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Agricultural Commercialization, Land Expansion, and Homegrown Large-Scale Farmers

Insights from Ghana

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ABSTRACT

The past decade has seen several African countries increasing their agricultural growth, a trend largely underpinned by increases in land area cultivated instead of productivity increases. Meanwhile, scholars debate whether Africa should pursue a strategy of large-scale or smallholder farms, paying little attention to a special group of smallholder farmers who have transitioned to become medium- and large-scale farmers. This study, therefore, begins to analyze this group of farmers, using qualitative data from in-depth interviews and focus group discussions in Ghana. We analyze their characteristics, ingredients of farm-size expansion, and commercialization. Numerous insights are gained and hypotheses formulated for future research. One important insight is that with the right attitude, exposure, and discipline, it is possible for smallholder farmers to increase their farm size and commercialize regardless of initial farm enterprise choice. However, to transition, initial farm size and farming system appear critical, with farmers in areas of low population density and flat topography more likely to acquire larger farming land. The transition, however, occurs gradually over 20 to 30 years, with mean annual land acquisition rates ranging from 0.3 to 24.3 acres per year. In the transition process, large- and medium-scale farmers are found to increase their use of modern farm inputs (such as fertilizer and high-yielding seed varieties) and agricultural technologies (such as tractors and processing machinery) and appear more productive than smallholder farmers. Additional quantitative analyses using representative survey data are, however, needed to substantiate the observed qualitative patterns and to further understand the trajectories of farm size expansion and the implications for agricultural productivity and commercialization.

Keywords: large-scale farmers, agricultural commercialization, land expansion, farm size, Ghana

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1. INTRODUCTION

In his provocative article "The Politics of Hunger," Collier (2008) reignites the debate about whether Africa should promote large-scale farms or smallholder farming to spur agricultural commercialization and growth. Collier argues that Africa has less chance of achieving accelerated agricultural growth and poverty reduction if the strategy continues to focus on smallholder farmers; instead, he calls for a shift in priority to large-scale commercial farmers, contending that "the world needs more commercial agriculture, not less." Supporting this view, others have cited the Cerrado farms in Brazil (The Economist 2010), in addition to pointing to the highly commercialized agricultural sectors of the West, in particular the United States and Canada, which account for more than 20 percent of global agricultural supply (USDA 2013).

This view, that large-scale farmers should be the priority, has attracted much criticism from scholars and practitioners who for many years have advocated for a smallholder-based development strategy. They have argued that any development strategy that ignores the vast majority of smallholder farmers is bound to fail. (See, for example, Byerlee et al. 2009 and Future Agricultures 2009). The proponents of smallholder agriculture contend that a strategy that excludes smallholders and focuses on the large-scale farmers will leave many trapped in poverty, as most of the smallholders will not be able to compete in the market due to resource constraints—constraints that could be solved by investing in smallholder agricultural commercialization (Wiggins et al 2011; Jayne, Mather, and Mghenyi 2010; Hazell et al 2007; Wiggins, Kirsten, and Llambi 2010). However, due to the high degree of heterogeneity among smallholder farmers, no one strategy will fit all (Collier and Dercon 2009; Leavey and Poulton 2007), and formulating policies that will result in inclusive and commercially driven growth will require spatial creativity (Djurfeldt 2013).

As the debate on smallholder versus large-scale commercialization rages on, a special class of previously smallholder farmers has transitioned to become homegrown medium- and large-scale farmers. This group has much been part of the agricultural commercialization process in Africa in the last two decades, yet it has not featured in the debate on agricultural commercialization and transformation. In the case of Ghana, this group of farmers has transformed over the years by acquiring more land and capital, adopting modern agricultural technologies, and increasing production and market participation. We have also seen the government of Ghana and some donor agencies begin to design agricultural commercialization programs centered on these homegrown large-scale farmers as nuclear change agents under the Ghana Commercial Agriculture Project. This study, therefore, begins to analyze this group of transitioned medium- and large-scale farmers; focusing on their characteristics and the processes they underwent to become commercialized medium- and large-scale farmers. The aim is to better understand these farmers, the ingredients of their commercialization process, and the context within which they commercialized. This will contribute to the literature and debate on the "right" strategy for agricultural transformation in Africa, with emphasis on the dynamics of scale of farm operations.

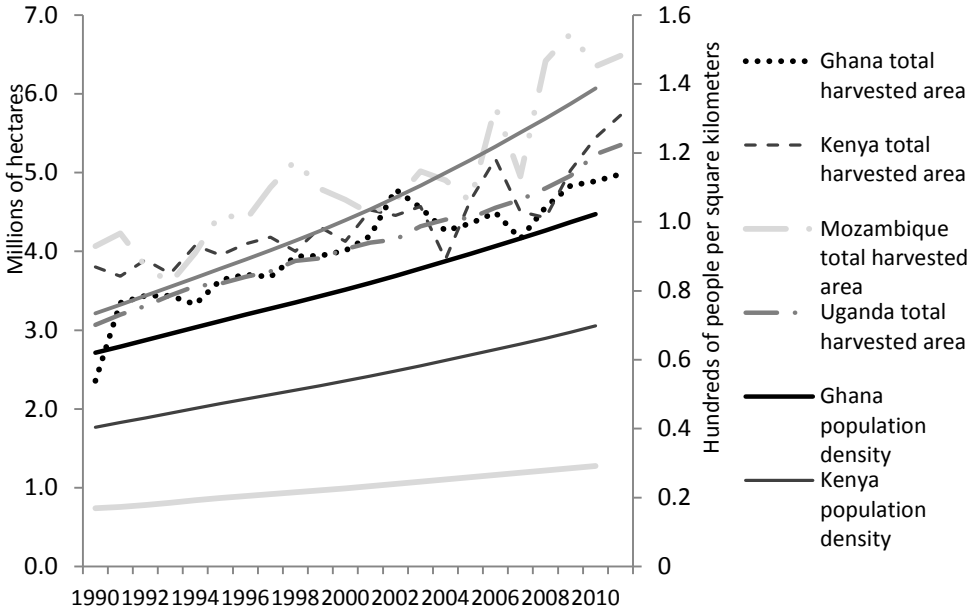
In this paper, we primarily argue that although the debate on the right strategy for agricultural transformation in Africa has tended to focus on whether to promote large-scale versus smallholder farmers, the dichotomy is somewhat misplaced, as there is an important transition and heterogeneity taking place between these two ends of the spectrum. This, we contend, is a critical aspect of agricultural commercialization and transformation taking place in Ghana and other African countries in the context of increasing population pressure and overall agricultural land expansion. Therefore, it behooves us to systematically analyze and understand this process and the farmers involved to formulate appropriate strategies for agricultural transformation in Africa. Those making agricultural policy and investments should take care to understand the underlying microeconomic processes and ingredients of successful agricultural commercialization to promote accelerated and inclusive agricultural growth.

The rest of the paper is organized as follows. In Section 2, we provide a background on the agricultural commercialization and land expansion processes taking place in the context of increased population in Africa. In Section 3 we present the conceptual framework that underpins the analysis. Section 4 describes the data and methods used in this study. Section 5 provides the results of our analysis, documenting the characteristics of homegrown medium- and large-scale commercial farmers in Ghana as well as the ingredients of their transition to commercial farming at scale. Section 6 concludes with a summary of insights gained from the case study as well as numerous areas of promising future research on this class of homegrown medium- and large-scale commercial farmers.

2. POPULATION DENSITY AND LAND EXPANSION: DRIVERS OF AGRICULTURAL COMMERCIALIZATION IN AFRICA?

In the course of the last two decades, several African countries have witnessed significant and sustained growth in agriculture and the overall economy (The Economist 2011a, 2011b; Roxburgh et al. 2010). Increased agricultural commercialization is thought to have played a major part in the agricultural growth, with both smallholders and large-scale farmers participating at varying degrees. Potentially underlying this increase in agricultural growth are increases in population density and expansion in cultivated land. As shown in Figure 2.1, there have been distinctive trends in land area harvested and population density in select African countries, especially where appreciable increases in agricultural growth have been recorded. What is clear from Figure 2.1 is that increases in population density are positively correlated with total land area harvested.[1] It is, however, expected that as land available for conversion to agricultural use vanishes, the correlation may decline and even become negative while intensification and outmigration of labor from agriculture increases. What is not quite clear, are the empirical microeconomic processes underpinning this relationship and how, if at all, they are associated with increased agricultural commercialization at the farm household level. In particular, household-level dynamics of farm-size increases, productivity, and farmers' participation in agricultural markets have not been fully analyzed in the contexts of increasing population pressure. Recent evidence also suggests that part of the land expansion may be explained by foreign land-based investments, particularly in land-abundant countries (Deininger and Byerlee 2012).

Figure 2.1—Agricultural land expansion and population density in select African countries



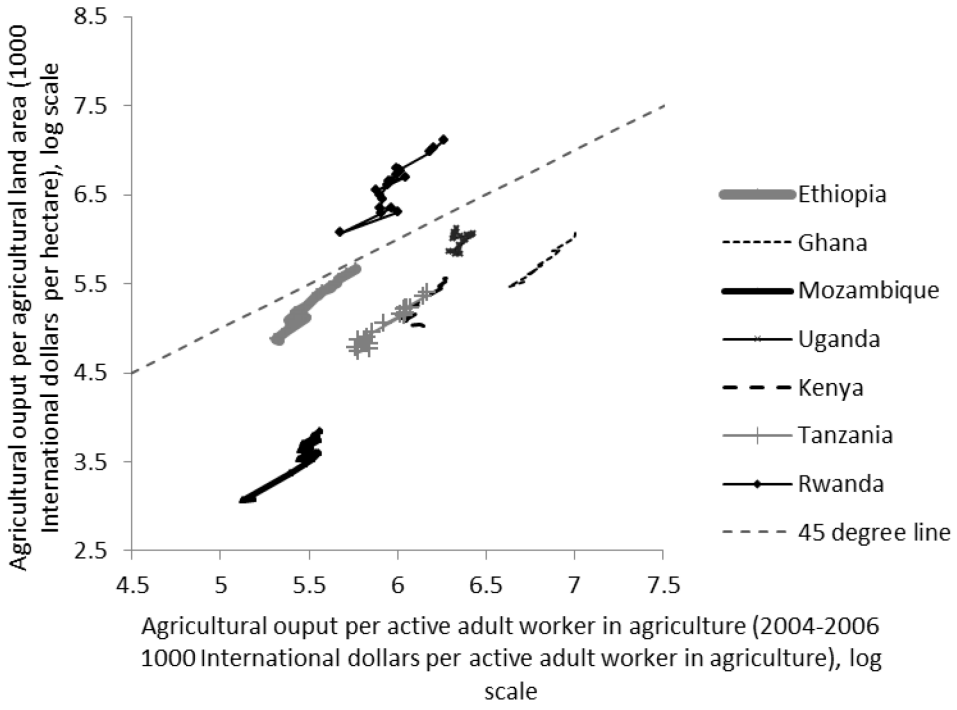
Source: FAO (2013) and UNESA (2013).

Note: The dashed series (land area harvested) are read off the left axis, and the solid series (population density) are read off the right axis.

[1] Undoubtedly, land expansion and increases in population pressure have taken place more generally in Africa (see also, Figure A.2 in the Appendix for larger countries on the continent), especially where there has been sustained agricultural growth in the last two decades. However, causality is difficult to determine, despite land expansion and population growth appearing to be prime drivers of agricultural commercialization and growth. Moreover, there are likely to be other concomitant drivers, including uptake of agricultural technologies (such as improved seeds and agricultural mechanization) as well as improved market incentives (high agricultural commodity prices) and increased land-based investment (Deininger and Byerlee 2012). Understanding these processes in a holistic manner is critical to properly guide policy.

Also, as displayed in Figure 2.2, the African countries that have experienced high agricultural growth exhibited some increases in productivity between the 1990s and 2011. The increases in labor productivity were, however, less than land productivity by the amount of decrease in the land-labor ratio—this is signified by the productivity growth trajectories shown in Figure 2.2 that are steeper than the 45-degree line. Moreover, Fuglie, Wang, and Ball (2012) show that African agricultural productivity growth has generally been limited if one compares it to other parts of the developing world, such as Asia and Latin America, underscoring that agricultural growth has mostly been driven by increases in land area cultivated.

Figure 2.2—Land and labor productivity in select African countries (1993–2011)



Source: Authors' representation using FAO data (2013), following the methodology of Hayami and Ruttan (1971) and Fuglie, Wang, and Ball (2012).

In the case of Ethiopia, Dorosh and Rashid (2012) note that agricultural growth has largely been driven by increases in total land area cultivated, followed more recently by increases in yield, in a context of improved public investments and policy for agriculture. It is interesting to note that in the same period, Ethiopia's population has also grown rapidly, at an annual rate of 2.8 percent (UNESA 2013), suggesting that population growth may have contributed to the increase in land area cultivated and agricultural commercialization. Similarly, in Mozambique, agricultural growth in recent years has been driven by expansion of land area cultivated and increased population, leading to increased agricultural commercialization (Morris, Binswanger-Mkhize, and Byerlee 2009). As revealed by farm household survey data (Mozambique Ministry of Planning and Development 2009), the total cultivated area in Mozambique increased from about 4.2 million hectares (ha) in 2002 to about 5.6 million ha in 2008, with the average farm size cultivated by households also increasing by 12.4 percent in the same period (Arndt et al. 2012). A major part of the increase in land area cultivated has been attributed to the increase in land-based investments, many of which have been foreign-financed as part of large-scale land acquisitions that have taken place. However, Arndt et al. (2012) contend that much of the increase in agricultural production in Mozambique can be attributed to increases in cultivated land area and population growth, such that when one adjusts for these two factors, agricultural growth is found to be mostly weak.

