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Changing Farm Size Distributions and Agricultural Transformation in Sub-Saharan Africa

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Abstract

We review the literature on the distribution of farm sizes in sub-Saharan Africa, trends over time, drivers of change in farm structure, and effects on agricultural transformation and present new evidence for seven countries. While it is widely viewed that African agriculture is dominated by small-scale farms, we show that medium-scale farms of 5 to 100 hectares are a nontrivial—and rapidly expanding—force that is influencing the nature and pace of food systems transformation in Africa. The increased prevalence of medium-scale holdings is associated with farm labor productivity growth and underappreciated benefits to smallholder farmers. However, the rise of African investor farmers is also contributing to the commodification of land, escalating land prices, and restricted land access for most local people. A better understanding of these trends and linkages, which requires new data collection activities, could help resolve long-standing policy debates and support strategies that accelerate agricultural transformation.

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1. INTRODUCTION

One of the greatest empirical blind spots limiting our understanding of African agriculture and economic transformation concerns farm structure. Farm structure is a multidimensional concept that relates to the distribution of farm sizes, the inequality of landholdings, and patterns of land tenure (USDA 2021). Despite tremendous progress in understanding smallholder household behavior in sub-Saharan Africa (SSA) owing to data collection exercises such as the Living Standards Measurement Study-Integrated Surveys on Agriculture (LSMS-ISA), these surveys are neither able nor intended to provide an accurate understanding of farm structure in African countries (Christiaensen & Demery 2018). Though farm censuses could provide insights into farm structure, few SSA census data sets are made publicly available, and almost none permit an understanding of changes in farm structure over time.

The agricultural sectors of SSA are widely understood to be dominated by smallholder farms, often defined as those operating <5 hectares of land and generally characterized by low levels of modern input usage and limited commercialization. In a few countries such as Kenya and Zimbabwe, this small-scale sector has long coexisted with a large-scale farm sector created during colonial times and largely transferred to indigenous African hands after independence (Binswanger et al. 1995). The dominance of small farms has been the main rationale for 50 years of smallholder-led development strategies in SSA, based on the understanding that economic development in Africa would generally follow the Asian small-farm model, with productivity growth on small farms being the primary catalyst for economy-wide rural and structural transformation (Larson et al. 2016).

However, there are signs that farm structure in SSA may be evolving, with a rising importance of medium-scale farms of 5–100 hectares, managed by a relatively educated and entrepreneurial class of African farmers (Chitonge et al. 2017; Jayne et al. 2016, 2019; van Dijk et al. 2022; Wineman et al. 2020b). Such changes are most evident in settings with reserves of arable land, with weaker indications of farm structure change in relatively densely populated countries. Where medium-scale farms are growing, their impacts on development may be very different from those of large-scale farms. Evidence suggests that medium-scale farms in Africa may be catalyzing various aspects of rural transformation by producing food surpluses to feed a growing nonfarming population and by encouraging new investments in input and output markets that improve market access conditions for nearby smallholder farmers and broadly promote agricultural productivity. If this is the case, an improved understanding of structural change in African agriculture could hold major implications for African policy makers, international development organizations, and the data collection activities of development economists seeking to understand the dynamics of food systems transformation.

This article summarizes what is known about current farm size distributions in SSA, how and why they are changing over time, and the impacts on sector productivity and the pace of rural transformation. While other studies have summarized the emerging data on medium-scale farms in Africa (Jayne et al. 2016, 2019), and there is a long-standing literature on shrinking average farm sizes and their implications (e.g., Masters et al. 2013), there has been no prior comprehensive empirical review of how and why farm size distributions may be changing in Africa and the wide-ranging consequences of such changes. Section 2 identifies why agricultural-led transformation in many parts of SSA may diverge from the stylized Asian rural transformation process. Drawing on existing empirical literature and fresh statistical evidence for seven SSA countries, Section 3 documents how farm size distributions are changing in diverse ways across the region; Section 3 also summarizes evidence on the modes of land acquisition that may account for a rise in the share of national farmland under medium-scale farms. Section 4 highlights four main drivers

of change in farm structure. Sections 5 and 6 explore the direct and indirect impacts of farm structure change on agricultural productivity and rural economy. Section 7 summarizes the main conclusions, identifies unresolved research and policy questions, and proposes a research agenda and data collection activities to fill in key knowledge gaps.

2. WILL AFRICA'S FARM STRUCTURE BE MORE LIKE ASIA'S OR LATIN AMERICA'S?

The stylized Asian structural transformation process, characterized by farm productivity growth on millions of small-scale farms, has for decades provided a framework for anticipating the development process that would similarly unfold in much of SSA (Hazell et al. 2010, Johnston & Mellor 1961, Larson et al. 2016, Lipton 2009).¹ Like Asia, Africa was understood to have a predominantly unimodal small-scale farming system (with a few exceptions such as South Africa and Zimbabwe) and, therefore, the Asian experience has been considered more relevant for Africa than Latin America with its bimodal and highly concentrated farm structure. However, some aspects of the economic transformations now underway in Africa show significant divergences from the stylized Asian transformations.

Rural populations in SSA continue to grow. Even as most African countries are urbanizing, the rural populations of SSA are projected to increase by 60% between 2015 and 2050. Similarly, Green Revolution Asia and most other agricultural growth successes occurred with steadily rising absolute numbers of rural and agricultural populations for extended periods of time, with Asia's rural population only having begun to decline recently (Lipton 2009). Farmland consolidation in most Asian countries has also started to occur only very recently, if at all (Huang & Ding 2016, Lipton 2009, Masters et al. 2013). Hence, the Asian experience might suggest that Africa should also experience a very slow pace of farmland consolidation.

