized by being drought-prone, and he explains the ways in which pastoralists have “developed complex strategies to mitigate the effects of environmental uncertainties,” including a social “safety net” of reciprocity through age-sets and patrilineal kinship, as well as highly mobile residential patterns—moving to a new location every few years (Ole Morindat 2015, Coffman 2015, Homewood et. al 2004). This kinship system, in which males pay bridewealth in the form of cattle, binding two families together through the exchange of reproducible wealth, combined with the ability to move around, maintain what Robin Reid calls an “enrichment response” with the grasslands on which the cattle graze (139) form the moral economy that has allowed Maasai pastoralists to thrive in East Africa. This system has become disrupted, however, since its articulation with the global economy via the international development schemes beginning in the 1950’s and, later, the gazetting of conservation areas and the rise of the tourism industry (Edwards 2014, Ole Morindot 2015, Homewood 2009).

Economist Sebastian Edwards, as well as Alais Ole Morindat, point to the emphasis on industrial agriculture by the Bretton-Woods institutions as a leading cause of resources scarcities
among rural populations, a trend that has been quantified by Homewood et al. in *Staying Maasai*. The Tarangire and Longido “Family Portraits” sections demonstrate the increased reliance on agriculture and other industries to diversify household incomes, largely as a result of the erosion of the social and ecological “safety nets” residential mobility historically provided pastoralists (Homewood et. al 2009). As Robin Reid explains, agriculture can have a number of negative impacts on the semi-arid ecosystem, including increasing human-wildlife conflict (66): a reality critical in the discussion of human-environment interactions in East Africa.

In Longido, attempts to unify conservation and “community” have been weak and largely unsuccessful. To demonstrate perennial issues with so-called “community-based” conservation among Maasai in northern Tanzania, I will turn briefly to Manyara Ranch to situate the later discussion of community based conservation (or the lack thereof) within the region-wide struggle for union between conservation and community development.

Manyara Ranch is described as a sustainable-use conservation area located to the southeast of Longido District and occupies 17, 807 hectares of land (Wallert 2015). Formerly a state-run cattle ranch, the area was privatized in the 1990s when the Tanzania Land Conservation Trust obtained a 99-year lease via USAID from the Tanzanian government. The local Maasai were not informed of this until 2002. In 2003, a grazing plan was proposed, which provoked conflict because some said it was “too liberal” in allowing cattle to graze in the wildlife corridor. According to management, retaliatory wildlife killing soon escalated and human populations surrounding the corridor continued to expand. They are now considering placing further restrictions on the amount of cattle allowed inside, though they claim that even now herders are bringing their cattle in illegally at night (Ole Kashe, personal comm.). The case of Manyara Ranch thus demonstrates the ways in which conservation management professionals from abroad
and from Tanzania deploy taken-for-granted notions of “community” for increasingly preservationist policies, and in doing so become only nominally “community based.”

Jennifer Coffman’s “Buying (into) and selling conservation among Maasai in southern Kenya” (2009) discusses the ways in which colonial/neocolonial development initiatives have led to the creation of “unnatural collectives” in the form of group ranches, which are predicated on the (inaccurate) image of a distinct, unified Maasai community. The composition of such groups is heterogeneous and membership is often not defined in a way that is meaningful to Maasai kinship structure, to the detriment of family groups. A similar pattern is at work in Manyara Ranch, as one Trust member represents the entire “community” of local Maasai.

At the same time, Coffman argues, regional and national development initiatives often promote individuated land titles, effectively “sub-dividing communal localities into private parcels of land” (168). This has led to an increased disparity between members, a process which disrupts the moral economy by making some people increase their individual wealth at the expense of their less fortunate neighbors who defaulted on their loans, a process which one female participant claims is currently underway in Longido.

Conservation and development in Longido District

Longido District is a semi-arid rangeland in the Arusha region of northern Tanzania predominantly inhabited by Maasai pastoralists, many of whom were moved into the area during the Nyerere administration via Ujamaa, or the villagization movement that established rural locales as agricultural centers to supply the Tanzanian state (Homewood et. al 2009, Edwards 2014). To date, there is no evidence that any agricultural production of large scale ever took place in Longido, likely because it has become increasingly dry and unable to support such
water-demanding activities. The area relies on rainwater runoff from the nearby Mount Longido as their primary water source of freshwater, and many families must walk several miles to reach fresh water outlets.

Mount Longido is designated as a Forest Reserve, through which there have been relatively weak initiatives to distribute the meager ecotourism revenue to the community. The Enduimet Wildlife Management Area (WMA), an important wildlife corridor for the Kilimanjaro-Amboseli ecosystem, the goal of which is to increase connectivity between Mkomazi, Arusha, and Kilimanjaro National Parks, borders the district on the east. The area hosts a number of threatened taxa, including elephants, buffalo, giraffe, leopard, oryx, lesser kudu, eland, gerenuk, klipspringer, hartebeest, bushbuck, wildebeest, hyena, thomson and grants gazelle (Enduimet 2012). Arusha National Park lies 80km to the south, Kilimanjaro National Park to the east of the WMA. Serengeti National Park, Ngorongoro Conservation Area, Lake Manyara National Park, and Tarangire National Park are situated to the southwest of Longido District, all of which form the southern part of the continuous Maasai Steppe/Savanna ecosystem between northern Tanzania and southern Kenya (Fig.1, Fig. 2). In addition to being surrounded by ongoing conservation efforts in the form of protected areas, Longido District is located near plantation operations in Arusha, including sisal, coffee, cane sugar, and cotton (Edwards 2014, Kimaro et al. 1994) and, more recently, maize and rice (Maghimbi 2007), many of which have increased in both intensity and scale following the Nyerere administration (Kishimba et. al 2004, Sabea 2001).
Fig. 1

Map by the Honeyguide Foundation

Fig. 2

Map by Orio Wildlife Safaris
Longido pastoralists have begun to diversify their income strategies in recent decades, as rural poverty, population growth, gender relations, and persistent issues of land tenure and security interact to produce severe livelihood instability for many Longido Maasai, the causes and consequences of which was the focus in the ethnographic portion of this research.

METHODS

As a student of the East Africa Field School of James Madison University, I completed a 6-week field study followed by a four-week internship, supervised by Dr. Jennifer Coffman. The six-week core program, which covered multiple locations in northern and eastern Tanzania, included Kiswahili language training, coursework regarding the historical context of human-environment interactions in Tanzania, hands-on training in ethnographic research methods, and a “homestay” during which I had the opportunity to live with a family in Longido. After completing the core program, I returned to Longido for the four-week internship, conducting ethnographic research under Dr. Coffman’s supervision. I collected data using open-ended, semi-structured interviews and a role-playing, interactive game called ERAMAT© followed by focus group discussions, each designed to gauge decisions and challenges of Maasai pastoralists and their perspectives on industrial agriculture and conservation activity in the area.