In Tanzania, another African country that has registered sizeable agricultural and economic growth, the land area cultivated has also increased from 4.9 million ha in 1998/99 to 7.8 million ha in 2009, resulting in increased production and agricultural commercialization (United Republic of Tanzania 2008; Binswanger-Mkhize and Gautam 2010; Liwenga, Kangalawe, and Masao 2012). While several large-scale land acquisitions have been associated with the increase in land area cultivated, farm households are found to be expanding their cultivated area as well, although increases in land and labor productivity appear marginal (Binswanger-Mkhize and Gautam 2010). Similar trends have previously been documented in Uganda (Pender et al. 2004), where the expansion of cultivated land took place in the context of increasing population. Pender et al. (2004) note that as the cultivated land area increased, the yields either stagnated or declined, while specialization in agroecologically specific crops increased coupled with land degradation (deforestation and soil erosion). This demonstrates that increases in population tend to result in expansion of agricultural land area with little or no productivity increases when relative incentives for sustainable intensification of agricultural production are lower than incentives for converting more land into agricultural use.

Within the African countries where land expansion has taken place simultaneously with rapid increases in population density, a select group of farmers acquired significantly larger areas of land (perhaps with the exception of Ethiopia, where land use/tenure laws cap land size to 10 ha per household) (Dorosh and Rashid 2012). Sitko and Jayne (2012) document the case of Zambia, where emerging farmers have transitioned to cultivate anywhere from about 12 to 50 acres of land, compared to the majority (70 percent), who cultivate 5 acres or less. In their analysis, they find that those who became emergent (medium- or large-scale) farmers mostly used income and resources from nonfarm employment to expand their agricultural enterprises. They also find that the initial farm sizes of the emergent farmers were far larger than the mean farm size in Zambia. This suggests that these farmers are not traditional smallholder farmers become large-scale farmers. Instead they are entrepreneurs who have entered farming laterally from nonfarm sectors (particularly from public sector employment) (Sitko and Jayne 2012).

In the case of Ghana, the focus country of this study, sustained economic growth and substantial poverty reduction have taken place in the last two decades (World Bank 2012). At the same time, the area under cultivation has increased substantially, with the total land area harvested more than doubling from 2.4 million ha in 1990 to about 5 million ha in 2011 (FAO 2013). Simultaneously, population density has increased, as revealed by national population estimates, with rural population density increasing faster in some regions (see Table A.1 and Figure A.1 in the Appendix; see also Diao et al. forthcoming). Also, at the microeconomic level, Ghana Living Standards Survey (GLSS) data show that the percentage of households owning more than 24.7 acres of land has increased from about 1.2 percent in 1998/99 to about 7 percent in 2005/06, with the average farm size among rural landowners also increasing from approximately 4.9 acres in 1998/99 (standard deviation = 22.7 acres) to 9.9 acres (standard deviation = 54.4 acres) in 2005.[2] Quinones and Diao (2011) also estimate that Ghanaian rural households owning more than 12.4 acres account for 64 percent of the total agricultural land in Ghana, emphasizing the high concentration in land ownership. Despite the convincing evidence of land expansion in Ghana and elsewhere in Africa, there is noticeable heterogeneity in the farm sizes cultivated by different farm households depending on their agroecological and geographic location and access to resources. Moreover, recent results from the Ghana Agricultural Production Survey suggest that between the 2011 and 2012 agricultural seasons, the areas cropped increased for some crops, such as maize and legumes, but decreased for others, such as sorghum, millet, and cassava. This implies that although total land area cultivated has increased, that increase can be attributed to a few crops and potentially a small group of farmers, some of whom have become large-scale and medium-scale farmers (SRID 2013).

[2] Quinones and Diao (2011) as well as the authors' computation, using GLSS5 and GLSS4 datasets (Republic of Ghana Statistical Service, 2006, 1999); see Quinones and Diao (2011) for a more detailed description of the distribution of landholdings in Ghana based on analysis of GLSS5. We have converted hectares into acres for consistency and ease of comparison in this paper.

Part of the explanation for these varied trajectories in land expansion for different crops and farmers is rooted in the differences in geographic comparative advantages. In addition, market incentives (prices) and changing demand preferences for specific agricultural products are important drivers. The latter are particularly driven by increasing urban population and incomes within the African countries, [3] in addition to heightened global demand for specific agricultural commodities. For example, cocoa prices and global demand have increased in recent years, probably accounting for a significant share of the land expansion and increased agricultural commercialization in Ghana (Kolavalli et al. 2012).

Thus it is imperative to carefully analyze the nature of agricultural land expansion as it relates to agricultural commercialization at the microeconomic levels. This is particularly important given the ongoing debate about whether African governments and development partners should promote large-scale versus smallholder farming and given the uncertainty about the extent to which current commercialization and growth in agriculture have been inclusive. Indeed, anecdotal evidence suggests that the processes entail a special group of smallholder farmers that have transitioned to become medium- and large-scale commercial farmers, but the nature and implications of this transitioning process are not understood.

[3] See, for example, Figure A.1 in the Appendix, showing projected increases in urban population and income growth in Ghana. Also, for larger African countries (Nigeria, Ethiopia, and Tanzania), see Figure A.2, showing a consistent relationship between land area harvested and population density. The authors have also calculated correlation coefficients for land expansion and population density among the selected African countries, revealing mostly a high positive correlation between the two variables across the board over time (Table A.2 in the Appendix).

3. CONCEPTUAL FRAMEWORK

We couch our analysis in the theories of agricultural transformation and farming systems dynamics. At the macroeconomic and sector levels, agricultural transformation is seen as entailing a decline in the share of agriculture in a country's labor force and total output over time (Timmer 1998; Johnston and Kilby 1975; Schultz 1964; Lewis 1955). As part of this transformation process, the economy transitions from subsistence-oriented household-level agricultural production toward an integrated production and exchange system based on greater specialization and market transactions (commercialization), while capturing economies of scale (Johnston and Mellor 1961; Lewis 1955). The transition of smallholder farming from subsistence to more commercialized enterprises is a key feature of agricultural transformation in the process of economic development (Johnston and Mellor 1961; Johnston 1970). Through agricultural commercialization, rural farm households increasingly participate in the market economy to earn higher incomes, accumulate assets, and be lifted out of poverty and food insecurity as the process of structural transformation takes root (Gabre-Madhin and Haggblade 2004; Haggblade and Hazell 2010; Jayne, Minde, and Argwings-Kodhek 2002). Simultaneously, the process involves movement of labor out of the farming sector into the nonfarm sectors, including nonfarm rural employment and rural-urban migration for employment in urban areas as well as value added processing of agricultural primary products and trade (Haggblade, Hazell, and Reardon 2007). Adoption of agricultural technology is an integral part of the agricultural transformation process, resulting in increased on-farm production and productivity and greater reliance on the market for farm inputs, outputs, and services, which are all necessary for specialization to take place.

Underlying this sector-level transformation of agriculture is a transformation at the microeconomic level, which involves rational farmers and households engaging in constrained optimization (Schultz 1964) in the context of evolving farming systems (Boserup 1965; Ruthenberg 1980. [4] In this regard, we consider farmers in their community to be rational individuals making farming decisions to maximize expected utility over time but framed by evolving constraints that characterize their farming systems. Over time, different constraints may relax or become further constraining (for example, through some government intervention or other external factor or through increased population pressure).

Collectively, as numerous farmers make decisions over time in response to changing opportunities and constraints presented by their farming system, agricultural transformation takes place under specified conditions. However, the nature or path of the transformation will vary fundamentally by farming system and its evolution, largely depending on biophysical, historical, institutional, and socioeconomic characteristics. Boserup (1965) argues that a fundamental driver in the evolution of farming systems is rising population pressure, which induces innovation as farmers adopt more intensive cropping systems and modern technologies. In contexts where land is not as constraining but perhaps labor is, the nature of induced innovation and agricultural intensification will entail expansion of land cultivated and conversion of fallow land into more intensely used land, in turn resulting in the reduction of shifting cultivation practices. This is often facilitated by the availability of labor-saving farm technologies, such as mechanization, barring prohibitive fixed-transaction costs and institutional constraints. In contrast, in areas with a binding land constraint and where institutions that govern land use preclude expansion, there is likely to be more intensification of farming, with irrigation technologies facilitating multiple cropping enterprises in the same year, in contrast to rain-fed farming systems that do not permit multiple cropping in the same year. In addition, chemical technologies such as fertilizer and pesticides become more readily adopted, as does the use of improved seed varieties, allowing for increased output per unit land area (Boserup 1965; Stryker 1976). Market incentives also play a critical role and motivate the high degree of intensification, both in terms of input and output (relative) prices, such that the profitability of different enterprises may shape the nature of farm intensification and commercialization. Classic examples include horticultural, coffee, and cocoa export market incentives

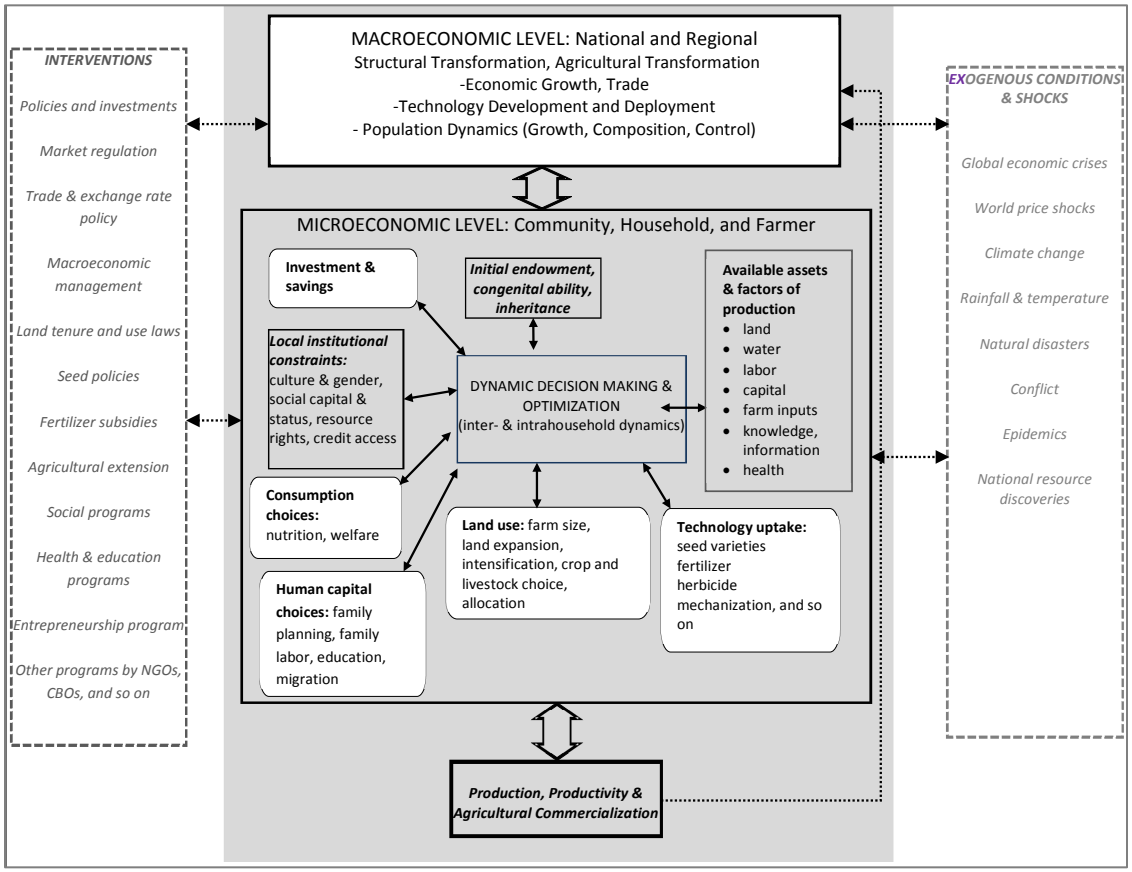
[4] A farming system consists of macro- and microeconomic structure, drivers, and constraints (including population growth and density) that influence decisions and shape the trajectory of land use, modern agricultural technology use, agricultural commercialization, and transformation. (For details, see Boserup 1965 and Ruthenberg 1980.)

that have enhanced profitability in parts of Africa and led to both land expansion and intensification. Another related factor is that of public policy and investments, for example, investments in infrastructure that lower transport and transaction costs, which may relax constraints and enable farmers to intensify their production and commercialize.

There are also heterogeneous constraints within the same geographical locality and farming system, such that some farmers can take advantage of the available technologies or invest in land expansion, but others fail, owing to farmer-specific constraints. These farmer-specific constraints may include initial endowment levels and natural abilities or other social-institutional constraints that discriminate by farmer type or gender, for instance. For this reason, some farmers in the same locality may be found to be transitioning from smallholder to medium- to large-scale commercial farmers and others remain largely subsistence, though potentially benefiting from their transitioning peers through spillover effects. For example, if a transitioning farmer invests in a tractor, he or she might hire out that tractor to other farmers in the village after plowing his or her own fields, thus relaxing the capital constraints of other farmers that fail to purchase a tractor. In essence, the farmers do not operate in a vacuum but interact with one another, thereby influencing each other's constraints and the collective farming system over time.

The above describes the conceptual framework that we apply to empirically analyze the decisions and characteristics of Ghanaian large-scale farmers who have transitioned from smallholder to medium- or large-scale commercial farmers. Figure 3.1 is an illustration of this conceptual framework.

Figure 3.1—Conceptual framework of agricultural commercialization in the context of agricultural transformation and dynamic farming systems



Source: Adapted from Ecker et al. (2011) and Ecker and Breisinger (2012) to conceptualize agricultural commercialization in the context of macro- and microeconomic factors influencing the evolution of farming systems and agricultural transformation.

Note: The shaded area can be conceived as the realm of an evolving farming system, or *development domain* (Pender et al. 2004, Pender 2001), within which farmers make decisions under dynamic constraints over time.

