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Overcoming the Obstacles to Sustainability in Ghana

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Abstract

For several decades following its independence from Great Britain, Ghana's policies continued to promote over-extraction of natural resources to the detriment of its economy and rural communities. Agricultural and forestry policy has gradually evolved to foster more sustainable and equitable practices, as in building partnerships with the private sector to fund infrastructure improvements. Policy has recently recognized the dire need to adopt agricultural practices and means of forest resource extraction that are compatible with ecological stewardship. However, many shortcomings are still apparent. Large logging operations completely disregard forestry regulations with impunity, whereas rural sustenance extractors are severely punished in the rare event that policy is actually enforced. Although the severe disadvantages that agricultural policies had imposed in the 1960s have been partially alleviated, much improvement is still needed. Recent agricultural policy has recognized the lack of funding available to invest in more efficient and higher-yielding agricultural practices, but partnerships with the actual lending institutions do not exist. The scarcity of crucial inputs, such as fertilizer and technical assistance remains a major problem in the agricultural sector, as the soils are becoming rapidly depleted, leading to declining crop yields and further encroachment on the 20 percent of forests remaining. Overly ambitious targets and unrealistic policies require more careful and detailed formulation so that Ghana's resources can be managed effectively before famine sweeps the food-insecure country once more.

Chapter 1: Introduction

West African agriculture was environmentally and economically sustainable prior to the 1960s (Onyeiwu *et al* 2010). However, Ghanaian agriculture and forestry are both currently managed in a wasteful and inefficient manner. Ghana's forested lands have decreased from 8.2 million hectares in 1957 (Onyeiwu *et al* 2010) to only 1.6 million as of year 2000 (McDermott 2009). The approximate three percent annual deforestation rate continues to diminish forested lands further. Recent measures indicate that 28 percent of Ghana's forests were lost between 1990 and 2005, landing it at the world's fifth-worst rate of deforestation during this period (McDermott 2009), following a ten percent decrease in natural forests between 1980 and 1990 (Ascher 1995). Of the "40 main marketable" lumber species, 16 are being cut highly in excess of what can be sustained (Glastra 1999: 84).

This rapid deforestation carries with it severe consequences beyond the waste of potentially valuable resources. Vegetation naturally regulates water supply and prevents erosion, so its destruction carries major ecological, economic, and human health implications. High risk of wood fuel shortages, increased sediment deposits, floods, landslides, disappearance of water bodies, drought, dam siltation, increased prevalence of water-borne disease, bushfires (Agbosu 1983) and biodiversity loss are but a few (Food and Agricultural Organization of the United Nations 2004).

Ecology

Over 90 percent of Ghana's forests have been cut since the 1940s. Ghanaian primary forests, which are ecologically superior to secondary forests (in carbon sequestration and biodiversity measures), basically disappeared in the 1980s (Glastra 1999: 76). Only approximately 20 percent of Ghana is forested at all (Trading Economics 2010).

Deforestation degrades the land through soil erosion, nutrient depletion, and desertification. Rainfall in Ghana has been declining by about 2.4 percent each decade since 1960. Northeastern Nigeria has been experiencing similar problems. In addition, the wet season has been shorter but more intense, resulting in increased runoff, flooding, and erosion, and decreased "infiltration", all of which has been intensified by the lack of vegetation (Onyeiwu *et al* 2010).

Declining soil quality is one of Ghana's major problems. "Slash and burn" agriculture, a practice in which most Ghanaians engage (Appiah *et al* 2007), is often identified as one of the main causes. Fires can be used in hunting and to strategically alter plant species compositions and eliminate pests. In addition, they are often used to get rid of brush and felled trees, which create uncontrolled fire hazards. Though fires 200 degrees Celsius or cooler are beneficial to the soil, those above 400 degrees Celsius diminish soil quality, as they "completely destroy the soil organic matter and reduce the cation exchange capacity" (Nsiah-Gyabaah 1996). Improper fire management is common, so the soil is often harmed.

While swidden agriculture often degrades the soil and contributes to deadly bushfires, the practice is not inherently destructive; if a given land area is not

overpopulated, the soil nutrients can be sustained (Science Daily 2010). However, population pressures in Ghana greatly exceed the carrying capacity of the land, especially when coupled with poor management practices.

Crop rotation rarely implemented. Practically all soil nutrients "show a deficit", since erosion and over-harvesting use more than are being provided in fertilizers. Since fertilizer imports were reduced and subsidies eliminated in the 1980s, the price prohibits most farmers from enriching their soils. Between 1978 and 1993, fertilizer use declined by roughly two-thirds. Nitrogen could easily be captured from human waste, but it instead is disposed of improperly, posing a health hazard. Due to rapid population growth, the soil is allowed only 2-3 years to fallow after 1-3 years of cropping, although eight to 15 years are needed "to regenerate soil fertility" (Onyeiwu *et al* 2010). This diminishing soil quality leads to lower crop yields, economically straining the rural poor further.

Soil/fertilizer

Since subsidization of agricultural inputs (particularly fertilizers) ceased in 1983, they have been used sparingly. A 2004 study conducted on maize, Ghana's most important food crop, affirmed the importance of fertilizer. It discovered that the progressive productivity decline in recent years was due to poor soil quality and lack of fertilizer; these are "the most important factors affecting maize yield". The major problems with the soil were found to be soil organic carbon, ECEC (which illustrates the soil's ability to prevent positively charged ions from leaching out [Espinoza *et al* 2008]), and clay. Hence, soil management that does not adversely affect soil organic matter and

water holding capacity should be promoted (Braimoh and Vlek 2004). Removal of subsidies to agricultural inputs has almost certainly cost society more (by environmental degradation, other wasted resources, diminished food security, etc.) than the subsidies would have.

Unfortunately, specific erosion and water pollution data are not readily available, due to the lack of research and information that hinders Ghanaian policymaking. These data would provide invaluable insight into optimal land management practices and be extremely helpful in forming effective forestry and agricultural policy.

Economics

Ghana's economy relies heavily upon agriculture and forestry; the agricultural and forestry sector contains 60 percent of Ghana's workforce (WorldFacts 2008). Forests provide approximately 75 percent of Ghana's energy, and they are the primary source of "food, clothing, shelter, furniture, water-supply sources, bushmeat, and traditional medicine for the local community" (Glastra 1999: 76, 84). However, the percentage of land area devoted to agriculture is increasing rapidly; cultivated lands rose from 51 percent of Ghana in the late 1960s to 65 percent in 2005. Despite this rapid growth, agriculture's contribution to GDP declined; agriculture accounted for 46 percent of the GDP in 1969 but only 37 percent in 2005 (Onyeiwu *et al* 2010). This indicates that increasingly more resources are used to create decreasing levels of output.

Agriculture cannot be easily sustained in nutrient-poor tropical soils, and most of the forestry resources previously available to Ghanaians have been destroyed; 85 percent of locals surveyed can no longer obtain food that was available in the forests 20 years

before. It has also been noted: “loss of forest cover in Ghana has had an adverse effect on agricultural productivity and the environment” (Appiah *et al* 2007). Since Ghanaians increase agriculture to compensate for decreased food sources in the forests, which in turn decreases agricultural activity, a vicious cycle is perpetuated.

Structural Adjustment Programs (SAPs) and the Import-Substitution Industrial (ISI) strategy have also contributed to Ghana’s rampant deforestation. The ISI strategy’s aim was to bolster the economy by encouraging industrialization to decrease foreign dependency. Because funds earned in the agricultural sector were used to finance this industrialization and crops were subsidized to lower urban living expenses (and subsequently product prices), agriculture was harmed. Farmers’ incomes plummeted, though the world prices of the cash crops were rising. Because the prices of manufactured goods were simultaneously increasing, the living conditions of rural inhabitants worsened. Infrastructural development was also emphasized in urban areas and neglected in the rural parts. Regardless of the efforts, industrial activity remained poor (Onyeiwu *et al* 2010).

Ghana also enacted an SAP and the World Bank’s Export Rehabilitation Project (1983-86) to expand logging operations (Onyeiwu *et al* 2010). This also improved the economy, though millions of dollars in illegal logging profits disappeared from Ghana because of corruption and fraud. The SAP increase forestry products’ contribution to GDP from three to four percent in the 1980s to six to eight percent. However, this was “achieved by logging the forest at unsustainable rates”. Wood was priced below its real market value and production has been wasteful and inefficient; hence, the forests are exploited above economically beneficial amounts (Glastra 1999: 83).

Price controls and marketing boards that funneled most of the profits away from the farmers were removed under the SAP (Glastra 1999: 49). However, rural to urban migration continued to increase, since the consumer price index for items in rural areas increased drastically. In addition, subsidization for governmentally-provided social services and agricultural inputs was eliminated or drastically reduced, which also greatly increased the rural cost of living. The agricultural sector was greatly weakened, increasing rural poverty. Ecologically unsustainable use of natural resources has been driven by these things; over-logging for charcoal production to fuel cooking and other domestic activities is one of many common practices that exemplify this (Food and Agricultural Organization of the United Nations 2010).

These problems already affect the nation's youth. Half of the children in rural areas and approximately one-fifth of the urban child population were engaged in economic activities in 2001. Approximately 60 percent worked in agriculture, forestry and fishing activities (Food and Agricultural Organization of the United Nations 2010). This has limited educational opportunities for many of the children, in both the near and extended future. Therefore, future generations are trapped into agricultural and forestry activities. These individuals also remain unaware of more efficient and sustainable practices.

Illegal practices

Rampant poaching and unregulated tree-felling are common practices in Ghana (Appiah *et al* 2007). A 1994 Forestry Department study estimated 34 percent of logs to be illegally harvested. "The main collaborators with illegal chain-saw operators are

district forestry officials, district chief executives and assembly people, law enforcement agents, chiefs and village elders, concessionaires, and wood sellers" (Glastra 1999: 83). Restricted forest management decisions and use have driven many Ghanaians to engage in illegal forestry practices, which lead to nearly complete degradation of those resources.

Nutrition and Livelihood

Though Ghanaians do not suffer from caloric deficits, the typical starchy diet is deficient in protein and vitamin A, which has led to stunted growth and blindness. The forests formerly provided a more balanced diet, but much of the previously available food resources have been overexploited (Onyeiwu *et al* 2010).

In addition, the majority of rural Ghanaians lives from "hand-to-mouth"; a large proportion of the population is in a very precarious position, especially considering the rapidly declining forest resources and agricultural productivity. The forests continue to be the only source of wood for fuel, construction, and furniture for most Ghanaians (Appiah *et al* 2007). With an average annual income of $248 US (2004) for most farmers and a GDP per capita of $1500 US (2009) (Central Intelligence Agency 2011) for the nation, many rural Ghanaians' best option is forest collection, which costs nothing (Appiah *et al* 2007). Due to declining resources, some rural inhabitants walk 12 hours to collect enough fuel wood to satisfy daily needs[i] "many Ghanaians and Nigerians enjoyed higher living standards in the 1960s than they did in the 1990s". People are beginning to migrate to urban areas because agricultural income is not sufficient and basic services (such as education and health care) are lacking; only 52 percent of Ghanaians lived in

rural areas in 2005, though 76 percent did in 1961. In addition, 70 percent of urban Ghanaians live in slums (Onyeiwu *et al* 2010).

Basic causes of deforestation

The factors contributing to Ghana's high rates of deforestation are diverse. Rapid population growth, land conversion to agriculture and livestock operations, unchecked tree felling, previous governmental policies (Food and Agricultural Organization of the United Nations 2004), mining, and forest fires all play large roles (Okrah 1999). Charcoal (along with other fuel wood) use, which is rural Ghana's primary means of fueling cooking operations, also amplifies the problem; roughly 0.1 hectares of forest must be consumed to produce one ton of charcoal (Enterprise Works Ghana 2010), since wood must be burned in extremely hot kilns to create charcoal (Resch 2007).

The greatest contributor to deforestation is the sale of agricultural and timber products to outsiders. In itself, timber extraction causes approximately 70 percent of Ghana's deforestation (Okrah 1999), and most of these products are exported to the USA and Europe. In addition, loggers receive lengthy concessions, some of which last longer than 50 years, and these parties undergo "little or no monitoring" (Resch 2007).

The timber industry is comprised of approximately 500 logging companies, some of which are European-owned, that operate through long-term concessions and short-term licenses. Some concessions are also too small to allow for proper management practices to be employed; some are as small as $2km^2$. Because of inefficient logging techniques and wasteful timber processing, final lumber volume is only 25 to 40 percent of the total

log volume extracted" (Glastra 1999: 77). Another ten to 15 percent of Ghana's deforestation can be attributed to forest fires (Nsiah-Gyabaah 1996).

Tree plantations are also problematic; some view these as equivalent to forests, though their ecological impacts are very dissimilar (Okrah 1999). The Ghanaian government has established a fund to promote plantation establishment, and the president appealed to poor community landowners to release land for this purpose (Okrah 1999).

The impacts of human settlement are not negligible, but some must rely forest lands for their livelihoods, and these effects are "comparatively minimal, and in some cases traditional methods of sustainability are applied" (Okrah 1999). The most severe deforestation is orchestrated by those who do not live in and rely upon the forests. Lack of dependence upon the land decreases incentives to employ sustainable practices.

The establishment of forest reserves has been inadequate in the struggle against rampant deforestation. Within forest reserves, only two percent is in excellent condition, 14 percent of the forest reserve land has no forest, 15 percent is in very bad condition, 20 percent is mostly degraded, 35 percent is partly degraded, and 14 percent is moderate (Blay *et al* 2009).

Ghanaian agricultural and forestry policy has evolved to adopt more of a focus on sustainable agriculture and forestry. However, implementation is lacking. Funding and enforcement of regulations are especially limited.

Chapter 2: Socio-Economic Impacts

Major measures of economic well-being have significantly improved, most notably during the 1990s. However, agricultural productivity is rapidly declining, the majority of forest resources have been depleted, and policies have neglected the small-scale forestry and agricultural actors that carry the most promise for sustained activity. The improvements are generally due to policies that push excessive resource exploitation. Adequate nutrition, though one of the most basic determinants of well-being, has been largely ignored by agricultural policy, and these negative impacts are very apparent.

Nutrition

The agricultural sector directly and strongly impacts a society's quality of nutrition, as it determines which foods are produced and the relative affordabilities. Processing of raw food inputs, which agricultural policy continues to promote, has immense nutritional implications, as nutrients are often lost.

Although the typical Ghanaian caloric intake is adequate, malnutrition, mostly due to inadequate micronutrient consumption, is an underlying factor of many deaths in Ghana. Food security is also problematic, particularly in the Northern and Upper East regions (Food and Agricultural Organization of the United Nations 2009: 3). Since at least 1966, the average Ghanaian caloric intake has had approximately the same composition: 79 percent carbohydrates, 12 percent fats, and nine percent proteins (Food and Agricultural Organization of the United Nations 2009: 19). However, it is recommended that 45 to 65 percent of an adult's caloric intake come from carbohydrates,

20 to 35 percent from fats, and ten to 35 percent from proteins (Institute of Medicine, Food and Drug Board 2002). These imbalances, along with vitamin and mineral deficiencies, cause and exacerbate various health problems. For example, vitamin A (sufficient consumption of which is necessary for healthy immune system function) cannot be absorbed without consumption of fats, so inadequate fat intake diminishes the body's ability to process nutrients (ORC Macro 2005: 36). Children are particularly vulnerable: in 1988, 31 percent of children were "stunted" and eight percent "wasted"[1] (Rawlings 1996: 22). These figures remained mostly unchanged as of 2003, at 29 percent and seven percent, respectively. Approximately 22 percent of children younger than five years are deemed underweight (compared with two percent in a well-nourished population) and three percent are overweight (ORC Macro 2005: 14).

In a nutritional study conducted in 2003, approximately 20 percent of the children surveyed between the ages zero months and five years died. However, the typical under-five mortality rate in Ghana has been estimated to be at 11 percent. Though still quite high, this is at the lower end for sub-Saharan African countries. Infectious diseases are the main cause of death in this age category, and (even minor) malnutrition is an indirect cause of this, as it increases the children's susceptibility. It has been estimated that 40 percent of deaths before age five are related to severe and moderate malnutrition, with moderate malnutrition a factor in 88 percent of malnutrition-related deaths. Between 0 and 20 months, the minority of children (45 percent) is alive and not malnourished (ORC Macro 2005: 5-10).

[1] "Wasting" is an indicator of acute malnutrition, in which a child is far too light than is healthy for his/her height. In a healthy population, this figure is at about two percent (ORC Macro 2005: 14).

Chronic malnutrition (as evidenced by stunting) was four percent lower during the mid-1990s than in 1988. However, between 1998 and 2003, this has increased by three percent. There was a two percent decrease in acute malnutrition, but this figure fluctuates greatly. The percentage of underweight children, however, drastically decreased between 1988 and 2003, down from 30 to 22 (ORC Macro 2005: 16).

Poverty alleviation during the 1990s

An annual growth rate of five percent during the 1990s was mainly attributed to the Structural Adjustment Program created to mitigate for the economic crisis of the 1980s (Jeffrey 2009). However, the 1991 Medium-Term Agricultural Development Program and related policies also played a large role. The 1991-2 and 1998-9 Ghana Living Standards Surveys (GLSS) showed that the percentage of Ghanaians below the poverty line (900 current Cedis annually) fell by 12 percent during that period. Areas that produced cocoa experienced the most rapid poverty alleviation, but many other crops boomed. Cassava production has increased by 400 percent and corn production by 300 percent. However, the expansion in growing areas responsible for this success cannot continue for much longer; forest reserves and "marginal lands" are encroached as farmers try to expand their lands, leading to vast deforestation and land degradation. Poverty even increased among food crop farmers in the North, where the land is not conducive to an expansionary strategy (Asuming-Brempong 2003).

Both national income and national disposable income greatly increased (relative to 1975 prices) throughout the 1980s and 1990s. With a few exceptions (such as a 1991 decrease), real agricultural income has been increasing since 1984. However, the annual

growth rates in real income, real disposable income, and real agricultural income declined during the 1990s (Asuming-Brempong 2003).

Other livelihood measures

Several other indicators of well-being have been improving recently. In 1996, only 53 percent of the adult population was literate, with 57 percent of the school-aged population enrolled (Rawlings 1996: 7). There has been a minor improvement: 57.9 percent of the adult population is now literate (Central Intelligence Agency 2011). Life expectancy has also improved from 55 years in 1996 (Rawlings 1996: 21) to 61 years in 2011 (Central Intelligence Agency 2011). Both are a vast improvement from the 45 year expectancy of 1957 Ghana and significantly exceed the African average of 51 years. However, the average among all developing countries is 63 years and industrialized countries enjoy a life expectancy of 75 years (Rawlings 1996: 21), so there is much room for improvement. Although Ghana continues to suffers from high rates of infant and child mortality, infant mortality decreased to approximately one in 20 (2011) from one in ten (1996) (Central Intelligence Agency 2011).