However, many parts of Africa are experiencing major shifts in the balance of power over land allocation and resulting change in land institutions. Customary tenure systems in SSA were generally designed to hold land in reserve for current and future generations of local people. Yet recent studies point to a widespread breakdown of these traditional norms (Boone 2014, Colin & Woodhouse 2010, Edelman et al. 2015, Woodhouse 2003). Customary tenure systems have already been abolished in some countries as the modern state exerted its authority over all land. In other cases where customary tenure systems still exist, local and foreign interests have successfully negotiated with traditional authorities for land, much of which is subsequently converted to privately titled land.

These types of land acquisitions can, over time, influence patterns of farm size distribution. Sitko & Chamberlin (2016) report that the share of Zambia's land under customary tenure declined from 94% at independence to at most 54% in 2015. The share of Malawi's land under customary tenure has similarly declined from 87% at independence to an estimated 60% today (Anseeuw et al. 2016). To the extent that willingness-to-pay has become an important determinant of land acquisition in customary tenure areas (Chimhowu 2019, Chitonge et al. 2017), we might expect to see the scale and structure of farmland ownership changing much earlier and more rapidly in African structural transformation processes than was witnessed in Asia (Woodhouse 2003).

A second stylized fact of Asian structural transformation models that may not generally apply to Africa is that of a unidirectional flow of labor from farm to off-farm sectors of the economy, i.e.,

¹ Stylized facts about the Asian structural transformation process primarily focus on South and Southeast Asia; farm structures are different in the former Soviet Asian countries.

that once people find their way into gainful nonfarm employment, they are unlikely to return to farming. This perspective neglects the possibility that under certain conditions, some groups that are urban-based and engaged primarily in nonfarm jobs have incentives to invest in farming and are in a relatively advantageous position to do so, having access to capital, management expertise, social entrée, and an ability to navigate complex traditional and/or statutory institutions to acquire land. The vast majority of rural households lack these advantages and are less able to access quality land in statutory and, increasingly, customary tenure systems, particularly when competing with urban-based investors (Chitonge et al. 2017, Muyanga 2013, Sitko & Chamberlin 2016).

Political economy models may also help us anticipate future trajectories of farmland distribution in parts of Africa. Because of the tendency for politically influential groups to succeed over time in altering government distribution systems to their interests (López 2005), it may be expected that they would seek to utilize state apparatuses to acquire land once the returns to capital in farming become attractive, e.g., in response to heightened global food prices and improved access to markets as rapidly growing cities and towns create a voraciously expanding demand for food. These conditions could trigger efforts by wealthy and influential people to gain access to stocks of land held by customary authorities and government (Jayne et al. 2016).

Consistent with these expectations, between 1990 and 2017, 32 new land laws were enacted in SSA, with most designed to facilitate the conversion of land from customary to statutory tenure systems, supporting the rise of entrepreneurial emergent farmers (Chimhowu 2019). Lipton (2009) notes how government officials have been major beneficiaries of post-independence land redistribution in some African countries, especially in land-abundant countries.

For these reasons, we may expect the pace of farm structure change and the characteristics of the farmers driving these changes to differ from the stylized Asian smallholder-led model of structural transformation.

3. EVIDENCE ON FARM SIZE DISTRIBUTIONS IN SUB-SAHARAN AFRICA

3.1. Review of Existing Studies on Farm Structure

Most studies that aim to characterize farm structure in SSA rely on either farm-household survey data or agricultural census data, often arriving at an incomplete view of farm size distribution. FAO (2019) summarizes the results of agricultural censuses conducted between 2006 and 2015 in 20 SSA countries but does not seek to explain the trends or patterns presented. Using agricultural census data from nine SSA countries, Lowder et al. (2016) find that farms of under 2 hectares comprise about 80% of all farms and operate about 40% of the farmland. Meanwhile, they find few farms larger than 50 hectares. Lowder et al. (2021) expand on this work by utilizing a combination of census data and household survey data (for most countries that lack census data), estimating that farms up to 2 hectares produce 35% of the value of food production in SSA.

Although it is not an analysis of farm structure per se, the Land Matrix is a public database of large-scale land acquisitions in low- and middle-income countries that captures information on land size of each acquisition, purpose of the investment, and type of investor (e.g., transnational or domestic; <https://landmatrix.org>). Analysts often reference this data source as an indication of the prevalence of nonsmall-scale holdings in a given country (e.g., Wegerif & Guereña 2020). However, a land deal in this database is defined as covering an area of at least 200 hectares. Thus, the Land Matrix systematically omits the many medium-scale landholdings in SSA held primarily by domestic investors which, in aggregate, cover more land than that of all transnational large-scale land acquisitions in SSA countries for which comparative data are available (Jayne et al. 2014).

Ascertaining an accurate picture of farm size distributions in SSA is complicated by the fact that most survey data sets (e.g., LSMS-ISA) are population-based samples that accurately capture smallholdings but underrepresent medium- and large-scale farms. This is clear by comparing the few available farm censuses against surveys undertaken in the same country and period (see **Supplemental Table 1**). For example, the 2008–2009 LSMS-ISA and the much larger 2009 Agricultural Sample Census Survey (ASCS) in Tanzania produce very similar estimates of total area held by farms of 0–5 hectares, but the ASCS finds 53% more land held by farms of over 5 hectares than the LSMS-ISA. Similarly, the LSMS-ISA in Malawi indicates that farms over 5 hectares account for 5% of total cultivated area whereas the 2006–2007 National Census of Agriculture and Livestock (NACAL) in Malawi finds 21%. The 2013–2014 Population and Housing Census in Senegal finds that farms of over 100 hectares account for 18% of the total land area, while the 2010–2011 Poverty Monitoring Survey estimates this value to be 3%. A World Bank study makes similar observations regarding the underrepresentation of medium-scale farms in the LSMS-ISA (Christiaensen & Demery 2018). The upshot is that while we utilize available survey data to examine changes over time in the proportion of farms, area operated, and value of crop production, these estimates may systematically underestimate the importance of farms of over 5 hectares.