4. DATA AND METHODS

To understand the dynamics of agricultural commercialization and land expansion in Ghana and the emergence of homegrown medium- and large-scale commercial farmers, we conducted in-depth interviews with homegrown commercial farmers. We asked the Ministry of Food and Agriculture (MoFA) regional offices to help us identify successful large-scale commercial farmers who had a consistent outstanding record of production and marketing in their area and had managed to scale up their farm operations, accumulate farm and nonfarm assets, and diversify their income sources. MoFA regional offices came back to us with a short list of farmers, most of who had at one stage won an award under the district or regional best farmer program or had been nominated for the award. [5] We then made appointments with the farmers listed by MoFA and visited them at their farms to conduct in-depth interviews.

This fieldwork was conducted in October 2012, followed up by additional fieldwork in February 2013, when we also interviewed neighboring smallholder farmers residing in the same communities. The in-depth interviews were audiotaped, and in a few instances farming activities were videotaped, if the farmers consented. The authors also took notes during the fieldwork, mostly on observations made or comments that appeared important for the understanding of agricultural commercialization and land expansion within the context of the visited areas. We visited the Volta, Brong-Ahafo, Northern and Eastern regions. In total, 21 farmers were interviewed, 6 of whom farmed more than 95 acres and 9 whose current farm sizes ranged between 9 and 95 acres. We classified the former group as large-scale farmers and the latter as medium-scale farmers. The rest of the farmers interviewed were smallholder farmers with farm sizes less than or equal to 9 acres. Further details on farm size and accumulation of land are discussed in Section 5.

In addition to the in-depth interviews, we conducted three focus group discussions in the Northern and Eastern regions to elicit qualitative data on the communities' farming activities and what the farmers considered indicators of successful commercial farming. We also elicited information on any spillover effects the smallholder farmers experienced as a result of the medium-scale or large-scale commercial farmers in their communities. This exploratory fieldwork was part of a larger study, which continues to take place and is expected to collect survey data on large-scale and medium-scale farmers in Ghana in 2013.

During the second round of the exploratory in-depth interviews, conducted in February 2013, the authors also tested a pilot version of the questionnaire that will be used to collect quantitative data on farming practices, land expansion, and commercialization of large- and medium-scale farmers. Some of the data collected during the pilot interviews are reported in this study to triangulate the qualitative findings observed.

Following the fieldwork, we transcribed the audio and video material and collated the observational notes from the field visits. We developed a typology of the farmers based on farm size and other qualitative characteristics, including sociodemographics, cropping patterns, agricultural technology use, and farmers' perceptions of the key ingredients for successful agricultural commercialization. Detailed analysis of these data was performed, including the calculation of reported yields, rates of land accumulation, and agricultural sales by the large-scale and medium-scale farmers. Furthermore, we compared and contrasted these characteristics and statistics of the farmers by scale of farm operation. Results of the analysis are presented in the following section together with the qualitative findings from the in-depth interviews and focus group discussions.

[5] For more details on the best farmer award program in Ghana, see Box A.2 in the Appendix.

5. RESULTS

Characterizing the Homegrown Large-Scale Farmers and Their Transition

Sociodemographic Characteristics

As shown in Table 5.1, all of the large-scale farmers we interviewed were in the Northern or Brong Ahafo regions, where population density is relatively lower than in the Eastern and Volta regions. This may suggest a link between the existence of large-scale farmers and population density as observed at the regional level (see Table A.1 for variation in rural population density by region). The large-scale farmers interviewed were between the ages of 40 and 50, and four of them had completed high school, whereas the other two had no formal education. Essentially, two education groups emerged from our analysis of the large-scale farmers, one consisting of farmers who had at least completed high school and the other that had no education and could barely converse in English; they communicated with the authors through a translator. We noticed stark differences in the way these two groups managed their farms. The more educated farmers were more aware of the operations on their farms, such as the type of seed used, the amount and type of fertilizer applied, types of chemicals used, crop harvest, and so on. The less educated group of farmers relied heavily on the government extension service agents and followed the advice given carefully, one factor they emphasized as a secret to their success. In contrast, the more educated group used extension agent advice sparingly, preferring to carry out experiments on their own plots to tailor recommendations for their farm conditions. This was especially the case with fertilizer recommendations, suggesting that the more educated group realized that the recommendations were not specific to their fields' soil quality. In addition to formal education, the large-scale farmers highlighted the importance of on-farm training they had received from their parents during their youth or from other family members or local extension officers. Tables 5.1 to 5.3 show the differences in formal education as well as other sociodemographic characteristics of the farmers interviewed.

Table 5.1—Sociodemographic characteristics of large-scale farmers interviewed

	Large-scale farmers (land area cultivated > 95 acres)*					
Farmer number	**1**	**2**	**3**	**4**	**5**	**6**
Region	Northern	Northern	Northern	Brong Ahafo	Northern	Brong Ahafo
District	Karaga	Yendi	Tamale	Atebubu	Kpandai	Berekum
Gender	Male	Male	Male	Male	Male	Male
Marital status	Monogamous	Monogamous	Polygamous	Monogamous	Monogamous	Monogamous
Education	Polytechnic (tertiary)	Teacher training (tertiary)	No formal education	Polytechnic (tertiary)	No formal education	High school
Literacy (read/write)	Yes	Yes	No	Yes	No	Yes
Age of farmer (years)	43	50	74	62	48	40
Year started farming	1990	2000	1970	1993	1985	1995
Nonfarm work experience	None	Teacher	Driver	Retired accountant	None	None
Receipt of assistance from parents	None	Only assisted by brother	Land, 14 acres (from father)	Land, 5 acres (from father)	Yam sets (from parents)	Seed money (from parents)
Inheritance	None	None	None	None	Land (from father)	None
Migrant or exposure to outside community	Migrated into community	Grew up in area but received teacher training elsewhere	Interacted with outsiders as village chief	Moved back to assist aging father	No, grew up in area	No, grew up in area
Award winner/ nominee	District Best Sorghum and Maize; Regional Best Farmer	District Best Yam Farmer	District Best Farmer	District Best Farmer; Regional Best Farmer	District Best Farmer	District Best Farmer

Source: Authors' compilation of data collected from in-depth farmer interviews.

Note: * Farmers with > 95 acres of land under cultivation, not including the fallow and/or virgin land they had access to.

All of the large-scale farmers were male and married, with one having multiple wives (polygamous). No female large-scale farmers were found in the villages visited—only one woman was identified as a successful farmer, and she was farming less than 40 acres of land. Therefore, there is need to assess whether any female large-scale commercial farmers exist and, if so, to quantitatively analyze their farming operations and histories to understand how they commercialized their farming compared to the male large-scale farmers.

Of the three women farmers that we interviewed, one was relatively more successful (see Table 5.2 and compare with Table 5.3). The interviews with the women farmers yielded insights on gender and agricultural commercialization, particularly that they faced several gender-specific constraints in terms of access to land and productive assets, as well as labor constraints that limited their ability to expand their land and become large-scale commercial farmers. Moreover, social institutions in the communities appeared to disfavor women, such that it was more difficult for women to approach a village chief to acquire significant tracts of land to expand her agricultural production. Also, it appeared that one of the relatively more successful female farmers had received significant assistance from her husband and brother, suggesting that the support of a man was critical for a woman to access resources and become a medium-scale farmer. Furthermore, there were culturally defined gender roles in the communities visited, with female farmers rearing smaller animals (goats and sheep) and farming traditionally "female crops", such as groundnuts and yams, and tending vegetable gardens.

Our interaction with two female farmers during two separate focus group discussions reinforced the Ghanaian social setting with respect to gender and agriculture. When a male relative was present during the focus group discussion, women relied heavily on him for answers even when the women were asked about their own farming enterprises. This suggests biased responses and emphasizes the need to conduct interviews with women separately. Thus most responses women gave in the presence of a male relative in the focus group discussions are interpreted with caution.

Of the two women we interviewed, both referred to their reliance on their husbands for motivation and encouragement as well as physical assistance on the farm. They noted that they would require their assistance to remain successful. This opinion was reiterated by a male farmer in one of the focus groups, who emphasized that for a woman to be successful, she needed a male helper, especially to perform "harder farm tasks such as land preparation, and embankment during floods." Nevertheless, this male farmer said women were better at financial and human resource management than their male counterparts.

While these insights are important in understanding the gender dimension of agricultural commercialization and land expansion, more data are required to better analyze the issues of gender and large-scale commercial farming. In our view, the comments made by the women in the presence of men were most likely biased with the possible exception of comments made by a few observably assertive women. For example, in another focus group discussion, an assertive female farmer indicated having yields that were comparable to and even higher than those of her male counterparts in her village. Some male farmers disputed the claim, saying it was impossible for female farmers to achieve such yields. In the end, however, after an extended discussion, there was consensus that female farmers could do as well as men and expand their land area to commercialize if assisted or supported by men and community leaders such as chiefs. Box A.1 in the Appendix is an excerpt from the interview we conducted with the more successful female farmer on advice she would give to other female farmers.

Farm Size, Accumulation, and Cropping Patterns

With the exception of a few farmers who were privileged to inherit land at the outset, obtain resources from nonfarm employment, or receive at least 10 acres of land from their living parents, we found that the majority of medium- and large-scale farmers began small (as little as 1 acre of land) and were able to progressively expand their farm size and commercialize their farming businesses over time. For example, one large-scale farmer who started with just 1 acre of rice in 1994 had expanded his farm size to 10 acres by 1997 and is now farming more than 250 acres of rice and 150 acres of maize in the Northern region. Another farmer, also from the Northern region, started by cultivating 2 acres of yams and had managed to expand to farming 200 acres of yams and 100 acres of maize by 2012. Table 5.4 presents more evidence of small initial farm sizes and land expansion among selected medium- and large-scale farmers. The table also compares the farm sizes of these farmers with those of smallholder farmers, in addition to showing their cropping pattern dynamics.

Table 5.2—Sociodemographic characteristics of medium-scale farmers interviewed

	Medium-scale farmers (land area greater than 9 acres and less than or equal to 95 acres)									
Farmer number	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Region	Northern	Northern	Northern	Eastern	Eastern	Volta	Volta	Brong Ahafo	Northern	Brong Ahafo
District	Tamale	Wamale	West Maprusi	Suhum	Suhum	Keta	Keta	Sene	Kpandai	Techiman
Gender	Male	Male	Male	Male	Male	Male	Male	Female	Female	Male
Marital status	Polygamous	Married	Married	Married	Married	Married	Polygamous	Married	Married	Married
Education	No formal education	High school	Teacher training (tertiary)	Basic	Basic	Basic	University	High school	No formal education	General certificate in agriculture (tertiary)
Literacy (Read/write)	Yes (Arabic)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Age of farmer (years)	>60	31	34	38	63	39	51	50	46	54
Year started farming	1959	1997	1990	2008	1983	1999	1984	1985	2006	1990
Nonfarm work experience	Blacksmith	Currently a preacher	Teacher	Selling wood in Tema (trader)	Had a bus transport business; sold it	Transport sector	Irrigation consultant	Nursery school teacher	Trader (currently); processing of cassava flour (*gari*)	None
Receipt of assistance from parents	None	1 acre land, 2 bags groundnuts, hoe and cutlass	10 acres	Inheritance	Inheritance	None	Initial capital (father)	None	None	Inheritance
Inheritance	None	None	20 acres	67 acres (inherited)	100 acres (from grandfather)	None	None	None	Land (father)	Land (father)
Migrant or exposure to outside community	Moved around after parents death (same region)	No, grew up in area	No, grew up in area	Yes, used to live in Tema	Yes, born in Accra, lives in town	Yes, moved to Keta District because of farming	No, grew up in area	No, grew up in area	Moved into community to live with husband	Grew up in area and received education within district
Award winner/ nominee	District Best Maize & Rice (2004), District Best Soybeans (2009)	No	No	No	No, but is a chief farmer (introduced a number of young men to farming)	No	District Best Farmer (2003)	No	No	District Best Cowpea Farmer (2002), Regional Best Seed Grower (2005)

Source: Authors' compilation of data collected from in-depth farmer interviews.

Table 5.3—Sociodemographic characteristics of smallholder farmers interviewed

	Smallholder farmers (land area cultivated ≤ 9 acres)				
Farmer number	**17**	**18**	**19**	**20**	**21**
Region	Northern	Eastern	Eastern	Eastern	Northern
District	Tamale, Gbabshe	Suhum	Suhum	Suhum	Tamale, Dagbandabofang
Gender	Male	Male	Female	Female	Female
Marital status	Never married	Monogamous	Divorced	Divorced	Polygamous
Education	Basic	Basic	No education	No education	High School
Read/write	Yes	Somewhat	No	No	Yes
Age of farmer	25	35	43	50	45
Year started farming	2004	1998	1993	2006	1993
Nonfarm experience	Trader (currently)	Carpentry	Trader (liquor sales)	None	Trader (currently)
Receipt of assistance from parents	3 acres of land, GHC 30, training in farming	None	None	None	None
Inheritance	None	None	5 acres of cocoa	None	Land to build 2-room house
Migrant or exposure to outside community	Born in Yendi and moved to area with parents	No, grew up in area	Born in Volta and moved to area with parents	No, grew up in area	No, grew up in area
Award winner/nominee	District Best Farmer	No	District Best Female Farmer	No	No

Source: Authors' compilation of data collected from in-depth farmer interviews.