The protocol for this research was approved by Institutional Review Board of James Madison University (approval no.15-0354) and strictly conforms to the guidelines of FPIC and participant confidentiality. All names of people and organizations from Longido that appear in this document are pseudonyms, chosen to ensure that both the subjects and third-party members are non-identifiable.
ERAMAT game play and focus-group discussions:

ERAMAT is a “culturally-anchored” board game developed by Jacob Mayani along with Drs. Jennifer Coffman and Mike Deaton at James Madison University in 2011 (Mayani et. al 2012). Mayani, who grew up in Southern Kenya, had experienced the struggles related to drought cycles in the semi-arid rangelands, and his desire to simulate their ecological dynamics and provide an entertaining way for pastoralists to talk about them provided the impetus for the game design. The purpose of the game is to integrate Maasai culture, life events, and the ecology of the East African rangelands, including rainfall patterns and the interaction of non-domesticated faunal species, into an entertaining multiplayer game. The integrated nature of the game allows participants to discuss “high-risk issues in a low-risk setting.” (Coffman 2015), generating conversations regarding a diverse range of issues that influence human-environment interactions in East Africa—from population growth and climate change to kinship structures and gender roles. The game was first piloted in 2012 in Kenya in Lenkisem and Melepo, and has subsequently been played by Maasai in different locales throughout southern Kenya and Northern Tanzania, as well as by student and non-student groups in the U.S.

The full history and design of the game is detailed at length in Mayani et al. 2012, as well as a forthcoming paper by Mayani, Drs. Coffman and Deaton, and other members of the ERAMAT team. In short, each player assumes the role of the head of a Maasai household, and they begin by rolling the dice to determine the gender of their children and then spinning an arrow for a “life event.” These “life events” at the beginning of each dry season represent events that can impact their cattle and currency holdings, such as livestock predation events, wildlife mass migrations, and the birth of children. Each player has an initial herd of cattle and currency holding of equal size, and the overall community herd size is set to be slightly below the carrying
capacity of the ecosystem and divided equally among the players. Water, which acts a proxy for grass and forage availability, is represented by surface and groundwater stocks on the communal board, which are replenished by rain that is determined by rolling the dice during the rainy seasons, and is depleted by foraging cattle. Throughout the game, players have the option to purchase “actions” which represent avenues of livelihood diversification such as owning a shop, working in a safari camp, sending a child to a university, and more. Players advance in the game by earning respect, or “enkanyit” points. Players earn respect for successfully providing for their families, meeting social obligations, and giving gifts and lending cattle and currency to other players. At the end of the game, the number of cattle in each player’s herd is tallied and added to the number of respect points each player has accumulated throughout the game. The Enkanyit point system is an element critical to the game’s function because it models the centrality of social alliances and reciprocity in Maasai culture (Mayani et al. 2012, Mayani et al. forthcoming).

The 2015 ERAMAT research team included Dr. Jennifer Coffman, Dr. Mike Deaton, Martin Mayani, myself, and Hunter Hart, all faculty and students from James Madison University, and Duncan Lanoi, a long-time EAFS program assistant and translator from Kenya. We facilitated ERAMAT game sessions in Maasai homesteads in Longido and held group discussions following game play. This combination of game play and focus-group discussions is a form of qualitative data collection that offers unique opportunities to observe participants’ responses to real-life situations that encompass livelihood, environment, and culture (Coffman 2015). We conducted 11 game sessions and discussions at 9 different homesteads between July 3rd and July 23rd 2015, each lasting upwards of 3-4 hours. Each game had between 5 and 6 players, with additional participants observing the game and participating in the discussion.
A typical ERAMAT session would begin with the research team bringing some combination of sugar, tea, rice, maize flour, beans, cooking fat, and salt to give to the host family/group with whom we were conducting the session. As is customary in guest/host relations in Maasailand, these foodstuffs would later be distributed to the larger/extended family at mealtimes (Coffman 2015). The Maasai “bomas,” or homesteads, were selected to participate through snowball sampling via the female heads of household who had previously hosted EAFS students during the six-week core program, as well as through individuals with whom members of the research team had become acquainted during our time in Longido. This sampling method was ideal for the kinds of questions we would ask during the interview sessions regarding the life histories and experiences of “being Maasai” in Longido as well as with the interactive nature of the game. The researchers were able to interact with the participants following positive relationships the families had previously formed with the students, allowing the participants to feel comfortable interacting with the researchers. The researchers would also bring their homestay “children” (the EAFS students who stayed in that particular boma for their homestay), which always pleased both hosts and students. We would drink tea and visit with the family prior to commencing the game and while waiting for participants from neighboring bomas to arrive.

All games began with Maasai translators, Martin Mayani and Duncan Lanoi, explaining the consent process and asking them for permission to record non-private, non-identifiable information. Upon completion of the consent process, the translators would explain the game to the participants, and they would begin playing. Games were either mixed gender or women-only groups of mixed age, from 19 years old through late 60s. Observing each game, I recorded the number of cattle, children, and currency units for each of the 5-6 players at the end of each of the 4 seasons, keeping track of action purchases, marriage alliances, and major events such as
wildlife predation and mass migration. I transferred the game results and ad libitum notes into electronic spreadsheets (Table 1) upon returning to the U.S. Depending on the time constraints of the participants, we would try to get through at least four seasons, to see how the players responded to seasonal changes in climate and how they influenced resource abundance and scarcities. After the game, we asked the participants to talk about their experiences playing the game, including how they felt about the action card options and inclusion of stochastic ecological variables, such as surface/groundwater supply, rainfall, and wildlife interactions. These discussions themselves often lasted for over an hour, as the game opened up avenues of conversation regarding land use, livelihood diversification, and family life. For this reason, we learned after a couple sessions that it was advantageous to have an ERAMAT session with a family prior to the interview session with the female heads of household, as the fictional world of the game afforded them opportunities to experiment with family structure and livelihood options in ways that provided a good segue into talking about their real lives within an ecological context. We found that when interviews followed ERAMAT sessions, participants were more likely to explicitly link their life experiences to the contours of their surrounding environment and elaborate on the feedback between land and livelihood. Thus, ERAMAT game play/group discussions and the household interviews are mutually informative qualitative data collection techniques that, used in conjunction with one another, can engage participants in deeper discussions of the cultural and ecological system under investigation—that of Longido Maasai of northern Tanzania.
Table 1: Sample ERMAT Spreadsheet

<table>
<thead>
<tr>
<th>Season</th>
<th>Player 1</th>
<th>Player 2</th>
<th>Player 3</th>
<th>Player 4</th>
<th>Player 5</th>
<th>Player 6</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td><em>closer to 19 groundwater</em></td>
</tr>
<tr>
<td>Herd Size</td>
<td>18</td>
<td>12</td>
<td>5</td>
<td>3</td>
<td>12</td>
<td>2</td>
<td><em>F12 marriage alliance with PISU1</em></td>
</tr>
<tr>
<td>Money</td>
<td>18</td>
<td>14</td>
<td>17</td>
<td>6</td>
<td>24</td>
<td>6</td>
<td><em>Manu Thomas purchased Hand buff action card</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Season 2</th>
<th>Player 1</th>
<th>Player 2</th>
<th>Player 3</th>
<th>Player 4</th>
<th>Player 5</th>
<th>Player 6</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td><em>Broke the bonfire; they were amused by this and jokingly complained about pairing for it</em></td>
</tr>
<tr>
<td>Herd Size</td>
<td>15</td>
<td>13</td>
<td>9</td>
<td>4</td>
<td>12</td>
<td>2</td>
<td><em>he bought family planning but then wanted to put it back once marine explained what it was</em></td>
</tr>
<tr>
<td>Money</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td><em>can prediction; Maria Thomas stated “It is time to move to a new boma because the other members of the pride will return unless you all the same one” (Toss: By Duncan)</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Season 3</th>
<th>Player 1</th>
<th>Player 2</th>
<th>Player 3</th>
<th>Player 4</th>
<th>Player 5</th>
<th>Player 6</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td><em>One of the men in the P1 partnership got up and left; stating the game was “childish” but his partner stayed for the end discussion</em></td>
</tr>
<tr>
<td>Herd Size</td>
<td>6</td>
<td>8</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td><em>All players about to go into debt</em></td>
</tr>
</tbody>
</table>
| Money | 4 | 0 | 1 | 5 | 5 | 4 | *P5 attempting to bargain for uninvited card; ends up purchasing; stated to stress the importance of cattle to the Maasai that “If you don’t have cattle, you don’t even have a bed!” would be*