3.2. Empirical Analysis of Farm Structure

Notwithstanding the aforementioned caveats, this section summarizes the evidence base on farm size distributions across SSA, inclusive of new data considered statistically representative of smallholder populations in seven countries (Ethiopia, Ghana, Kenya, Malawi, Nigeria, Tanzania, and Zambia). The data sources are described in **Supplemental Appendix 1**. Referring to the most recent surveys available, **Table 1** shows that, as expected, farms of up to 5 hectares are in the majority in all countries. However, in some countries, farms greater than 5 hectares comprise a non-negligible share of all crop farms. Specifically, in Ghana, Zambia, and Tanzania, medium-scale and larger farms account for 11.5%, 10.9%, and 10.3% of crop farms, respectively. Farms over 5 hectares account for a smaller proportion of total farms in more densely populated countries: 2–4% in Ethiopia and Nigeria and less than 1% in Kenya and Malawi.

Farm holdings over 5 hectares constitute a greater share of cultivated land area and value of crop output. Specifically, they account for 47.2% of the total area under cultivation in Tanzania. This value is 41.4% in Ghana, 33.6% in Zambia, 31.1% in Ethiopia, 26.1% in Nigeria, 8.0% in Kenya, and 2.5% in Malawi. **Table 1** also shows that these farms account for a large share of total crop value in Zambia (37.4%), Ghana (32.8%), and Tanzania (32.6%). In contrast, medium-scale and larger farms seem to be of less importance in Ethiopia and Nigeria (at 9.5% and 7.4% of crop production values, respectively) and in Kenya and Malawi (at 3.5% and 3.2%, respectively). Note that, especially for the value of crop production, farms of greater than 20 hectares seem to play a marginal role in the landscape of family farms in these countries. Instead, it is medium-scale farms of 5–20 hectares that account for a major share of the agricultural area and crop output in about half of the countries examined. Combining both survey and available census data, **Supplemental Figure 1** shows that farms over 5 hectares account for more than half of national farmland in 13 of the 26 country data points for which data was available.

These patterns have a strong spatial expression. Medium-scale farms account for a greater share of cultivated land in areas of low population density, where land is more readily available (**Supplemental Table 2**). We created high- and low-population density zones by dividing districts or comparable administrative zones at the fiftieth percentile of rural population density.

Table 1 Share of farms, area under cultivation, and value of crop production by farm size category

Country (date)	Indicator	Farm size ^a					Data source
		0–2 ha	2–5 ha	5–10 ha	10–20 ha	20+ ha	
Ethiopia (2016)	% of crop farms	74.6	21.7	3.1	0.6	0.1	ESS/LSMS-ISA (https://microdata.worldbank.org/index.php/catalog/lsms)
	% of cultivated land area	33.4	35.5	9.6	3.2	18.3	
	% of value of crop production	48.7	41.9	6.7	2.6	0.1	
Ghana (2017)	% of crop farms	57.3	31.2	8.5	2.5	0.4	GLSS (https://www2.statsghana.gov.gh/nada/index.php/catalog/97)
	% of cultivated land area	19.8	38.8	23.5	12.2	5.7	
	% of value of crop production	28.1	39.1	17.7	9.9	5.3	
Kenya (2015)	% of crop farms	93.4	6.0	0.5	0.1	0.0	KIHBS (https://www.knbs.or.ke)
	% of cultivated land area	70.4	21.6	3.8	1.9	2.4	
	% of value of crop production	76.3	20.1	1.9	1.2	0.4	
Malawi (2019)	% of crop farms	96.5	3.2	0.2	0.0	0.0	IHS/LSMS-ISA (https://microdata.worldbank.org/index.php/catalog/lsms)
	% of cultivated land area	84.4	13.1	2.2	0.3	0.0	
	% of value of crop production	81.8	15.0	3.1	0.1	0.0	
Nigeria (2015)	% of crop farms	88.3	9.7	1.4	0.5	0.2	GHS/LSMS-ISA (https://microdata.worldbank.org/index.php/catalog/lsms)
	% of cultivated land area	46.5	27.4	8.9	6.2	11.0	
	% of value of crop production	74.9	17.7	3.2	2.9	1.2	
Tanzania (2015)	% of crop farms	67.3	22.4	6.7	2.8	0.8	NPS/LSMS-ISA (https://microdata.worldbank.org/index.php/catalog/lsms)
	% of cultivated land area	22.2	30.6	19.4	15.7	12.2	
	% of value of crop production	34.5	33.0	21.6	7.7	3.3	
Zambia (2017)	% of crop farms	58.2	30.9	8.9	1.8	0.2	CFS (https://www.worldbank.org/en/research/commodity-markets)
	% of cultivated land area	26.5	39.9	24.1	8.7	0.8	
	% of value of crop production	23.6	39.0	25.9	10.6	0.9	

^aFarm size defined according to area under operation (area devoted to crops, pasture, and fallow); undeveloped land not counted.

Abbreviations: CFS, Zambia Crop Forecast Survey; ESS, Ethiopia Socioeconomic Survey; GHS, Nigeria General Household Survey; GLSS, Ghana Living Standards Survey; ha, hectares; IHS, Malawi Integrated Household Survey; KIHBS, Kenya Integrated Household Budget Survey; LSMS-ISA, Living Standards Measurement Study-Integrated Surveys on Agriculture; NPS, Tanzania National Panel Survey.

In the low-population density zones, farms over 5 hectares accounted for more than half of total cultivated land in two of the seven countries (Ghana and Tanzania). Farms over 10 hectares accounted for 22.7% of total area cultivated in Ethiopia, 23.9% in Ghana, and 21.6% in Nigeria. These shares were much lower in the high-population density zones. Moreover, the share of land under cultivation among farms greater than 10 hectares is increasing over time in the less-densely populated districts of Ghana, Nigeria, Tanzania, and Zambia.