Table 5.4—Farm size and cropping pattern dynamics of selected farmers

	Large-scale farmers			Medium-scale farmers				Smallholder Farmers		
	Farmer 1	**Farmer 3**	**Farmer 4**	**Farmer 7**	**Farmer 8**	**Farmer 9**	**Farmer 11**	**Farmer 18**	**Farmer 19**	**Farmer 20**
Year started farming	1994	1970	1993	1959	1997	1990	1983	1998	1993	2006
Initial farm size (acres)	1	14	5	3.25	1	3	10	0.5	0.3	1.5
Current size of area farmed (acres)	417	324	490	40	21	42	22	2	9.5	1.5
Total current land area (acres)	1,500	324	1,100	90	30	42	103	2	9.5*	1.5†
Mean growth rate in farmed area (acres per year)	18.1	7.2	24.3	1.6	0.3	1.7	0.4	0.1	0.7	0.0
Initial crops/animals‡	Rice (1)	Maize (10), rice (4)	Chickens (100 broilers & 100 layers)	Maize (1), rice (2), yams (0.25)	Groundnuts (1)	Maize (1), groundnuts (2)	Maize, plantain, cocoyam	Cassava	Tomatoes	Maize, cassava
Crops currently grown‡	Rice (250), maize (165), yams (2)	Maize (262), groundnuts (45), Rice (7), yams (6), cassava (4), horticulture	Maize (200), rice (25), mango (60), cocoa (20), citrus (10), cassava, yams, eggplant, other vegetables	Rice (30), Maize (15), yam (1), Cowpeas (4)	Groundnuts (4), Maize (7), Rice (2), Soya(7), yams (0.5), guinea corn (0.5)	Maize (15) rice (5) groundnuts (3) groundnuts/ maize (2)	Oil palm (15), citrus(15) cocoa (30), maize (5), cassava(5), plantain (10), teak (1)	Maize / cassava, horticulture	Maize (1), cassava (1), horticulture (1.5), cocoa (5) plantain (1)	Maize / cassava/ plantain

Source: Author's compilation using data collected from farmer in-depth interviews and pilot survey.

Notes: * 3.5 acres rented at GHC 70 per acre per year; 6 acres sharecropped at 50% of harvest.

† Sharecropped at 33% of harvest.

‡ Figures in parentheses indicate acres allocated to each crop or number of animals raised.

What can be observed from Table 5.4 is that the initial farm sizes of the medium- and large-scale farmers are quite comparable and are significantly higher than the initial farm sizes of the smallholder farmers. By comparing farmers who started around the same time, for instance in the 1990s, we find that farm-size growth and current farm sizes have little to do with when one started farming. All but one of the farmers interviewed have steadily increased their land area cultivated, indicating the possibility for smallholder farmers to grow into medium- and large-scale farmers. However, as shown in Table 5.4, it takes more than 20 to 30 years for farmers who start relatively small to increase their farm sizes beyond 95 acres, implying a rather slow process of land acquisition. Additional information on the large-scale farmers' gradual process of farm-size expansion revealed that the process of land accumulation is also stepwise, with farmers acquiring discrete batches of additional land at specific time points along the trajectory. That process often involved migration from one village to another, or in some cases entailed accumulation of land in different localities at the same time, such that large-scale farmers could be found farming different large parcels of land located in different communities at the same time. Detailed information about one farmer's land acquisition process is shown in the Appendix in Table A.3; it demonstrates the slow, stepwise process of land acquisition. What is unclear, however, are the reasons that some farmers became large-scale farmers and others were only able to become medium-scale farmers, particularly after accounting for regional differences in farming systems and population pressure, which affect the extent to which farmers can increase their farm sizes. Further investigation is warranted to understand the differences in farm-size trajectories.

In terms of cropping patterns, one finds quite similar patterns for all types of farmers, with farmers starting with one or two food crops at most, usually cereals such as maize or rice, which are also cash crops in Ghana. However, once farmers expand, they will grow more crops other than those they started with, while concentrating most of their land on one or two cash crops. Thus much of the land expansion can be attributed to a few crops, which is indicative of specialization.

Our in-depth interviews also included two poultry farmers, and both reported having started small and gradually scaling up their operations. For example, one of them, from Brong Ahafo Region, started with 200 broiler chickens in 1995. After three years, he had switched and increased his operation to 1,000 layers and had invested in constructing the chicken hutch using money from the sale of all his broiler chickens. After further scaling up his operations, the poultry farmer now produces 8,000 chickens per year. This farmer has also invested his income from poultry farming into crop production and now farms more than 300 acres of field crops, mostly used for feed in his poultry business. We found further evidence of land expansion among commercial horticulture farmers in the Volta region. For instance, one horticulture farmer who started with 4 beds (30 squares meters each) of onions in 1983 was now growing 10 ha of horticultural crops (onions [2 ha], okra [2 ha]), carrots [4 ha] and tomatoes [2 ha]) and had diversified into pig and fish farming as well. This qualitative evidence suggests that expansion of farm size and production is possible irrespective of the farmer's enterprise choice (cereal crops, horticulture, or livestock), or location. This may also be related to the farmers' ability to take advantage of different opportunities to commercialize, ranging from livestock production to cereal and horticultural crop production.

The process also entails diversification into enterprises not chosen at the beginning. The qualitative interviews reveal that scaling up farm production and commercialization was achieved through sustained reinvestment of income from the farm and other nonfarm income sources, with the latter being a critical driver of expansion.

Also, a consistent finding is that all the large-scale farmers were cultivating less land than they had acquired, with several of them highlighting their plans to expand further. The farmers gave three explanations for not cultivating all of their land. First, they left some land fallow, as they were using shifting cultivation methods, particularly in the Northern and Brong Ahafo regions, which are less densely populated and are considered savannah and forest zones, respectively. Second, the farmers noted that acquiring more land guaranteed them the potential to expand further in the future, thus serving as a land security measure. This potentially signifies land acquisition for speculative reasons and may be a result of the prevailing land use and tenure rights, which may have inefficiency implications. Third, the farmers

reported that they lacked the labor and capital resources to suddenly cultivate larger land areas once they had acquired it. The reason for this difficulty is that the land is acquired at discrete time points and usually in different communities implying a coordination challenge; all the large-scale farmers interviewed reported having to manage land in different locations and deal with the difficulty of coordinating operations at different locations. Moreover, to clear large tracts of recently acquired land in a short period of time, in time for the rainy season, would require substantial capital which most large-scale farmers said they did not have.

It is obvious that the ability to acquire more land was an integral part of becoming a large-scale commercial farmer, irrespective of geographic location or initial farm size. However, a factor that appears to be critical in land acquisition is one's social capital and ability to convince the village chief to allocate more land. Part of this seems to be linked to the Best Farmer Award Program as well as MoFA's block farming program, as we noticed that once farmers were awarded prizes or identified as nucleus farmers for the block farm program in a community, they tended to command more resources from the chief as well as from other sources, such as nongovernmental organizations (NGOs) and government programs. This is not to understate the achievements of the large-scale farmers, who had managed to scale up their operations prior to receiving any attention and support from the NGOs and government programs. However, it does raise questions about the land acquisition implications of the NGO and government programs that target this class of farmers for support. Moreover, there may be equity and efficiency implications that need to be studied.

When farmers were asked how they acquired more land, most said they simply asked the village chiefs for it, then cleared and stumped the land to assure their use rights. It was reported that stumping of land was a public sanction for securing land-use rights, especially in the Northern and Brong Ahafo regions. Also important to note is that in return for receiving land, the farmers give the chief a small portion of their harvest every season (in some sense serving as an informal land tax or rent payment). As for the smallholder farmers who also increased their farm size, they were either awarded a small piece of land by the chief or had to enter into a sharecropping or land-rental agreement to acquire more land, depending on the geographic location, with more sharecropping taking place in the Eastern and Volta regions.

We also learned that most of the farmers benefited from their parents' farming background, through on-farm training as they grew up or encouragement to be a successful farmer. However, other than that, most farmers we interviewed said they did not receive any start-up capital from their parents. Also, most farmers did not get any financial or in-kind government assistance when they started their farming business, apart from extension services, which all of the farmers said they received. The farmers said it was after attaining large-scale operations and a high level of commercialization that the government approached them through MoFA to participate in the farmer award program. Moreover, NGO projects also approached them to actively support them after they attained large-scale status. Overall, more than half of the large-scale farmers we interviewed were participating in the government's block farm program, which was helping them access subsidized inputs and farm equipment (such as tractors and combine harvesters) on credit through bilateral agreements and other government- or donor-funded programs. These insights on land acquisition underscore the importance of social networks and community relations, as well as region-specific land-use and tenure institutions, in explaining why some farmers were able to acquire more land and become large- or medium-scale commercial farmers and others remained smallholder farmers.

With farm expansion taking place, even among the smallholder farmers, all the farmers were able to increase the number of crops grown. However, all the farmers had one or two primary crops that remained their focus, with most of the farmers' land allocated to these crops. The rest of the crops were grown on smaller areas of land, primarily to provide food for their families or to provide in-kind payments for hired laborers. For example, one farmer had 250 acres of rice, 165 acres of maize and 2 acres of yams, with the yams mainly produced for his own consumption and to feed his laborers, whereas the maize and rice were his main commercial crops (Table 5.4). On the other hand, a much smaller farmer who started with groundnuts had expanded to 30 acres and was growing six crops: maize, rice, soya bean,

and groundnuts as his main cash crops and guinea corn and yams for home consumption. This cropping pattern supports the argument that as the level of integration into the market increases, a farmer will specialize in a few crops but continue to produce diverse food crops (Pingali and Rosegrant 1995; Kurosaki 2003; Timmer 1997; Pingali, Khwaja, and Meijer 2005). However, for most farmers interviewed, the transition from subsistence to commercial staple crop production was more important than shifting to specialized high-value crops. Part of the explanation for this outcome is that the farming system, as measured by agroecological conditions such as rainfall levels and soil types, as well as the population density, may have led the farmers in the Northern regions to scale up production of food staples as opposed to growing high-value crops, which is a phenomenon more common in the Volta and Eastern regions, where population density and rainfall are higher and where densely populated urban centers are closer, which lowers marketing costs. (See Figure A.3 in the Appendix for a map showing the agroecological zones of Ghana.) The impression from our in-depth interviews is that the main objective of the farmers in the Northern and Brong Ahafo regions was to increase staple crop production (mainly rice and maize) that they had produced when they started as smallholder farmers and to use lump-sum annual crop profits to diversify into nonfarm income activities and asset investments. In contrast, the farmers in the Eastern and Volta regions specialized in high-value crops as well as making investments in the urban areas, since they could not easily expand their land areas due to high population density. Further empirical testing of this hypothesis is needed to fully understand the dynamics of population density, location and farming systems in explaining the nature of agricultural commercialization and the transition of smallholder to large-scale commercial farming.

Hired Labor, Agricultural Technology, and Improved Farm Input Use

Because of their market-oriented production system, the large-scale and medium-scale farmers relied heavily if not entirely on hired labor. The farmers said they directly supervised or had their family members supervise the laborers for those farming activities considered to be critical for achieving high production levels (that is, planting and fertilizer application). This need for labor supervision highlights the information asymmetry and principal-agent problems that arose once farmers increased their farm sizes, which necessitated the use of hired labor. Comments by the large-scale farmers suggest that they were still struggling to address the problem, with some combining strategies of ex-ante screening and ex-post monitoring of labor. However, we found limited use of incentive-based mechanisms to address the principal-agent problems associated with the hired labor. Several farmers said they paid workers the same fixed daily wage or a fixed quantity of harvested output for a day's work, irrespective of the total quantity harvested in a day, suggesting that the wages paid were not performance based. Another example is that wages paid for labor hired to plant crops were determined by the area planted, irrespective of the time taken to plant or the quality of the work done. In fact, the majority of farmers we interviewed used a fixed-wage system to remunerate hired labor for numerous types of farm work.

While hired labor was a prominent feature of the large- and medium-scale farm operations, smallholder farmers mostly relied on family labor. In several cases, the smallholder farmers said they could not afford to hire labor and did not see the need to, given their small land area. For the large- and medium-scale farmers, we found it a little counterintuitive however, that most of them did not hire permanent labor and instead relied on casual wage labor.[6] Many paid their laborers in kind in the form of a small share of the harvest, in addition to providing food to the laborers during the days that they worked on the farm. For instance, one of the large-scale farmers mentioned paying 10 women a 100-kilogram bag of maize each as well as providing food for 8 days when the women were harvesting 390 100-kilogram

[6] In a study of cocoa production growth in Ghana, Vigneri (2008) finds that cocoa commercial farmers largely relied on family labor and daily-wage labor, with farmers choosing not to engage migrant laborers in annual labor contracts due to cash flow constraints. This may partly explain why we found large- and medium-scale rice and maize farmers mostly hiring daily-wage labor and not engaging in annual labor contracts. It may also be linked to seasonality in production activities and uncertainty. The lack of adequate incentives for migrant workers to relocate and enter into long-term contracts appears to also play a part, despite migrant-worker status signaling a higher quality of labor.

bags of maize from 19 acres of his land. Another large-scale farmer said he would bring laborers from another community to work on his fields for a daily wage. Other farmers in his community also offered to hire the same laborers, thus he had started bringing more laborers to the village thereby benefiting his fellow farmers. The large-scale farmers hired laborers from other villages because there was often a critical shortage of local labor during the planting season. Two other large-scale farmers in the Northern region indicated using migrant workers from the Ejura, Ashanti region for planting. They emphasized that the Ejura migrant workers were more productive and cheaper than the local farm laborers. They also said the Ejura migrant workers did a better job of planting the crops in rows and spacing them accordingly and mentioned that when laborers came looking for work, they would screen workers on the basis of migrant status, with migrant workers being preferred for all farm tasks. This finding implies that although the emergence of large-scale and medium-scale farmers may have created off-farm employment in the local communities, it generated positive spillover effects for other communities with migrant farm workers. It also appears that by attracting migrant workers into the local communities, the large-scale farmers may have created other (positive and negative) spillover effects on their communities. Analysis of these spillover effects is important to understand the effects of land expansion and commercialization by homegrown large-scale farmers. What is certain from our qualitative findings is that as the large- and medium-scale farmers expanded their farm sizes, they had to hire more labor, which brought on labor management and information asymmetry challenges for the large-scale farmers as well as associated spillover effects for their communities and migrant-worker communities.