Household Interviews/Demographic data collection

We conducted 7 semi-structured, open-ended household interviews with 6 different Maasai women between July 3rd and July 23rd, 2015. All interviews were conducted in the Maasai language, translated by Kenyan Maasai program assistants Martin Mayani and Duncan Lanoii. Demographic data were also collected during these interviews.

By talking to participants and asking them questions about their life experiences, we were often able to generate discussions about how the socioecological landscape in which the participants live has changed over time and what they understand to be the drivers and consequences of those changes. The sequence varied depending on the participants’ time and interests. It was common for interviews to take two to three hours, as they were conversational, informal, and purposely guided by the interests of the participants. It is for this reason that our
participant pool was much smaller than we anticipated; we were simply not able to fit in more interviews during the four-week study period, as ERAMAT sessions and discussions took upwards of 3-4 hours.

Like the ERAMAT sessions, interviews were generally scheduled in morning and afternoon blocks, though sessions often exceeded the amount of time allotted because of the importance of keeping to the pace of the participants, who always had a great deal to talk about that they felt was important to our understanding of what it was like to live in Longido as members of extensive families as well as the larger pastoral community. Unlike the ERAMAT sessions, which were often mixed-gender groups, the participants of the household interviewed were all women. This was the case for several reasons. Logistically, interviews took place during the morning and afternoon hours, when men are typically out with their herds. We were also particularly interested in female perspectives on what it means to be Maasai in Longido District, as much of what we had heard in the previous six weeks of the program about pastoralism came from either male Maasai (e.g. Alias Ole Morindot, Fidelis Ole Kashe, Maasai guards at Ecoscience) or from wildlife and resource management professionals (e.g. Bernard Kissui, Helene Wallaert, Madaka Tumbo). Finally, it was important that the female participants felt comfortable sharing information about their lives with us, which was often deeply personal, which we did not want to be influenced by the presence of male members of the household. Gender relations in in the Longido community are such that the presence of male relatives/community members would likely influence female participants’ responses to questions regarding livelihood and life history.

The interview procedure was similar to that of the ERAMAT sessions, except instead of playing the game after the consent procedure, we would begin asking them questions about their
lives to generate discussion regarding what they think it means to be a Longido Maasai. As the interview participants were all female mothers, we usually began by asking them how it was that they came to live in that particular boma. This question usually led to lengthy and detailed responses, which provide insights into the complex patrilineal kinship structure of Maasai culture, as well as the ways in which these kinship structures empower and limit the women’s livelihood options and familial relationships.

RESULTS AND DISCUSSION

Responses gathered through the qualitative data collection techniques of both ERAMAT and household interviews revolved around three major themes” gender, conservation, and agriculture/urban development. I argue that together, these three broad factors interact to influence local perceptions of livelihood and land use in Longido, and that an investigation of these local responses yields insight into the emerging patterns of livelihood diversification and land conversion in northern Tanzania.

*Gender conflict, kinship systems, and the “population problem:” influences on rural livelihoods in Longido District:

The opening interview question, regarding how the woman of the household came to live in that particular boma, generated responses that highlight the role of kinship and gender roles in shaping the lives of pastoralists in Longido District. For example, many of the women with whom we spoke reported having alcoholic husbands who physically abused them. Some of these women spoke of seeking divorce, but the bridewealth system has made it difficult for them to separate themselves from the complex web of relationships solidified through the exchange of reproducible wealth in the form of cattle. Thus, the life-history questions are a way to both
engage in meaningful conversation with the participants and gain a better understanding of the cultural system that is in constant interaction with the Maasai Steppe ecosystem. These discussions were often reached through the life-history questions as the controversial topics of land rights and notions of “ownership” often arise as the women discuss the challenges they have faced in their respective lives.

The district government, for example, can seize commercial plots granted by the office of the Longido District Commissioner, if the land is not “developed” within two years. One woman stated that one of her primary motives for partly building a house made of brick and cement was to protect her property from being “grabbed.” A number of the women we interviewed conveyed this same sentiment, thus allowing us to discern an institutional bias towards a particular kind of “development,” one that privileges impervious surfaces and built environments over the more temporary, organic structures of traditional Maasai bomas in the land tenure system of Longido District. This bias in favor of built infrastructure demonstrates what Jennifer Coffman calls “concretized discourse,” through which ideologies are made “tangible” by being set down in writing, including and especially legal documents (government policies, contracts, and legal land surveys). These concretized discourses formalize latent narratives of “ownership”, land use, and prescriptions for human-environment interactions (Coffman 2009)—a process our participants are currently experiencing in the transition from informal agreements to individuated land titles in Longido District.

This bias for regulated, documented ownserships is not limited to the prioritization of impervious materials and physical structures: it is by extension biased in favor of increased sedentarization and decreased mobility, which in turn contributes to the degradation and marginalization of the Longido Maasai and the surrounding ecosystem. As we recall from Robin
Reid’s analysis in *Savannas of Our Birth*, the mobility and seasonal grazing patterns of traditional pastoralism “makes sense” within the context of the semiarid grassland ecosystems of East Africa, and thus increased sedentarization challenges ecosystemic and social resilience. This system of land tenure, which privileges *permanent* structures, thus contributes to the increasing restrictions placed on pastoralists, who have traditionally utilized relatively continuous rangelands that are now “owned”—in other words, controlled—by powerful interest groups, including the government and local elites (Robbins 2012). The interviews conducted in 2015 are thus critical to my political-ecological analyses because they reveal many of the mechanisms of land appropriation and control, as well as the unintended consequences, or emergent properties, that result when the legal and cultural systems “lash-up” with regional changes in climate, producing scarcities which in turn can lead to a number of significant cultural changes, including and especially income diversification and, potentially, alcoholism and increasing gender conflict. Alcoholism among Longido men is linked to both the increased availability of cheap liquor, replacing lower-alcohol content home brew, and the simultaneous influx of “women’s development” projects from outside development groups. In other words, it was women that became the focus of income diversification and education initiatives in Longido, while males were “left behind” (ERAMAT 7.6.16). At the same time, the increasing severity of the drought cycles made maintaining livestock herds ever more challenging, especially in cases where chronic alcoholism was a factor. Thus, the aggregate interview responses of local female heads of household allow us to see the manifold connections between gender relations, land tenure systems, and environmental interactions.