3.3. Characteristics of Medium-Scale Farms

Several recent studies seek to understand the characteristics of these medium-scale farmers and how they entered farming (Anseeuw et al. 2016, Chapoto et al. 2013, Muyanga et al. 2019). In Kenya, Tanzania, and Zambia, most medium-scale farmers stepped into this status, having initially engaged in nonfarm activities and used their savings to invest in relatively large landholdings and pay for other startup expenses. Many were urbanites or relatively privileged rural people (e.g., civil servants, rural businesspeople, extension agents, religious leaders, traditional headmen or chiefs). Emergent farmers who reside in urban areas and hire managers to run their farms have become common enough in the region that the term telephone farmer has emerged to describe them. The urban-based residences of many medium-scale farmers are reinforced by data from the nationally representative Demographic and Health Surveys (DHS), which indicate that urban-based individuals control a significant proportion of total national land. For example, urban-based individuals and families control close to one-third of all privately held land in Kenya, Tanzania, and Zambia. In each of the five countries for which data is available, the proportion of national land owned by urban residents increased between the first and last DHS: from 26.8% to 31.9% between 2008 and 2014 in the case of Ghana (Jayne et al. 2019).

More recent surveys in Nigeria and Zambia indicate that roughly 50% of medium-scale farmers surveyed in 2017 and 2018 have stepped up from small-scale status. In Nigeria, land accessibility and mechanization rental markets were important factors that enabled small-scale farms to step up into medium-scale status, pointing to the importance of land and mechanization markets in this process. The growing dynamism and upward mobility among some segments of smallholder farmers is associated both spatially and temporally with increasingly active land, labor, agricultural input, output, and finance markets, which make it easier to overcome binding constraints on farmland expansion. However, even the medium-scale farmers who stepped up from small-scale farms might be considered atypical of most small-scale farm households. Although they started out farming fewer than 5 hectares (by definition), they often controlled considerably more than that and also had higher levels of household assets and wealth than most small-scale farm households (Jayne et al. 2019).

We are also interested in documenting changes in farm structure over time. **Table 2** shows the percentage point changes over time in the same indicators that were presented in **Table 1**. The proportion of farms over 5 hectares grew in Zambia (by 3.7 percentage points over 6 years) and Tanzania (by 2.1 percentage points over 6 years) and in Ghana among farms 5–10 hectares. We generally do not see evidence of a rising prevalence over time in Kenya, Malawi, and Nigeria. In three of the seven countries, medium-scale and larger farms accounted for a growing share of the national area cultivated and the value of crop production. For example, between 2008 and 2014, these farms accounted for an additional 11.0 and 6.5 percentage points of total cultivated area in Zambia and Tanzania, respectively. They also account for an increasing share of the value of crop production in Zambia (by 13.5 percentage points), Tanzania (by 12.3 percentage points), and Ghana (by 8.8 percentage points). Jayne et al. (2019) found that medium-scale farms in these three countries accounted for over 40% of the additional value of national crop output produced over roughly a decade.²

²For Ghana, we found a major increase in the share of national cultivated land and crop production among medium-scale farms of 5–100 hectares between the 2005 and 2013 Ghana Living Standards Survey (GLSS) waves, but not between 2005 and 2017.

Table 2 Percentage point changes in the shares of farms, cultivated land, and value of crop production between baseline and endline survey years by farm size category

Country (dates)	Indicator	Farm size ^a					Data source
		0–2 ha	2–5 ha	5–10 ha	10–20 ha	20+ ha	
Ethiopia (2014, 2016)	% of crop farms	2.6	–2.1	–0.2	–0.2	–0.3	ESS/LSMS-ISA (https://microdata.worldbank.org/index.php/catalog/lsms)
	% of cultivated land area	0.8	–1.0	–0.1	–2.4	2.8	
	% of value of crop production	3.2	–1.0	–1.4	–0.5	–0.4	
Ghana (1992, 2017)	% of crop farms	–4.5	4.5	1.5	–0.7	–0.8	GLSS (https://www2.statsghana.gov.gh/nada/index.php/catalog/97)
	% of cultivated land area	–0.9	4.4	4.8	–3.3	–5.0	
	% of value of crop production	–12.9	4.1	5.9	3.5	–0.6	
Kenya (2005, 2015)	% of crop farms	5.4	–4.0	–0.9	–0.2	–0.3	KIHBS (https://www.knbs.or.ke)
	% of cultivated land area	11.8	–5.2	–4.1	0.0	–2.5	
	% of value of crop production	–0.6	5.8	–2.7	–0.5	–2.0	
Malawi (2010, 2019)	% of crop farms	0.4	–0.4	0.0	0.0	0.0	IHS/LSMS-ISA (https://microdata.worldbank.org/index.php/catalog/lsms)
	% of cultivated land area	1.2	0.0	0.1	–0.6	–0.7	
	% of value of crop production	–3.9	2.3	1.6	0.1	0.0	
Nigeria (2010, 2015)	% of crop farms	0.1	0.7	–0.8	0.1	–0.1	GHS/LSMS-ISA (https://microdata.worldbank.org/index.php/catalog/lsms)
	% of cultivated land area	3.3	0.7	–5.8	1.9	–0.2	
	% of value of crop production	–2.3	1.7	–2.2	2.1	0.8	
Tanzania (2009, 2015)	% of crop farms	–2.4	0.2	0.6	1.5	0.1	NPS/LSMS-ISA (https://microdata.worldbank.org/index.php/catalog/lsms)
	% of cultivated land area	–6.4	–0.1	1.4	7.7	–2.6	
	% of value of crop production	–7.7	–4.6	7.0	4.6	0.7	
Zambia (2011, 2017)	% of crop farms	–4.0	0.2	3.1	0.7	0.0	CFS (https://www.worldbank.org/en/research/commodity-markets)
	% of cultivated land area	–6.8	–4.1	7.5	3.3	0.2	
	% of value of crop production	–8.7	–4.8	8.6	4.7	0.1	

^aFarm size defined according to area under operation (area devoted to crops, pasture, and fallow); undeveloped land not counted.