Macroeconomic measures

Growth of real GDP decreased from an annual rate of 5.7 percent between 1989 and 1989 to four percent between 1996 and 2001, which caused the rate of employment, overall labor productivity, and investment to decrease. However, the national savings to GDP ratio has been increasing since a 4.4 percent low in 1993 (a sharp decline from 9.2

percent in 1990). Agriculture has remained at approximately 40 percent of the GDP from 2000 to 2008 (Asuming-Brempong 2003).

Agricultural output has a strong inverse relationship with inflation rates, as food comprises a major proportion of spending. Inflation steadily decreased from 122.8 percent annually in 1983 to 10 percent in 1985, in part due to improved weather conditions (primarily increased precipitation), which caused the domestic price of food to fall. But between 1986 and 2000, the annual rate of inflation fluctuated between 10.1 percent and 70.8 percent (Asuming-Brempong 2003).

Exchange rate

The Cedi drastically depreciated in relation to the US Dollar between 2000 and 2004. The volume of exported goods in 2004 was subsequently triple its 1996 value. However, imports of "import substitutes" like rice, poultry, and tomato paste also surged (Ministry of Food and Agriculture 2007: 57). From 2000 to 2006, the effective real exchange rate was on the rise, reducing competitiveness of exports. However, from 2007 through 2009, it steadily decreased (Index Mundi 2010).

The neglected rural population and potential for agriculture

Accra is now growing at approximately 4.4 percent annually (2003), compared to 3.3 percent in 1984 (the national population growth rates were 2.5 percent and 2.6 percent, respectively) (Asuming-Brempong 2003). Rural areas tend to be disproportionately more economically disadvantaged and house 80 percent of Ghana's poor (Rawlings 1996: 17). In rural areas, 34 percent of rural children are stunted,

compared to 20 percent of children in large city areas and 26 percent in towns (ORC Macro 2005: 74). Safe water access is greatly imbalanced as well: 93 percent of urban and 39 percent of rural had "nominal access" (Rawlings 1996: 22)

However, rural areas support the bulk of Ghana's economy. The agricultural sector contributed between 33.9 percent and 38.5 percent of the country's foreign exchange earnings between 1999 and 2002 (Asuming-Brempong 2003). However, most Ghanaians are eager to seek occupations in other sectors; the non-agricultural segment of the population (which is primarily urban) has been growing at about 3.2 percent annually (Asuming-Brempong 2003).

Agricultural sector funding

In 1998 and 1999, bank loans to agriculture increased to 12.2 percent of loans (up from 5.7 percent in 1995), but this percentage has been declining since. Rural banks in particular have performed slightly better but still leave the agricultural sector with inadequate funding (Asuming-Brempong 2003). Lending rates from commercial rates have been astronomically high. The minimum and maximum nominal lending rates subject to the agricultural sector between 1997 and 2002 ranged from 27 and 50 percent to 39 and 55 percent. The real rates ranged from approximately seven and 17 percent to 19 and 37 percent (Food and Agricultural Organization of the United Nations 2005). Hence, funding is scarce and expensive.

The minor input subsidies of 2008 and 2009 were largely ignored

Fertilizer subsidies in 2008 and 2009 based on vouchers given to farmers (with a unique price set for 50-kilogram bags in each district) had a very small impact on the agricultural sector. Most fertilizer retailers sold without vouchers: 86 percent of sellers in 2008 and 84 percent in 2009. The vast majority of venders who did not accept vouchers cited inability to redeem the vouchers as the primary reason for not accepting them, but a few also stated difficulty of redemption and lack of fertilizer (Krausova and Banful 2010: 26).

The bulk of vouchers received were redeemed through other agricultural input dealers (47 percent in 2008 and 52 percent in 2009), as most retailers did not have relationships with fertilizer importers who could redeem the vouchers directly. The indirect relationships hindered voucher redemption and required trusting a chain of diluted accountability. Many dealers were compensated for the vouchers with credit (44 percent in 2008 and 47 percent in 2009). Approximately one-fourth of retailers who participated in 2008 and 2009 received the cash value for the vouchers. However, about 20 percent of retailers were reportedly never paid for at least part of the vouchers submitted both years, several were forced to redeem the vouchers for other products instead of cash, and many payments were delayed (Krausova and Banful 2010: 27).

Lack of affordability constrains technological advancement

Lending rates available to the agricultural sector were close to 50 percent annually in the 1990s. This creates somewhat of a vicious cycle between lack of technology and lack of funding, and productivity consequently suffers. Available technologies are

outdated and costly. Foreign firms receive subsidies from their governments and therefore have more technologically advanced agricultural methods and can more easily produce higher quality goods at a lower cost (Asuming-Brempong 2003). Furthermore, a history of political instability, changing policies, and inflation discourage the meaningful investments necessary to foster sustainable economic growth.

Chapter 3: Forestry Policy

Forestry policy in Ghana has historically been lacking in its capacity to solve rampant deforestation. Europeans sought to make money in Ghana and leave as soon as that was accomplished, so British and other Western forestry companies were not concerned with long-term ecological impacts. The Ghanaian government also did not prioritize sustainability: although the state gained independence in 1957 (and therefore changed in various political, social and economic regards), there was no major forestry policy review between 1948 and 1992 (Ghana Forestry Commission 2005).

Early policy

While still a British colony (the Gold Coast), Ghana's first policy relating to forestry was adopted in 1883. The Native Jurisdiction Ordinance of 1883 enabled Traditional Councils (comprised of natives) to enact by-laws to protect water courses and to conserve forests (Agbosu 1983: 169-187). However, the Traditional Councils did not exercise their power to create reserves. Shortly after, in 1894, the Report of the Commission on Agricultural Potential of the Gold Coast was published, informing British business of the economic potentials of the forests and spurring an exponential increase in timber exports to Europe at the turn of the 20th century.

Large-scale logging policy

The first regulation specifically pertaining to logging was the 1900 Concessions Ordinance No. 14, which provided Gold Coast citizens the right to grant concessions on

their own lands as they pleased, so long as this complied with customary law. However, the concession owners were required to validate the concessions in court within six months of being granted, posing a major logistical challenge (Adjei 1994). Policy to control commercial logging of younger trees was introduced in 1907 to enhance forest regeneration. Since "timber cutters never confined timber felling to trees of full growth", the Governor proposed the Timber Protection Ordinance, which prohibited cutting trees with diameters less than those proposed for each tree species without written permission by a District Commissioner. A scientific review of the types of trees that could be felled sustainably was conducted but involved complex observations incomprehensible to local communities. Another report (by the 1908 Pennington Commission) found that many timber cutters had no licenses and therefore timber felling regulation was very limited. Companies and natives alike complained of the regulation; indigenous people had been felling smaller trees sustainably and relied upon them for certain uses. Hence, this Ordinance was revoked in 1908 (Agbosu 1983: 169-187).

Nevertheless, governmental control of forests progressively strengthened. The Forestry Department was created in 1908. Enactment of the 1911 Forest Ordinance provided the governor power to declare any unoccupied land a forest reservation. Resource exploitation within these areas required Reserve Settlement Officers' permission (Adjei 1994).

Forestry Estates

Forestry estates were set aside in 1939, but governmental support backing enforcement was minimal. Increasing population and agricultural demands, coupled with

mass disobedience of pre-existing regulations, prompted Ghana's 1948 Forest Policy, which provided management for permanent forest estates, along with forestry research. The 1948 policy pushed protection and management of reserves, but all forests outside of the permanent reserves were left for conversion to agricultural land, and no resources were provided to implement the law (International Development and Research Centre 2003).

Failure to regulate logging

The 1951 Concessions Ordinance, which required acquisition of timber concessions, also failed to provide governmental oversight. The concession holders were required to deliver an annual statement of profits incurred from concessions to the Treasury. Negligence of this could carry a 50 pound (or $140 current US) fine. One could also be fined up to five pounds daily for noncompliance with the Ordinance, but it was mostly ignored, as enforcement was very weak. Since revenue collection was the priority, timber operations remained unregulated (Agbosu 1983: 169-187).

Policy based on environmental concerns

Other attempts to minimize the ecological impacts of deforestation focused on scientific forestry initiatives. The 1953 Land Planning and Soil Conservation Act addressed mitigation and prevention of soil erosion, land reclamation, and water use (Ghanaian Environmental Protection Agency 1953). Between 1956 and 1970, the Modified Selection System was implemented through “the selective exploitation of

mature species, governed by minimum-girth limits" so that the forests could regenerate (International Development and Research Centre 2003).

Because of this system's ineffectiveness, the government reverted to simpler, more direct, and heavy-handed control. The 1959 Protected Timber Lands Act (Act 34) deemed off-reserve forest land protected timber lands, giving the Forestry Department the ability to regulate farm development and control agricultural expansion (Kotey *et al* 1998: 82,100). However, this direct assertion of power was reversed with the 1960 Forests Improvement Fund Act (Act 12), which established a Forest Improvement Fund (Forestry Commission of Ghana 2000). The FIF was created to "establish an improvement fund for forest reserves and to provide for the control of revenue derived from forest reserves" (Odoom 2005: 37). This also severed the Forestry Department's management of Forestry Reserves, and accountability to landowners was eliminated regarding the revenue's use; the Act eliminated all individual forest reserve account and previous agreements in the Working Plans that provided state accountability of revenue (Marfo 2006: 17).

The 1961 Wild Animals Preservation Act enabled the minister to appoint honorary game officers (Government of Ghana 1961: 2). Hunting "trophy" export was prohibited unless a permit was granted by a superior police officer. Hunting via motor vehicles (including aircraft) and strategic fire setting was also prohibited in this act. Arrests without warrant were also permitted (Timber Industry Development Division 2009). But it was not until four years later, in 1965, when the Department of Game and Wildlife was deemed an official Ministry of Forestry agency (International Development and Research Centre 2003).

Communally-owned lands

The 1962 Administration of Lands and Concessions Acts further deprived rural communities of previous rights. The Administration of Lands Act (Act 123) enabled the federal government to manage community-owned lands and collect revenues from them (Amoako-Nuama 1999: 6). The Concessions Act (Act 124) provided timber concessions and central governmental management of timber resources, both on and outside of reserves (Odoom 2005: 32). Hence, the combined impact of the 1962 acts prohibited farmers from using trees on their properties.

Timber marketing control

In 1963, the Ghana Timber Marketing Board was established to regulate timber and wood product exportation (Timber Industry Development Division 2009). The Timber Operations (Government Participation) Decree of 1972 provides the Ghanaian government power to be the majority shareholder, hold governing board positions, and engage in general management of timber companies (Government of Ghana 1972). The Forest (Protection) Decree of 1974 also greatly limits community use of forest reserves and establishes Forest Officers' powers. Criminal penalties for violations of forestry laws (including "damaging of trees, cultivation, creating fires, obstructing of water flows, hunting or fishing or grazing or trespassing of cattle") in a Forest Reserve were introduced. However, collection of non-timber forestry products for domestic use only was permitted (Forestry Commission of Ghana 2000).

Strict policy

The 1974 Trees and Timber Act (N.R.C.D. 273) attempted to improve inspection effectiveness by dividing Ghana into forestry regions. Property registration was mandated before tree felling was permissible. Logs were required to be labeled with the cutter's property mark, which is given during registration with the office of the Forestry Commission (Government of Ghana 1972). The registration fee for a property was 400,000 Ghanaian Cedis (roughly the same equivalent in current USD). The registrations expired every six months from the date of issue, and the renewal registration fee was 200,000 Cedis. This was later amended to last for two years. If the application was made after the registration expired, the registration fee was 400,000 Cedis. Arrest without warrant by a "police officer or forest officer or a person authorized by the Minister" was declared legal if "that officer or person reasonably suspects" that the suspect "committed or have been concerned (sic) in the commission of an offence" under the Trees and Timber Act, if the suspect does not give a name and address for the timber (or gives a name and address that is suspected to be false), or "if there is reason to believe that the suspected person may abscond". However, the person may not be held for more than 48 hours before being released or taken before a Magistrate (Government of Ghana 1974). In addition, felling timber for export without a valid property mark became a criminal offense (Kotey 1998: 82).

The 1977 Amendment to the Timber Industry and Ghana Timber Marketing Board Decree (SMDC 128) prohibited exportation of any timber products by any entity other than the Ghana Timber Marketing Board (or parties authorized by it). This carried a potential prison sentence of 15-30 years. The Timber Marketing Board also set the

prices of timber for domestic sales and held the power to determine the percentages of products that timber processors could sell domestically and abroad. The Minister was also provided with the power to create regulations for the Act's enforcement (Government of Ghana 1977).

Chainsaw regulation

Chainsaw ownership requires registration with the District Assembly. Wood harvested with a chainsaw may only be used "for social or community purposes and shall not be sold or exchanged" (Forestry Commission of Ghana 1998). Some reasons to ban chainsaw felling are: higher levels of waste, greater risk of wildfires, and faster felling (Parker 2011). However, roughly 78 percent of domestically purchased timber was felled by chainsaw (Forestry Commission of Ghana 2010).

The 1982 Timber Concession Revesting Law (PNDCL 17) removed 1,473 square miles of timber felling land from indigenous logging companies (Daily Graphic 2003). Subsequently, illegal chainsaw timber felling drastically increased.

1991 marked the first of eight years during which chainsaw use was legalized through a permit-based system (Odoom 2005: 42-8). This was to support the construction boom. However, more trees were felled than were approved by permits; this was related to the log export boom to Asia (42). Permit issuance was "streamlined" in 1994, but the accompanying inspections to verify legal compliance were not carried out, due to limited resources by enforcement agencies. To mitigate for practically unrestrained chainsaw timber felling, "timber task forces" were created in 1996. Although those who assisted in the arrests of chainsaw operators were given 30 percent

of seized timber, many members of the Forestry Commission and other enforcement agencies collaborated with illegal operators. Finally, the Legal Instrument 1518 was repealed, and LI 1649—which outlawed chainsaw harvesting—was enacted. Legal Instrument 1649 also addressed the problem of corruption among enforcers (43). However, chainsaw operations are reportedly increasing (44).

When the contractor ceased operation, the Chief Conservator of Forests (with the approval of the Forestry Commission) was permitted to cut remaining wood, with branches and scraps given to benefit the forest community. Certain species could not be logged without a special permit; otherwise this was considered an offense. Offenses and penalties were given for: obstruction of Forestry Department or Forest Products Inspection Bureau inspections, possession of improperly labeled or unmarked timber, possessing timber without a conveyance certificate, owning an unregistered chainsaw, using an unregistered chainsaw, failing to properly mark felled timber, selling timber felled with a chainsaw, permitting unregistered chainsaw felling on one's property, and felling or possessing felled timber of a "restricted species". Officers who aided those breaking regulations were also liable and guilty of an offense (Forestry Commission of Ghana 1998).

Communities organize to illegally demand rent from timber companies. In doing so, they "are tacitly supporting raids of company concessions by chainsaw operators – who at least pay rent up front" (Odoom 2005: 38-9). In addition, "many landowners and farmers would rather negotiate secretly with chain-saw operators to have the trees on their land illegally harvested than allow the legitimate concessionaires to harvest the trees and pay token compensation". Timber dealers who do not cut locally own 60-80 percent

of chainsaws. These chainsaw timber dealers reap all of the benefits while the local inhabitants only transport the equipment and wood for short-distance carries. Although chainsaw-cut timber is illegal, it comprises 70 percent of locally-sold timber (Odoom 2005: 7-8).

Bushfires

Seasonal bushfires between 1982 and 1984 were particularly destructive; between 1982 and 1983, roughly 50 percent of Ghana's vegetation and 35 percent of its crops and agricultural stores were destroyed (Ampadu-Agyei 1988). Human activities that contribute to bushfires include clearing the land for cultivation, flushing out game, protection against dangerous animals, cooking, carrying fire brands, grudge fires to settle disputes, smoking, religious and ceremonial practices, and deliberately sparked fires to avoid repaying loans used to finance rice farms. PNDC (Peoples National Defense Council) Law 46 (1983) prohibited the setting of bushfires except for certain agricultural, forestry, and game management uses. The 1983 Control of Bush Fires Law criminalized "intentional, reckless, or negligent" cause of bushfires and held offenders liable for all of the fires' repercussions (Kotey *et al* 1998: 82). Though the penalties were strict and the government followed through with enforcement actions, bushfires remain a major problem (Daily Graphic 2003).

Unlike its 1983 predecessor, the 1990 Control and Prevention of Bushfires Law (PNDCL 229) aimed to regulate and prevent bushfires through public awareness and district assembly-controlled burning rather than imposing harsh penalties to the offenders. PNDCL 192 marked a great improvement over the failure to address bushfires

with undetermined fault in PNDCL 46. However, PNDCL 229 did not specify which agency would implement the law or even how this would be performed (Ghanaian Environmental Protection Agency 1990).

Mining

Although mining has detrimental effects on forested lands, it was deregulated in 1983 to spark economic activity. Mining activity (especially small-scale efforts) skyrocketed (Library of Congress 2010).

The Minerals and Mining Act (Act 703, 2006) "states that a mineral right holder has sufficient authority to enter the land in respect of which the right is granted subject to negotiating compensation with affected farmers (Section 73) and paying compensation based on compensation principle" (Ghana News Agency 2010a). Every mineral (in its natural state) belongs to the government of Ghana. The government can also claim land when necessary to extract the minerals. Mining activities may also be prohibited on certain lands. The government has complete control over granting mining rights, and possessing those rights gives complete water use rights as well (Government of Ghana 2006: 5).

Major restructuring

Due to the 1948 Forest Policy's failure, the Forestry Department began to review its practices in 1984. This led to some restructuring within the organization. The Timber Export Development Board Law of 1985 (PNDCL 123) established the Timber Industry Development Division (TIDD), which functions to promote and develop timber

marketing (Appiah 1999, Ghana Forestry Commission 2005). TIDD is one of the three "operational elements" of the Ghana Forestry Commission (the other two are the Forest Services Division and the Wildlife Division) (Ghana Forestry Commission 2005). PNDCL 123 and PNDC Law 117 replaced the 1963-established GTMB with the Timber Export Development Board (TEDB) and the Forest Products Inspection Bureau (FPIB) (Timber Industry Development Division 2009).

World Bank-funded projects of the late 80s and early 90s

The World Bank financed a $24 million project for the importation of logging equipment in 1986 to bolster Ghana's struggling economy (Ampadu-Agyei 1988). To mitigate for the resulting acceleration in deforestation (in part due to the World Bank project), the 1989-1997 Forest Resources Management Project was introduced, establishing several water protection laws. However, there was no clear cut policy or financial commitment.

The 1989-92 Forest Resource Management Project supported implementation of a "sustained yield policy". Forestry conservation and tree planting on farms were encouraged. The policy was backed by creating a rural forestry program, initiatives to support forestry education and research, and strengthening forestry institutions (World Bank 2000a).