The scarcities resulting from land ownership and appropriation for commercial purposes discussed above has had varying impacts on the livelihood options available to the Longido
Maasai. For example, several of the women interviewed spoke of the opportunities for income that was made possible by the existence of commercial plots. One woman has her own shop in Longido Town, from which she has been able to make enough money to build another house for her and her children. Another woman is in the process of building a shop adjacent to her family property, through which she hopes to generate revenue by selling her beadwork and small goods for daily use close to home, without having to travel to the market. The system also has its disadvantages, however, as several women reported investing money into projects that were later taken over by more powerful individuals without compensation.

Also manifest in the privatization of land, as stated previously, is the problem of increasing land and resource scarcity resulting from reduced mobility, which is compounded by human population growth. During both ERAMAT discussions and interview sessions, several participants voiced their concerns regarding how they were to distribute their land to their children, as they face more land restrictions than their parents and grandparents experienced. As one elder Maasai woman explained, her grandparents “cleared the land” on which their homestead was established, and that was how they (the family) “knew it was theirs.” This changed with the advent of the contemporary land tenure system, however, as land is subject to seizure by the district government if certain “development requirements” are not met, as discussed earlier. Participants had mixed responses when asked whether the land tenure system is gender biased; some female participants claimed that their land was “grabbed” by district officials and local elites, who were predominantly male, while others claimed that they had become “empowered” by the land tenure system because it enabled them to formalize property agreements independently of their husbands if they had the resources to do so. These mixed responses potentially suggest the emergence of institutionalized income stratification between
Maasai families, reinforced and reproduced in the legal system of land ownership. The educational opportunities available (or not available) to these women also had an influence, as women who left Longido to attend secondary school tended to have more employment opportunities. This apparent income stratification and resulting imbalances in livelihood options (for livestock holdings, which to this day form what Julian Steward would call the “core” of Maasai culture, require more land in order to be housed with proper protection from predators, as well as ample pasture area) (Steward 1955, Coffman 2015) require further investigation in order to fully explore the implications it has for human-environment interactions in the region.

“Community-based” conservation in Longido: problems, more problems, and local responses

The mission statement of the Enduimet WMA proposes a union between biodiversity conservation and community development: “To provide a platform for sustainable protection and utilization of resources within Enduimet for income generation through eco-friendly tourism activities that shall address health, water, education, livestock, infrastructure and wealth creation for future generations” (Enduimet 2012). Household interviews with Maasai families and ERAMAT focus group discussions revealed divergent perceptions of community-based conservation from these stated goals. Generally speaking, participants claimed to have received few, if any, benefits from any conservation ventures in the area. Members of several households mentioned one organization in particular, EcoCulture Longido, as an example of “conservation not living up to expectations” (Int. 7.20.2).

EcoCulture Longido is the only “community-based” conservation initiative our participants mentioned, and they were not impressed with it. According to EcoCulture’s brochure, they offer nature hikes and “wild animal sightseeing” the proceeds of which are to go towards scholarships and help “provide education for the children of Longido.” One participant
knew of one child in another family who was granted a small scholarship from the organization (Int. 7-20.1) but that aside from that the organization’s community outreach was “weak.” A Canadian-run organization, Project Twiga, was thought by several participants to be “doing a better job” than EcoCulture Longido because they built the community library (Int. 7.9.1). More research needs to be conducted looking into these organizations, as little is known about how they operate and who is in charge of them.

Local perceptions of commercial agriculture and urban development: advantage or catalyst of marginalization?

While several of the participants reported cultivating small subsistence-level crops, the nearest large-scale farming operations lay about an hour and a half by car to the northeast, near Arusha and Kilimanjaro and are thus outside the range of most participants’ daily lives. Because of this, the Longido Maasai we interviewed seemed to know almost nothing about industrial/plantation agriculture; but what they do know, or at least what they think they know, is mostly good. Several participants in both interviews and ERAMAT games, for example, reported benefiting from the relatively inexpensive foodstuffs brought to Longido from Arusha, including maize, rice, and potatoes (Int. 7-20.2). One participant stated that many of her female friends and relatives have been able to earn additional income by selling these crops at the local market, and that it has helped them to pay school fees. Furthermore, this participant explained that the development of roads has made their community more “connected” to urban centers like Arusha, allowing them to have access to goods they would not have been able to obtain very easily in the past, like fabrics and cookware. I asked the same participant if she felt she benefitted more from the big farms near Arusha or from conservation projects in the area (we had had a discussion about conservation earlier in the conversation) and she laughed good-naturedly, asking me why I
would ask such a stupid question: that she had never experienced any tangible benefits from conservation activities, even the ones that were “supposed to give back” to the community. In the same interview, however, she spoke at length about the problem of water scarcity, a topic that surfaced frequently in all interviews, ERAMAT games, and group discussions. Not one session went by without at least one of the participants discussing the problem of decreasing water availability and its impact on the pastoralist livelihood. The 2009 drought was mentioned frequently as being one of the most devastating events in the participants’ lives, having been responsible for massive herd die-offs and leaving residents of Longido, as well as the neighboring districts of Ngorongoro and Simanjiro, in a state of severe food insecurity (IFRC 2011). As discussed in chapter 1, industrial agriculture is the leading consumer of Tanzania’s freshwater. Maasai activists/experts like Alsis Ole Morindat and Fidelis Ole Kashe, along with the growing body of research in the ecological and social sciences, all suggest that large-scale agricultural operations are essentially diverting both land and water away from local people in a globalized state economy that remains largely export-oriented—reducing habitable areas for wildlife in the process and thus further increasing human-wildlife conflict. In spite of this, evidence from the interviews with Longido Maasai demonstrate the ways in which local people feel they have benefitted from the existence of industrial agriculture and have found innovative ways to use its products to diversify their livelihoods in the face of pressing resource scarcities. To recall evidence from chapter 1, these scarcities may very well have been largely caused or at least exacerbated by industrial agriculture in the first place, but that does not change the need for locals to respond immediately with the resources available to them.

Aside from, through related to, industrial agriculture is the urbanization of Longido town and its implications for local residents. ERAMAT and interview participants discussed the ways
in which the area has changed over time and how it has affected them personally, both in terms of their livelihoods and their social relationships. Excerpts from interviews below illustrate the findings of this line of inquiry—that in general, participants responded most favorably to opportunities relating to small-business ownership, community leadership opportunities (particularly for females) and educational outreach initiatives, which all participants associated with the increased contact with neighboring communities and urban centers via the construction of roads and other forms of public infrastructure.

Mama Sydney self-identifies as a “Maasai mama who likes development,” and lives in a concrete house that she “built from scratch” rather than a traditional boma, which is made out of mud, cow dung, and sticks (Int. 7-20.1). She works as a kind of “market middle man,” who purchases goods from a factory owner in Nairobi, Kenya, and sells them to wholesale buyers in Tanzania, who then sell the goods to small-scale retailers. Her husband, who was an alcoholic, had no cattle when she married him: all of the family’s wealth, she says, was a product of her hard work as well as the support of others. Although she always “wanted to live in a nice house,” she qualified that a large part of why she chose to build the concrete house was because she had seen her neighbors “get their land grabbed for not developing it.” She also stated that she was “judged harshly by her neighbors” for building the house because “many people were struggling to get water for their home consumption,” while she was “getting water to pour on the ground,” to mix the concrete.