Abbreviations: CFS, Zambia Crop Forecast Survey; ESS, Ethiopia Socioeconomic Survey; GHS, Nigeria General Household Survey; GLSS, Ghana Living Standards Survey; ha, hectares; IHS, Malawi Integrated Household Survey; KIHBS, Kenya Integrated Household Budget Survey; LSMS-ISA, Living Standards Measurement Study-Integrated Surveys on Agriculture; NPS, Tanzania National Panel Survey.

4. DRIVERS OF CHANGE IN FARM SIZE DISTRIBUTIONS

We identify four main drivers of changing farm structure in SSA: (a) a period of relatively high world food prices, starting in 2006 and persisting at least until the time of this writing in 2021; (b) the agricultural input and output market reforms that ushered in major opportunities for

Table 3 Average commodity prices and index values, 1990–2020^a

Indicator	Commodity	Average value		
		1990–2006	2007–2010	2011–2020
Commodity price index value (2010 = 100)	Agriculture	69.1	97.6	93.3
	Food	68.1	101.8	97.4
	Grains	70.1	109.9	99.4
Commodity price (\$/metric ton, real 2010 values)	Maize	129.2	186.5	195.0
	Rice	310.8	509.6	441.3
	Soybeans	299.2	448.8	438.1
	Wheat	168.7	247.1	226.7

Based on data from the World Bank Pink Sheet 2021 (<https://www.worldbank.org/en/research/commodity-markets>).

^aAll prices deflated to 2010 real values by the World Bank Manufacture Unit Value (MUV) index for the G5 economies.

investment in agrifood systems; (c) urbanization, which has created new towns and cities in formerly remote areas, improved market access conditions for African farmers, and expanded the demand for food; and (d) the region's strong economic development since 2000, which has created a rapidly growing number of relatively wealthy urban and rural Africans with the means and incentives to invest in land.

4.1. High World Food Prices Since the Mid-2000s

The rise in global food prices, often viewed as a temporary aberration in the 2007–2009 period, has been sustained over the subsequent decade and a half. **Table 3** shows that the average inflation-adjusted agriculture price index rose by 41% (from 69.1 to 97.6) between 1990 and 2006 and 2007 and 2010 and has remained high over the ensuing decade at an average of 93.3. This extended period of favorable agricultural commodity prices precipitated an inflow of resources into commercial agriculture and contributed to the rising global demand for farmland (Deininger et al. 2011, Punthakey 2020).³ While international attention to agricultural investments has been focused on large-scale foreign land acquisitions, elevated food prices also played an important role in incentivizing new entry into farming by Africans with the means to do so (Jayne et al. 2016, 2019). Indeed, the amount of land acquired by medium-scale farms of 5–100 hectares has far exceeded the amount acquired through large-scale foreign investments since 2000 in each of four countries analyzed by Jayne et al. (2014).

Beyond promoting land investments by private entities, this protracted period of high food prices has encouraged African governments to find ways to access land for national agricultural investments. In many countries, the primary target has been customary lands still under the control of traditional authorities. As noted earlier, 32 new land laws were enacted in SSA between 1990 and 2017, with most designed to wrest control of land from customary authorities (Chimhowu 2019). In short, the past 15 years of relatively high food prices has encouraged both individuals and governments to acquire land for farming in rural Africa. We would anticipate that new land acquisitions would be concentrated in countries with large amounts of potentially

³Although global market expectations of high food prices have been the primary driver of land-based investments in SSA (Cotula 2012, Holmén 2015), other factors have also been acknowledged, particularly for large-scale investments. Global energy prices and the growing demand for biofuels have been associated with investments in jatropha plantations (Aha & Ayitey 2017, Borras et al. 2011), and the desire for geopolitical influence has motivated investments, particularly by South African firms seeking greater influence in the region (Sebastian & Warner 2014).

available farmland, which is quite consistent with the patterns of medium- and large-scale farms' emergence and concentration seen in **Tables 1** and **2**.

4.2. Agricultural Market Reforms

Macroeconomic and sectoral policy reforms implemented in most African countries during the 1990s substantially expanded the scope for private investment in trading, processing, and retailing of agricultural inputs and commodities. The effects of these reforms were mostly dormant until the mid-2000s when world food prices skyrocketed, enabling thousands of small-, medium-, and large-scale private firms to respond to profitable incentives and rapidly build up the region's agri-food systems (Jayne et al. 2010). Whereas the extended period of high food prices provided the profit incentives for commercial agriculture, these agricultural market reforms reduced the costs of acquiring the inputs and output marketing services needed to engage in profitable commercialized farm production.

4.3. Urbanization

The growth of cities and emergence of new towns have converted formerly isolated lands into attractive farmland with commercial potential (Abay et al. 2021, Masters et al. 2013). As new towns are created and populations rapidly increase, local demand for food rises, leading to new investments in agri-food systems that improve market access conditions for commercial farm production.

4.4. Economic Development and Income Growth Since 2000

As noted earlier, many medium-scale farms in SSA are established by urban-based investors. Both financial and cultural motives seem to be at play in domestic land acquisitions, reflecting the complex linkages that urban Africans hold with rural areas. Rural-urban migrants often maintain strong relationships in their rural communities of origin, which can involve the retention of land and which persist into subsequent generations (Geschiere 2020, Gugler 2002, Mainet 2017, Pauli 2020). Such linkages may be particularly strong for elites, who have greater wherewithal to maintain them and who derive greater benefits from them (Behrends & Lentz 2012, Pauli 2020). Maintaining connections to rural areas is motivated by both financial interests (i.e., in commercial agriculture) and cultural concerns (e.g., ensuring the right to be buried in ancestral land) (Geschiere 2020), and many urban Africans also maintain rural connections with a desire to return to rural areas after retiring (Mainet 2017).