Efforts for improved implementation

The 1991 National Environmental Action Plan was created to address ecological problems in the areas of land management, water resource management, marine and

coastal ecosystems, mining and hazardous chemicals, human settlement, and forestry and wildlife (Benneh 2011). The Environmental Protection Council was to report and coordinate actions to enforce NEAP, but the Council had no enforcement powers (Library of Congress 2010).

Previous legislation created 282 forest reserves and 15 wildlife protected areas; these comprise over 38,000 km or about 16 percent of land area. Outside of these reserves, roughly 4,000 km of forest were rapidly disappearing and lacking protection. To address this problem, Article 269 of the 1992 Constitution established the Forestry Commission, along with its functions and structure (International Development and Research Centre 2003). The 1993 Forestry Commission Act (Act 453) reinforced this (Kotey *et al* 1998: 83).

Forest and Wildlife Policy (1994)

The 1994 Forest and Wildlife Policy, which is mainly still in effect, was a major reformation of Ghana's outdated forestry regulations, most of which originated during colonial times. Environmental impact statements were introduced. National lands were reserved for mixed uses, though mostly for exploitation of forest resources. Unclaimed lands became regulated by the Forestry Department. These forests, forest reserves, and wildlife protected areas became managed under "detailed prescriptions… to guide sustainable management", and more effective enforcement mechanisms, such as periodic audits of forestry operations, were specified. Timber rights were awarded by competitive bidding and forest and wildlife fees were regularly reviewed to reflect economic value, increasing revenue collection. Timber processing, improved milling efficiency, and

exploitation of lesser-used timber species were also encouraged through various initiatives, such as specialized training programs for wood processing operators and produce graders. Wild animal production and forest plantations were other state-funded forestry investments (International Development and Research Centre 2003).

The policy aimed to "sustainably develop wildlife potential", regulating trade and consumption of "highly valued" and endangered species. A National Parks and protected areas network (along with its proposed management practices) was established, along with national tree planting programs (International Development and Research Centre 2003).

Public awareness and local community participation in natural resource protection and land reservations were promoted. Various stakeholder groups were required to be integrated in consultations (though the Forestry Commission and district conservation committees) to address the problems of wildfires in at-risk areas, illegal farming and encroachment upon protected areas, and pollution. In addition, local access to traditional uses of forestry products and participation in policy formation was improved, and farmers' land and tree tenure rights were restored (International Development and Research Centre 2003). Bureaucratic controls on the marketing of wood exports were weakened while dialogue with the private sector was enhanced. Ironically, there was little stakeholder consultation during the policy's development.

Inter-ministerial cooperation and maintenance of an interagency coordinating committee was promoted. Accordingly, a holistic research database for forestry and wildlife studies was proposed. In addition, human resource development programs were implemented to improve planning and management in the private sector and

communities. The policy also aimed to improve dialogue with international entities, trade associations, private interest groups, and NGOs concentrated on sustainable natural resource management (International Development and Research Centre 2003).

The Forestry and Wildlife Departments were reorganized to improve "monitoring, coordination, and accountability". Likewise, previous legislative and administrative means were reviewed. Adequate funding was arranged for resource management. Accounting practices were also improved, enhancing accuracy and collection of resource utilization revenues (International Development and Research Centre 2003).

NGOs view the policy as a "useful advocacy tool"; the policy adopts collaborative forestry management (CFM) and studies of "environmental, cultural, scientific, and social functions of forestry" (Forest Watch Ghana 2006: 21). It also prefers "low volume high value" timber extraction, which is optimal because it decreases waste. However, post-1994 legislation did not allow for collaboration with the rural communities (Forest Watch Ghana 2006: 22).

Further support of the Policy

Several laws and plans institutionalize the Forest and Wildlife Policy. The 1994 Act 490 established the Ghanaian Environmental Protection Agency, which is stronger than the Environmental Protection Council (EPC), the previous environmental agency (Library of Congress 2010, Ghanaian Environmental Protection Agency 2011).

The 1994 Lands Commission Act required the newly formed Lands Commission to manage public "and any other lands vested in the President by the Constitution" and to recommend policy regarding land use to the national government (Ghanaian

Environmental Protection Agency 2011). In 1995, interim measures were established to control illegal timber harvesting outside of reserves, enabling farmers to veto timber felling on their lands and to be compensated for crop damage (Kotey *et al* 1998: 83).

The 1996 Forestry Development Master Plan was to "guide the implementation of the Forest and Wildlife Policy" (International Tropical Timber Organization 2006: 99). The FDMP has three time horizons during which it expects to achieve its objectives (which are managing and enhancing its forest and wildlife resources, promoting "viable and efficient" forestry industries [especially promoting more advanced processing], promoting public awareness and rural involvement in forestry and conservation efforts, promoting more scientific and technological forestry and wildlife management, and developing national, regional, and district levels of forest and wildlife management), spanning the period 1996-2020 (Oduro 2002: 32-34). This makes implementation of the FDMP more manageable. The 1998 Wildlife Development Plan was created to facilitate implementation of the 1994 Forest and Wildlife Policy (Japan International Cooperation Agency 1999: 22).

Timber Resources Management Act and Regulations

The Timber Resources Management Act of 1997 introduced Timber Utilization Contracts (to replace timber concessions) and Social Responsibility Agreements. This was yet another instance of timber regulations and procedures discriminating against small-scale efforts. In addition, the new policies were crafted in a way that fosters arbitrary implementation, increasing the potential for corruption.

Also in 1997, levies were introduced to exports of nine air-dried timber species (Forestry Commission of Ghana 1998) and rough log exportation was banned (Benneh 2011). Though annual allowable timber extraction from forest reserves have been more strictly controlled, harvesting limits outside of reserves have been relaxed to compensate (Forestry Commission of Ghana 2010).

The 1998 Timber Resources Management Regulations called for inventories to determine the suitability of lands for timber utilization contracts. The decision is made by the Chief Conservator of Forests through a field inspection that includes input from the Traditional Council, land owners (if applicable), and governmental forestry officers. The District Chief Executive must identify owners and farmers of land for field inspection. The suitability of the land for timber concessions is judged on "quality, quantity, and value" of timber, topography, and special characteristics (including water bodies and roads). Owners are given 21 days to consent to timber rights on the land and verify that there exist no "conflicting claims" upon that property. The reports pass through the Forestry Department and eventually to the Chief Conservator of Forests. However, the notices are only required to be posted at the District Assembly, Traditional Council, and District Forest offices (Forestry Commission of Ghana 1998); it is unclear how the typical rural subsistence farming community would ever see these. Obtaining transportation from the rural communities to these offices is difficult. The law is also unclear about situations during which the landowners do not respond.

When the landowner objects or there are conflicting claims of interest on the land, the District Forest Officer must refer the case to a committee, comprised of a

representative of the Administrator of Stool Lands[2], two representative of the District Assembly, and a Traditional Council representative. The chairman of that committee is the representative of the Traditional Council. The proceedings are informal and "guided by natural justice". If the committee report considers the objection reasonable, it will forward its recommendation document (which also contains the land survey and boundary specifications, topographic maps and plans, the consent or objection and grounds, and conflict resolution if available) to the Regional Forest Officer. The Regional Forest Officer then reviews the report for accuracy and may include his own recommendations or exclude those made by the committee. However, the law states that the conflict or refusal to grant land rights must first be settled and written consent obtained before the timber utilization contracts are granted. "Where any public identified as suitable for the grant of timber rights and endorsed by the Chief Conservator of Forests is also identified by any other state institution to be suitable for some other national purpose, the matter shall be resolved by the Minister and any other Minister concerned" (Forestry Commission of Ghana 1998).

Once land ownership has been verified, the land's information is advertised, inviting parties to apply for the timber rights (and permitting verification). Requirements for the submission of each land use application include payment of a fee, evidence of timber company ownership or forestry partnerships, and proposed operations. The Timber Rights Evaluation Committee awards points based upon proper completion of the form, whether the applicant intends to process the wood, the competence and qualifications of the timber operations staff, the timber operations record of the applicant (if existent), previous timber rights held, the harvesting plan's details, financial and

[2] "Stool lands" are communally owned properties.

technical ability to carry out the operations, the environmental impacts, fire protection plans, economic impacts, suitability of roads and logging equipment, proposed security measures against illegal encroachment, and proposed disposal of logging and milling operation remains. Any applicant whose request scores above an arbitrary number of points determined by the Evaluation Committee is invited to submit proposals on reforestation and deforestation plans and social responsibility agreements to aid the forest communities in an amount not exceeding five percent of the annual royalty from operations under the timber utilization contract operations. The Evaluation Committee *recommends* the award to be given to the highest scoring applicant. The Evaluation Commission then submits the report of the applicants and its recommendations to the Minister (Forestry Commission of Ghana 1998). Though the process seems to be competitive, arbitrary cutoffs and subjective requirements promote corrupt awarding of concessions.

The Attorney General determines various contract conditions, including the size and limits of the contract area, contract duration, prescriptions by the Forestry Department to which the contract holder must adhere, rent payment to the landowner, grounds for termination or suspension of the contracts, and provision of social services to the communities impacted. Successful applicants must sign a contract agreeing to these terms with representatives of the communities. District Forest Officers will monitor compliance within his district, and the Forestry Department will conduct occasional audits. Inspectors of the Forestry Commission, the Forest Products Bureau, and the Forestry Department may inspect timber operators to verify that they are producing in

accordance with their records. Felled trees must all be marked, numbered and documented (Forestry Commission of Ghana 1998).

The stumpage fee royalties, payable to the landowner, are based upon estimates prepared by the District Forest Officer (Forestry Commission of Ghana 1998). The stool[3] (or other landowner) only receives half of the stumpage fee; the Forestry Commission collects the other half (Forestry Commission of Ghana 2010). The District Forest Officer measures the volume of timber within 48 hours of extraction. Timber cannot be moved unless timber conveyance certificates certify that this has occurred (Forestry Commission of Ghana 1998).

National Land Policy (1999)

The 1999 National Land Policy prohibited any lands with primary forest cover to be cleared for the creation of tree plantation or mining activity operations (Japan International Cooperation Agency 1999: 33). All lands deemed forest reserves are "'fully protected' for ecosystem maintenance, biodiversity conservation, and sustainable timber production" (Ghana News Agency 2010a). In addition, no timber production activities are permitted at gradients of 30 degrees and steeper. However, agriculture, mining, human settlement, and other activities are permitted in those circumstances. Areas within 100 meters of a water body's "high water mark" were declared "protected areas" (Amoako-Nuama 1999: 15). An important object of this policy is to "protect the rights of landowners and their descendants from becoming landless or tenants on their own land" (Amoako-Nuama 1999: 11). Prohibited activities include wetland drainage, damming water courses feeding into wetlands, creating settlements and infrastructure in wetlands,

[3] "Stool" is a term for the traditional communal land owner.

waste disposal in the wetlands, and mining in wetlands (Amoako-Nuama 1999: 15). However, “farming, grazing, fishing, timber production and salt-wining” are permitted in these areas (Amoako-Nuama 1999: 16).

The government may deem “any land with potential for ecosystem maintenance, biodiversity or scenic beauty preservation” a protected area. In these cases, the government must pay annual rent as compensation (Amoako-Nuama 1999: 15).

Ghanaians do not enjoy extensive property rights. Various problems plague land management, such as “land encroachments, multiple sales of residential parcels, unapproved development schemes, haphazard development” (Forestry Commission of Ghana 2010). Because there are no reliable land maps, the boundaries of stool/skin lands are not clear (Forestry Commission of Ghana 2010). Ownership of vested lands is split between traditional communities and the government. Some of the payment due to the landowners from governmental acquisitions is much delayed, placing landowners in a difficult position. Stool, skin, clan or family land cannot pass to family or descendants more than what the other land holding community members are entitled to: “unless approved by the appropriate public authority, no land use change of any kind will be countenanced”. The government can acquire land whenever it desires, and it also “may intermediate in facilitating investors’ access to land owned by stools, skins, clans, families, or individuals” (Forestry Commission of Ghana 2010).

Environmental Permits and Impact Assessments

The 1999 Environmental Assessment Regulation LI 1652 provided for Environmental Permits (this was lately amended in 2002 with minor logistical changes)

(Ghanaian Environmental Protection Agency 1999: 1-4). Environmental Permits are required to "commence or implement an undertaking in Ghana" (Ghanaian Environmental Protection Agency: 2). When the Environmental Permit is followed during the undertaking, an Environmental Certificate is granted to that party.

Environmental Impact Assessments (EIAs) are required for "implementation(s) or development(s) (that) may have significant impact". Relevant information must be gathered and analyzed to realize potential consequences, mitigations and alternatives that should be considered "to ensure environmentally sound and sustainable implementation or development". These are publicly available and required to be as comprehensible as possible (Parker 2011).

Forest Plantation Development Fund

The Forest Plantation Development Fund Act of 2000, which superseded Forest Improvement Fund Act (1960) and its 1962 amendment (Amoako-Nuama 1999: 25), creates a fund to assist in the development of private commercial forest plantations (Forestry Commission of Ghana 2000). This is to develop forest plantations on lands that are suitable for commercial timber production and to promote research and technical development in commercial forestry endeavors. Funding for this program is provided by the 1974 Trees and Timber Decree (via the timber export levy, subject to its 1994 amendments), grants//loans, and parliamentary funding (Forestry Commission of Ghana 2000, Amoako-Nuama 1999: 25). A Fund Management Board (comprised of private sector, governmental, and donating parties) is required to create a "private sector forest plantation development scheme" that includes 200,000 or fewer hectares of land for a

period between 10 and 25 years. Forest plantation inspectors are permitted to visit beneficiary plantations at any time (Forestry Commission of Ghana 2000).

Replanting

The National Forestry Development Programme, which was enacted by the President in 2001, aims to replant 20,000 hectares of forest annually (Benneh 2011). This relies upon private sector participation (Forestry and Agriculture Organization 2008: 1).

Absence of data

Data collected by different environmental agencies is often "guarded rather jealously" at the expense of efficiency and knowledge transmission. Many of Ghana's environmental statistics are kept from the public and other agencies (with few exceptions). International organizations provide much of the available environmental information. Data are collected inconsistently, preventing trend observations. In addition, most people are unwilling to provide information, “feeling that the data collector will use it for a personal financial or prestigious gain so he should pay something for what he wants to collect". Fear of job loss and disapproval by one's superiors also discourages provision of information (United Nations 2005: 2-4, 6-7)

Implementation failures

Although recent policies appear to protect Ghana’s forests, they are not actually implemented. During 2002 and after, the Forestry Commission and commercial loggers

"simply ignored access restrictions and fiscal measures with impunity". And in certain communities, "the state has lost control" over the forestry reserves: there are armed communities willing "to confront Forestry Commission officials, police, and military to protect illegal farming activities" (Forest Watch Ghana 2006: 17). Though there is a provision for "Social Responsibility Agreements" that allocate five percent of timber companies' stumpage obligations to support social projects in the companies affected by their operations, performance cannot be monitored; the communities are unaware of the stumpage obligations (Appiah 1999). However, new legislation provided farmers the right to allow or prevent Timber Utilisation Contract holders from felling trees on their properties.

Only six out of over 600 active timber concession holders registered to pay timber rights fees. These were mandatory, starting in September 1998, under the Timber Resources Management Act. The Ministry of Lands, Forestry and Mines and the Forestry Commission never enforced the permit policy, since industry opposes it and "it involved a redistribution of resource rent" (Forest Watch Ghana 2006: 12). In addition to shaping forestry policies and regulations, large logging operations "systematically violate permit regulations with complete impunity" (Forest Watch Ghana 2006: 9). This logging industry subsidy costs the government at least $100 million US per year (Forest Watch Ghana 2006: 12).

The 1998 Timber Resources Management Regulations (LI 1649) created "Timber Utilization Permits" (TUPs) to allow communities, District Assemblies, and NGOs to use trees for non-commercial use. However, the regulations outlining these permits are vague, and communities have been unable to use these permits. Instead, the Forestry

Commission uses the permits to provide commercial loggers discounted timber; the Forestry Commission issued 125 TUPs to large logging companies between 2001 and 2003 (Forest Watch Ghana 2006: 11). Practically all regulations apply only to rural communities, who have little clout.

Furthermore, the Large Taxpayers Office of the Internal Revenue Service reported that the majority of large logging companies have been registered as "free zone enterprises" under the Ghana Free Zone Board Act since 2001. This entails a ten-year tax holiday in lieu of the 30 percent corporate income tax that should apply (Forest Watch Ghana 2006: 13).

Elimination of Timber Utilisation Contracts

In 2002, the Cabinet approved of the previous government's recommendations to revoke Timber Utilisation Contracts, replacing them with competitive bidding (Ghana News Agency 2002). This is consistent with the 2002 Timber Resources Management Act (617), which provides "legal basis for competitive bidding" (African Development Bank Group 2010).

Stricter penalties

The 2002 Amendment of the Forest Protection Act increased penalties for forestry offenses; fines were increased, and joint liability was introduced. The Community Forestry Management Project (2003) has four components: integrated forest management, sustainable livelihood improvement, "capacity building and institutional strengthening", and "project management support" (African Development Bank Group

2010). The project's aim is to relieve poverty through sustainable forestry development (via strengthened institutions and increased agricultural and forestry production, coupled with rehabilitation of damaged reserves). Collaborative forestry management is a proposed tool. "Smallholders" living near the reserves are expected to plant trees and produce food crops, which would likely increase their incomes. Establishing communities' long-term interest in the trees' performance is crucial for this to work. This is also created to narrow the gap between supply and demand of wood in domestic markets to decrease timber imports. This is funded by the African Development Bank and aims to rehabilitate six degraded reserves (Forestry Commission of Ghana 2010a).

The Timber Resources Management Regulations were amended in 2003 to include competitive bidding for timber rights (after passing through a pre-qualification process) (Forestry Commission of Ghana 2003).

Development of a certification system

The Forestry Commission began to develop a Forest Management Certification System and a computerized tracking system, under the Validation of Legal Timber Programme. The objective of this was to verify the legal origin of timber for exportation, "to secure a bigger and sustainable share of the market through the promotion of verified legal timber products, and thereby seek the support of the EU to offer sufficient incentives to the Ghanaian industry to ensure adherence to the licensing scheme" (GhanaWeb 2005). Ghana exports approximately 60 percent of its wood to the European Union, and the most profitable contracts are through EU customers (Forest Watch Ghana 2006: 26). Therefore, logging companies have sufficient incentives to comply with the

Programme. This would place Ghana on track to certify timber exports to the European Union in accordance with a Voluntary Partnership Agreement. The Programme is completely funded by the Ghanaian government, with Société Generale providing technical assistance (GhanaWeb 2005).