Three lessons regarding land use and livelihood emerge from Mama Sydney’s story: 1) She asserts that the increasing interconnectedness of East Africa through urban development and road infrastructure has allowed her to earn a living beyond what would have been possible for her otherwise, as her career as a broker of goods from Nairobi illustrates, 2) her mobilizing the
labor and resources to build a concrete house was in large part a defensive measure against land insecurity, and 3) she and her neighbors recognize water as a limiting factor and the environmental conflict that increases with its appropriation for industrial uses.

Mama Kierenne has also sought her own income independent of her alcoholic husband through selling her beadwork in Longido Town. As a longtime resident of the area, she states that she has seen “many changes take place in Longido, both good and bad” (Int. 7.9.1). In regards to the development of Longido Town, she stated that in some ways “growth,” which in this context means the expansion of public infrastructure and increased connectivity to urban centers, has brought benefits in the form of access to “knowledge.” When asked to provide an example, she supplied that educational seminars in particular have been helpful and have “promoted the well being of the community.” She gave the example of an “anti-malaria campaign for health education” that focused on preventative strategies—such as reducing impervious surfaces on which stagnant water would collect—which she claims to have incorporated into her boma. She stated that she has also benefitted from the ability to sell her beadwork in town and at the local Maasai market, which relies in large part on her ability to obtain cost-effective materials that she can use to make the jewelry. She says that she needs this in order to support her large family (including paying school fees for many of the grandchildren) because her husband is “useless.” Like Mama Sydney, she half-built two permanent structures to avoid “land-grabbing,” but she did not have the funds to finish them. One of the half-completed buildings is now used for cooking, which is ideal because it has no ceiling, the other to burn piles of trash. Building to the minimum standards, which stakes a claim to land but does not provide any functional support to livelihoods, has led to the scattering of these half-built structures
throughout Longido, and signifies water and labor inputs that did not produce nutritional or cultural benefits.

Mama Thomas and Mama Hunter also claimed to have benefitted from the educational opportunities Mama Kierenne mentioned. Several years ago, Mama Thomas attended a workshop on how to build and install biochar stoves in Maasai bomas. Since then, she has become a leader of the local chapter of women in the organization, installing stoves in the homes of her neighbors and being paid commission by the organization for her efforts (Int. 20.2). Mama Hunter also participates in the project, and both women stated in their separate interviews that it enabled them to earn income independently of their husbands, both of whom they described as abusive, and with whom neither of them lived during the time of the interviews. Thus, the increasing connectivity of Longido with other localities enabled the women to obtain the necessary materials to construct the stoves via their organization, which advances their earning opportunities while simultaneously addressing a critical health concern associated with increasingly sedentary residential patterns among rural Maasai.

Participants from the ERAMAT sessions also discussed various benefits of urban development in their game sessions and post-game discussions. For example, players are able to purchase “actions,” or different ways through which to earn income (the amount of income brought in each season is stochastic, determined by rolling the dice), and the “duka” or goods store was always among the most popular options. ERAMAT quote of participant stating, “money gets you a lot of things but it runs out quickly” (ERAMAT 7.17.1).

The participants also discussed a number of negative consequences associated with the urban development of Longido, perhaps the most alarming of which is the steady increase in rates of alcoholism among males. Every one of the female participants interviewed discussed at
least one alcoholic male in her kin group spending money on alcohol instead of household necessities. While alcoholism among rural male Maasai is a complex phenomenon that is likely influenced by multiple factors, a growing body of research over the past 30 years has linked alcoholism and urbanization in other populations (Room 1983, Sundquist and Frank 2004, Rabow and Watts 1982, Madsen et. al 2005). Arguably, the replacement of home-brewed beer with the high-alcohol content liquor, including and especially “Konyagi,” which can be purchased in small amounts for the USD equivalent of about 40 cents, played a role in the increase of alcoholism among rural pastoralists, many of whom no longer maintain large herds because of drought conditions and rangeland scarcity. Thus, alcoholism is likely an emergent property of an increasingly sedentary residential pattern in a drought prone area, combined with exclusion from paying jobs and the availability of cheap, high-alcohol content liquor: an unintended consequence of the urbanization of the area and disruption of traditional livelihood activities due to environmental vulnerability and decreased ability to respond to that through nomadic dispersal.

In addition, the participants addressed the health problems associated with staying in the same boma for too long. In a traditional mud-dung boma, there is a tradeoff between smoke inhalation and insect infestation: cooking inside the home will “smoke out” the insects, but will also cause respiratory damage over long periods of exposure (Coffman 2015). Mama Thomas and Mama Hunter are working towards combating respiratory illnesses among Longido Maasai through the innovative stove designs they install, as smoke will go out through the chimney. This could mean an increase in indoor insects, which the women explained is mitigated by the installation of mosquito nets and the application of other preventative measures. Aside from malaria, bed bugs (Cimex lectularius) become a problem the longer a family stays in the same
boma. Historically, bed bugs were less of an issue because Maasai families would abandon their bomas every few years, but with the advent of land privatization and urbanization, which creates less space in which to move around, families become vulnerable to health issues associated with insect infestation.

*Insights from Longido District: situated knowledges at work in the face of changing landscapes*

Both the household interviews and ERAMAT focus group discussions shed light on the ways in which Longido pastoralists conceptualize their environment, both in terms of how they interact with it and the larger societal forces that shape these interactions. Having learned about perennial issues with wildlife conflict from Helen Wallaert of Ecoscience Center and Bernard Kissui of the Lion Project, many of the questions we asked participants were designed to gauge their perceptions of how much wildlife conflict factors into their daily existence as livestock herders. The ERAMAT game also has wildlife conflict built into its design, with random “predation events” that make the player lose livestock and “mass migrations” that significantly reduce surface water supply. We asked the participants following the game and during interviews if they felt that certain species in particular (plant and/or animal) had a significant impact on their ability to maintain their herds, and the majority of participants mentioned elephants, lions or both. Interestingly, only one female participant in all of the discussions about human-wildlife conflict mentioned a wild plant species that has had a negative impact on local populations: the Jimson weed, (*Datura stramonium*) a member of the nightshade family that is toxic to both humans and livestock and is spread through soil disturbances, often found along roadsides and dung-rich livestock enclosures (ERAMAT 7.3.1, Veblen 2012).