Since 2000, the number of middle-class Africans has grown dramatically (Resnick 2015, Shimeles & Ncube 2015, Tschirley et al. 2015). This pronounced growth in the middle class means that more people can translate their cultural demand for land into an ability to acquire it, with implications for farm structure. First, the greater numbers of wealthy Africans, in both urban and rural areas, reflect relatively strong economic growth in the region, itself a result of improved macroeconomic management and structural adjustment policy changes (Resnick 2015, Shimeles & Ncube 2015). Second, as individuals enter the middle class, they are more likely to demand transparency, accountability, and quality of public service provision from their governments (Lufumpa et al. 2014). This includes increased demands for unambiguous property rights and clear ways of engaging with existing land institutions, e.g., processes for converting customary land to leasehold tenure status. Third, relatively wealthy, educated and/or urban-based actors are better able to navigate the complex procedures of land registration (Sitko & Chamberlin 2016).

There is strong evidence that the commodification of land, i.e., the degree to which land exchanges take place through market transactions, is on the rise, particularly in areas with

relatively good access to markets and where labor-to-land ratios are relatively high (Abay et al. 2021, Chamberlin & Ricker-Gilbert 2016, Deininger et al. 2017, Tione & Holden 2020). The rise of land sales markets is particularly notable considering that the sale of customary land by individuals was illegal in most SSA countries only one or two decades ago. The permissibility of land sales in customary tenure areas remains ambiguous in some countries, making it difficult to observe in survey data (Byamugisha 2016). However, there is mounting evidence of widespread informal sales markets (sometimes referred to as clandestine) in customary areas (Chitonge et al. 2017, Sitko 2010). We discuss the available evidence for welfare effects on sellers below.

Cumulatively, these drivers (high food prices, agricultural policies that facilitate private investment in commercial agriculture, rapidly growing urban demand for food, improved market access conditions, and a growing number of wealthy Africans with the interest and means to invest in land) have put massive pressure on the institutions governing how land is allocated in rural Africa. These institutional changes are endogenously related to demand—both responding to and expressing the demand for land—suggesting a transition toward market-based land institutions, with willingness-to-pay becoming the main criterion determining access to land. This evolution in land institutions and markets has enabled new actors to invest in customary lands that may influence farm size distributions. Moreover, many of these drivers have a strong spatial expression so we may expect heterogeneous patterns of change (consistent with results in **Tables 1** and **2**) according to population density, policy conditions, and the pace of urbanization and income growth.

5. DIRECT IMPACTS OF FARM STRUCTURE CHANGE ON SECTORAL PRODUCTION AND PRODUCTIVITY

The expanding presence of medium-scale and larger farms in at least some SSA countries raises many questions about their development impacts. A vast literature has generally documented an inverse relationship between farm size and farm productivity (see Fuglie et al. 2020 for a useful review), but at least in Africa, the range of farm sizes examined has been too limited—generally between 0 and 10 hectares—to permit robust conclusions about the comparative productivity of smallholder versus medium-scale versus large-scale farms (Jayne et al. 2019). Recent evidence for a wider range of farm sizes has revealed a U-shaped relationship between productivity and farm size, with the relationship turning positive beyond 4 or 5 hectares (Foster & Rosenzweig 2021, Fuglie et al. 2020, Muyanga & Jayne 2019). However, there remain few empirical analyses that directly compare the productivity of small- and medium-scale farms in SSA, and Gollin & Udry (2021) find that farm size may be a relatively minor factor explaining differences in farm productivity.

Table 4 presents annual rates of change in the value of crop output, land productivity, and returns to family labor for the same seven countries. The three countries where medium-scale farms have clearly risen in importance over the past decade (Zambia, Tanzania, and Ghana) also show medium-scale farms achieving the most rapid rates of growth in crop production. In Zambia, the annual rate of growth in the value of crop production is -1.4% among farms of 0–2 hectares, 1.9% among farms of 2–5 hectares, 11.1% among farms of 5–10 hectares, 14.8% among farms of 10–20 hectares, and 7.0% among farms greater than 20 hectares. A similar pattern is evident in Tanzania, where farms of 10–20 hectares are growing the fastest in terms of value of crop output. Although annual rates of change in Ghana are lower in magnitude (noting that the analysis for Ghana spans 25 years), the same pattern is again evident, with farms of 10–20 hectares growing the fastest in their value of production, followed closely by those of 5–10 hectares. A similar pattern is also seen in Malawi.

In most countries in this analysis, medium-scale and larger farms are also experiencing the fastest growth in land productivity (the value of production per hectare cultivated) and in returns

Table 4 Annual rates of change (%) in the value of crop production, land productivity, and returns to family labor by farm size category

Country (dates)	Indicator ^b	Farm size ^a					Data source
		0–2 ha	2–5 ha	5–10 ha	10–20 ha	20+ ha	
Ethiopia (2014, 2016)	Value of crop production	7.6	2.8	–5.3	–5.3	–55.3	ESS/LSMS-ISA (https://microdata.worldbank.org/index.php/catalog/lsms)
	Land productivity	0.9	–1.0	–9.8	19.2	–60.9	
	Returns to family labor	7.9	3.1	–4.0	16.7	–48.0	
Ghana (1992, 2017)	Value of crop production	0.6	2.6	3.8	3.9	1.7	GLSS (https://www2.statsghana.gov.gh/nada/index.php/catalog/97)
	Land productivity	–0.8	0.5	1.3	3.3	2.7	
	Returns to family labor	0.6	1.3	1.3	4.4	6.6	
Kenya (2005, 2015)	Value of crop production	–0.1	3.5	–8.4	–3.4	–17.2	KIHBS (https://www.knbs.or.ke)
	Land productivity	–1.6	6.1	–1.1	–3.3	–10.8	
	Returns to family labor	–0.2	11.3	3.6	2.4	8.2	
Malawi (2010, 2019)	Value of crop production	2.3	4.8	11.1	19.9	NA	IHS/LSMS-ISA (https://microdata.worldbank.org/index.php/catalog/lsms)
	Land productivity	0.1	2.6	8.5	32.1	NA	
	Returns to family labor	1.3	3.3	3.7	27.8	NA	
Nigeria (2010, 2015)	Value of crop production	0.8	3.4	–8.7	29.7	22.7	GHS/LSMS-ISA (https://microdata.worldbank.org/index.php/catalog/lsms)
	Land productivity	–2.2	1.3	–0.7	18.3	21.2	
Tanzania (2009, 2015)	Value of crop production	5.5	6.8	16.5	27.0	13.4	NPS/LSMS-ISA (https://microdata.worldbank.org/index.php/catalog/lsms)
	Land productivity	5.0	2.0	9.8	8.4	11.8	
	Returns to family labor	10.1	8.7	16.3	12.7	4.8	
Zambia (2011, 2017)	Value of crop production	–1.4	1.9	11.1	14.8	7.0	CFS (https://www.worldbank.org/en/research/commodity-markets)
	Land productivity	–1.1	0.1	0.9	2.6	–0.3	