Land and taxation policies encourage deforestation

Property can be held by a family for 90 years before ownership is revoked. If there is a property ownership disagreement following a division, the land reverts back to the original owners (Ansah 2010). The government occasionally "forcefully obtain(s) land" from communities to create forestry reserves (Forestry Commission of Ghana 2000). Hence, there is not a strong sense of property security. There is an incentive to develop land as quickly as possible to place one's stake on it (Ansah 2010): "with few or no rights in the reserves, nearby farmers and communities have had no incentives to protect, manage, or invest in the resource." (Forestry Commission of Ghana 2000). However, this does not guarantee anything and is often wasteful. Taxation also encourages agricultural development: the only items that can be imported duty-free are agricultural implements of any type (including tractors) and musical instruments. In addition, self-employed individuals (such as farmers) are not subject to income taxation (Ansah 2010).

Conclusion

Ghanaian forestry policy has strictly controlled small-scale forestry operations by rural communities with low ecological impacts. In regard to small-scaled operations,

"the provision of draconian punishments for the smallest infringement of forest use restrictions has been the most consistent feature of forestry legislation through the years" (Forest Watch Ghana 2006: 10). Large loggers operate unchecked, and illegal chainsaw cutting is a major source of timber. In regards to ecological and rural livelihood considerations, the policies are often "unbalanced like elephants and ants on cee-saws" (Genius/GZA 1995).

The corporate sector therefore plays a large role in policymaking and unsustainably obtains the vast majority of resources with impunity, at the expense of rural communities. Corruption of the industry and government is a major problem. In order to make any progress, major policy reform and improved implementation to foster sustainable practices and fair access to resources is detrimental: "NGOs are not set up to take on what is essentially a political challenge" (Forest Watch Ghana 2006: 25). Rapid resource depletion and population growth place increased economic and environmental strains on Ghana: time is of the essence in crafting viable policy. There are some concerns about extreme violence, similar to that of Sierra Leone and Cote d'Ivoire (which were peaceful until a sudden collapse). Ethnic tensions have been increasing, and "warlords very quickly link up with (or become) natural resource plunderers" (Forest Watch Ghana 2006: 25).

There is a high degree of official leniency; forestry "reserves" are multi-purposed and can be legally logged, and policy promotes increased exploitation of forestry resources with only rehabilitation of degraded resources to mitigate for the negative ecological impacts. The incentives provided by the policies and extremely limited enforcement do not yet encourage sustainable development, although that was more of a

concern in recent policy. However, forestry policy has not been significantly updated since the 1994 Forest and Wildlife Policy.

Future policy should not repress rural populations; as evidenced by previous initiatives, overly stringent measures only cause communities to blatantly disregard them or rebel in order to support their basic needs. Many policies do not attack the real problem (industry) and would provide insurmountable economic barriers were they to be followed. Great potential exists in "participatory" development that provides the communities with some control and community modernization (using the resources they have) (Forest Watch Ghana 2006: 17). However, funding effective and sustainable forestry policy remains a challenge: "It's hard to be legit and still pay tha rent" (Tupac 1993).

Agricultural policy has had the same history of slow improvement, peppered with a few major failures. As with forestry policy, there still remains much room for improvement, particularly in implementation.

Chapter 4: Agricultural Practices and Policies[4]

As the dominant economic sector with great cultural significance, agriculture is a vital component of Ghana's livelihood. Approximately 60 percent of Ghana's workforce operates in the agricultural and forestry sector, with 64 percent of Ghana's wealth in crop lands. Most of Ghana's poor live in rural areas and are food crop farmers; "any intervention in agriculture… can have (a) profound effect on poverty alleviation among the rural" (Asuming-Brempong 2003). Agriculture has a unique ability to provide social stabilization, buffer shocks in the economy against deterioration in living standards, improve environmental sustainability, and foster cultural values. However, lack of financial adaptability from the predominant "hand-to-mouth" form of livelihood leaves many vulnerable to fluctuations in economic and weather conditions and with practically no room to respond. Because of its deep-rooted dependence upon agriculture, which is experiencing steady declines in both land availability and productivity (due to limited access to proper inputs), Ghana is in a precarious situation, although the vast majority of the population enjoys relative economic prosperity now.

Agricultural productivity is largely based upon the natural resources available to the region. Improper use of shifting cultivation and diminishing forest cover put Ghana at risk; 69 percent of its total land surface area is "prone to severe erosion"; this reduces annual GDP by two percent (Ministry of Food and Agriculture 2010: 61). Overgrazing increases the problem; much of the lands are communal and lack designated livestock

[4] Unless otherwise noted, the information in Chapter 4 is based upon: Ministry of Food and Agriculture. *Food and Agriculture Sector Development Policy (FASDEP II)*: Republic of Ghana, 2007. www.mofa.gov.gh/FASDEP%20II.

grazing areas, so large swaths are prone to erosion. Use of agricultural technologies is extremely limited, with the brunt of production being entirely dependent upon rainfall. Less than 1 percent of arable land is irrigated; the cost of irrigation is prohibitive (Ministry of Food and Agriculture 2007: 18). Because of the weather dependency of food crops, yields of roots, tubers, and vegetables widely oscillate between scarcity and surplus. Much of the arable land has minimal organic content and is not well-suited for farming (Ministry of Food and Agriculture 2007: 12). Poor infrastructure, lack of credit, minimal access to technology, and limited energy availability further hamper incentives to participate in the agricultural sector and improve existing practices, particularly in the realm of environmental and economic sustainability.

The Northern Region, which is semiarid, has the greatest need for irrigation. However, these lands are comprised of voltaic sandstone, which has low fertility and water capacity, limiting agricultural potential (Pleasant Valley Conservancy 2009: 1). Because there is limited ground water capacity, dams would be the primary means of irrigation infrastructure (Kuyini 2005: 1). The Kpong Irrigation Project (which was completed in December 2003), which distributes water from the Kpong Dam through canals, has caused water tables to rise (MASDAR 2009). This, along with increased agricultural activity, has increased erosion, soil salinity, and human exposure to agrochemicals (African Development Fund 2005). However, the Agricultural Development Bank has cut funding, due to poor governmental planning (Ghanaian Chronicle 2001).

However, officials of the Ministry of Food and Agriculture (MoFA) believe irrigation should be increased, as there exists a “well-endowed network of water bodies

which can be tapped for irrigation" (Ministry of Food and Agriculture 2007: 21). This is the same extractive and destructive mentality that has harmed the forestry sector. Agriculture should not be dependent upon irrigation, and lack of it does not permanently damage the soil, unlike fertilizers, which improve soil quality, increase sustainability, and augment crop yields.

Ghanaian agriculture is inefficient, due to limited access to inputs (because of limitations in both credit and affordability), land property-owning systems that hamper ability to invest, poor soil conditions, erratic precipitation, disease, pests, and poor breeds (of both plants and livestock). Lack of knowledge regarding "post-harvest management", especially of perishable produce has caused extensive post-harvest losses of up to 50 percent of yields. Traditional processing methods are most commonly used but tend to have low yields of poorer quality (but the exact opposite is true of palm oil).

Poor infrastructure increases the costs of agricultural inputs like fertilizer. And in spite of its comparative advantage in horticultural crops, such as pineapple, Ghana is less competitive to Latin American, East Asian, and neighboring countries. This has been primarily attributed to poor infrastructure, high capital costs, lack of irrigation, poor quality control, and insufficient management of logistics.

Gender inequality problems are largely intertwined with agricultural practices, in regard to both human rights and overall economic efficiency considerations. Lack of feeder roads between farms and villages require manual transportation of produce, and this is predominantly the women's duty. Women are also responsible for the majority of household responsibilities, marketing, and agricultural work, culminating in a "triple workload". Even women whose livelihoods are connected with families conduct a large

share of agricultural work. Men tend to migrate to the cities for work and send home money to support their families, while the women conduct all of the household responsibilities and agricultural work. In addition, female access to land and capital is limited because of "cultural and institutional factors"; for example, lack of legal ownership over tangible assets translates into incapacity to possess collateral for obtaining credit. Furthermore, extension services largely ignore women, as the extension agents do not consider them legitimate farmers. Therefore, a large number of households are completely neglected by extension services, and fewer than 20 percent of extension services reach women. These extension services are vital, as they also play a key role in improving food safety.

Due to low literacy among farmers, dissemination of information is hampered. A disproportionately higher prevalence of poverty within the agricultural sector also limits new practice adoption, as lack of economic viability limits purchasing power and increases risk-aversion. Approximately 80 percent of Ghana's total agricultural output is produced by subsistence farms that use minimal forms of technology, and 90 percent of agricultural holdings are less than two hectares. Many agricultural producers do not recognize the relationship between the health of the environment and agricultural productivity.

Although modern Ghana as a whole has enjoyed food security, there are segments of the population that lack this in all regions: "for most households, hunger is frequently associated with poor harvests resulting from environmental degradation, poor weather, natural disasters, or conflict. Almost all families supplement their food requirements with significant amounts of purchased staple crops". Malnutrition is most problematic

for children, adolescents and pregnant women, due to insufficient levels of food intake and/or diets lacking proper levels of nutrients. Malnutrition contributes to 40 percent of childhood mortality. Seven percent of children are "wasted" due to acute malnutrition, down two percent from 1998. There are 11 times more underweight children than in a typical well-nourished population.

Limited collateral vastly diminishes credit, due to minimal value assets and lack of official ownership by women (whose impact on the sector is enormous) and other economically disadvantaged actors. Additionally, interest rates are high, and financiers view agriculture as a risky sector. The ADB, which primarily loans to large traders, farmers, and processing units, provided but 28 percent of the total demand for credit in the agricultural sector in 2006.

Many policies are still based upon the pre-independence structure. Many policies are based upon repeated mistakes, some upon successful endeavors, and a few are experiments. Because governmental interventions in the cocoa subsector, as in providing vital agricultural inputs, have been successful in reducing poverty within that arena, these form the basis for initiatives of the second Food and Agricultural Sector Development Policy.

Colonial Policy

Before Ghana became independent from Britain, agricultural policy created by the colonial rule bolstered food and raw material production for the Empire's benefit. The Gold Coast was expected to provide Europe with raw inputs to be processed abroad. A poll tax law passed in the early 1900s further encouraged most sustenance farmers to

produce cash crops, especially cocoa (Girdner *et al* 1980: 14-25). Several governmental programs were implemented to promote cash crop production (in particular, oil palm and cocoa) and agricultural development in general, such as the 1919 Ten-Year Development Plan. To increase efficiency within the agricultural sector, the colonial government developed a road and railway infrastructure, particularly in the South (Asuming-Brempong 2003). *U*nlike many of its neighbors, Ghana fortunately did not face "large-scale land alienation and harsh labour codes" (Girdner *et al* 1980: 14-25). Plantations were also not as common in Ghana, due to a belief of increased resiliency in small-scale agricultural operations (World Rainforest Movement 2010).

However, colonial influences discouraged "subsistence economic activities" in the Gold Coast (Ghana) so that the colony would be profitable to Britain in exporting to it minerals, cash crops, and timber. "Extractive industries" faced low taxation, and agricultural products grown by the rural poor were sold below their true value. Most of the profits were retained by European companies, and much of what remained in the Gold Coast paid the colonial administration (Forest Watch Ghana 2006: 19).

It was not until 1946 that another 10-Year Development Plan was penned for the then Gold Coast (Asuming-Brempong 2003). A few similar plans were implemented until the Nkrumah administration modeled a new plan based on Eastern European countries following independence.

Cocoa

Poorly designed policies have had detrimental effects on Ghana's single-most important industry, cocoa. Over-reaching policies have greatly hampered cocoa

production. It is also epitomizes Ghana's sacrifice of food crops for export crops. The majority of the Ghanaian government's funding was solely derived from cocoa, the nation's bumper crop (Ascher 1999: 1-279). The repercussions of heavy taxation on the most economically successful industry in Ghana were widespread. However, there have been a few successful policies, such as governmental provision (and subsidization) of agricultural inputs, such as pest and disease protection for the crops.

The Gold Coast Cocoa Marketing Board, also known as COCOBOD, was officially established in 1947 (COCOBOD 2010). Though COCOBOD's ostensible purpose was to improve cocoa production infrastructure, rehabilitate farms, improve harbor infrastructure, conduct research, and prevent crop disease, it soon became highly politicized by the dominant Convention People's Party (CPP) in the 1950s. All non-governmental cocoa purchasing companies were banned, and a state agency—the United Ghana Farmers' Council Cooperatives, or UGFCC—was created to exercise complete control over cocoa cooperatives. The UGFCC "had both a political and an economic monopoly". Since the UGFCC and state-run Cocoa Board were extremely powerful and implemented a variety of activities (such as taxation, purchasing cocoa, making loans, running cocoa cooperatives, providing technical assistance and crop disease treatment, operating health centers, providing scholarships, and supporting the University College), there was no accountability in fund allocations to the "producing areas" (Ascher 1999: 1-279). COCOBOD's internal marketing monopoly also prevents marketing efficiency via competing buyers that would improve producer prices.

A large gap between cocoa export and farmgate prices developed as revenues were allocated to general governmental funds; "public cocoa income" comprised 60

percent of export sales in 1953-4. In addition, Cocoa Board reserves were made available for loans and grants unrelated to cocoa production and/or marketing. A 1954 ordinance allocated 40 percent of the funds to finance the national development plan, 40 percent to fund large-scale projects beyond the national development plan's scope, and 20 percent was given to the central treasury (Ascher 1999: 1-279).

Cocoa taxation was also structured to encourage urban development and discourage agriculture, though cocoa production was and remains the staple of Ghana's economy. Unity within the CPP, which was pro-industry, enabled this gross exploitation of the cocoa industry. "Ghana's most precious export commodity" was likely put at such risk because of low expected political and other retaliation from the cocoa industry, desire to industrialize the economy, and ease of obtaining cocoa surpluses. Taxing agriculture for "self-reliance" led to "agricultural decline and inefficient industry" (Ascher 1999: 1-279).

Taxation was so high that between 1975 and 1985, producers often received less than ten percent of the world market price. Coupled with plummeting world prices, cocoa production drastically declined. The combination of decreased production of Ghana's single greatest source of revenue with high inflation culminated an economic crisis in the 1980s (Ascher 1999: 1-279). And though cocoa comprised 14 percent of national GDP in 1970, this figure declined to 3.5 percent in 1980 and further to 2.6 percent in 1982 (Asuming-Brempong 2003).

Fortunately for cocoa producers, as a condition for IMF and World Bank funds, the government agreed (in part with other reforms) to raise cocoa producer prices in 1983 (Ascher 1999: 1-279). Cocoa output eventually increased, aided by devaluation of the

Cedi. Government programs that "mass spray cocoa farms" to protect the crops from pests and disease and higher nominal producer prices have also augmented production *(*Asuming-Brempong 2003). However, only industrial tree crops (like cocoa, coffee, and oil palm) were assisted by the government (US Library of Congress 2011).

The 1988-9 Cocoa Rehabilitation Project (CRP) was a result of the 1983 ERP, which pushed stabilization and structural reform. The CRP was the first cocoa project in Ghana to be funded by the Agricultural Development Bank. Stated objectives of the CRP were: increased cocoa production, augmenting foreign exchange earnings from cocoa exportation, and reduced rural poverty. The project took ten years to implement instead of the intended five. Due to an improved producer price, hybrid seed availability, and governmental disease/pest control, the CRP was successful in increasing cocoa production (African Development Bank 2002).

Eventually, governmental control of cocoa production in general decreased drastically. The Ghana National Association of Farmers and Fishermen was established in 1991, in place of the Ghana Federation of Agricultural Cooperatives. Funding from the farmers was expected to run this cooperative in place of governmental sponsorship. The lack of financial support from the government put farmers in a hard position (U.S. Library of Congress 2011).

In addition, the Cocoa Marketing Board's control over pricing and marketing eventually declined (U.S. Library of Congress 2011). Two new buyers (Universal Crop Production Limited and Cashew and Spices Products) were licensed to buy cocoa in 1992 (in addition to the Produce Buying Company, which is one of COCOBOD's

subsidiaries). Even more cocoa buying agencies have been licensed recently (Asuming-Brempong 2003).

Cocoa prices have increased by about three times since 2001. The second Food and Agriculture Sector Development Plan aims to increase the amount locally-processed cocoa from 20 percent in 2002 to 40-50 percent in 2007. This is incredibly optimistic, and as seen by the forestry sector, extreme optimism may not be the best approach. Sometimes processing does not actually increase profits, due to high levels of waste.

Post-Independence

Socialism

The post-independence government, led by Kwame Nkrumah, was heavily influenced by Eastern Europe and the Soviet Union. It created 1,089 state and cooperative farms from 1961 until it was overthrown in 1966. The Agricultural Development Corporation and State Farm Workers Brigade and Farmers' Co-operative were established in 1963 to modernize and increase the national scale of agricultural endeavors (Asuming-Brempong 2003). However, the performance under this socialist system was poor.

Price controls were introduced with “quantitative import restrictions” that began in 1962. The government’s aim was to decrease inflation and protect the consumer, preventing both importers and domestic manufacturers from “earning monopoly rents”. Items included imported consumer goods and domestically produced good with “high import content”. The price controls, however, did not extend to most local food products (Killick 1973: 405-26). Maximum prices were set for manufactured goods and minimum

prices for “major agricultural commodities” such as cocoa, corn and rice (Asuming-Brempong 2003).

However, price controls are only effective when conditions enable there to be “large monopoly profits”. Corruption also prevented improved enforcement that would have made the price controls more effective. Hence, the controls were mostly ignored, especially in urban markets and rural areas as a whole. Only urban shops, which have predominantly elite clientele, abided by this policy. Hence, the inequalities in living standards were only broadened, as the elite reaped the benefits of discounted goods (Killick 1973: 405-26). The price controls only exacerbated the existing problems of scarcity and inflation, as the amount of imports was drastically limited and governmental spending increased (Meier and Steel 1989).

State-run large-scaled operations, such as State Farms and the Food-Production Corporation “have been notoriously inefficient” (Girdner et al 1980: 14-25). These farms were most dominant for five years during the 1960s. Though the governments supported large-scale farms since the 1950s, state farms only began to be majorly implemented in 1962, following a recent plummet in world cocoa prices and foreign exchange shortfalls that reduced imports in raw materials and food (Miracle and Seidman 1968: 3-50).

The State Farms Corporation (SFC) began operations in June of 1962 (though it was not officially established until the following January). Its purpose was to expand agricultural production, at which the government felt that the traditional sector was failing (Miracle and Seidman 1968: 3-50).

The 1963-4 Seven-Year Development Plan aimed to increase basic food crop production, expand crops into “uncultivated” areas (to put “idle land resources…to

productive use"), and boost export crop and meat production. In eagerness to dominate the land and produce, many valuable resources were wasted. Though these data vary widely, of Ghana's approximate million acres of agricultural lands, it has been estimated that state farms held roughly 250,000 acres, 203,000 of which were cleared, with only 99,000 cultivated (1965) (Miracle and Seidman 1968: 3-50).