On one occasion, following one of the ERAMAT game sessions in which one of the players experienced a predation event, several of the elder male participants began to discuss...
“the problem with lions” (ERAMAT 7.17.1). The male head of household, who was in his mid-60s, proceeded to tell us a story in which he was attacked by a lion, killed the lion, and nursed himself back to health in the nearby forest, “living off the land” for several weeks. Two of his male age-mates, also present, verified the truth of his story, claiming that he was “lucky to have survived” (ERAMAT 7.17.1). Maasai spokesperson Alais Ole Morindat similarly personified the lion in his story of livestock predation and his personal struggle to maintain the pastoral “way of life.” According to Morindot, a lion attacked and killed his father’s most prized bull when he was watching over the family herd as a child. He stated: “I told that lion not to eat him (the bull) but he did not listen to me. That lion looked me in the eye and knew that it was not right to kill my father’s bull, but he was old and lazy and did not want to get his own food, and he did it anyway. I killed that lion not because I don’t want there to be lions. Maasai, we love lions, but he did not obey the contract” (Morindat 2015). These two stories, both featuring elder Maasai community leaders, demonstrate the perception of lions as a serious threat to livelihood security, and the emphasis of the lion within the larger narrative of human-wildlife conflict: an emphasis which, according to scientists working with the Lion Project, may not reflect “reality” in a strictly ecological sense. According to Dr. Bernard Kissui, approximately 70% of livestock deaths in general are due to famine or disease, and of those deaths related to wildlife predation, an analysis of livestock wounds around Tarangire from predation events since 2003, over 80% of the wounds were actually inflicted by hyenas—not lions. These examples demonstrate the perception of lions as a major threat to livelihood security among rural pastoralists, as well as how this perception shapes participants approaches to the subject of human-wildlife conflict.

Lions and elephants are two species that have come to be understood, through the various power-laden environmental discourses discussed in chapter 2, to be simultaneously desirable
“game” to be hunted as trophies, intelligent and charismatic creatures deserving of protection from humans, and, more recently, as potential threats to rural livelihoods that are undergoing significant changes as the global economy combines with growing human populations (Coffman 2007). Thus, these species are caught in the middle of a global struggle between multiple stakeholders who represent divergent interests and disparate degrees of access to and control over the land itself and the policies that “govern” it. Central to this war of ideas is the increasing prevalence of human-wildlife conflict as a result of increasingly sedentary and agriculture-dependent livelihoods resulting from land partitioning and privatization. As Fidelis Ole Kashe, Dr. Bernard Kissui, and Dr. Helene Wallaert explained, elephants trample crops and lions kill livestock for obvious reasons: livestock are highly concentrated, and often unprotected, nutrient sources in an ever-diminishing land area of habitable space. As Fidelis Ole Kashe stated regarding crop trampling and livestock predation, “If someone cooked you free dinner and washed the dishes for you, you would go for it, too” (Ole Kashe, personal comm.). This is problematic for rural livelihoods, including and especially pastoralists, who have become increasingly reliant on agriculture, odd jobs as taxi drivers, market sales, and more to diversify their income. In light of Ole Kashe’s statement, we must keep in mind that as more and more land is appropriated for commercial activities in the primary sector and as urbanization expands its footprint, rural pastoralists are not the only ones being “squeezed out;” the wild animals are as well. The goal of conservation efforts is to lock up land for habitat protection, though relying heavily on the tourism industry to generate revenue, which as we discussed in earlier sections leads to its own brand of urbanization. To recall Robin Reid’s analysis, the boundaries of these protected areas often increase human-wildlife conflict with locals living nearby (Reid 2012).
The existence of different protected area types, which permit varying levels of human activity, is an attempt to mitigate the competing interests of the tourism industry, conservation areas, and local people. Ngorongoro Conservation Area (NCA), allows small numbers of pastoralists to graze their herds, though hunting is not permitted. WMAs separate the land into management “zones” some of which allow grazing and others of which do not, while hunting remains prohibited. Alistair Pole, Director of Land Conservation in Zimbabwe for the African Wildlife Foundation advising Manyayra Ranch, explained that WMAs as well as game-controlled areas, which allow hunting by permit only, can, if managed properly, contribute to balancing wildlife and human communities to a greater degree than national parks. He argued further that conservation efforts that are truly community-centered will allow local people to benefit directly from the setting aside of land from wildlife habitat. This is the goal behind Manyara Ranch, the focus of which is capacity building and environmental education for local pastoralists (Ole Kashe 2015, personal comm.). Similarly, the Lion Project seeks to empower locals to increase boma/livestock enclosure security and thus reduce livestock predation. The successes and challenges of these endeavors highlight the difficulties of policy-making and implementation in East Africa, while also demonstrating the potential for syncretism between small-scale local production systems and biodiversity management.

The findings of this field study illustrate what we learned from Jennifer Coffman in “Buying (into) and selling conservation among Maasai in Southern Kenya:” that “Community,” “Wildlife,” and “Development” are all politically-loaded terms designed to invent an objective “reality” of the ecological and political landscape in line with the goals of conservation that is often at odds with the reality on the ground. We project and impose “community,” as in a cohesive group of people who share interests and culture and operate under a moral economy,
onto a collection of people who are frequently at odds with one another. An anthropological/political ecological approach to conservation in East Africa problematizes this projection of “community” as such because it completely overlooks the complex relationships of what Reid calls “conflicting coexistence,” consequently limiting viable conservation strategies to the extent that they depend on a cohesive, homogeneous group of people who share the same goals and have the same amounts of resources to pursue and advocate for those goals. The same can be argued for industrial agriculture and urban development schemes, which benefit some individuals and interest groups while overwhelming “community” support remains elusive.

In terms of research methodology, the ERAMAT/focus group discussions and interview techniques provided high potential for analyses and interdisciplinary connections through the critical framework of political ecology, though a larger study area and longer study period would allow for both additional ecological and historical context as well as quantitative analyses. Interactive and participant-driven techniques like ERAMAT and life history interviews can help researchers foster productive, meaningful communication and understanding between pastoralists themselves and between pastoralists and the larger global community. These conversations are critical, as the world of conservation has recently focused its “gaze” on rural pastoralists, as the ecosystems of East Africa have become prioritized in this time of rapid industrialization and population expansion. Among the powerful interests contending for Tanzania’s land is that of industrial agriculture, which continues to expand under the influence of foreign direct investment, and while protecting habitat and wildlife does cost, FDI for cash cropping is likely not the way to pay.
In 2013, the Tanzanian Development Corporation signed a deal with Singapore venture firm Nhava Bharat for a 10,000 hectare land concession for one export crop in particular, the African oil palm. The project, which is backed by 111 million USD, is set to break ground in the Ruvu River Basin, an area listed as a critical conservation site by the Alliance for Zero Extinction, and is home to thousands of people from the communities of Kimala Misale in Kisarawe District and Dutumi in Kibaha District (Cannon 2015). This represents an unprecedented set of decisions that will likely have considerable implications for both ecosystems and rural residents—not only in areas in close proximity to these future plantations, but across the entire region as forest is cleared, water is extracted, and vast quantities of agrochemicals and potentially migrant laborers are transported in the name of increasing export GDP. As Linder (2013) and others have shown, palm oil cultivation on a large scale is not just about forest destruction, but also the construction of massive infrastructures required to manage production and labor and maintain high oil yields. In these surrounding infrastructures we find biases towards impervious surfaces, increased connectivity between forest landscapes and urban centers, and, most problematically, a reliance on cheap, abundant labor. These combined factors have been shown to result in negative impacts on ecosystems and rural populations in West Africa and in Southeast Asia—both regions characterized by substantially higher and more consistent rainfall than East Africa (FAO 2016). As stated previously, there is strong evidence in the scientific literature suggesting the incongruity of industrial agriculture and the historically bimodal, “boom and bust” drought cycles of semiarid East Africa. While the proposed palm oil concession areas are all located on the eastern coast of Tanzania near Dar es Salaam, an area with more forest cover and more consistent rainfall than its northern counterparts, I argue that the
hydrologic cycle of the region is such that increasing freshwater withdrawals for large-scale oil palm operations will exacerbate what Paul Robbins calls the “shifting risk ecology” of the entire country, to the effect of making rural residents more vulnerable to stochastic ecological variables such as drought. Access to clean water is a very real issue in northern as well as south-central Tanzania (Tumbo 2015), and the appropriation of freshwater resources to industrial agriculture will likely increase environmental conflict in locations distant from the plantations themselves. Finally, the overwhelming dominance of Malaysia, Indonesia, Nigeria, and Colombia in oil palm production makes it highly unlikely that Tanzania will become a viable competitor in the global palm oil market, especially given the more established production networks that exist in West Africa. To recall the problems of “comparative advantage” from chapter 1, the expansion of industrial palm oil to East Africa, if it makes any difference at all, will only make the global market price decline: which is good for importing nations who want inexpensive palm oil in everything, but bad news for the economy of the export country. Meanwhile, if Tanzania follows the production models of West Africa and Southeast Asia, rural residents will disproportionately bear the ecological costs associated with oil palm production in a region that, as Robin Reid has shown, is not very well suited for large-scale agriculture in the first place.