It is crucial to also note that as the farmers expanded, they also increased their use of modern farm inputs and agricultural technologies. Most of the large-scale farmers indicated acquiring a number of productive assets using income from their farm output sales, as well as nonfarm income sources. Six of them said they purchased at least one tractor at some point in their farm expansion. With the exception of farmers in the Brong Ahafo and Eastern regions (classified as transition and forest zones)[7] all large- and medium-scale farmers used tractors for plowing, and all with more than 100 acres of land owned tractors. Those with less than 100 acres mostly hired tractor services from large-scale farmers, from the government program Agricultural Mechanization Service Enterprise Centres, or from private tractor-service providers. As shown in Table 5.5, all the large-scale farmers owned at least one tractor, and one of them also owned two combine harvesters, suggesting that when farmers expand to become large-scale commercial farmers, they acquire dedicated mechanization as opposed to relying on tractor services. One of the larger-scale farmers, who owned four tractors, said that two of his tractors were primarily dedicated to his farmland, whereas the other two were purchased specifically to provide tractor services to neighboring farmers. The other large-scale farmers indicated that their farming enterprises were too large to rely on the market for tractor services because when they needed the service, it would not be available at times. Instead, they preferred to own the equipment, which in some cases they could use to offer tractor services to others after finishing their own fields. This underscores how uncertainty of mechanization supply influenced the demand for tractors versus tractor services among the large-scale farmers.

[7] See map of Ghana's agroecological zones in Figure A.3 in the Appendix.

Table 5.5—Use of hired labor, agricultural technology, and improved farm inputs

	Large-scale farmers			Medium-scale farmers				Small-scale farmers		
	Farmer 1	Farmer 3	Farmer 4	Farmer 7	Farmer 8	Farmer 9	Farmer 11	Farmer 18	Farmer 19	Farmer 20
Hired labor use/ worked as a laborer on another farmer's fields	Hired 9 permanent; Hired many day-wage laborers, especially migrant workers	Hired 0 permanent; Used family labor to supervise; Hired many day-wage laborers	Hired 7 permanent; Hired many day-wage laborers; Used some family labor	Used family labor and hired day-wage laborers	Hired 18 day-wage laborers	Used family labor and hired many day-wage laborers	Used family labor and hired many day-wage laborers	Used family labor	Used family labor	Used family labor; Worked as a laborer to harvest another farmer's field
Land preparation method	Plowing by own tractor	Plowing by own tractor	Plowing by own tractor	Plowing by own tractor	Plowing by hired tractor	Plowing by hired tractor	Slash/burn & spray herbicide (zero tillage)	Spray herbicide (zero tillage)	Spray herbicide (zero tillage)	Slash/burn (zero tillage)
Number of tractors owned (hiring in or out of tractor)	4 (hire out 2)	3 (hire out 1)	1 (do not hire out)	1 (hire out 1 after own farm use)	0 (hire in)	0 (hire in)	0 (did not hire)	0 (did not hire)	0 (did not hire)	0 (did not hire)
Other major agricultural machinery owned	2 combines, tractor accessories, maize sheller, irrigation equipment	3 maize shellers, 3 dibblers (planters), 1 groundnut thresher	Irrigation equipment, sheller, gari processor, storage facility	Tractor accessories	Basic farm implements	Basic farm implements	Palm oil processor	Basic farm implements	Basic farm implements	Basic farm implements
Transport assets owned	2 trucks	1 Kia truck, 4 motorbikes		1 trailer, 5 motorbikes	1 motorbike	1 motorbike	Had bus, but sold it	Bicycle	None	None
Fertilizer use	Inorganic (NPK)[1] combined with shifting cultivation	Inorganic (NPK & Yara Blend)	Inorganic (NPK & ammonium)	Inorganic (Activa, Sulfan) only on maize under contract	Inorganic (NPK) on maize and rice	Inorganic (NPK) on maize under contract	Manure for oil palm	No	No	No
Type of seed used	Maize(Obatampa Pannar 53), rice (Togo, Marshall)	Maize (Obatampa, Pannar)	Maize (Obatampa) —recycle for 5 years	Maize (Pannar), rice (Tox)	Recycled for most of the crops except rice and maize— from market	Maize (Pannar), groundnuts (Agric) rice (Mendi)	Hybrid for cash crop—sold green (major season); local variety for home consumption crop—insect resistant (minor season)	Maize (Obatampa) Recycled all	Recycled all	Recycled all

Source: Authors' compilation using in-depth interview transcripts.

Note: NPK = Nitrogen Phosphate Potassium fertilizer.

In one of the interviews, a farmer said the use of machinery was a prerequisite for expansion beyond 100 acres. According to him, "[One] may grow 10 acres [without mechanizing] and when they reach 20 acres, they will stop. For them to get to 100, I would say no! You can never get to a hundred if you don't mechanize." All the farmers who did not own a tractor aspired to buy one, and those who owned a used one said their goal was to acquire newer and more durable tractors. One exception was a female farmer who indicated that at her level, owning a tractor was going to be very expensive, so she preferred hiring tractor services. Instead, she aspired to save money to acquire a maize drier because the minor season rains often came too early, before the major season maize crop had fully dried, resulting in high moisture content in her maize, which led to lower sales prices. In the case of horticulture farmers in the Volta Region, we found that they also mechanized, though they mostly used power tillers (hand tractors) instead of tractors to cultivate their land, and used irrigation equipment. They explained that the undulant topography of their land as well as the smaller farm sizes owing to population pressure in their region necessitated the use of smaller-sized machinery such as power tillers.

Other than tractors and power tillers, vehicles and other transportation machinery were of high importance in the large- and medium-scale farm operations. Four large-scale farmers had acquired their own cargo trucks, and one of them said he owned a trailer that he used to transport produce as well as farm inputs to and from the farm. In addition, nearly all medium-scale farmers had purchased at least one motorbike, which they said was useful for their farming operations. Harvesting and post-harvest equipment were also prominent features of mechanization among the large- and medium-scale farmers. For example, two farmers had acquired cassava flour *(gari)* processing machines, and one had an oil-pressing machine. Moreover, we found that all the large-scale maize farmers had maize-shelling machines, demonstrating that the adoption of mechanization was not limited to tractors but extended to harvesting and post-harvest mechanical technologies. All the large-scale rice farmers we interviewed were also using combine harvesters for timely harvesting, though the large-scale maize farmers used hired laborers for harvesting.

Regarding farm input use, we found that apart from herbicides, smallholder farmers generally did not use improved farm inputs (improved certified seed varieties, inorganic fertilizers, and insecticides) compared to the medium- and large-scale farmers. The large-scale farmers emphasized that the use of improved farm inputs was important for large-scale commercialization but that the high cost of inputs was a limiting factor. As highlighted by one of the large-scale farmers, use of improved inputs such as fertilizer was a driver of productivity. However, because they continued shifting and cultivation practices, they could afford to apply less fertilizer and continue expanding their land area given that the virgin land was relatively fertile. This allowed them to maintain reasonably high levels of output while applying less fertilizer than is recommended by MoFA. Nonetheless, the farmers acknowledged that there were productivity gains associated with using fertilizer saying, "Without fertilizer, we get 2 bags per acre. With the fertilizer, you can get 10 bags or more."

Similar comments were made regarding the use of improved seed varieties. However, we found that most of the large-scale and medium-scale farmers used certified improved seed but in many cases would select their own seed after harvest and recycle it for at least three years before purchasing new certified seed. Those who purchased certified seed every year did it if the seed was provided under contract farming arrangement or through the government and NGO programs. This suggests that although the large-scale and medium-scale farmers knew the benefits of using more improved seeds, they largely recycled the seed and depended on external program to obtain new certified seeds. As shown in Table 5.5 all large-scale maize farmers continued to use improved local varieties as well, such as Obatampa (an open-pollinated variety of maize), in addition to using hybrid seed varieties, such as Pannar 53 (a hybrid variety of maize that was often provided through interlinked farming contracts with a private company, Masara N'Arziki). The mixed use of improved inputs and technologies such as recycling certified seed and combining fertilizer use with shifting cultivation brings into question whether these homegrown large-scale and medium-scale farmers had commercialized through technology adoption and increased productivity or merely through expanding land area and production. Therefore we investigated their farm yields to provide insights on their productivity compared to smallholder farmers.

Farm Productivity and Market Participation

In the literature, surveys of farm size in developing countries frequently show small farms producing more per acre than large farms, a sign of the inverse relationship between farm size and production per unit land area (Wiggins 2009; Cornia 1985; Eastwood, Lipton, and Newell 2010). The explanation often given is that there are few economies of scale in farming; indeed, there may be diseconomies of scale, especially once farm size grows beyond a certain threshold that can be managed by the farm household.[8] Unlike formal surveys, we found that the homegrown large-scale and medium-scale farmers had at least twice the maize yields of smallholder farmers. However, we did not find significant differences in maize yields between the large-scale and medium-scale farmers—in fact the farmer with the highest reported maize yields was a medium-scale farmer. It is indeed critical to cautiously interpret our results, as they are based on a small, nonrandom sample of farmers interviewed for exploratory purposes to provide insights on homegrown large- and medium-scale farmers in Ghana. A comprehensive random sample survey of the homegrown farmers is needed to quantitatively test the productivity differences we found. Table 5.6 shows the reported yields for the selected group of farmers we interviewed.

We found that the large-scale farmers had higher rice yields than the medium-scale farmers, with most of the large-scale rice farmers producing as much as three times the yield of medium-scale farmers. This suggests that the relationship between crop yields and farm size may also vary by crop, perhaps due to crop-specific technological differences and potentially due to a different minimum efficient scale of production for each crop. In the case of rice, a critical technological difference observed between large-scale and medium-scale farmers was the method of harvesting, with large-scale rice farmers using combine harvesters and most medium-scale rice farmers using hired labor. It is therefore likely that using a combine harvester reduced the loss of rice during harvest for the large-scale farmers.

An additional finding is that yields of the large-scale farmers when they started farming, that is, when they were still smallholder farmers, were mostly lower than their current yields. For example, one large-scale farmer said his current maize yields were about 2.5 tons per ha (tons/ha) but had been about 1.7 tons/ha when he started farming in 1994. When asked why the current yields were higher, the farmers mentioned the increased use of improved inputs, including fertilizer and high-yielding seed varieties. Other farmers also attributed their increased yield to the use of improved inputs and agricultural technologies.

There was one exception among the large-scale farmers, who said his yields had declined from 2.7 tons/ha to 2 tons/ha. He explained that the land he farmed when he started was more fertile, as it was virgin land. However, after several years of farming, fertility had declined, even with the continued use of shifting cultivation methods as well as application of some fertilizer. Another explanation given was that smallholder farmers use labor and inputs more intensively than large-scale farmers and do not have the problem of monitoring laborers to ensure they are working properly; thus higher yields can be realized when farming a smaller area, albeit the farmers achieve a lower total output compared with large-scale farmers. Thus, it appears the inverse relationship between farm size and productivity did not hold for most homegrown large-scale farmers in Ghana, though it potentially held in some cases. Whether one compared the current yields of large-scale and smallholder farmers or compared the initial and current yields of the same transitioned large-scale farmers, the results do not reflect an inverse relationship between farm size and yields.

This is contrary to the majority of claims about land expansion and productivity in Ghana. For example, Vigneri (2005) and Gockowski (2007) raise the concern that the recent growth in commercial cocoa production has largely been driven by land expansion and increased labor use, with little or no productivity gains resulting. It is unclear whether this is the case for maize and rice as well, and further quantitative analysis is needed to empirically assess the relationship between increases in farm size and land productivity over time. Moreover, the current study was unable to adequately assess labor

[8] Other explanations have also been given, for instance, that there are systematic measurement errors in farm size (Carletto et al. 2013; Barrett, Bellemare, and Hou 2010), soil quality differences (for example, Bhalla and Roy 1988; Benjamin 1995), and moral hazard problems associated with increased use of hired labor as farm size increases (Feder 1985).

productivity and moral hazard issues in relation to increases in farm size, another aspect of farm size expansion and farm productivity that would require detailed analysis using survey data.

The bottom half of Table 5.6 presents the extent of market participation by farmer type and output prices received. In general, we found that smallholder farmers marketed relatively lower shares of their crop output (ranging from less than 33 percent to about 67 percent). As expected, the large-scale and medium-scale farmers marketed a greater share, close to 100 percent of crop output.

At first glance it appeared that smallholder farmers were receiving higher output prices, contrary to our a priori expectation. However, these price differences can be explained by at least three factors: (1) most of the smallholder farmers we interviewed were located closer to urban centers such as Accra and Kumasi, (2) the large-scale and medium-scale farmers often received prices that accounted for input credit received earlier during the planting season, and (3) smallholders tended to sell their output in smaller units in the local community rather than selling in bulk to agribusiness firms or traders, such that their unit prices, although higher, may be associated with higher unit transaction costs. Thus, although the prices reported by the smallholder farmers appeared to be higher, they in fact may have been lower after accounting for the above-mentioned factors, thus indicating lower returns per unit of output marketed. The finding that smallholder farmers usually sold smaller units at relatively higher prices may also imply a marketing strategy by smallholders to increase returns from small-quantity sales. Additional investigation is needed to explain the differences in price as well as to ascertain the extent of market participation between of large-scale, medium-scale and smallholder farmer operations. At the very least, our current results imply a positive correlation between farm size and the degree of agricultural commercialization as measured by the share of marketed output surplus, but a negative one with respect to unit output prices received.