Some organizations, such as the state-run Workers' Brigade (which contained many unemployed citizens who were paid to work the farms), worked in concert with state farm productions; the Brigade grew roughly 13 percent of State Farms' crops. However, many Brigade workers and camps were "fictitious", with its supervisors pocketing the money (Miracle and Seidman 1968: 3-50).

In 1967, the SFC created several processing mills. However, it lacked adequate staffing, in regards to both competency and number of employees. Resources were set aside for the workers to live on the farms, but the vast majority chose to remain in their villages. Use of mechanized equipment was limited, due to inadequate training and risk of erosion (with the clearing of large swaths of land). Regardless of the inefficiencies, the production targets were very optimistic, and during the State Farms' lives, there was always a great disparity between these and the actual results. Due to large expenditures, such as for unused machinery and supplies to encourage living on the farms, coupled with small returns, the SFC posted of a loss of approximately $4 million in 1964, $7 in 1965, and $9 million in 1966 (Miracle and Seidman 1968: 3-50).

The 1964 Sever-Year Plan focused on industrialization, with the ambitious goal of an 83 percent increase in industrial output by 1970. Import substitution was another focus of the policy, as was the creation of a processing industry for raw agricultural and

mining products. The plan's aim was to focus on a few commodities and apply more advanced forms of agricultural and technical knowledge because of that specialization. The commodities were chosen based on nutritional benefits (i.e. cereals and fish) and/or the ability to solve Ghana's trade deficit (i.e. sugar and cocoa). Extension services by the government were used to augment agricultural development (Asuming-Brempong 2003).

This socialist approach to administration diverged from the colonial administrative strategy. State enterprises were established to support economic development and industrialization. Various other policies were implemented for the same reason, including internal price controls, establishing a minimum wage, controlling the interest rate, over-valuing the exchange rate, and providing free importation of capital equipment to promote industry and use of technology. The creation of farming cooperatives was encouraged, as this was thought to increase access to machinery and modern agricultural techniques. The Seven Year Development Plan was scrapped just two years later with the 1966 coup, and the military and civilian governments that followed created their own 2-Year and 1-Year Development Plans (Asuming-Brempong 2003).

Economic liberalization

Because Ghana's economy has been highly dependent upon agriculture, most regimes were empowered or overthrown because of their agricultural platforms. Discontent related to rising food prices and lack of imported raw materials that limited both agricultural and industrial operations were major reasons for Nkrumah's upset

(Miracle and Seidman 1968: 3-50). The plans following the 1966 coup promoted liberal economic policies and development of the private sector (Asuming-Brempong 2003).

The National Liberation Council government that claimed control in 1966 focused on economic stabilization by pushing a "market-oriented" economy. "Stringent stabilization measures" were taken by minimizing gross national expenditure, liberalizing trade, devaluing the Cedi (most major in 1971), and cutting public capital expenditures. Several state-owned companies were sold to the private sector, and others were re-organized under the Ghana Industrial Holding Corporation, starting in 1968. Import licensing and ceilings were cut, and export subsidies for crops other than cocoa were initiated (Asuming-Brempong 2003).

The overly optimistic import substitution strategy of the 1960s was funded by increasing the money supply, although a major budget deficit already existed. The capitalist military and following civilian governments that controlled Ghana after Nkrumah's 1966 overthrow completely abandoned this, but import tariffs were low and the balance of payments problem remained. To solve this problem, the Cedi was devalued to increase exports. In addition, single commodity development boards were established to aid subsistence farming efforts (Asuming-Brempong 2003).

Re-introduction of restrictive polices

The Agricultural Development Bank was established in 1968 to provide credit for funding agricultural improvements. The government also improved the infrastructure in rural areas to encourage rural inhabitance. However, the next government and others during the political turmoil of the 1970s completely reversed economic policy again,

overvalued the Cedi, and re-implemented price controls. This caused per capita income to plummet by 40 percent. Agricultural production decreased from the 1960s until the Economic Reform Policy/Structural Adjustment Program (ERP/SAP) of 1983 was adopted (Asuming-Brempong 2003).

The decline was due in part to poor economic policies and weather conditions. Commodity prices greatly dropped during the late 1960s, and infrastructure and governmental services in general have been inadequate since. This problem is compacted by limited access to agricultural inputs, which have not been subsidized since the 1983 ERP. Consequently, the "food self-sufficiency ratio" fell from 83 percent between 1961 and 1966 to 71 percent in the period 1978-80; food imports quadrupled during the 1972-82 period. Drought caused food shortages and decreased export crop production (U.S. Library of Congress 2011).

Because the desired results from the import restrictions and price controls did not come to fruition, just before the 1972 military coup, the government drastically reduced the number of products previously included in the controls. However, the new military government re-expanded the number of items subject to import restrictions (Killick 1973: 405-26).

Food shortages sparked the overthrow of the democratic government in 1972 by a military regime that created and implemented the Operation Feed Yourself (OFY) policy that same year. Although food production was actually declining, OFY called for "national self-reliance based on increased food production". The agricultural growth rate was only 2.6 percent between 1969 and 1972, but the targeted growth rate under the policy (to begin in 1973) was unrealistically set at six percent (Girdner et al 1980: 14-25).

Adverse weather conditions widened the disparity between the amount that the farmers were able to produce and that which the government had expected (Asuming-Brempong 2003). A food shortage obviously resulted and the price of food subsequently skyrocketed (Girdner et al 1980: 14-25). These, joined with plummeting mining and timber operations, lead to the economy's drastic decline between 1972 and 1982. The economy's failure and high previously-accumulated deficits prompted the government to borrow large sums of money. The government then expanded the money supply, which caused inflation to soar from nine percent in 1970 to 123 percent in 1983 (Asuming-Brempong 2003).

In a desperate attempt to increase the supply of food, Operation Feed Yourself encouraged the Ministry of Agriculture, state-run agricultural corporations and agricultural boards, schools, colleges, prisons, the armed forces, private corporations and individual citizens to engage in agricultural production. The Ministry of Agriculture also pushed production of the most efficient crops on a regional basis (Girdner et al 1980: 14-25).

However, farmers were only granted Agricultural Development Bank loans if land ownership was documented properly. This practice continues. Since most land is communally owned, with land granted by the local chief, this policy is problematic for a typical small-scale farmer. It is difficult to use undocumented communal lands as mortgage collateral. In addition, land registration for loans must also be done in Accra; due to transportation limitations, this is not feasible for many communities. The administrative process itself is flawed as well; "delays and mix-ups" are common. If a

farmer somehow is able to successfully complete the application process, s/he typically does not actually receive the loan until one to two years later (Girdner et al 1980: 14-25).

Expansion of state-run agricultural activities was pushed once more via OFY. However, repayment of debts (to the Agricultural Development Bank, founded in 1965) by State Farms and the Food Production Corporation continued to be poor, and funds were not used as intended; they were often spent on "payment of old debts, personal allowances, salaries, and the acquisition of capital items not having any immediate bearing on production". The government did not publicize annual yields information, and food shortages were common, evidencing the large-scaled operations failures (Girdner et al 1980: 14-25).

The recurring theme of limited cooperation among state agencies was fortunate in this instance. The wasteful State Farms operations died out, in part due to the Agricultural Development Bank discontinuing OFY corporation funds as of 1975. But failing large enterprises continued to receive the majority of governmental aid while neglect of small farming operations remained (Girdner et al 1980: 14-25).

The ADB is notorious for holding overly stringent standards for loans to farmers. This is partly due to the astronomical losses to the Bank from State Farms. The ADB was forced to take this measure to protect itself from collapsing, but the lack of funding available to sustenance operations impedes agricultural efficiency. Since the government had promised financial aid, difficulty in receiving loans diminished faith in the government. In addition, the Extension Service and similar organizations that were given the responsibility of implementing OFY did not act in a manner that impacted the food producers *(*Girdner et al 1980: 14-25).

A 1980 article by the IPC Business Press stated: “until quite recently, few attempts at eradicating the problems inherent to a mono-crop economy had been made by modern Ghanaian governments”. In addition to extensive governmental funding, export crop producers (predominantly large-scale cocoa farmers) have received basically all benefits of agricultural research, such as improved seeds, pest control, and improved production techniques (Girdner et al 1980: 14-25).

In 1977, plantations were created with joint ownership between the government and private sector (both domestic and foreign). Two of the three major oil palm plantations created had joint private and governmental ownership, and the third (GOPDC, which was divested in 1995) was owned by the state but given foreign assistance (World Rainforest Movement 2010). Following the 1981 coup, many similar operations proliferated due to governmental support.

The regime that assumed power in December of 1981 immediately reduced the amount at which the Cedi was devalued from 78.2 percent to 25 percent. The government played an even stronger role in agriculture, as was apparent with the reintroduction of import licensing (which are non-tariff trade barriers), price controls, and the import substitution strategy. Consequently, engagement in black market activities soared. Inefficiency, overstaffing, fraudulent allocation of public funds, and poor accounting practices by the public sector were also problematic. Falling world cocoa prices and once again, adverse weather conditions placed additional strain on the national economy (Asuming-Brempong 2003).

Crisis

By 1983, the economic decline was unrivalled (Asuming-Brempong 2003). Due to scarcity, locally produced foods in 1980 were more expensive than imported equivalents. The consumer index, based upon year 1963, reached 226.7 (and 259.4 for the local food index) in 1972, but in 1977 was a whopping 1,729.2 (2,677.8 for the local food index) (Girdner et al 1980: 14-25). Food self-sufficiency was 83 percent between 1964 and 1966 but only 60 percent in 1982, although the economy was impaired mostly due to failed attempts to reduce dependence. The deficit soared as total public expenditure outpaced government revenue by 65 percent (Asuming-Brempong 2003).

Gradually returning to economic liberalization

Though subsidization of agricultural inputs (such as fertilizer and other agrochemicals) created "bottlenecks" in their availability, the gradual removal of those subsidies (via the ERP and SAP)—though meant to improve efficiency—may have been more detrimental. The costs of these inputs became entirely prohibitive, which has led to soil depletion and subsequent diminished agricultural productivity. However, agricultural investments were prioritized, with loans and grants as the primary means for such (U.S. Library of Congress 2011). In addition, the Cedi's exchange rate was realigned (Asuming-Brempong 2003).

Reforms in 1983 limited governmental involvement in production, distribution, and marketing, both of inputs and products (Khor 2006). Guaranteed prices for corn and rice were cut, and imports were then allowed to compete with domestically produced

items. However, cocoa continued to have a guaranteed price, since it is so vital to Ghana's economy (Asuming-Brempong 2003).

But as with OFY, the policy failed; all major foods (except yams) experienced higher price instability during the post-liberalization era than before the so-called reforms (Asuming-Brempong 2003). In addition, subsidy removal of agricultural inputs hindered the Ghanaian farmers' capabilities to compete with cheaper imports supported by other governments' subsidies on inputs. Hence, several industries failed, such as rice, poultry, oil palm, and cotton production.

Basically all palm oil is hand-processed in villages by women. The only inputs are water, a large pestle, fire, and human labor. The remaining palm nuts and fibers are re-used, so this is a very efficient method. In addition, hand-produced palm oil is strongly preferred by consumers, due to its higher quality. However, industrial oil palm production is being promoted by the government now, mostly due to its use as a biofuel (World Rainforest Movement 2010).

Agricultural production declined until the Economic Recovery Programme (ERP)/Social Adjustment Programme (SAP) of 1983 was adopted (Asuming-Brempong 2003). The ERP was provided IMF and World Bank assistance, in order to reduce Ghana's debts and improve trade. However, the World Bank's assistance depended upon developing the private sector (U.S. Library of Congress 2011).

The ERP's focus was on the export sector, not food production (U.S. Library of Congress 2011). The ERP and SAP liberalized importation. It also improved foreign exchange rates, improved infrastructure, privatized state-owned enterprises, and liberalized trade. The policy's stated goals were: "restoring economic productivity at

minimum cost to the government", lowering inflation (through trade, fiscal and monetary policies), improving foreign exchange rates, liberalizing trade, restructuring the economy (through privatization of state-owned enterprises), enhancing infrastructure to boost commerce, and increasing availability of necessary goods (Library of Congress 2011). The ERP/SAP aimed to deregulate "both the input and output markets" (Asuming-Brempong 2003).

The policy was implemented in three phases. During the first, governmental expenditures was reduced in order to encourage private production. This cut the deficit from 6.3 percent of GDP in 1982 to 0.1 percent in 1986, even though large infrastructure improvements took place in 1986. The government sold assets, increased privatization, and implemented exchange reforms to devaluate the cedi during the second phase (1987-9). Foreign exchange bureaus were introduced in 1988, cutting the "hard-currency black market". The final phase involved more monetary reforms and reduced corporate taxes (Library of Congress 2011). However, monetary policies flipped back and forth between being restrictive and liberal between 1985 and 1995 (Asuming-Brempong 2003).

The 1987-90 Agricultural Services Rehabilitation Project (ASRP) had similar objectives. The policy aimed to strengthen and improve the services of the Ministry of Food and Agriculture and reform existing practices to privatize production and marketing of various agricultural inputs (such as veterinary drugs and fertilizer) (Asuming-Brempong 2003).

The annual agricultural growth rate decreased from 3.57 percent during the 1980s to 1.97 percent during the 1990s (Asuming-Brempong 2003). Also due to the ERP (and its subsequent import liberalization and lack of available credit), many governmental

workers became unemployed (aka “retrenched”); 18,000 workers were “retrenched” from the state enterprises and civil service and another 40,000 by the Ghana Cocoa Board. Budget devoted to agriculture plummeted from ten percent in 1983 to 3.5 percent in 1988. PAMSCAD was created to mitigate for the negative social consequences of the ERP (and related economic reforms), and its focus was aid to the poorest citizens, who were primarily small-scale miners and artisans (U.S. Library of Congress 2011).

Improving upon the ERP/SAP

Though the economic policy reforms greatly contributed to environmental degradation, PAMSCAD did not address this. The ERP greatly increased incentives to produce export crops like cocoa, but the costs of improved agricultural technologies drastically increased. Therefore, these were not commonly used, leading to reduced overall agricultural productivity. Hence, more land became cultivated and degraded, worsening deforestation (Asuming-Brempong 2003).

The Programme of Actions to Mitigate the Social Cost of Adjustment, or PAMSCAD (1988), facilitated “donor-funded community initiated development projects”, supported education, increased employment, and provided assistance to retrenched civil servants and other workers. PAMSCAD was successful in improving the livelihoods of those who were harmed by the ERP/SAP. The Programme was strongly supported by donors. Water and sanitation also greatly improved, and this positively impacted agricultural productivity. However, poverty worsened during the mid-late 1980s, and many individuals moved from urban to rural areas (Asuming-Brempong 2003).

The Financial Sector Adjustment Programme (FINSAP) was created in 1988 with financial assistance from the IMF and the World Bank. This was created to address "structural and institutional weaknesses of the financial sector" in order to increase the Structural Adjustment Program's effectiveness. Deficits were cut, and the money supply was controlled more stringently. The Cedi's exchange rate was converted from a flexible to a fixed rate. Rural banks were restructured by the Bank of Ghana, through the 1989-92 Rural Finance Project (which was also World Bank funded). This was to mitigate the agricultural productivity decline of the 1970s-80s, by enhancing local capacity to create and implement rural finance policy (Asuming-Brempong 2003).

Prior to these reforms, credit was granted to "priority sectors" (such as the agricultural sector). Because of this, loans to agricultural endeavors were required to comprise at least 20 percent of those allocated by banks. The Central Bank fixed interest rates on loans to agriculture at least two to three percent below rates to other sectors. However, these credit ceilings were removed by FINSAP. Many claim that FINSAP has increased credit mobilization and efficiency in credit allocation. However, credit to "priority areas" has been decreasing. Only 15.9 percent of total loans in 1990—considerably lower than the mandated 20 percent—were allocated to agriculture by commercial and secondary banks, and this further declined to 5.7 percent in 1995 (Asuming-Brempong 2003).

Agricultural real output even declined in 1990 and 1992; between 1989 and 1992, the agricultural growth rate was the lowest in recent years, at 2.6 percent, with shrinks of two percent and 0.6 percent in years 1990 and 1992. However, the services sector grew unprecedentedly. Lending rates have been high (almost 50 percent annually in the 1990s)

and available credit low. Agriculture has low rates of return; financial institutions instead invested in treasury bills and other assets that bear high interest rates. Agriculture is rain-fed and therefore depends entirely upon weather conditions, so yields are uncertain (Asuming-Brempong 2003).

Subsidies for agricultural inputs were completely removed by 1991. The agricultural sector also took a hit from the excess demand for foreign exchange, which devalued the Cedi; agricultural inputs from abroad became unaffordable. Because the increases in the prices of improved agricultural technologies therefore outpaced prices of agriculture output, they were (and are) not implemented. Hence, agricultural productivity has remained low; increased levels of production have only occurred because more land was exploited. Incentive to produce agricultural outputs that are not exported was decreased: because other countries subsidize inputs, domestic producers are unable to compete, regardless of the discount benefit from the undervalued Cedi. In addition, post-harvest losses are high from limited storage and processing capability (Asuming-Brempong 2003).

The 1991 National Feeder Roads Rehabilitation and Maintenance Project was created to facilitate economic development in rural areas. By improving feeder roads, transportation costs decrease and ease of agricultural endeavors is improved. The four-year project includes a contracted feeder road rehabilitation and maintenance program, a "sustainable management system", institutional support (to improve planning and supervision), and support in decentralizing the Department of Feeder Roads (World Bank 1999).

Policies to reverse the decline in agriculture

The PNDC party focused on augmenting local food production during the early 1990s. The Medium Term Agricultural Development Program (1991-2000) was formulated to "attain food self-sufficiency and security by the year 2000" (U.S. Library of Congress 2011). The MTADP guided the Ministry of Food and Agriculture during the 1990s. The World Bank funded much of this, again on the condition of privatized agricultural marketing and freer market pricing. Input supplies were liberalized in order to increase supply reliability, as competition due to lower prices diminished what was available (Asuming-Brempong 2003).

MTADP objectives were to be achieved via "market-led growth in agriculture"; governmental output and input intervention declined, but the state increased infrastructure (as through feeder road establishment and repairs), irrigation, crop disease research and extension services. As with most other policies, industrial production and improved balance of payments were stressed (Zimmerman et al 2009). Because of World Bank suggestions, the government continued to depend upon the private sector to implement these measures; unfortunately, this put subsistence agricultural endeavors at a gross disadvantage (U.S. Library of Congress 2011). With limited state assistance, vital services (such as fertilizer application and pest control) are lacking.

MTADP programs aimed to increase annual growth in agricultural GDP to four percent. MTADP projects include the Agricultural Diversification Project (1991-9), National Agricultural Research Project (1991-9), Land Conservation and Smallholder Rehabilitation Project (1991-7), National Agricultural Extension Project (1992-2000),

Agricultural Sector Adjustment Credit (1992-9), and Agricultural Sector Investment Project (1994-2000) (Asuming-Brempong 2003).