While the palm oil industry is geographically distant from Longido District, it demonstrates many of the same problems associated with industrial agriculture in general, and provides a necessary context for the more recent developments in the expansion of the industry more close to home on the east coast of Tanzania and its implications for rural residents. In Political Ecology: A Critical Introduction, Paul Robbins (2012:161) cites the growing body of literature addressing the cotton industry in West Africa. Like palm oil, cotton gained prevalence under the colonial regime, persisted through market-oriented economic reform programs, and has
recently been heralded as a poverty alleviation strategy in spite of mounting ecological concerns due to high labor, water, and nutrient demands (Robbins 2012, Van der Pol 1992, Moseley 2005, Bingen 2004). Robbins (2012:161) explains that non-food export crops can lead to soil degradation, which is often blamed on locals but has been shown to be primarily driven by large-scale intensification and that the value of the crop itself is “spirited away from local producers, leaving West African soils and farmers more vulnerable, even while…manufacturers in distant capitals turn significant profits.” Palm oil development in West Africa has already led to significant functional losses in the tropical forest ecosystems of West Africa. Of principle concern are threats to the region’s biodiversity as a result of deforestation (Harvey et al. 2008, Linder 2013, Balanchandran 2013, Laurance et al. 2014, Linder 2013, Linder and Palkovitz forthcoming).

As Paul Robbins (2012:160) explains with regard to non-food cash crops, “with declining economic margins, especially under increasingly competitive global trade regimes and unregulated markets, costs and risks are passed downward to individual producers, who can be predicted to extract from the ecological system to balance their losses.” The “value” of the ecosystem is commodified, and then accumulated in a distant location away from the site of production, while customary landholders are expected to carry the burden of the environmental degradation left in its wake: a positive, and thus potentially devastating, feedback loop that the palm oil literature indicates is currently underway in palm oil producing nations. Water pollution from agrochemical runoff further exacerbates ecological degradation (Marin-Burgos et al. 2015, Hazlewood, 2012, Rosenkrantz et al. 2003). The influx of migrant workers into the area, many of whom are underpaid and housed in poor conditions (Njoh, 2002), effectively urbanizes these forested areas, resulting in more people living there than under pre-plantation conditions. Thus,
both rural residents and migrant laborers must cope with severe nutrient shortages, leading them to extract bushmeat from the surrounding forest areas to balance these imposed deficits, as well as clear land for subsistence farming (Susanti and Burgers 2013, Schoneveld 2014, Linder 2013). This leads to unsustainable hunting levels radiating outward from the plantation area, which can be difficult to reverse (Linder 2013, Linder and Palkovitz 2016, forthcoming).

Finally, there have been numerous reports of palm oil corporate entities exploiting the tenuous legal framework of customary land rights and failing to inform indigenous populations of the full risks and socioeconomic costs associated with plantation development (Colchester and Chao, 2013), often in violation of national and international laws (Hazlewood 2012, Larsen et al., 2014, Vermeulen and Cotula, 2010, Orsato et al. 2013, Linder and Palkovitz 2016, forthcoming). Evidence is emerging, for example, that palm oil plantations alter the geophysical landscape such that locals become more vulnerable to malaria (Pleuss et al. 2009). Thus, literature on industrial palm oil demonstrates the severe negative health and livelihood consequences associated with plantation development.

Nevertheless, national governments in the humid tropics are looking to increase foreign revenue earnings via foreign direct investment (FDI) in the primary sector—a trend that has been largely influenced by the international donor community, including and especially the World Bank and IMF (Edwards 2014). In spite of its neocolonial, extractive tendencies, the notion of comparative advantage in industrial agriculture and natural resource extraction has continued to drive sectorial policy in palm-oil producing nations (Rhein 2015), exposing rural residents and smallholder production systems to the declining margins and ecological risks discussed above. Matthias Rhein’s economic analysis of palm oil development in Liberia suggests that as more and more low-income tropical nations try to break into the palm oil industry via FDI, the global
market price of palm oil and its products will continue to decline. Meanwhile, deforestation and its myriad social and ecological consequences will escalate, potentially leaving populations of rural residents with severe resource scarcities (Cotula 2009, see Jorgenson et al. 2007, Jorgenson 2008, Shandra et al. 2009, Linder and Palkovitz forthcoming).

In sum, the existing literature on industrial oil palm around the world indicates very severe ecological and social consequences are often associated with its development, and that, for better or worse, its integration into the global economy is likely irreversible (Feintrenie 2014, Linder and Palkovitz 2016, forthcoming). In other words, while palm oil may have devastating socioeconomic and ecological consequences, global investments in oil palm production are not going to decline in the near future. The scientific and activist communities must therefore continually strive to mitigate the impact of individual operations, and work closely with policymakers on the ground to prevent agribusinesses from obtaining land leases to the greatest extent possible. One of the major causes (and consequences) of ecologically unequal exchange is that national governments are often willing to relax environmental standards to accommodate foreign direct investment. However, working within the national governmental framework in the development of protected areas can also lead to negative outcomes as rural residents may be displaced and revenues are inequitably distributed. The question that remains, then, is how can we protect land from potentially harmful international development schemes while simultaneously protecting the interests of rural residents in the face of rapid population growth?
Conclusion

This analysis of the development of and the relationships between industrial agriculture, conservation science, and rural livelihoods reveals contests over both land use and the normative discourses circulating around them. The colonial and neocolonial histories of industrial agriculture and protected areas show a clear prioritization of international and (to a lesser extent) national interests over those of rural residents. Qualitative ethnographic research in Longido reveals, however, the complexity of local responses to these issues of land use and livelihood. When people discussed the “benefits” of the nearby plantations and market integration, they recalled the availability of cheap produce and increased income opportunities and were quick to seize these opportunities that became available, even as they acknowledge becoming increasingly vulnerable to resource scarcities produced by these very processes of systematic land conversion.