Table 5.6—Maize and rice yields and marketed surplus of large-scale, medium-scale, and smallholder farmers

	----------Large-scale farmers ----------			---------Medium-scale farmers-------				----------Small-scale farmers----------		
Farmer Number	**1**	**3**	**4**	**7**	**8**	**9**	**11**	**18**	**19**	**20**
Maize yields at beginning (tons/hectare)	1.7	1.3	2.7	1.2	*	1.8	0.5	*	*	*
Current maize yields (tons/hectare)	2.5	2.5	2.0	2.5	2.1	4.2	0.7	1.0	0.7	1.2
Rice yields at beginning (tons/hectare)	3.0	1.2	2.0	1.9	*	1.3	—			—
Current rice yields (tons/hectare)	3.0	2.5	3.0	2.2	0.6	0.5	—	—	—	—
Share of crop output sold:										
Maize (%)	99.9%	80%	—	30%	100%	96%	70%	<33%	67%	57.1%
Rice (%)	99.9%	80%	95%	100%	100%	90%	—	—	—	—
Soybean (%)	—	—		—	100%	—	—	—	—	—
Cassava (%)	—	—	100%	—	—	—	—	—	—	—
Price received:										
Maize (GHC/100 kilogram bag)	70	50	70	55	50	46	150†	*	150†	120†
Rice (GHC/100 kilogram bag)	80	45	50	70	60	50	—	—	—	—
Soybean (GHC/100 kilogram bag)	—	—	—	—	63.64	—	—	—	—	—
Cassava (GHC/100 kilogram bag)	—	*	*	—		—	—	—	—	—
Market channel sold to	Rice miller (aggregator); certified seed to MoFA; private individuals	Masara N'Arziki; Nestle Ghana, poultry farmers	Traders from Accra, Mankessim, Tema, Tarkoradi; market women	Local traders	Local traders	Masara N'Arziki, local traderfor rice	Local marketwomen	Local market women	Community neighbor; local market women	Community neighbor; trader

Source: Authors' compilation.

Notes: — indicates not applicable.

* Information not collected

†Farmers in Eastern region and price per bag derived from selling maize in smaller quantities

Migration, Exposure, and Aspirations

Although many of the large-scale farmers we interviewed started relatively small, they all seemed to have come from outside the usual set of rural smallholder farmers struggling to commercialize. Most of them had been able to go outside of their communities for a few years to explore other opportunities or attain some level of education (see Tables 5.1–5.3). This appears to have helped them return and start farming in their communities with the objective of scaling up and commercializing their farms. This observation is somewhat consistent with the result found by Sitko and Jayne (2012) in Zambia, where a majority of emergent farmers have entered farming laterally, using resources from outside agriculture, potentially including the knowledge and skills obtained from nonagricultural exposure in the public sector. From this observation, we asked ourselves whether the majority of farmers who do not leave their communities or have opportunities to work in the nonfarm urban sector or migrate are able to transform their farming into commercial enterprises. In addition, it remains an empirical question whether the more commercialized large-scale farmers generated positive spillovers and assisted the smallholder farmers to commercialize through role-model effects, a transformation of the community's aspirations window, or exposure to new technologies and farm management practices used by the large-scale farmers. While we explored some of these issues in our second round of in-depth interviews, it was clear that more quantitative analysis is needed to adequately answer these questions. In our second round of in-depth interviews and the focus group discussions, smallholder farmers residing in the same communities as the large-scale farmers said they were in fact being exposed to new farming methods as well as receiving some assistance from the large-scale farmers in the form of free agricultural advice and tractor services for a nominal fee. A few smallholder farmers noted that they were inspired by the achievements of the large-scale farmers, and this motivated them to increase their farm sizes. Also, one of the large-scale farmers talked about "the competition of farming" and said that competition with other large-scale farmers motivated him and others to produce more and expand farm size.

We also observed that a number of the large-scale farmers were not entirely residing in the communities where their farms are located. Instead, they were commuting between their farms and the nearest town, where they had access to better amenities. In some cases, they were farming land in several communities and would commute to different villages from their place of residence in the urban centers. When asked about this arrangement, the smallholder farmers in the rural communities said this was an aspiration they had—to someday move out of the rural village and stay in the city. This was particularly the case for several younger farmers who participated in the focus group discussion. They also noted the intergenerational dynamics of having older large-scale farmers in their community who could be role models for them. In a related issue, most of the older smallholder farmers we talked to did not want their children to become farmers, and some were educating their children outside their village with the help of relatives in the city. This emphasizes that many of the farmers viewed migration out of the local community, be it temporary or permanent, as a beneficial strategy to improve one's livelihood.

Ingredients for Successful Agricultural Commercialization: Large-Scale Farmers in Their Own Words

In this section we highlight the qualitative responses that the farmers gave as the secrets to their successful farm size expansion and commercialization. We believe portraying the unadulterated comments is of value, particularly to emphasize some of the noneconomic and psychological perspectives that the farmers raised.

When we asked the large-scale farmers to share the secrets of their successful commercialization and expansion, most responded by giving us a list of ingredients for success. The ingredients they most often mentioned include, in their own words, (1) "interest and self-motivation in farming," (2) "farming as a business," (3) "discipline, good farm management, and hard work" (4) "saving and reinvestment to accumulate assets" (5) "diversification and risk management" (6) "land availability and tenure status," and (7) "access to credit." We elaborate on each of these below and discuss related aspects we observed during the focus group discussions and farm visits.

1. Interest and Self-Motivation

In the majority of cases, the farmers emphasized that without an interest and drive to commercialize, one would not succeed in farming. They said many rural people remain subsistence farmers because they lack the interest and motivation; they fail to persevere to move to the next level of farming. When we asked one of the medium-scale farmers what made him successful, he said, "First you have to decide that you want to become a farmer. Then you work towards it. For me, the decision is the most important thing. As for the money, you would have to get it from whatever source if you want to become a serious farmer. Since you will know what you want to be, you will utilize whatever money you get to achieve your goal." When we asked the farmer if it was possible to make someone a successful farmer by providing startup capital and farming knowledge, he emphasized the importance of the farmer's aspiration and said no kind of assistance would help if the person had not made the decision to make farming his or her business.

2. Farming as a Business

Most of the large-scale and medium-scale farmers also said that a lot of aspiring farmers failed to commercialize because of failing to treat farming as a business. Treating farming as a business, they argued, enabled them to effectively control costs and use marketing strategies that resulted in higher profits. For example, one strategy they all had was to wait and sell their harvest later in the season when the prices were higher. Although the use of such marketing strategies may be viewed as part of "treating farming as a business," it is possible that the smallholder farmers also wanted to implement the same strategies but failed to do so due to a lack of resources, such as storage for their produce, which would have allowed them to sell later. Therefore, just because the large-scale farmers considered strategic marketing as part of treating farming as a business, which they identified as a necessary condition for commercialization, it is likely the smallholders could have also considered strategic behavior but failed to execute it due to constraints not faced by large-scale farmers.

Another aspect of "farming as a business" that large-scale farmers highlighted is that farming "is not a part-time job," which alludes to the notion that one has to specialize in farming. According to the farmers, this involved dedicating all their time, effort, and resources to farming rather than farming as a hobby or as a lifestyle. In our view, farming as a hobby or lifestyle is generally less likely in developing countries than in developed countries. However, such cases of lifestyle farming cannot be ruled out, especially among retirees and wealthier individuals.

Despite the comment about farming not being a part-time job, some of the large-scale farmers were working full-time in nonfarm employment alongside farming, which seemed to contradict their statements. These farmers justified their concurrent engagement in nonfarm employment by saying they were doing so for strategic reasons, mainly to access employer-guaranteed bank loans, which they could use to invest in their farm's expansion, as well as to manage the risks of poor performance in the farm business and irregular cash income. The farmers indicated that one had to farm for profit and not just to supply food for the family, implying that the large-scale farmers considered themselves as having a different objective from the smallholder farmers.

3. Discipline, Hard Work, and Good Farm Management

The importance of hard work and discipline was repeated by all large-scale farmers during our in-depth interviews and focus group discussions. Most of the large- and medium-scale farmers described themselves as hardworking, committed, and disciplined. They said this business-like attitude, or work ethic, combined with their discipline to defer immediate consumption in favor of reinvesting in their farms, enabled them to expand and succeed. The farmers noted that commercial farming was not for everyone; only hard workers and disciplined individuals were able to establish successful commercial farm ventures. When we asked what it takes for someone to succeed in farming, one farmer said, "There are two things you can look out for in a successful farmer, laziness and hardworking. The lazy ones will not yield any improvement despite the support given to him. But the hardworking ones pay back whatever they owe you when you give them the support. Though both farmers will be facing challenges in their lives, the good farmer looks beyond his problems and concentrates on his farming activities to produce

results, while a bad farmer focuses on his problems only." Good farm management was a related ingredient for success mentioned by the farmers. They saw this mainly as being able to skillfully supervise crop production and hired labor, as well as managing finances well. In addition, the large-scale farmers said that to be successful, farmers had to live near or on their farms, work in their fields, and keep a close eye on their crops and workers. This underscores monitoring of production and marketing activities, which the farmers argued played a significant role in enabling them to expand farm size and commercialize their enterprises.

4. Savings, Sustained Reinvestment, and Asset Accumulation

Despite starting small, most farmers interviewed emphasized that through financial discipline, savings, and reinvestment into their farming business, they were able to scale up and diversify their farming enterprises. Starting farming with a little savings from previous employment elsewhere, an employer-guaranteed loan from the bank, credit from a friend, or a small grant from parents meant they had to be financially disciplined to save and reinvest most of their proceeds, which then allowed them to expand further and diversify into other crops. With accumulation of assets taking place over extended periods of time, they also managed to diversify into nonfarm activities, such as providing tractor services, transport, processing, real estate, and trading. Regarding financial discipline, one of the farmers said, "You don't have to misuse your capital but rather you have to allow it to grow. As it grows, you reinvest." When asked how they saved, one farmer said he did not put his money in the bank, because the return was very small; instead he invested in livestock. While the large-scale farmers said they were able to save their income this way, it appeared that the smallholder farmers did not have the capacity to save anything at all. This constitutes a major barrier, requiring innovative solutions to improve smallholder farmers' ability to save and reinvest in their farms.

5. Diversification and Risk Management

Most of the large-scale farmers had diversified crop and livestock portfolios. In addition, they invested in nonfarm enterprises such as agricultural value addition and processing, tractor services, transport, and real estate. They considered the diversification of enterprises as a risk-management tool. As revealed by the data on cropping patterns, crop diversification was common among all types of farmers, and was used as a strategy to cushion against price shocks or bad weather. Many farmers interviewed said, "It is only a foolish farmer who puts his eggs in one basket."

Diversification into nonfarm activities also offered farmers a way to maintain a steady income year-round, which allowed them to cover day-to-day family expenses and other farming expenses. For example, the farmers reported that if the harvest was low due to drought, they could count on nonfarm enterprises for income. Moreover, the nonfarm income could be used to finance farm expansion and general farm operations in the year following a drought or flood.

Apart from crop and enterprise diversification, the farmers said they managed price risk by storing their grains and selling when prices were highest. Others preferred to travel to the capital city, Accra, in search of higher prices than to sell at low prices offered by traders and market queens[9] at the farm gate. A horticulture farmer in the Volta region said he managed price risk by controlling the area under cultivation, especially during the rainy season. By phoning other horticulture farmers in major production areas, he was able to gauge how much area was being cultivated, which helped him determine how much land to allocate to different crops. In addition, he deferred some production to the dry season, taking advantage of his irrigation equipment, which other farmers did not have. The farmer lamented that the only wild card was the unpredictable market supply of horticulture produce from neighboring countries.

[9] Market queens are women involved in trading of agricultural products and provision of credit to farmers. They are referred to as "queens" because of the market power and relative control they exercise in the agricultural markets they operate in.

6. Land Availability and Tenure Status

Land availability was one of the key factors that enabled the large-scale farmers to expand, especially those who farmed maize, rice, yams, and tree crops. However, with the exception of three farmers who had title deeds to part of the land they were farming, most of the farmers only had use rights obtained from the village chiefs. This underscores that in the context of Ghana, it is possible to expand land area cultivated and become a large-scale commercial farmer without title over the land, as long as one has favor with the local village chief as well as public (community) sanction over the land-use rights. As evidenced by the comments of the farmers, even though they did not have title to the land, they were not worried that someone might grab their land or that the chief would give it to someone else. In their words, "the land [was theirs] for life," but they could not use it as collateral to obtain formal loans from a commercial bank.

The farmers in the Brong Ahafo and Northern regions indicated that land acquisition was not a constraint, as land was readily available as long as they were able to clear and stump the fields and fully use the land to the satisfaction of the local leadership. By stumping land in Brong Ahafo and the Northern regions, farmers would have staked their land, and public sanction ensured that nobody would take land stumped by someone else. Most of the farmers in the Northern region said acquiring resources to expand, rather than land, was the limiting factor. For example, one farmer said, "The tradition is that when they give you a virgin land and you clear the trees, it automatically becomes your property. That is the practice for land acquisition here. So when you ask for the size of this room, they'll give it to you and ask you to clear it. When you clear it, it becomes yours." In contrast, the farmers in the Volta region indicated that land for expansion was scarce. The population pressure was a result of many farmers being attracted to the area because of its proximity to water, electricity supply, and markets.

Overall, the customary land tenure system in place appeared to facilitate easier access to land for the large-scale farmers who originally had employment elsewhere and had access to other resources or social capital. This finding is quite consistent with the case of Zambian emergent farmers (Sitko and Jayne 2012) who entered agriculture laterally from previous positions in the public sector, have easier access to land and are able to expand their farms relatively quickly.

7. Access to Credit

The final ingredient of successful large-scale commercialization that was noted by the farmers was access to credit. They emphasized that large-scale commercial farming requires purchased inputs and technology and, as a result, credit becomes a necessity. Only a few farmers involved in horticulture and poultry were found to have relied on bank loans or borrowed money at some point to expand their operations. However, the majority engaged in nonfarm employment and used employer-guaranteed loans to expand their farming operations. Although not all the farmers financed their start-up through loans, the different experiences of the large- and medium-scale farmers reinforced the importance of credit in commercial farming.