*T*he Agricultural Diversification Project was created w*ith the intention of increasing production of non-cocoa* tree crops, such as oil palm, coffee, and rubber, and horticultural crops (i.e. pineapple) for exportation and import substitution so that Ghana will be less dependent upon cocoa. *The ADP* provides "training and technical support" to farmers and institutions that produce the "target crops" (Asuming-Brempong 2003).

The National Agricultural Research Project (NARP) attempted to develop and reform research management, human resources, research facilities, library/information systems, and sustainability of financial resources. The government and a few other donors financially support Ghanaian agricultural research, but the funding is unreliable. NARP called for all contributions to be routed through the National Agricultural Research Committee, though other options, like a donation-fed research development fund, were "explored" (Asuming-Brempong 2003).

The Land Conservation and Smallholder Rehabilitation Project encouraged retired public and civil sector employees to farm. To do so, credit and training was provided (Asuming-Brempong 2003).

The number of agricultural extension agents was increased from one agent per 1,504 farmers in 1991 to one per 780 in 2000 due to the National Agricultural Extension Project (Asuming-Brempong 2003). Extension agents, among other things, apply research knowledge and instruct famers about improved agricultural technology and practices (Bokor 2005). It is worth noting that the number of extension agents has

dwindled to one per 3,000 and that unreliable transportation decreases the agents' efficiency (Ghana News Agency 2007).

The Agricultural Sector Adjustment Credit supported agricultural sector reforms and poverty alleviation. ASAC requested creation of poverty reduction programs from the government in 1992-93 (Asuming-Brempong 2003).

The Agricultural Sector Investment Project aimed to increase the allocation of technical and financial resources towards rural development. This also supported agricultural processing, market infrastructure, storage capacity expansion, maintenance of feeder roads, and provision of water in rural areas (Asuming-Brempong 2003).

The Accelerated Agricultural Growth and Development Strategy (AAGDS) of 1996 followed the MTADP to promote agricultural growth. Proposed initiatives included: increased marketing access for certain products, access to financial services and technological advancements for sustainable production, infrastructure, and human resource and institutional capacity (Asuming-Brempong 2003).

The 1996 civilian government launched the VISION 2020 Framework (Asuming-Brempong 2003). The Framework was introduced in 1996 with the objective of transforming Ghana into a middle income state by year 2020 (Government of Ghana 1995). Its focus was on agriculture and forestry to provide these improvements, with education cited as the biggest impediment to achieving the VISION 2020 goals (Oteng 1999). VISION 2020 "is not a plan but a planning framework to provide guidance to planning agencies to prepare their own development plans". This defers the power to the agencies. The actual plans were to be created and implemented by "Ministries, Sectoral

Agencies, and District Assemblies"; these are the "Planning Authorities" (Government of Ghana 1995).

VISION 2020 set the goal of an annual growth rate of agricultural output at four percent (1996) by year 2000, compared to an actual rate of 1.8 percent prior. As with other failed policies, VISION 2020 was overly ambitious. Therefore, it only lasted for five years (instead of 24). In spite of this, the plan's first five-year rolling plan (5YRP) included concrete and useful steps, such as increasing all farm inputs, improving infrastructure, encouraging private enterprise (with a plan to privatize all state-owned agricultural enterprises by 2000), and diversifying crop production (Government of Ghana 1995). It included initiatives to decrease deforestation and drought as well (Iddrisu and Telly 1999). The 5YRP is intended to be a "reference document that informs the entire country as well as the international community of the enabling environment to be provided by Ghana government (sic) in support of private investment". It is also used to inform NGOs of broad social and economic intentions (Government of Ghana 1995). Because Ghana is very "aid-dependent" (Jeffrey 2009), it is necessary to inform the international community in order to fund these initiatives.

In 2001, VISION 2020 was declared "dormant" and "dead" by the government in official statements made by the Minister of Economic Planning and Regional Cooperation and the Minister of Finance (Ghana News Agency 2001), (Accra Mail 2001). During its short life, the program did not receive adequate funding (Ghana News Agency 2001). This has been attributed to political reasons; the year 2000 marked a majority party switch from the NDC to the NPP (Accra Mail 2001).

The 1997 Village Infrastructure Project was created to improve rural living standards. One initiative is improved rural water infrastructure and management, with an emphasis on water conservation techniques and investments in technologies that would provide water for human consumption and agricultural use. The Project also aims to improve feeder roads. Improvement of post-harvest infrastructure was also a priority, with aims of providing community crop drying (to cut post-harvest losses), storage, and processing facilities. The Project also intended to increase the roles of District Assemblies, NGOs, and other community organizations (World Bank 2000).

The Smallholder Credit, Input Supply, and Marketing Project (SCIMP) was implemented during 1990-9 in the Ashanti, Brong-Ahafo, and Volta Regions. This provided farmers and food traders with short-term loans. SCIMP also helped to create dams and hand-dug wells (for agricultural and personal household use) and farm access roads through financial support to the Department of Feeder Roads (Asuming-Brempong 2003).

Ghana has been struggling intermittently with national deficits (though they totaled over 200 million USD in the early 1990s) in recent years. Agriculture helps with Ghana's balance of payments through commodity exports and by providing import substitutions. Agriculture accounted for 43.9 percent of export earnings in 1999, but this figure rapidly declined to 33.9 percent in 2001. The sector is incapable of producing adequate amounts of those commodities that the country has a competitive advantage in providing (Asuming-Brempong 2003).

The Presidential Special Initiative on Cassava-Starch (PSI) was implemented in 2001 as an attempt to diversify the economy. The PSI aims to increase jobs and foreign

exchange earnings. In addition to its use as Ghana's main starch, cassava has many industrial applications. Approximately 75 percent of farmers already grow cassava, an indigenous staple crop, to some extent. Therefore, knowledge of how to grow it is already widespread. In addition, it grows well in "suboptimal conditions", which would enable it to be grown in "marginal land" and the challenging climatic conditions of the north. Hence, there is great potential to expand cassava production. The PSI also aimed to establish cassava processing plants (to be funded by private investors) that would serve as models to other starch processing operations (Andoh 2009: 88-93).

The Agricultural Services Sub-sector Investment Project (AgSSIP) of 2002 combined the aims of the Accelerated Agricultural Growth and Development Strategy, Food and Agricultural Sector Development Policy, and Ghana Poverty Reduction Strategy (Asuming-Brempong 2003). The World Bank provided funding, as AgSSIP's objectives were formulated to bolster the agricultural sector and reduce rural poverty (Ministry of Food and Agriculture 2006). AgSSIP focused on Farmer Based Organizations, as this was believed to be a more effective means of disseminating extension services and increasing access to inputs, markets, and credit (Ministry of Food and Agriculture 2006).

The peak agricultural growth rate of the 1990s, 5.2 percent, was achieved in 1996. Though this quickly diminished to 2.1 percent in 2000, it slowly improved in years 2001 and 2002 (Asuming-Brempong 2003).

Production of "non-traditional" (non-cocoa) export crops has been pushed. This has been successful; these crops are consistently contributing to foreign exchange earnings, and Ghana's Northern Region has faced population growth since rice

production intensified. However, the soil in the Northern Region is poor and it contains less water there than the rest of Ghana. Unfortunately, Northern Region is also agriculturally based. Hence, population growth in the Northern Region is a negative indicator. But while the current population (2003) grows at 2.9 percent annually, which is higher than the 2.5 percent national average, this has declined from a 1984 annual population growth rate of 3.4 percent. Starting in 2001, the government attempted self-sufficiency in foods like cereals and "starchy staples" (such as corn, roots, and tubers). Ghana's north has a comparative advantage in growing these (Asuming-Brempong 2003).

Biofuels further threaten land security

Efforts to increase production of biomass energy, which was promoted through the 1996 VISION 2020, have been accelerating recently (Government of Ghana 1995). However, biofuel production may pose a risk to Ghanaian agriculture/food security. "Fragile land ownership rights", which are mostly collective rather than individual, are threatened. Vulnerabilities in land laws do not prevent multinationals from acquiring smallholder farmers' properties with "little or no compensation". Most biofuel companies are foreign-owned, some with Ghanaian partners. Land acquisition for food crop and non-food crop production to suit the needs of biofuel producers has been "aggressive", and these fuels will primarily be exported to developed countries (Dogbevi 2001).

Ghana's northern areas are most vulnerable to land encroachment. Most biofuel companies are becoming established in the north. There, "land is abundant and cheap".

Ghana's poverty is concentrated there as well; though the north only accounts for 17.2 percent of Ghana's population, it contains 54 percent of its poor. The potential consequences of land encroachment in the northern regions are far-reaching; much of the grains that feed Ghana (which are scarce) are grown in the north (Dogbevi 2001).

Biofuels supporters claim that the plants (especially Jatropha) can grow on marginal/degraded lands, the use of which would not displace any communities. However, "what are often presented as ownerless, unused lands are at times the source of subsistence for the poorest people, and provide them with food, medicine, construction materials, fuel and other resources, aside from being used normally for pasture". Because the land is not very valuable, marginal lands are not clearly defined, which weakens smallholders' property rights. Regardless, biofuels companies do not intend to use marginal lands, since the yields are much lower than from fertile lands. There is no policy restraining the biofuels industry in particular, which spurs "uncontrolled and unregulated development of the biofuels sector" (Dogbevi 2001).

The creation of FASDEP I and its successors, FASDEP II and METASIP

The first Food and Agricultural Sector Development Policy (FASDEP I) of 2002 was created with the main objective of modernizing the agricultural sector. It is a holistic policy based upon the 1996 Accelerated Agricultural Growth and Development Strategy, one of the policies that spun off from MTADP with the intention of strengthening the private sector to bolster the economy. Another policy that attempted local level involvement, Local Government Law (Act 462) required implementation of policies at the district level, but it was ignored, due to lack of district capacity and inadequate

funding. Many of its tenets are based upon the first Ghana Poverty Reduction Strategy. A poverty and social impact analysis declared that the policies would not alleviate poverty as desired due to the inability to modernize poor smallholder agricultural endeavors. This reflects the lack of necessary infrastructure, adequate marketing, and availability of credit and technology. In addition, the policy "did not sufficiently reflect client perspectives".

The overall goal of FASDEP II—which is intended to be an improved version of FASDEP I—is "to enhance Ghana's comparative advantage and translate it into competitive advantage in producing the needed volumes of commodity and quality on a timely basis". FASDEP II (2007) also prioritizes sustainability, scientific advancements, use of more advanced technologies, and commercialization, based on market-driven growth. However, fewer commodities are targeted. Most notably, food security is the main objective rather than self-sufficiency. This is a crucial development; the previous governments had erroneously been fixated on self-sufficiency in order to achieve food security (Asuming-Brempong 2003).

The Medium Term Agriculture Sector Investment Plan (METASIP) is mostly based upon FASDEP II. The six shared objectives are: food security, income growth, increased market competitiveness, sustainable land management (and other aspects of agricultural production), increased use of improved technology, and more coordination (Ministry of Food and Agriculture 2010: xi).

Local markets are paying relatively higher prices for crops such as oil palm and corn, which has encouraged farmers to expand non-cocoa agricultural production in recent years. In addition, increasing cocoa prices have caused cocoa output to skyrocket

from 159,000 metric tonnes in 1983 to 493,000 in 2000. Fixed prices for all agricultural outputs except for cocoa were removed. Subsidization of fertilizer, agro-chemicals, and other inputs was discontinued as well, which drastically reduced use of fertilizer (Asuming-Brempong 2003).

METASIP has the incredibly optimistic aim of increasing by 50 percent "marketed output of staple crops by smallholders" by 2015 (Ministry of Food and Agriculture 2010: 44). To improve market access, the Policy aims to identify successful leading agricultural firms and industries, educate farmers on demand-driven production, and lobby businesses to "participate in selected commodity value chains". As optimistic is the intention to increase exportation of "non-traditional agricultural commodities" from small-scale farmers by 2015 (Ministry of Food and Agriculture 2010: 45).

Improved economic considerations

The agricultural sector is also considered capable of absorbing a large number of unemployed workers, due to its labor intensity. MoFA believes staple crops—more so than export crops—to be capable of rapid growth and reducing poverty. The Agency further states: "contribution of agriculture to national social viability has been low because the structural transformation of the sector has been slow".

The Policy will not use quotas and tariffs to limit importation. MoFA believes the economy to have recovered from the economic crisis of the 1980s due to "the sector's capacity to increase exports, government tax revenue, domestic food supply and to raise per capita incomes". However, this rapid recovery is not uniquely inherent to

agriculture. But unlike prior strategies, FASDEP II is tailored to differing regional needs and comparative advantages.

Unlike FASDEP I, FASDEP II recognizes the existence of different categories of farmers (even within the subgroup "smallholders") and has created policy accordingly. The Policy focuses on risk-prone subsistence farmers, reducing their vulnerability and bolstering productivity. FASDEP II also aims to link commercial and smallholder endeavors "for their mutual benefit". Although linking commercial and subsistence farmers is controversial, FASDEP II is the first Ghanaian policy that takes the needs of small-scale farming operations into account.

Many of FASDEP II's strategies are based upon the second Ghana Poverty Reduction Strategy (GPRS II), whose main goal is to elevate Ghana's economy from a lower- to a medium-income country, optimally by 2015. Education, agriculture, increased access to health services and safe water, improved urban housing options, and macroeconomic policy are key tenets of GPRS II (National Development Planning Commission 2005).

To increase use and cost-effectiveness of inputs, FASDEP II endeavors to increase "competitiveness and cost-reduction in input markets". The strategies to accomplish this are increasing trade of agricultural inputs (by creating policies to encourage this), encouraging district input vendors, educating the public on the benefits of input application, and promoting local production. Those initiatives that decrease cost will likely be the most effective, since price is the most significant barrier (rather than awareness).

Policy funding

FASDEP II aims to provide steady funding of agricultural initiatives. However, maintaining the financial resources necessary to support prior policies has been a major challenge throughout Ghana's policy history. For example, many programs of the 1990s were created through and funded by the World Bank. This funding was discontinued, and subsequently, so were the policies. The same was true of the National Agricultural Extension Project and the National Agricultural Research Project, until the Agricultural Services Sub-sector Investment Project renewed their funding. Ties with Development Partners are also being strengthened, which is improving budgetary support.

FASDEP II intends to elicit funding from the Government, development partners, private sector, civil society, and international financial institutions. The Multi Donor Budget Support, which was already adopted in 2003, acts in accordance with the Growth and Poverty Reduction Strategy in providing additional funding to the Ghanaian government (Ghana Ministry of Finance and Economic Planning 2008). Funding strategies are also aligned with the Medium Term Expenditure Framework (Ministry of Food and Agriculture 2007: 53). The Policy listed the following as potential causes of failure: inadequate funding by the Government, slow allocation of funding by the Ministry of Finance and Economic Planning, lack of attention paid to the agricultural sector by the District Assemblies (although one of its departments is the District Directorate of Agriculture), lack of participation by other agencies, limited private sector participation, and inadequate producer response (Ministry of Food and Agriculture 2007: 54).

The budget that METASIP requires for its implementation greatly exceeds estimated available financial resources; the funding gap is approximately two-thirds of the estimated cost (Ministry of Food and Agriculture 2010: xiv). Additional expenditures on top of this for infrastructure improvements are also recommended (Ministry of Food and Agriculture 2010: xiii). However, the Policy expects the private sector to step up to close the gap between desired and currently feasible levels of funding. Additional funds to be allocated toward METASIP are expected to increase by six percent annually (Ministry of Food and Agriculture 2010: xiii).

METASIP aims to invest heavily in private-public partnerships to reduce the amount of public capital necessary and to push market-driven initiatives (Ministry of Food and Agriculture 2010: xiii). In doing this, governmental funding is expected to be "recovered" as well. This is considered necessary because MoFA spending is projected to increase by about 30 percent (Ministry of Food and Agriculture 2010: xiv). There currently exists no formal means of engaging the private sector and civil society with agencies within the agricultural sector, but achievement of such by 2011 is outlined in METASIP (Ministry of Food and Agriculture 2010: 55).

Because the gap between the projected funds and costs is so great, certain programs are given much greater precedence, as supporting all is clearly not feasible. The two given the highest priority are Programme 1: Food Security and Emergency Preparedness and 2: Increased Growth in Incomes. However, the sum of the estimated costs of these two programs exceeds that of projected available funding by about two-sevenths (Ministry of Food and Agriculture 2010: xiv, xv). In addition, the three programs that are not given priority—sustainable management of land and the

environment, science and technology for food and agricultural development, and institutional coordination—would improve food security and long-term economic growth.

As called for by FASDEP II, at least ten percent of the government's budget is to be dedicated to the expansion of the agricultural sector, in accordance with the Maputo Declaration. However, the government spent just nine percent of its budget on agriculture in 2009 (Ministry of Food and Agriculture 2010: xiii).

Research

FASDEP II focuses on improving value addition, research endeavors, productivity, and market access. However, current research endeavors are ineffective. The Ministry of Food and Agriculture recognized that there is "low uptake of research findings by stakeholders" and "duplication of research efforts". Further coordination with NGOs, domestic and foreign research institutions is necessary to optimize efficiency. Research is necessary to optimize "development of value chains of commodities targeted for food security, income growth and diversification, external markets, and linkage with industry" and improve policy. Improving the relevance of agricultural technologies and promoting "demand-driven" research are top priorities of FASDEP II. To achieve this, further participation of farmers is encouraged.

The Ministry of Food and Agriculture envisions playing a role in creating unity among projects and sub-sectors (i.e. among food, horticultural, and industrial crops). But in 2007, there was little collaboration within the Ministry of Food and Agriculture and

among governmental organizations, although FASDEP I created a framework to facilitate this. In addition, "exit strategies" from donor-funded projects have not been formulated.

Ambitious projected growth rates

FASDEP II goals include attainment of a six to eight percent annual agricultural growth rate over the next four years, increasing forestry and logging by five percent annually, and maintaining cocoa's strength and support of other sectors. These appear to be repeated mistakes. With diminishing land productivity and availability, it is impossible to attain these goals without drastically increasing productivity per unit of land, unless the few remaining preserved forests are encroached upon. However, infrastructure improvement is once again pushed. This is a step in the right direction, as it will improve input access and produce marketability.

Sustainability

FASDEP II is also making sure that sub-sector policies are consistent with FASDEP II objectives, as these provide the framework for implementing the Policy (Ministry of Food and Agriculture 2007: 24). One such focus is sustainable land management (SLM) practices. All agricultural policies and plans are required under FASDEP II to be evaluated by Strategic Environmental Assessments and every project by an Environmental Impact Assessment.

Attempts to increase crop yield

To achieve food security, FASDEP II aims to develop no more than five staple crops nationally, and MoFA will only support one or two crops in each district. This is so that only those crops which have the best comparative advantage and are most desirable in markets will be produced. However, diversification would actually increase security, as the crops would be collectively much less susceptible to pests and disease.