^aFarm size defined according to area under operation (area devoted to crops, pasture, and fallow); undeveloped land not counted.

^bLand productivity is defined as the gross value of crop production per hectare planted. Returns to family labor are defined as the gross value of crop production minus the costs of inputs (inclusive of hired labor) per full-time equivalent workday of family labor. In settings with more than one cropping season, these indicators are calculated over the full year. Information on returns to family labor is not available in Nigeria and Zambia.

Abbreviations: CFS, Zambia Crop Forecast Survey; ESS, Ethiopia Socioeconomic Survey; GHS, Nigeria General Household Survey; GLSS, Ghana Living Standards Survey; ha, hectares; IHS, Malawi Integrated Household Survey; KIHBS, Kenya Integrated Household Budget Survey; LSMS-ISA, Living Standards Measurement Study-Integrated Surveys on Agriculture; NA, not applicable (i.e., no observations in this category); NPS, Tanzania National Panel Survey.

to family labor. In Zambia, the annual rate of change in land productivity is 2.6% for farms of 10–20 hectares, higher than any other farm size category. Similarly, in Tanzania, Ghana, and Malawi, the rates of growth in land productivity for farms of greater than 5 hectares are much higher than for small-scale farm categories. In Ghana, farms of 0–2 hectares are becoming more profitable per unit of family labor at a rate of just 0.6% per year. This value rises incrementally with farm size to 4.4% for farms of 10–20 hectares and 6.6% for farms of more than 20 hectares. As with the patterns seen in **Table 1**, the story differs only for Kenya and Ethiopia, which are both relatively densely populated by African standards and have little unutilized land available for new investment. In countries where land is available for farm expansion, the data suggest

that medium-scale farms are strongly contributing to agricultural growth, underscoring their importance in the sector and in the story of agricultural transformation.

6. INDIRECT IMPACTS OF FARM STRUCTURE CHANGE ON THE RURAL ECONOMY

Section 5 indicates that medium-scale farms have generally contributed to national agricultural production and productivity in the countries where their share of national cultivated area has been growing. We now review the evidence on indirect impacts of a rise in medium-scale and larger farms, including (a) impacts on the structure and function of the agrifood system, (b) wage employment and multiplier effects in the local nonfarm economy, (c) impacts on smallholder land access, and (d) impacts on smallholder productivity and welfare. While more evidence is needed, there are indications that the rise of medium-scale farms has incentivized agribusiness investments, contributed to the development of agricultural markets, and introduced general equilibrium multiplier effects associated with the region's dynamism over the past decade.

6.1. Impacts on the Structure and Function of the Agrifood System

In some settings, evidence is emerging that medium-scale and larger farms attract investments in supply chains of agricultural inputs and in the value chains of agricultural outputs (e.g., van Dijk et al. 2022). For example, farming areas with a high concentration of medium-scale farms have attracted investment by large-scale grain buyers in Kenya, Tanzania, and Zambia (Sitko et al. 2018). Once they establish buying stations, they improve market access conditions for all farms in the area. Along the same lines, small-scale farmers in Zambia are more likely to sell to large grain trading firms (which offered higher farmgate prices than small traders) in districts with a high concentration of medium-scale farms (Burke et al. 2020). And small-scale farms in Tanzania are more likely to rent mechanization services in areas with a high concentration of medium-scale farms (Van der Westhuizen et al. 2019). The mechanization rental services that emerge to cater to the demand of relatively larger farms also enable small-scale farms to rent tractors and reallocate some labor to nonfarm activities; in such districts, as much as 20% of smallholder farmers rent tractors for plowing. Wineman et al. (2020a) also find important spillover benefits whereby small-scale farms in Tanzania are more likely to use improved seed and fertilizer and cultivate more of their landholdings and to receive agricultural extension and credit in the presence of more medium-scale farms.

Another pathway through which larger farms may contribute to structural transformation is through the deepening of food markets as surplus production and agricultural commercialization become more common. Larger-scale producers potentially bring down the local price of food, with impacts on the food security of buyers as well as sellers. Some analysts worry that large-scale producers who target the domestic market may push out small-scale farmers due to oversupply (Herrmann 2017), although we have not found evidence in the literature to support this concern. In terms of structural transformation, reliable access to food provides incentives for people to detach themselves from the land and shift into nonagricultural enterprises that generally provide higher returns to labor. Agricultural productivity growth benefits nonagricultural households if it lowers domestic food prices (De Janvry & Sadoulet 2010, Diao et al. 2010).