Most of the famers indicated that banks were not keen to lend to farmers because of high risks associated with rain-fed agriculture, lack of collateral, and the high incidence of loan defaults. Also, farmers themselves were not keen to take out loans from commercial banks because of exorbitant interest rates and the short time period given to repay their loans. Others were reluctant to borrow from the market because of bad previous experiences with bank loans which they had repaid at a loss. Therefore, most of the large-scale farmers interviewed relied partially on inputs supplied on credit by MoFA under the block farm program and purchased the rest of their inputs from the market using personal resources. Three of the large-scale farmers in the Northern region also noted that they produced some of their maize under contract with a private firm (Masara N'Aziki), and this helped them access inputs on credit. In a couple of cases, farmers without collateral but who had use rights over land were also able to access credit from market queens (traders) or from a separate private firm that was promoting soybean production (Savannah Marketing Company). These market queens and the private firm provided credit or inputs on credit during the planting season, and then recovered the debts during the harvest period through a contractual requirement that the farmers sell their produce to them at the time of harvest, when the prices were low. It

was noted that in the event that a farmer does not repay, the market queens can confiscate the farm produce with the assistance of the village chiefs. Most of the large-scale farmers were not accessing credit from the market queens or the interlinked private firm because they deemed it unprofitable and tantamount to extortion.[10] In all, there was consensus that although access to credit was an important ingredient for successful commercial agriculture, the options were limited and most farmers had to rely on different sources of credit in addition to saving their own income from previous years of farming or employment outside of agriculture. Given the difficult credit constraints, it appears that smallholder farmers are even more constrained and less likely to obtain credit for farming. The exception is the multiple farmer organizations we encountered during fieldwork, which provided various agricultural services, including group-lending options for member farmers. This seemed to circumvent most of the smallholder farmers' credit constraints but did not facilitate their expanding in land area to become medium- or large-scale commercial farmers. In the end, credit was deemed a necessary ingredient for farmers to expand and commercialize their farming. However, individual entrepreneurial savvy and the ability to use their size to access credit and resources from multiple sources (that is, government, NGO, and private sector) appeared to make the difference between the farmers who were able to transition and become large-scale farmers and those who were not.

[10] One farmer said the interest rate charged by the private firm was equal to or greater than 28 percent per year.

6. CONCLUSION

Summary of Insights

This study used in-depth interviews and focus group discussions with medium- and large-scale farmers in Ghana to understand their characteristics, the ingredients of their farm-size expansion and commercialization process, and the context within which they grew and commercialized their farms. Based on our analysis, this paper primarily argues that although the debate on whether to promote large-scale versus smallholder farming in Africa continues, the dichotomy is somewhat misplaced, because an important transition is taking place between these two ends of the spectrum. This transition as well as the heterogeneity in scale of farm operations have implications for development strategy and need to be understood carefully. The paper contends that there is a significant group of smallholder farmers who have transitioned to become homegrown large-scale and medium-scale commercial farmers, and this is a critical feature of agricultural transformation taking place in Ghana and other African countries in the context of increasing population pressure. As such, the paper makes the case for a research agenda that systematically analyzes the processes of expansion of farm size and operations and the group of farmers who have participated in this expansion in Africa. To that effect, this study commenced with an exploratory qualitative analysis of the characteristics of the homegrown large-scale and medium-scale commercial farmers in Ghana and the process they underwent to increase their farm sizes and agricultural sales.

The study shows that the farming sector in Ghana, as in most African countries, is highly heterogeneous, as evidenced by differences in farmers' resource bases, initial farm sizes, input use levels, and technology adoption, in addition to the levels of assets owned and agricultural commercialization (market participation). However, one important finding is that with the right attitude, exposure, and discipline, it is possible for a farmer to transition from small-scale to medium- and large-scale commercial farming.

We found that unlike the smallholder farmers who have limited land access, all large-scale farmers cultivated less than half of the total land area they have access or claim to. Part of the explanation given for this was the use of shifting cultivation methods as well as the desire to claim land for future use. The latter may be indicative of speculative investment that is associated with anticipated population pressure and competition for land. Speculation may also be a result of weak land-tenure and use rights that prevail in the regions visited, especially in the Northern and Brong Ahafo regions of Ghana.

We also observed that the large-scale and medium-scale farmers primarily grew crops for the market, whereas the smallholder farmers' main goal was to secure their food needs before selling any of their production, especially the food crops. Moreover, the large- and medium-scale farmers relied heavily on hired labor for their farm activities, used more improved farm inputs such as fertilizer and certified seed, and used agricultural equipment that they owned or hired from service providers in their locality. However, an important difference in the use of tractors was the topography and geographic region of the farmers' land. Farmers in the Eastern regions used mostly zero-tillage methods rather than tractors because of undulant farmland. This emphasizes that the nature of land expansion and use of machinery is contingent on the farming system, with agroecological conditions, topography, and population density playing a part in shaping the farming system of each area.

The qualitative interviews and focus group discussions provided valuable insights on what it took for the smallholder farmers to expand their farming enterprises and become homegrown large-scale and medium-scale commercial farmers. The farmers reported having to be disciplined, know a great deal about their land, "love their crops," "possess practical experience," and have "plenty of courage and determination" to expand their farming operations. In addition, the farmers said they had to "treat farming as a business," sell their product(s) when and where it was most profitable, keep adequate records, and, above all, plan their production and marketing to take advantage of the most favorable markets and timing of the season. Although most of these statements highlight perceptions and aspects that are not easily measured, they underscore the role of psychological and social variables that often fall outside the purview of mainstream economics.

Although most of the large-scale farmers interviewed said they started small, they all seemed to have been influenced by experiences outside farming and were distinctly different from the traditional smallholder farmers struggling to commercialize. Most of the large-scale farmers reported being able to go out of their communities and explore other opportunities or attain education outside their communities, which enabled them to start farming with the objective of expanding farm size or, if they had already started farming, be more commercialized when they returned to it. A question related to this finding is whether the majority of smallholder farmers who do not have external exposure or the ability to temporarily out-migrate are able to transform their farming into highly commercialized large-scale enterprises. It is likely that the ability to transition to large-scale commercial farming depends on exposure to different perspectives and experiences obtained from external communities.

In terms of gender and inclusiveness, we found no female large-scale farmers in this study, suggesting that they are few, if at all they exist. It is, however, possible that large-scale female farmers do exist in Ghana as classified on the basis of the land-size categories observed in the current study. The only medium-scale female farmer interviewed reported obtaining significant assistance from her male counterparts and husband, which was critical to her ability to commercialize and expand her farming enterprise. What is clear from the qualitative evidence is that there is gender discrimination in land acquisition and the ability of smallholder farmers to become large-scale commercial farmers. Nevertheless, we are not able to draw solid conclusions from the few farmers interviewed, so additional analysis is needed to assess further the gender dimensions of farm-size expansion and commercialization.

In a nutshell, it is worth ending this section by asking some questions that we believe are pertinent to the debate on farm size and agricultural transformation in Ghana:

1. Does farm size matter in commercializing agriculture?
2. Are large-scale farmers more productive and profitable?
3. Is high-value, high-input agriculture the answer for farmers who want to commercialize?
4. Should more resources be dedicated to the large-scale and medium-scale farmers or perhaps to those smallholders that have the potential to expand and commercialize?

Areas of Further Research

To help answer some of these questions, it will be necessary to further characterize the farmers who have transitioned from small-scale to medium- and large-scale farming, using representative survey data. In addition, one could quantitatively compare smallholder farmers who have increased their productivity and have commercialized over time with those who started farming at the same level and same time but have not expanded. This would provide a counterfactual to understand the dynamics of farm size and commercialization.

Another related aspect worth investigating is the role of the farmers' aspirations and goals for their farms as well as the role of planning, reinvestment and savings to accumulate land and productive assets. Based on the qualitative interviews, we found that most of the large-scale farmers believe that these factors were key ingredients for their successful expansion and commercialization. Simplistically, it can be hypothesized that performance is a function of objective function in the sense that those farmers who are content to subsist will subsist and those who want to become richer have a higher likelihood of commercializing their farming. However, a more astute theoretical model and empirical analysis may be warranted to better understand how farmer objectives influence farm expansion and agricultural commercialization. A critical finding from the current study is that behavioral characteristics of commercialized large-scale and medium-scale farmers—for example, self-motivation, discipline (laziness), treating farming as a business and management skills—are important and appear fundamentally different from those of smallholder farmers. All of these behavioral characteristics were reported to be important determinants of access to support and resources which facilitated expansion in farm size, agricultural production, and marketing (commercialization). Therefore, in analyzing farm-size expansion and agricultural commercialization, it will be important to assess whether, in fact, the large-scale farmers have different objective functions compared with the smallholder farmers that do not

expand. However, underlying such behavioral preferences and psychosocial variables may be numerous factors, including personality traits, risk preferences, aspirations, knowledge, and management skills, in addition to constraints such as access to markets and resources. This complexity of determinants of agricultural commercialization and land expansion requires careful analysis using quantitative data from a representative survey.

It would be important to also assess the role of constraints and the ability to overcome various constraints and shocks that may limit progressive accumulation of land and assets in the commercialization process. Here, an important issue is to find out what has made the large-scale farmers different from the other farmers under similar exogenous conditions (for example, location and agroecology) and whether we can empirically identify a few critical factors that lead to successful agricultural commercialization. Judging by the qualitative findings of this study, initial endowments influence the farmers' ability to make investments that relax constraints in the future, such as access to additional resources, and the ability to out-migrate and acquire experiences and skills from other communities. Also, there may be a role to be played by the more commercialized farmers in relaxing the constraints of the smaller and less commercialized farmers.

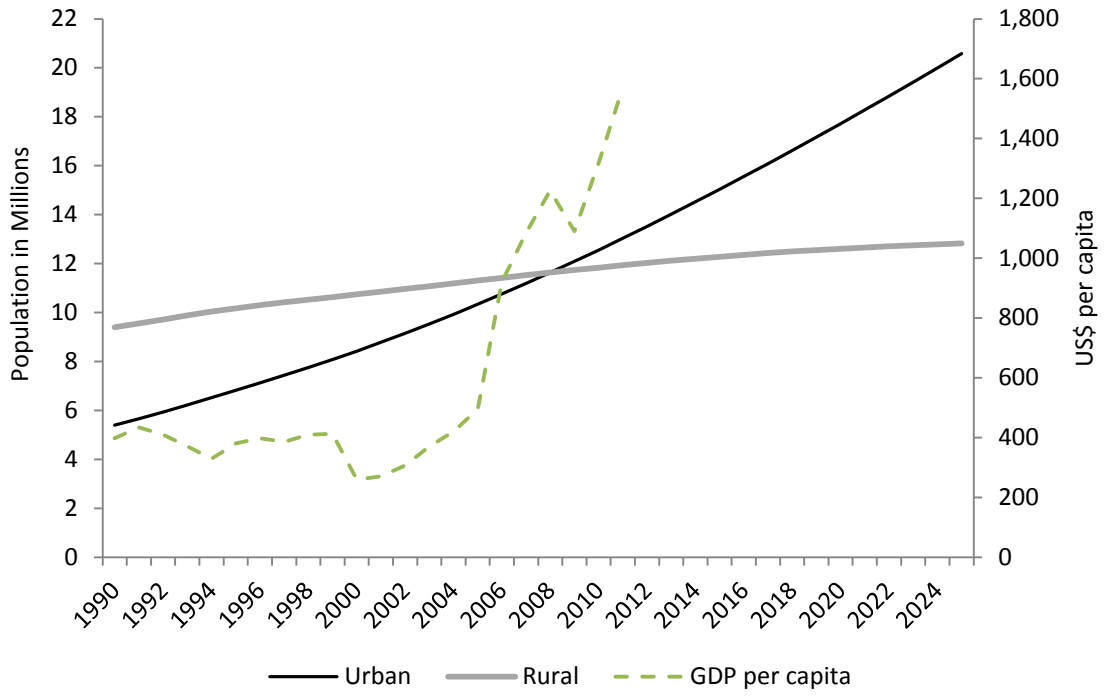
Although there was consensus among the commercialized large-scale farmers that "if one does not treat farming as a business, there is no way they could successfully commercialize," we noted that a number of the large-scale farmers were benefiting from NGO or government programs or both in various ways. For example, one farmer had received a 70 percent subsidy to purchase a combine harvester, and others had obtained subsidized inputs from the government through the block farming program. Therefore, a policy-relevant question is whether these large-scale farmers can sustain their commercial enterprises without external assistance, and whether they would be profitable without such support. Additionally, while the commercialized large-scale farmers have managed to develop large operations, are they more productive and are they competitive nationally and globally? It would be essential to account for support provided by NGOs, government, and other entities, which the large-scale farmers appear to have more of compared with the smallholder farmers. The lack of a large representative sample of large-scale farmers with quantitative data on their profitability and total-factor productivity is a conspicuous gap that needs to be filled.

Last but not least, it is worth questioning whether the large-scale farmers can be used as prime agents of change through targeted assistance to help other farmers commercialize. For instance, if one expects that large-scale and medium-scale farmers can play a more direct role in leading the diffusion of agricultural technologies at the local level, it would be imperative to understand how they relate with the less commercialized farmers in their villages—the culture and physical environment (for example, whether they live in the village or on their own farms), what kind of community life they lead, and social network dynamics that exist. If some smallholder farmers become outgrower-contract farmers for the large farmers or provide labor to the large-scale commercialized farmers, as in one case that was observed in the interviews, is such a relationship a mechanism for technology transfer to take place? If, on the other hand, tractor hiring is one main channel for the large-scale commercial farmers to interact with their neighboring smallholder farmers, then might mechanization spillovers as well as other technology spillovers be taking place through the large-scale farmers? Would smaller farmers be able to experience a similar growth and commercialization trajectory through such influence and interactions with the large-scale farmers? These questions of spillovers and externalities of farm-size expansion and agricultural commercialization remain unanswered and form important areas of future research.