FASDEP II aimed to introduce high-yielding crops with short growth periods, improve post-harvest storage and processing, and collaborate with the Ministry of Transportation (for road cargo) and the Ministry of Harbours and Railways to enhance crop distribution. Because Ghanaian agencies are jealous and competitive with each other, this collaboration would be an enormous step forward if successful.

Diversification into tree crops, vegetables, and poultry—based on comparative advantage—is also a FASDEP II strategy. Improving agricultural practices is another priority, as this has great marketability and efficiency ramifications. Improvements in infrastructure and delivery of services are prioritized. FASDEP II also favors increased production of certain cash crops, such as mango, oil palm, rubber, plantain, and citrus fruits. METASIP intends to add cotton, soybean, and sheanuts to the targeted crops in the northern regions, which have much higher levels of poverty (Ministry of Food and Agriculture 2010: 36).

METASIP aims to increase male and female income earned from cash crop production by 20 percent and 30 percent, respectively, by 2015. To achieve this, the following initiatives are to be employed: increasing seed growers' capacity, educating agricultural producers about improved technologies, increasing cash crop farmers'

capacities (in order to improve efficiency and product quality), and to facilitate cash crop producers' access to credit (Ministry of Food and Agriculture 2010: 37).

Urban Agriculture

Urban agriculture is promoted under both FASDEP II and METASIP as a "sustainable alternative means of livelihood for poor migrants" (Ministry of Food and Agriculture 2010: 42). It accounts for over 50 percent of food consumed in Accra (Maddox-Fisher 2010). Urban farming "insulates the urban poor from price shocks"; price inflation, particularly on foods, is rampant in Ghana. However, urban farmers are often in a very precarious situation, as farms are often seized or sold to developers. In addition, crops and livestock are vulnerable to toxic chemicals, as dirty waters are often used (Brunhuber 2008); untreated waste water is the main source of irrigation for urban agriculture (Ministry of Food and Agriculture 2010: 42). Urban agriculture occurs "anywhere there's a patch of green" in the cities, such as near busy roads and in dumps (Brunhuber 2008). Plot sizes are roughly 0.001 to 0.2 hectares in urban areas, and these are diminishing with "dredging of main drains" and land development. Decreasing soil fertility due to insufficient (or nonexistent) fallow periods is also problematic, as in more traditional agricultural practices. Most urban agricultural activities are legally permitted. But within Accra, agriculture must be registered with the metropolitan officer of health if cultivation is occurring outside of one's land (Ministry of Food and Agriculture 2010: 42). METASIP intends to conduct brucellosis and tuberculosis screening of milk collected in urban areas and to "organize mass vaccination, endo and ectoparasitic interventions against the endemic diseases in the peri-urban areas" (Ministry of Food and

Agriculture 2010: 43). However, if these safeguards fail to be implemented, the health hazards of urban agriculture could outweigh the benefits.

Gender

Many urban farmers are women who have left their homes due to domestic violence (Brunhuber 2008). Domestic abuse is prevalent in Ghana and viewed as an "inevitable" stage in relationships, but in only two percent of cases in which women sought legal interventions were women advised to press charges. In addition, only three percent of cases in which women press charges lead to arrest (Sarpong 2002). Wife beating is viewed as "an acceptable norm of society", and it is viewed as a "form of discipline" rather than abuse. Women also have limited means of supporting themselves (and their children) independently, as they often are not permitted to hold property (Ofei-Aboagye 1994).

Gender equality is another new goal of FASDEP II. For adequate human resource development, FASDEP II aims to increase private sector participation, cost effectiveness, and gender equity. To increase female participation, the Policy requires affirmative action in MoFA training and recruitment. An audit of the Ministry's human resources is also outlined. FASDEP II also calls for improved institutional structures, collection and use of gender disaggregated data, and conducting gender analysis of agricultural programs so that workloads do not become skewed. During the METASIP consultative process, gender representation was taken into account (Ministry of Food and Agriculture 2007: 2).

Poor product quality

A large volume of exports is returned by foreign purchasers due to inadequate quality. The main cause of this is limited knowledge in external market requirements. Logistics in marketing is also a great area for improvement. In addition, a weak legal infrastructure discourages contractual agreements in production, processing, and marketing. Agricultural processors typically receive "low, poor quality and irregular supplies of raw materials".

FASDEP II also aims to improve agricultural practices and create stricter quality control standards so that exports will not be rejected by importers due to sanitary reasons. Creating "clusters" of small- to medium-scale farmers and producers is another goal, as this would improve access to technical advice and services. The Policy also hopes to improve and enhance local agricultural processing via improved technology and training.

Capacity-building of extension services—whose primary function is to educate farmers on improved farming methods (this could therefore help to improve quality and efficiency of exports)—provided by MoFA is another priority. In 2006, approximately one out of ten land-using farmers over 21 years of age who were surveyed had not heard of the extension service (Boateng 2006: 19-29). Only 2.5 percent knew that one of the services provided by the agency was the supply of inputs, and 30.8 percent reported discontinuation of extension service staff visits. Only 41.5 percent were satisfied, with just 37.9 percent viewing the extension service as reliable. While 38.1 percent reported gaining new knowledge or technology, only 22.2 percent received advice that led to higher yields. Of the 58.5 percent who were unsatisfied, 47 percent believed the services

to be too expensive, 46.9 percent unreliable, and 6.1 percent received no follow-up (Boateng 2006: 19-29).

Irrigation

MoFA recognizes that water is used inefficiently by formal irrigation facilities, and that "most irrigation schemes are designed and operated with little consideration for land and water degradation and energy efficiency". FASDEP II aims to increase productivity from 30 percent to 80 percent. Use of small-scale pumps for subsistence farmers along perennial bodies of water, alternative methods of water delivery, and access of adequate water to urban farmers are also promoted. A disproportionately large amount of northern Ghana inhabitants is engaged in agricultural activities, although that region is semiarid and farming completely depends upon rainfall.

Enhancing irrigation capacity would be a means of reducing uncertainties in agricultural production due to climatic variability; as of 2008, only 0.5 percent of agricultural products were irrigated. Increasing the proportion of irrigated lands is also desirable according to policymakers because it enables the same piece of land to be used more frequently (Ministry of Food and Agriculture 2010: 26). However, soil depletion, which is currently the greatest limiting factor in agriculture, would greatly increase. Although the targeted irrigation intensification by METASIP is a 50 percent increase by 2015, the targeted increase in productivity is only 25 percent (Ministry of Food and Agriculture 2010: 33). These priorities are misplaced; merely increasing the efficiency increases capacity in turn, but the opposite is not the case.

One of the greatest barriers to establishing irrigation infrastructure is the cost; initiation is "capital intensive" and creation requires long-term investment to yield returns. The Policy proposes that irrigation infrastructure be developed as a public good, likely leased to private associations and management bodies "to ensure efficiency". It was noted: "irrigated agriculture can only be viable if there are backward linkages to infrastructure, inputs, and research and forward linkages to agro-processing and marketing" (Ministry of Food and Agriculture 2010: 27).

Plant disease and pests

One of FASDEP's goals is to reduce crop pest losses from 30-50 percent to 10-15 percent. Coupled with storage losses of roughly 50 percent, most of Ghana's crops are wasted. Large causes are exotic pests, minimal adoption of certified planting materials and means of plant protection by farmers (especially those who cultivate food crops), and weak enforcement of regulations. In addition, pesticides are commonly misapplied, and importation standards of recipient countries often change. Previous policies with the same objectives are the Guidelines for the National Plant Protection Policy, Prevention and Control of Pests and Diseases of Plants Act (Act 307, 1965), NRCD 100 of 1972, Seed Inspection and Certification Decree, and the Pesticides Controls and Management Act (Act 528, 1996).

FASDEP II aims to deal with the plant pest and disease problem by enforcing an international standard and improving "plant quarantine systems" at points of entry, as by increasing collaboration among the Plant Protection and Regulatory Services Directorate, Customs Excise and Preventive Service, and Ghana Immigration Service.

Efficiency improvements

The targeted agricultural sector annual growth rate continues to be six percent, as was the goal of Operation Feed Yourself. Closing the gap between potential and observed yields by increasing productivity on the land (rather than encroaching into other land areas) would help Ghana to meet this targeted annual growth rate. The difference between potential and actual yields is approximately 50 percent for most crops (Ministry of Food and Agriculture 2010: 70).

The difference between actual yields and estimated optimal yields is up to 55 percent for certain crops. This is mostly due to the limited use of inputs; only five to ten percent of subsistence farmers with one or fewer hectares of land used fertilizer, whereas 30 percent of farmers with over five hectares used fertilizer (which is still quite low). Inputs are limited primarily from high cost, limited availability and lack of confidence in input effectiveness (due to adulterated products) (Ministry of Food and Agriculture 2010: 23).

Post-harvest losses are astronomical; 35 percent of corn and 34 percent of cassava is lost (Ministry of Food and Agriculture 2010: 24). METASIP aims to reduce these between 20 and 50 percent by 2015 (the targeted percentage decrease in waste being dependent on the crop) (Ministry of Food and Agriculture 2010: 31). One way is by promoting processing, which would improve the products' shelf lives.

Reducing post-harvest losses is another focus of the Policy. METASIP intends to decrease losses of mango, plantain, tomato, pineapple, papaya, and citrus between 25 and 50 percent by 2015. The means outlined to achieve this objective are training (of extension staff, producers, processors, and marketers), improving storage facilities and

transportation, promoting commodity "cold chain handling" (which will likely be particularly difficult, since this infrastructure is basically inexistent at the moment), and using "appropriate handling containers" (Ministry of Food and Agriculture 2010: 38). Some proposed initiatives to improve transportation of agricultural goods are: linking district capitals with paved roads, connecting at least 70 percent of communities by roads to district capitals, and constructing farm trucks in agricultural areas (which is a bad idea, since the infrastructure does not exist; this would likely be fantastically inefficient) (Ministry of Food and Agriculture 2010: 41).

Land management

Land degradation threatens approximately 63 percent of Ghana's land area. Leading causes of this are traditional bush burning (with insufficient fallow periods), improper use of irrigation, and improper distribution of agro-chemicals (Ministry of Food and Agriculture 2010: 46). Severe erosion also occurs, as agriculture is conducted on extremely steep gradients. Land is limited, and livestock is an inefficient use of land, but FASDEP II aims for a 50 percent increase in output of animal products by 2015.

In 2009, the Ghanaian government introduced a 37 million Cedi fertilizer subsidy to increase the affordability of fertilizer, particularly for small-scale food crop farmers (Ghana News Agency). The subsidy is in effect such that fertilizer costs from December 2008 would appear to be unchanged for the farmer, even though the unsubsidized fertilizer price was exactly double by the following April. With the unsubsidized price, the Minister of Food and Agriculture estimated fertilizer use by small scale farmers to collectively decline by approximately 70 percent, cutting cereal production by 20 percent.

This corresponds to a production shortfall that would cost 62.5 million USD to import. Therefore, with these estimations, the subsidy is less costly. Measures to prevent abuse of this policy are coupon allocation, border control, and random inspections (Ghana New Agency 2009). Since the use of fertilizer has been limited, perhaps further discounted prices would create even greater economic benefits.

In order to predict climatic and weather changes that would place certain areas at higher risks, MoFA intends to collaborate with the Ghana Meteorological Agency. The Ministry also intends to encourage farmers to prepare, in addition to providing assistance for adaptation to and mitigation against the weathers' impacts (Ministry of Food and Agriculture 2010: 46). These include soil improvement efforts, introduction of drought- and flood-tolerant crop species, and growing high-yielding and short-duration varieties. However, short-duration crop species would be undesirable if they were used for the purpose of more frequent harvest, as this would rapidly deplete the soil. And yet again, cost, limited access to inputs, and lack of credit impede the introduction of necessary improvements (Ministry of Food and Agriculture 2010: 47).

Another pressure exerted on the lands is encroachment by other sectors. "Prime agricultural land" is used for other industrial applications and housing projects (Ministry of Food and Agriculture 2010: 81). METASIP aims to increase institutional capacity to push sustainable land management (Ministry of Food and Agriculture 2010: 47). The Ministry of Food and Agriculture states: "an effective policy would enhance the positive influences through carbon sequestration, contribution of tree cover for conservation and improved quality of soil, protection of watersheds, and enhancement of the beauty of natural landscapes" (2010: 79). MoFA also intends to promote creation and

implementation of 50 community land improvement plans each year (Ministry of Food and Agriculture 2010: 48). Like FASDEP II, METASIP was created with the intention of being evaluated by a Strategic Environmental Assessment (SEA), which "focus(es) on the four main areas of sustainability, i.e. natural resources, socio-cultural issues, economic issues and institutional issues" (Ministry of Food and Agriculture 2010: 79). The Ministry recognizes Sustainable Land Management as a means of improving the livelihoods of the economically disadvantaged, as it is "key to sustainable agriculture and has the potential to minimize waste in the sector" (Ministry of Food and Agriculture 2010: 80). METASIP also intends to foster enforcement and revision of the Plant and Fertilizer Act (803) of 2010, which was created to regulate plant, seed and fertilizer production (Ministry of Food and Agriculture 2010: 28).

Processing

Although incorrect assumptions of profitability are linked with "value addition" from processing (processing may make the net profit earned lower than without), METASIP aims to increase processing because of its ability to increase shelf life. Warehouse storage could also stabilize prices. Hence, METASIP aims to upgrade and re-establish adequate storage facilities. However, processing could worsen the nutritional deficiencies. But fortunately, agro-processing would be conducted "in an environmentally safe and sustainable manner" (Ministry of Food and Agriculture 2010: 25). Increasing storage and processing capacity in the private sector are other methods within METASIP to decrease post-harvest losses (Ministry of Food and Agriculture 2010: 31).

The Policy negatively views selling raw agricultural products, as they are "bulky, with short shelf lives and inconvenient to use". To solve this perceived problem, the Policy aims to produce "at least two new commercially viable products…from each of staple crops, horticultural crops, livestock and fisheries by 2015" (Ministry of Food and Agriculture 2010: 39). METASIP intends to increase "rural industrial processing" of cassava, oil palm, shea nuts, cashew news, soybeans, and groundnuts by up to 40 percent by 2015 (Ministry of Food and Agriculture 2010: 41). However, this is notoriously inefficient.

Mechanization and other improved technologies

There is limited use of agricultural machinery, which is costly and constrained with limited availability. MoFA aims to mechanize agricultural activities through collaboration with the private sector, promotion of local tractor assembly, and development of human capacity (in both the public and private sectors) to manage, operate, and repair the machinery. FASDEP II also promotes use of animal traction by establishing support centers.

Older farmers have little technical knowledge. Youth have been targeted, as they are trained in agriculture and not attracted to it. There is a great lack of specialists as well. FASDEP II aims to increase financial accessibility and increased use of more advanced technologies to attract the youth to agriculture.

In 2005, approximately 40 percent of farmers surveyed used some degree of mechanized agriculture. The most commonly mechanized activity is land preparation. A large area for improvement is processing; access to the equipment is limited, and the

machinery is inefficient. Locally-manufactured equipment is "not up to food grade standard". In rice regions, which are vulnerable to floods, mechanization would vastly increase efficiency in agricultural production. This is because the fields cannot be worked after the floods, and machinery would enable the lands to be planted before the rains, so that optimal harvesting could occur (Ministry of Food and Agriculture 2010: 27). METASIP aims to increase agricultural "mechanization", by establishing "at least one private sector led mechanisation centre" per district by 2015 (Ministry of Food and Agriculture 2010: 27, 35). Initiatives to support this include NGO collaboration to increase animal traction use, increased FBO ownership of large machinery, improving access to credit (which appears to be the prevailing theme of agricultural policy), and training technicians (which is not currently problematic). Another important goal relating to mechanization is adoption of food-grade processing technology (Ministry of Food and Agriculture 2010: 35).

Improved technologies could play various other roles in increasing agricultural production. Better crop varieties and use of media to improve extension services and information dissemination are only a couple of examples (Ministry of Food and Agriculture 2010: 28).

Technology implementation and development is yet again listed as a priority to achieve sustainable practices. Accordingly, initiatives to support this are: data collection on land degradation, integration of natural resource management and evaluation, and publishing research findings (Ministry of Food and Agriculture 2010: 48). Though MoFA admitted that research receives very little funding (as of 2010), METASIP reflects an intention to create an effective monitoring and incentive system for land use

management by 2012 (Ministry of Food and Agriculture 2010: 49). Although this is necessary, it appears to be yet another empty initiative. Many of the specific expected outcomes are oddly vague, such as increasing the agricultural technologies developed by 25 percent by 2015 (Ministry of Food and Agriculture 2010: 49, 51). However, the initiative to create a functional communicative strategy within MoFA by 2012 (Ministry of Food and Agriculture 2010: 53) is concrete, necessary, and feasible.

Standard of living implications

The first Ghana Poverty Reduction Strategy (GPRS I) of 2003-5—along with its successors, GPRS II (2006-9) and Ghana Shared Growth and Development Agenda I (2010-3) (all were developed in concert with the World Bank)—aims to promote rural development through the modernization of agriculture. The agricultural sector is considered integral in "raising the average real incomes of Ghanaians as a whole" (Ministry of Food and Agriculture 2010: 1).

The strategies to be used for nutritional improvement are nutrition and health information and food fortification. One of the assumptions on which FASDEP II relies is that "enhanced incomes will also reinforce food security through financial access to food". *A* later study showed that while poverty levels significantly decreased between 1998 and 2003, malnutrition (which resulted in "stunted" children) increased (Ministry of Food and Agriculture 2010: 23). Hence, increase in incomes is not enough to solve the problem of malnutrition. Part of this is due to limited knowledge of macro- and micro-nutrition. Food production should also take these aspects into account, such as through food fortification (Ministry of Food and Agriculture 2010: 24). METASIP has the

objective of halving the prevalence of stunting in children by 2015. To do so, growth and consumption of nutritious crops (such as sweet potato, leafy vegetables, and "High Quality Protein Maize") would be promoted, as would be the development of other nutrient-rich staples. Other initiatives include micro-nutrient fortification, availability of more healthy foods through a school feeding program, and nutritional education (Ministry of Food and Agriculture 2010: 30).

Of the Ghanaians who fall below the extreme poverty line, 18.2 percent are chronically food insecure. Another 10.3 percent of those who are "poor" but above the poverty line suffer from intermittent food insecurity (Ministry of Food and Agriculture 2010: 22). Subsistence farmers also have less diverse crops, which further worsens the rural poor's economic security. However, activities outside of farming (but still in the agricultural sector) could help increase diversity and subsequently lower the precariousness of many farmers' existences (Ministry of Food and Agriculture 2010: 24). Hence, METASIP intends to increase production from bee keeping, mushroom and snail farming, and "small stocks" by 20-50 percent by 2015 (Ministry of Food and Agriculture 2010: 39).