The scope and magnitude of the social and environmental costs associated with the expansion of industrial agriculture is becoming more prevalent in both the scientific and NGO literatures. There is still a gap in information coverage, however, between the different powerful interest groups contributing to these literatures. While many publications address rural livelihoods in at least some way, usually termed “poverty alleviation” in development lingo, the body of literature that explicitly prioritizes the relationship between ecosystem resilience and rural livelihoods in relation to industrial agriculture development remains relatively small.

In spite of its negative ecological and socioeconomic consequences, industrial agriculture, including and especially palm oil, has become so integrated in the global economic system that its presence is not likely to diminish in the near future. Preventing the expansion of plantation development into other forested areas is critical to biodiversity conservation, as palm
oil production areas overlap with areas that are rich in endemic species. Because the global market is the mechanism behind plantation development and resulting ecological degradation, it is our responsibility as citizens of wealthy nations to reduce our own reliance on these exports—including and especially palm oil. While consumer behavior alone cannot reform palm oil supply chains and true “sustainability” for these products ultimately requires massive structural changes in the realm of production, we can all say “no” to palm oil by avoiding products that contain palm oil and its derivatives. Likewise, the Tanzanian government should exercise the precautionary principle and prevent the further development of oil palm monocultures within its borders; indeed, other tropical nations being sought out for palm oil development should do this as well.

Conservation areas, while helpful to maintaining biodiversity in the face of international development projects, must do a better job of integrating rural livelihoods into their management plans. This ought to include but must not be limited to revenue sharing, ensuring that the revenue is distributed equally among affected residents, and capacity building among local populations. This requires a long-term commitment from everyone involved in conservation efforts. In an ideal world, the ultimate goal of international conservation efforts is to become unnecessary; indeed, there are locally run projects all around the world that demonstrate this is possible. As conservation and control research in political ecology has shown, however, conservation in reality is often guilty of many of the same problems that industrial ventures like palm oil plantations are: namely, seeking to perpetuate the bureaucratic managerial regime at the expense of local systems of production.

Even with reliable and equitable revenue sharing and incorporating local people into conservation projects, human population growth is a major challenge to the efficacy of
biodiversity conservation—especially if plantation monocultures continue to restrict regional mobility and diminish freshwater availability. As Garrett Hardin argued in 1968, population growth is a “no technical solutions problem.” The only pathways for reducing population growth are those with social contracts—between family members, between men and women, between socially salient alliances. Population growth is not an issue that can be relegated to critical biodiversity areas in the tropics—it is also our problem in wealthy industrial nations, and as such we must address both our own reproductive rates and our disproportionate consumption of natural resources. In places like Longido, where alcoholism among males is widespread and gender relations are highly contested and in a constant state of flux, these social contracts continue to evolve; and people respond to the pressures of population and environmental scarcity in innovative ways. Livelihood diversification is one such response, and it is becoming increasingly common among rural pastoralists in East Africa. From going off to work as a security guard in urban areas to building a local business, rural residents in this area are becoming increasingly connected to the global market—and it is still unclear what the full implications of that integration will be. As I have shown, there have been reports of reduced food and income security as locals become susceptible to the market fluctuations and ecological degradation that can accompany industrialization; yet several people in Longido have indicated to me that they have benefitted greatly from several forms of “development” as well, and to a much greater extent than they have benefitted from conservation activity.

Foreign direct investment, while commonly hailed as an effective strategy to increase the wealth of so-called “developing” nations in the African tropics, has resulted in several negative emergent properties, including patterns of ecologically unequal exchange. As forestry, agricultural, and mining exports flow from the host countries to other parts of the world, people
are finding that the return exchange value in the form of foreign revenue earnings is much less than the use value of a resilient ecosystem—especially in the face of rapid rural population growth and political instability. What is too often left out of the story, however, is how complex local production systems actually are. These literatures will sometimes refer to whole populations of people in a given area as “local communities,” or “stakeholders,” not taking the next step to acknowledge the possibility that truly collective responses are hard to come by because they rarely exist. As a U.S. citizen, I know this to be true of my own country and doubt many would argue with me; but that part is often left out of when discussing the people most immediately impacted by conservation and development policies in the African tropics.

Finally, in reviewing literatures surrounding conservation and agricultural development, I have come across the same problem too many times. Articles in both the ecological and social sciences will conclude, usually on the last page, with a paragraph or two about what “needs to be done” in “moving forward.” Three of the most common lines are something like this: “conservation/development projects should include local people to reduce conflict,” “development projects need to do a better job of protecting the environment,” and, my personal favorite, “something needs to be done to address global/regional/local poverty.” If the last few pages are any indication, I am guilty of this in this paper. Instead of ending there—with “these things need to happen if we want to mitigate the structural imbalances that have led to these negative social and ecological outcomes”—we should be starting there, and go forward from that critical acknowledgment that something has to change, and soon. As a community of scholars and activists, we have done a pretty good job of documenting the many ways in which things have gone wrong in our global society, and how they got that way. Having said that, situating human-environment interactions within their historical and cultural contexts remains among the
most significant tools with which to work through the logistics of how to improve site-specific outcomes, and is a critical step towards figuring out what works and what does not in a particular area. As Paul Robbins (2012: 99) tells us, political ecology can provide both “the hatchet and the seed:” having the capacity to critically examine historical material relationships between actors, as well as how to make them more socially and ecologically sustainable by uniting groups in collective action. Much of the critical scholarship regarding FDI, industrial agriculture, and the protected area paradigm successfully fulfill the role of the “hatchet,” but need to plant more “seeds” of what might actually work.

In this thesis, I have used political ecology to contextualize local responses in Longido, Tanzania within relevant power struggles over resources emerging from the activities of industrial agriculture and protected areas—in hopes that the next time I sit down to write about people, biodiversity, and production systems in the African tropics, I will be able to further investigate these shifting relationships and generate more ideas for where to go from here. At the community level, this would mean finding more detailed ways to answer the calls of the female participants from this past summer: for health clinics with family planning options, and environmental outreach and education programs targeting both youth and adult age groups in rural communities. It would mean cradle-to-cradle designs in all future “community development” projects that come to the area, and environmental impact assessments being conducted prior to implementing those projects. At the national level, it would mean a crackdown on government corruption and reducing political bias towards built infrastructure and industrial agriculture at the expense of resilient rural production systems. It would mean Tanzania saying “no” to palm oil given its high potential for severe ecological, social, and economic costs. Finally, at the international level, it would mean wealthy nations reducing their
reliance on products generated through unsustainable practices and terms of trade. It would mean investing in conservation programs that foster synthesis rather than exclusion, increasing the resilience of the social and ecological systems upon which all people on Earth depend.

As Mama Kierenne stated, in response to a question about where she has traveled and where she might one day live, “I am a person and people go everywhere” (Int. 7.20.1). While we may “know” this from the story of the evolution of our species, a whole new range of possibilities emerges if we begin to take this seriously in biodiversity conservation and land use planning. Understanding the difference between 1) rural mobility and livelihood diversity, as demonstrated through pastoralism in East Africa, and 2) the kind of urbanization that results from plantation development is essential to building policies that promote ecosystem and social health. To do that, we need to start talking—to more rural people, about a wider range of topics, and more often—and finally, demonstrate through our programs and policies that we actually listened.
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