However, only after we obtain a better understanding of the factors that lead to successful agricultural commercialization and transitioning of smallholder farmers, can we begin to address these questions of whether successful medium- and large-scale commercial farmers can influence the other smallholder farmers to commercialize, be it through role-model and peer-competition effects (which is hypothesized to influence aspirations and objective functions) or through technological spillovers (which has been documented widely in the case of the Green Revolution in Asia and parts of Latin America). These potential areas of research deserve due attention to guide policy and development initiatives aimed at enhancing agricultural commercialization and promoting inclusive agricultural growth in Africa.

APPENDIX: SUPPLEMENTARY INFORMATION

Figure A.1—Projected urban and rural population and gross domestic product (GDP) per capita in Ghana



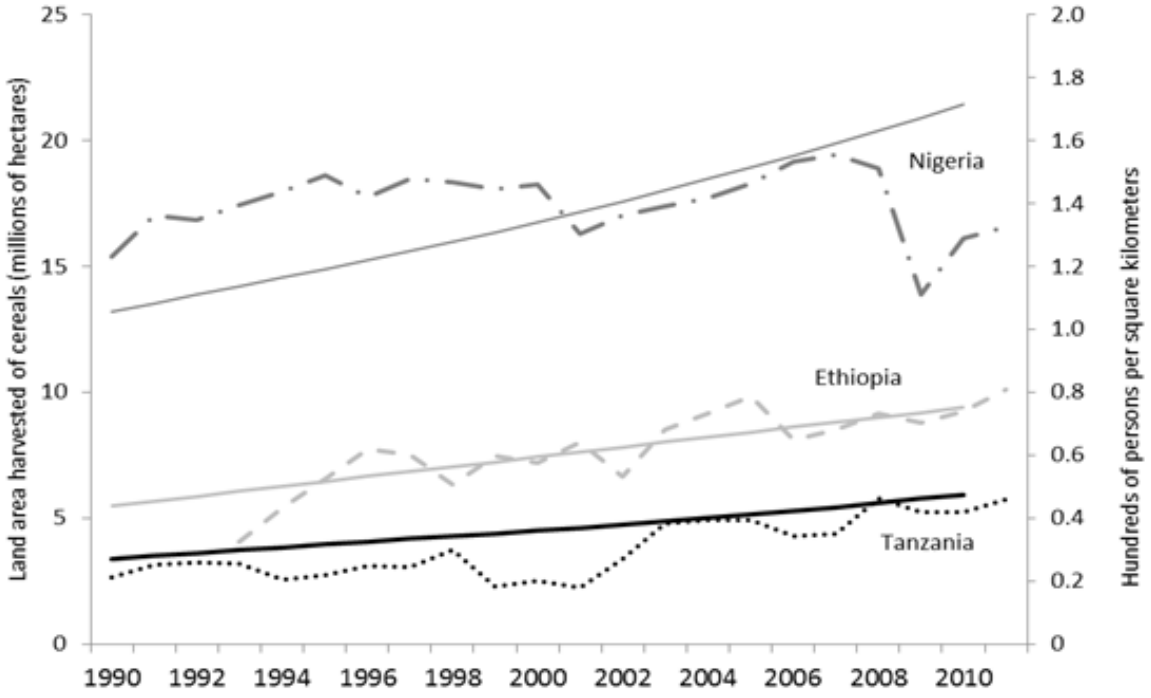
Source: Population data from FAO (2013), accessed December 31, and GDP data from World Bank (2012)

Table A.1—Population density estimates by region in rural Ghana

	1960	1970	1984	2000	2010
All Region	**22**	**26**	**35**	**45**	**51**
Western	20	24	37	51	57
Central	55	64	83	101	118
Greater Accra	46	39	75	110	117
Eastern	43	49	63	71	77
Volta	33	39	47	58	68
Ashanti	34	43	58	72	77
Brong Ahafo	13	15	22	29	32
Northern	7	8	12	19	25
Upper West	15	16	21	26	32
Upper East	2	57	76	88	94

Source: Diao et al. (forthcoming), using census data from the Republic of Ghana Statistical Services.

Figure A.2—Land area of cereals harvested (millions of hectares) and population density estimates (hundreds of persons per square kilometer) in select large African countries (1990–2011)



Source: FAO (2013) and UNESA (2013).

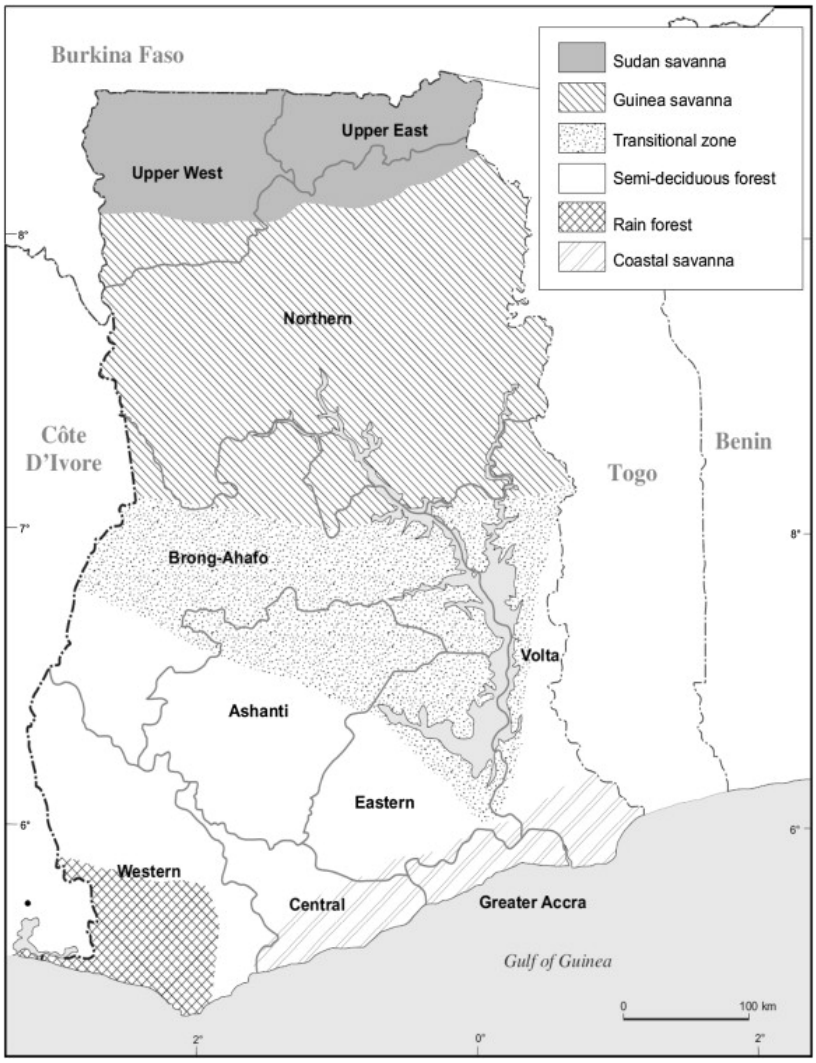
Note: The dashed series (land area harvested) are read off the left axis, and the solid series (population density) are read off the right axis.

Table A.2—Correlation coefficients of land area harvested and population density in select African countries

	Land area harvested of cereals			Total land area harvested		
	1990–1999	2000–2010	1990–2010	1990–1999	2000–2010	1990–2010
Ghana	0.76	0.40	0.78	0.84	0.59	0.90
Kenya	0.80	0.65	0.82	0.84	0.66	0.85
Mozambique	0.79	0.80	0.78	0.79	0.85	0.85
Rwanda	0.79	0.94	0.95	0.77	0.85	0.94
Uganda	0.93	0.996	0.99	0.990	0.986	0.995
Ethiopia	0.76	0.64	0.83	0.76	0.68	0.84
Nigeria	0.80	-0.19	0.01	0.91	-0.13	0.45
Tanzania	-0.01	0.80	0.79	-0.11	0.81	0.80

Source: Authors' calculations using FAO (2013) agricultural land area data and UNESA (2013) population data.

Figure A.3—Map of Ghana's agroecological zones



Source: Antwi-Agyei et al. (2012). Image downloaded from http://ars.els-cdn.com/content/image/1-s2.0-S0143622811001263-gr1.jpg

Table A.3—Land accumulation by farmer 7, over time

Time	1959	1962	1974	1979	1981	1996	2009
Total farm area accessed (acres)	3.5	12	20	>21,<30*	30	60	90
Community/Location	1	2	3	4	5	5	5

Source: Authors' compilation using in-depth interview data.
Note: * Farmer could not remember exact amount of additional land acquired in 1979.

Box A.1—Ghana's best farmer award program

The National Farmers Day instituted by the government of Ghana in 1985 to acknowledge the vital position that farmers and fisherman occupy in the nation's socioeconomic development, was first held in 1986 at Osino in the Eastern Region. This program was initiated to honor farmers and fisherman for their best practices and outputs. Since 1988, the first Friday of December has been designated as a national holiday in honor of farmers for helping feed the nation.

Nominations of farmers and fishermen for the national award begin at the district level for consideration at the regional level, and then at the national level. Winners are selected for awards at the district and regional levels. However, winners of the regional award cannot participate in the national award for the same year. The winners across the board are selected based on criteria (shown below) formulated by a MoFA selection committee comprised of representatives from the country's public universities, research institutions, and MoFA. The selection involves visiting the farms in the districts. The grand prize for the national best farmer has ranged since the program started from two machetes, a pair of Wellington boots, and a radio to a pickup truck and a house, depending on the value of sponsorship available for given year. Currently, the national best farmer is awarded a car, some money, farming equipment, and a three-bedroom house. From the interviews and discussions with district MoFA staff, it was apparent that there is prestige associated with the award program, both at the community and farmer level, suggesting that the program may be generating some spillover effects for other farmers living in the same locale as the winners or in neighboring communities. For example, all the farmers who won the regional best farmer award were asked by their chiefs to tell them what sort of help they needed to prepare themselves for the national award. All of them requested more land to expand their operations and asked to participate in MoFA block farm programs to help the other farmers. Generally, to some extent, we managed to talk to the most successful farmers in the selected districts.

Criteria for Selecting the Best Farmer

A farmer's activities are closely monitored and assessed by Agricultural Extension officers over the farming season, and preliminary selections made at the district and regional levels using the following criteria:

i. *Diversified and integrated farming operations:* For example, raising livestock and crops and using the crop residue to feed the livestock and the livestock waste to nourish the crops.
ii. *Scale of operation:* Various scales of operation—small, medium, and large—are considered. Size and number of various enterprises identified in (i) above—for example, acreage of crops, number of livestock and poultry, surface area of fishpond(s), number of beehives, and the yield realized from these—are used to classify the scale of operation.
iii. *Knowledge of husbandry practices:* The farmer should be conversant with cultural practices such as fertilizer application and weed, pest, and disease control as well as scientific animal-production techniques.
iv. *Environmental awareness and relevant practices:* An award-winning farmer should be aware of the problems of the environment and the measures needed to be taken to alleviate their harmful effects. He or she should be aware of factors such as control of bush burning, soil erosion control and other soil and water management practices.
v. *Identification of farming problems and innovation:* A good farmer should be able to identify and evolve or institute measures to combat periodic or perennial problems connected with his/her farm project.
vi. *Record keeping:* An aspirant award-winning farmer should have adequate knowledge in farm record keeping that will assist him/her to evaluate the success or failure of the enterprise.
vii. *Adoption of new technology:* The farmer should prove that he or she is abreast of innovations with regard to improved practices, inputs and techniques that will increase agricultural productivity.
viii. *Farmer's role in his or her community:* To be considered as an award winner, the farmer must contribute toward the growth of his or her community in which he or she lives. He or she should

Source: MoFA website.

Box A.2—Successful female farmer's advice to other female farmers

Question: What advice do you have for other female farmers who are married or not married to become successful like you?

Sakina: Things in the rural communities are different from the urban cities. It is possible to advise a woman to go into farming as a business venture other than being a subsistence farmer, but in most cases I do not succeed. I ask them to consider my condition when I came into the community before getting married. Through my husband's encouragement, I have succeeded and [I am] enjoying [the outcome] today. Unfortunately, because of the perception other women have in this community about farming, they ignore my advice. They complain about start-up capital and the inability to expand.

Question: What steps will a female farmer take if she is to become successful?

Sakina: Farming is a difficult thing. You have to be hard working if you wish to be successful in farming. Laziness cannot be entertained in the farming business. In both my trading and farming businesses, I strive to make things work despite the challenges I face from time to time. A lot of times, I am off target, but I keep on moving forward.

Managing your harvest is very important. I tell my colleagues growing yam to harvest only a portion of their field. One has to divide their field into two and only harvest the first portion when prices are low in order to cover the immediate day-to-day needs. You then have to harvest the other part when the price is highest, for the purposes of generating extra income and to expand the farm the next season. You can see that at the moment, yam prices are low, but because most of them want quick money, they harvest all their fields and sell when prices are low. Therefore, they are not able to save or expand their farms.

Also, I would encourage my colleagues not to rely solely on farming for the purpose of consumption. They should be able to invest into other businesses like trading. This would be like creating a revolving fund where money will always be available. Otherwise, there won't be anything to do after harvesting and selling. All that would be left to do is spend the money from the farm, which will be exhausted before the start of the next season. Expansion becomes impossible in this sense. If you harvest and sell, the returns would be invested into another venture to increase the income so that expansion can take place, especially during the rainy season.

Source: Authors based on field interviews.

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