METASIP aims to reduce the number of food insecure households by 20 percent before 2015 (Ministry of Food and Agriculture 2010: 32). One of the proposed initiatives is engaging more impoverished citizens in off-farm agricultural activities. To do so, micro and small enterprises, entrepreneurial training, exploitation of the correct markets, and partnerships with NGOs would be promoted (Ministry of Food and Agriculture 2010: 30). The ultimate goal of the Policy is to improve nutrition to obtain "higher productivity and reproduction" (Ministry of Food and Agriculture 2010: 23).

METASIP aimed to promote emergency preparedness by being able to provide food to people affected by disaster. Poor weather, pests, and disease are the main causes of food insecurity. Current capacity to respond to these is limited. Forecasts and steps to become better-prepared would help to improve emergency response. The Policy also suggests that the border controls and related organizations be used to monitor pest and disease outbreaks and to quench them. The Ghana Meteorological Agency is expected to play a more active role in local forecasting and communicating its findings. Food stocks are yet another proposed initiative (Ministry of Food and Agriculture 2010: 26).

Availability of financial resources

MoFA has practically no control over the financial institutions that provide loans to cultivators. However, the Ministry pushes group formation to obtain resources (Ministry of Food and Agriculture 2007: 46), although means of obtaining loans (via collateral) is structured around individuals. Lack of funding is probably agriculture's biggest constraint, at least partly due to low rates of loan recovery. Agricultural credit is not disbursed in a timely manner, and medium- to long-term loans are least available, which greatly limits investments that could increase sustainability. Through the FASDEP II, MoFA aims to improve operators' credit management, create more efficient means of applying for loans, increase farmers' education regarding loan procedures, increase loan monitoring, encourage financiers to accept a wider range of items as collateral, strengthen micro-financing and informal means of funding, promote the use of FBOs in delivering financial services, push the creation of an Agricultural Development Fund for medium- and long-term funding, and increase female access (Ministry of Food and Agriculture

2007: 46). However, many of these means to solving the financing problem are outside of MoFA's formal and informal control; the financial institutions that often are not paid back from agricultural loans ultimately have the control.

High interest rates discourage agricultural investment; although they are slowly falling, rates still fall between 20 and 33.5 percent. With a volatile annual rate of inflation that averages to about 15 percent, this corresponds to real interest rates falling roughly between five and 18.5 percent. This is mostly due to the risk of loans to the agricultural sector. However, extremely high interest rates may compound this problem, since those who are more conservative and less willing to take risks might not accept those terms. In addition, commercial producers are much more likely to receive loans, due to their higher levels of productivity (Ministry of Food and Agriculture 2007: 57).

The Government provides "tax holidays" to the agricultural sector of up to ten years (Ministry of Food and Agriculture 2007: 57). However, these have had little effect on the agricultural sector, as high energy costs and poor infrastructure have restrained the sector much more than taxation (Ministry of Food and Agriculture 2007: 57-8). MoFA will encourage the government to allocate more of its funds towards the agricultural sector. There has been proposed removal of the corporate tax on producers and processers in the agricultural sector as well (Ministry of Food and Agriculture 2007: 58). However, this only expands the difference in opportunities between larger producers and smallholders.

Development partners and collaboration

FASDEP also outlines the role of "development partners". The Policy emphasizes their role in providing "financial and technical resources", engaging in policy dialogue, and concerting their actions with other stakeholders (Ministry of Food and Agriculture 2007: 49). The development partners are also expected to monitor and evaluate, play a large role in research, and improve human development (Ministry of Food and Agriculture 2007: 50). In short, FASDEP II largely depends upon the development partners' efforts. That would be viable only if they cooperate.

FASDEP II outlines a major role for MoFA in monitoring and evaluation by carrying out annual performance reviews and publishing annual reports to communicate those results (Ministry of Food and Agriculture 2007: 53). The Ministry is given the role of coordinating the actions of the development partners. The Policy gives the National Development Planning Commission the role of overseeing partnerships among the private sector, civil society organizations, and the public sector (Ministry of Food and Agriculture 2007: 50). MoFA is given a large amount of responsibility in this area as well.

This area of the Policy is expected to be successful. The development partners have expressed the desire to collaborate, but no policies have outlined this previously (Ministry of Food and Agriculture 2007: 50).

Like FASDEP II—on which METASIP is largely based—stakeholder consultation is prioritized. Extensive processes were carried out to ensure that feedback, from groups such as sector ministries, researchers, NGOs, private sector actors, educational institutions, and regional and district officers, was used to formulate

METASIP. In the consultative process, public vs. private sector representation was balanced (Ministry of Food and Agriculture 2010: 2). This was used to create a "zero draft", which was then discussed by stakeholder groups, such as Development Partners, before the final draft was formulated (Ministry of Food and Agriculture 2010: 2, 4). Stakeholder feedback on the "zero draft" was collected in each of the ten regions, and agricultural input supply actors also participated in penning the First Draft. The draft was further circulated for comment and discussion in regional consultation workshops before its finalization. Like FASDEP II, METASIP promotes collaboration among governmental organizations, the private sector, and civil society (Ministry of Food and Agriculture 2010: 4). Customizing education and training programs to meet the needs of the agricultural sector and encouraging recruitment of women are further means of addressing the lack of agricultural specialists.

Policy coordination

The Ministry of Food and Agriculture recognizes the need for collaboration. The Ministry intends to lead coordination among all stakeholders (Ministry of Food and Agriculture 2007: 48). To do this, it intends to foster dialogue in policymaking and effectively use research findings.

MoFA is expected to organize the logistic aspects of the Policy, play a large role in lobbying and advocacy, and develop inspections for agricultural exports. FASDEP also outlines an audit of MoFA's human resources by the Human Resource Development and Management Directorate. MoFA is also expected to assess the consistencies of policies that relate to agricultural policy and those policies' impacts on the sector

(Ministry of Food and Agriculture 2007: 51). In doing so, data are expected to be disaggregated by sector and scale of farming endeavor so that future policies can be improved (Ministry of Food and Agriculture 2007: 52).

The Ministry is also given the responsibility of analyzing the impacts of macro polices on "the competitiveness of key agricultural exports and the effect of imports on domestic production" (Ministry of Food and Agriculture 2007: 51). Although this is pertinent to MoFA and the agricultural sector, FASDEP II should be focused on welfare rather than on promoting a particular industry; this has been the bane of several previous policies.

For district-level implementation, FASDEP II objectives are to be given priority according to the district's needs. In addition, districts "will select 2 crops or livestock (breeds) annually to focus on for effective use of resources but not neglecting other crops or livestock from normal course of development". District-level plans should also be developed through collaboration with other stakeholders. "Lack of composite budgeting" is noted as a "major limitation". In addition, district officers tend to work individually (Ministry of Food and Agriculture 2007: 52).

Key problems that were identified with agricultural production that METASIP aims to solve are limited and inefficient irrigation, low adoption of advanced technology, high post-harvest losses, lack of efficient processing capability, inadequate financing, poor disbursement of extension services, lack of skills, and competition from imports (Ministry of Food and Agriculture 2010: xi). METASIP intends to use already existing agency and stakeholder structures, and once again, MoFA is to lead (Ministry of Food and Agriculture 2010: xii).

METASIP is to create systems of evaluation and standardization for all agricultural commodities. These would apply to both domestic and export markets. Use of proper labeling is a strategy (Ministry of Food and Agriculture 2010: 45). The Strategic Analysis and Knowledge Support System (SAKSS) was established to support METASIP by aiding in its implementation and providing improvements. SAKSS will include National Agriculture Research System institutions and local think tanks (Ministry of Food and Agriculture 2010: 74). The role of the Secretariat is established to coordinate the Steering Committee, SAKSS, and the Policy Dialogue Group (Ministry of Food and Agriculture 2010: 75).

In addition, a monitoring and evaluation system specific to the agricultural sector has been implemented since its 2007 creation to observe effective and problematic areas within the agricultural sector plan. However, the system faces the following problems: inadequately skilled staff, unreliable and inadequate technology (primarily, poor internet connectivity), and staff exhaustion (Ministry of Food and Agriculture 2010: 85). The office of the President, Parliament, NDPC, MOFEP, Ghana Statistical Service, MDAs, Civil Society, NGOs, and various other organizations are involved in the monitoring and evaluation process. The Policy, Planning, Monitoring and Evaluation Division of the Ministry of Food and Agriculture coordinates this system (Ministry of Food and Agriculture 2010: 86). In addition, use of FBOs is to be intensified in METASIP (Ministry of Food and Agriculture 2010: 40).

Limited dissemination of information

Governmental bureaus have not coordinated well with each other. For example, the national universities and the Council for Scientific and Industrial Research (CSIR) often conduct agricultural and other research without communicating with each other or the Ministry of Agriculture. Therefore, many research endeavors are repeated, but the farmers are unaware of the findings. In the rare event that some communications occur, typically only commercial, large-scale farmers benefit. The improved seeds are usually only available for cash/export crops. Though extension officers inform small-scale farmers about insecticides, fertilizers, improved seeds, better farming methods, agricultural equipment, and machinery, subsistence efforts do not gain enough of a profit to economically justify these investments. Though the Ministry of Agriculture has started an irrigation program to hedge against climatic uncertainties, only growers of export or "import substitution" crops, such as rice, sugar cane, and cotton, receive the benefits; the typical consumer does not benefit. Though the commercial farmers benefit from governmental investments and subsidies, the "food substitutes" are too expensive for the typical consumer to take advantage of them (Girdner et al 1980: 14-25).

Mistrust of the Government rooted in a history of ineffective policy

The Ghanaian governments have been notorious for "giving orders and issuing decrees with great fanfare but without adequate plans for implementation". This has led to a general sense of dissatisfaction with the government. Results from a survey on the public sentiment following Operation Feed Yourself implementation support this conclusion. Of the consumers who were questioned, 93 percent felt that they could not

easily feed their families, as 80-90 percent of their incomes were spent on food. However, the customers believed the government—not the farmers—to be at fault. The majority of participants were upset with the policy; 90 percent believed OFY to be a failure, and 80 percent were unsatisfied with "the handling of food production in Ghana". A very small minority—four percent—believed the government had kept most of its promises, 55 percent believed that only some were kept, and 35 percent felt that none had been followed through. The vast majority of respondents believed policy-makers and executors were failing. However, the majority of policy executors disagreed. Though 75 percent of policy executors believed food production to be "somewhat adequate"; weather conditions were blamed (Girdner et al 1980: 14-25).

Many ineffective policy patterns are repeated. Although state farms were a major failure in the 1960s, they are being re-introduced, again with the aim of increasing food exports and also to encourage agricultural jobs for the youth. Some abandoned farms and those operating at less than full capacity have been targeted, but the major goal is to decrease unemployment by bringing youth into the agricultural sector (Ghanaian Times 2009). Many view state farms and expansion of agriculture as a means to ensure food security. Because of this, the re-introduction of state farms to attract the youth to agriculture is one of the major platforms of the New Vision Party for the 2012 elections (Ghana News Agency 2010).

Conclusion

The agricultural sector continues to contribute the largest share of GDP. The country's economic performance is closely related to that of the agricultural sector

(Asuming-Brempong 2003). Following the failure of Operation Feed Yourself in the 1970s, Girder *et al* (1980: 14-25) noted that declining food production in Ghana seems to be caused by a strong bias in public policy towards supporting export crops. Regardless, export crop production remains a priority, while domestic demands are neglected. Those export crops (like cocoa) were heavily taxed by the marketing board, although these marketing boards were created to protect producers by offering price stability. However, recent policies, such as FASDEP II and MEGASIP, encourage departure from dependence in cocoa and similar crops rooted in colonial times.

The effects of policies promoting agricultural activities (through initiatives such as promotion of export commodities, exploitation of timber and forest resources, mining, and use of agrichemicals) have been largely detrimental to the environment. However, the overall impacts—when livelihood is also taken into account—are mixed (Asuming-Brempong 2003). Recovery from the recession of the 1980s is one such example. Older policies have tended to aggregate various categories of crops that have profoundly different needs for efficient cultivation and processing. But requirements of Environmental Impact Assessments, promotion of disaggregated data in research endeavors and other progressive initiatives in recent policies, such as METASIP, are starting to solve these problems.

Although Ghana's economy is slowly diversifying, diminishing agricultural productivity due to progressively depleting soils is problematic. This is mostly due to the combination of a complete lack of fertilizer, shifting cultivation and inadequate fallow periods. METASIP has enacted subsidies so that the cost of fertilizer is unchanged from that of the previous year so that fertilizer use would not be discouraged. However, recent

policies have not subsidized fertilizer further, although this could greatly bolster agricultural productivity and prevent soil degradation. Pesticides and herbicides are often used in too great of abundance, leading to contaminated foods and groundwater-contaminating toxic runoff. And while previous policies encouraged shifting away from agriculture, FASDEP II and METASIP are promoting increased activity within the sector.

The economy flipped between very strong state control and completely *laissez-faire* economic policy. Because of the resultant confusion, there continues to be lack of confidence in the government's ability to formulate effective agricultural policy. "Empty promises" by the government further erode confidence in it and diminish policy obedience. Policies have been ineffective mostly due to lack of adequate funding. METASIP is in a financially precarious position, since it overlooks the fact that its projected budget grossly overshoots available funds.

Until recently, policy neglected smallholder farmers. Although FASDEP II and MEGASIP have addressed this and problems with gender inequality, these problems are deep-rooted and therefore remain. It is currently impossible to tell if these are other idealistic promises that will never be fulfilled or the beginning of real change.

Chapter 5: Summary and Policy Recommendations

Over-zealousness to industrialize the country and a colonial mindset favoring resource exploitation in prior decades has crippled the Ghanaian economy. The extent to which natural resources were wastefully exploited limits the ability of economic actors in the forestry and agricultural sectors to support themselves, more so in manner that can be sustained. Over 65 percent of Ghana's land area is devoted to agricultural endeavors, and agricultural productivity per hectare is declining, forcing farmers to expand cultivated lands. Available land is sparse, and only about 20 percent of the land is forested (Trading Economics 2010). Therefore, the great economic successes that Ghana has enjoyed recently must be viewed cautiously, in light of the rampant exploitation of the resources upon which Ghana relies.

Some harmful trends have discontinued, such as policy incentives for sheer forest exploitation regardless of the economic implications. However, there continues to be inadequate funding to invest in more viable long-term options, neglect of small-share operations, lack of recognition for communal ownership, and a pervasive view that unexploited forests are useless.

Once again, Ghana is in the process of revitalizing state farms, which were a definitive failure during the 1960s and 1970s. And to fund various agricultural endeavors, the Government encourages aggregation of smallholders with larger agricultural endeavors. Most logging companies disregard regulations with impunity. The vast majority of this timber is exported to industrialized countries. However, recent policy aims to verify exports to the European Union.

The lack of funding available to smallholders, particularly in the agricultural sector, greatly inhibits Ghana's development towards enhanced food security, educational opportunities, and health care. The agricultural and forestry sector provides by far the most support to the Ghanaian economy, and the majority of operations are subsistence efforts. Without adequate credit, the investments necessary to foster long-term economic support are not possible. The cost of something so basic as fertilizer is prohibitive to most farmers. This degrades the soil, greatly harming the Ghanaian economy and threatening future generations. Economic analyses have shown that the cost of fertilizer would be more than merely offset by the increased crop yields.

Although agriculture, forestry, and fishing contributed a very large proportion of the 2005 economic growth[5], only 1.2 percent on average of the Government's annual expenditures is allocated to the Ministry of Food and Agriculture (and Ministry of Fisheries, which only became a separate entity in 2005). Government expenditures on agriculture expands to 5.2 percent when the Department of Forestry under the Ministry of Lands and Forestry, Council for Scientific and Industrial Research, and COCOBOD (the cocoa marketing board) is included (Benin *et al* 2008: 10). In addition, the Agriculture, Forestry, and Fishing sector was allocated 8.1 percent of credit by deposit money banks, a 10.1 percent decline from 2005. All other sectors' credit allocations increased, with the exception of "miscellaneous" services. Although manufacturing contributed only 8.6 percent of Ghana's overall economic growth in 2005 (the industrial sectors aggregated contributing 23.9 percent—therefore, non-cocoa crops and livestock alone contribute more than the entire industrial sector), 18.9 percent of credit was allocated to

[5]Agriculture, forestry, and fishing contributed 41.4 percent of the 2005 economic growth, crops and livestock alone 25.5 percent, cocoa 9.7 percent, and forestry 3.5 percent.

manufacturing, a 33 percent increase from 2005. Manufacturing grew by 5.5 percent in 2005, industry by 5.6 percent. Agriculture grew by 6.5 percent, in spite of sparse funding (GhanaWeb 2006: 23-25, 46). As mentioned previously, this growth is mostly due to land expansion. In addition, the vast majority of loans to the agricultural sector have been allocated to large operators that are not locally based and tend to be the worst environmental offenders. Although loans to smallholders in the agricultural sector have been considered high-risk in the past, these are necessary to create the changes needed to sustain Ghana's economy.

Rural sector industrialization is given too much priority. Policy pushes for timber processing, which is wasteful because of inferior processing machinery. Attempting to process all agricultural and forestry products for rapid industrialization is not the most prudent option when agriculture is far and away the most economically successful sector.

In addition, there is nothing inherently superior in industrialization itself. It is much less sustainable than a rural economy, and an agriculturally-based economy with good education and medical services could exist. Manufacturing should not be pushed, but rather health services, research, and sustainable agricultural practices.

Ghana's strength lies in its closely-knit communities. Financial resources should be structured in a manner that is compatible with this. Communal loans might even be more secure than the more traditional individual loans, as it is less likely that a community would be unable to pay than an individual. Communal reputation in repaying loans and cutting off financial resources to defaulting communities could be means of enforcing loan repayments.

The backbone of the economy rests on smallholder endeavors in the agricultural sector. Policy must be crafted in a manner that recognizes this and provides incentives to act in a sustainable fashion and not comply with illegal loggers. As stated by Onyeiwu *et al* in 2010: "Rural farmers in Africa will continue to use resources in unsustainable ways, as long as they are economically desperate, socially isolated, and politically marginalized."

Forcing the timber companies to pay taxes and to follow regulations would make a large impact. Although the government is likely reluctant to do so for fear of discouraging business establishment, companies outside of the six or so that actually followed regulations in registering for permits harm the Ghanaian economy rather than support it.

Although there have been great improvements in agricultural and forestry policy itself, these progressive initiatives are often not implemented. Investing a much greater portion of governmental spending to fund the agricultural sector would greatly pay off. Simply providing major fertilizer subsidies would be one of the most effective solutions, assuming that border control is adequate to prevent smuggling. Similarly, motivating use of more efficient logging machinery would greatly benefit society.

It is imperative that Ghana implements sustainable forestry and agricultural policy. The majority of its resources have already been wasted, and traditional subsistence from forest resources is no longer viable. The livelihood of most Ghanaians now relies upon the performance of the agricultural economy. Increasingly limited land availability and soil depletion in the face of a continuously growing population place Ghana in a precarious situation.

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