6.2. Wage Employment and Multiplier Effects in the Local Nonfarm Economy

Medium-scale and larger farms can potentially stimulate the local economy through both forward and backward linkages. In the forward direction, greater surplus production on the part of larger farms can itself deepen the rural nonfarm economy. In the early stages of economic development,

a large share of commerce activity in the rural economy is oriented around buying and selling agricultural products, with manufacturing activities drawing from primary agricultural production to produce goods for local consumption (Barrett et al. 2017, Davis et al. 2017). McCullough (2017, p. 148) notes that this relationship is so strong that “one would not expect to see expansion of rural industry sector activities independently, without any agricultural growth.” The extra income earned by medium-scale farms also enables them to demand labor-intensive goods and services in their communities, circulating money and further deepening the rural nonfarm economy (Imai et al. 2017, Johnston & Mellor 1961, Mellor 2017). Accordingly, in both Uganda and Malawi, growth in agricultural income has been followed by growth in off-farm employment at the village level (Parvathi et al. 2019).

In the backward direction, medium-scale and larger farms can stimulate the local economy through their demand for inputs and by offering wage employment to small-farm households looking to diversify their income portfolio. Along these lines, farms of 5–20 hectares comprise just 9% of all family farms in Tanzania but hire in 28% of all agricultural labor days in the country (Wineman et al. 2020b). Similarly, medium-sized horticultural farms in Kenya tend to rely on hired workers, usually from small-farm households (Neven et al. 2009). In Senegal and Zambia, positive wage-income effects stemming from large-scale farms are observed specifically for the poorest or most land-poor households (Ahlerup & Tengstam 2015, Van den Broeck et al. 2017).

However, the evidence on wage employment effects for small-scale neighbors is not all positive. In Zambia, medium-scale farmers operating on titled land cultivate, on average, less than 30% of their land; on a per hectare basis, the employment effect of these farms is likely to be small (Ahlerup & Tengstam 2015). A similarly bleak pattern is seen in Ethiopia, where commercial farms generate just one permanent job per 20 hectares (Ali et al. 2019). Medium-scale and larger farms may choose to avoid hiring in workers by mechanizing, cultivating fewer labor-intensive crops, hiring seasonally, or selectively hiring more educated (relatively privileged) workers (Ahlerup & Tengstam 2015, Herrmann 2017, Herrmann & Grote 2015, Nolte & Ostermeier 2017). It is not clear why medium- and large-scale farms’ contribution to employment appears to vary widely across countries; this may be an important area for further research.

6.3. Impacts on Smallholder Land Access

A widely held concern is that larger-scale farm investments will displace smallholder farmers by forcing them to move (Amanor 2010) or excluding them from grazing land (Bekele et al. 2021), or they will contribute to land scarcity, thereby precluding the natural expansion of smaller farms as local populations grow (Akaateba 2019). Instances of displacement from grazing land, farmland, or forestland have been widely documented in many countries (Ango 2018, Bae 2019, Borras et al. 2011, Hufe & Heuermann 2017, Shete & Rutten 2015), although these are generally associated with large-scale land concessions rather than market transactions dominated by small and medium holders.

However, even without forcible displacement, concerns have been raised about smallholders losing land as a direct consequence of land commodification (Amanor 2010), as when the emergence of a land market creates opportunities for distress sales (Boone 2019, Colin & Woodhouse 2010, Mueller & Chan 2015). While claims of displacement are frequently made in the critical sociological literature, the meaning of displacement is often imprecise. Some have used the term displacement to describe the process of less-productive farmers exiting agriculture and/or selling their land to more productive farmers—a process that most economists would regard as integral

to structural transformation (see, e.g., Amanor 2012). The paucity of data on the nature of land transfers (discussed in Section 7) currently limits our ability to evaluate the welfare impacts of land transactions for the sellers.

Ghebru & Girmachew (2019) find that smallholders' perceived tenure security in Ghana, Nigeria, and Mozambique is negatively correlated with the degree of local land market activity, pointing to a breakdown of traditional systems to safeguard land rights. In addition, medium- and large-scale farms necessarily introduce heightened land demand into their communities, which can drive up land prices [a pattern observed across the region (Jayne et al. 2021, Wineman & Jayne 2018)] and induce less-efficient farmers to rent out or sell their land, potentially resulting in land consolidation (Anseeuw et al. 2016, Jayne et al. 2016).

The heightened land demand on the part of medium- and large-scale farms may also diminish others' prospects for acquiring new land through traditional mechanisms (Akaateba 2019). Where young people find it difficult to access land, they are more likely to exit farming and/or migrate away (Bezu & Holden 2014, Chimhowu & Woodhouse 2006, Ghebru & Girmachew 2017, Ghebru & Lambrecht 2017, Knapman et al. 2017, Kosec et al. 2018). To our knowledge, no study has yet examined the long-term effects of having less community land available for allocation to the next generation.

6.4. Impacts on Smallholder Productivity and Welfare

On the positive side, small-scale farms in proximity to large-scale farms are likely to benefit from improvements in the structure and function of the agrifood system (discussed in Section 6.1). In Tanzania, small-scale and nonfarm households are found to have higher farm and nonfarm incomes in districts with a high concentration of farmland under medium-scale farms, particularly farms of 5–10 hectares (Chamberlin & Jayne 2020). Compared to larger farms, medium-scale farms are more likely to share social and economic ties with their smaller neighbors, participate in the same rural institutions, and cultivate mutually beneficial economic synergies.

Medium- and large-scale farms may also more directly serve as conduits of knowledge diffusion, spurring their smaller-scale neighbors to adopt productivity-enhancing technologies. This would occur if larger-scale farms were more likely to implement modern agricultural techniques and if their neighbors learn from them either through observation or in the course of wage employment (i.e., learning by doing) (Ali et al. 2019; Baumert et al. 2019; Deininger & Xia 2016, 2018; Liverpool-Tasie et al. 2020; Neven et al. 2009). Small-scale farmers could then apply their new skills or knowledge on their own farms. Larger farms may also facilitate technology diffusion by providing tractor (or oxen) services to small farms in their communities, a pattern documented in Ghana and Tanzania (Houssou et al. 2014, Van der Westhuizen et al. 2019). Chamberlin & Jayne (2020) and Baumert et al. (2019) found that medium-scale farms of 5–20 hectares generated greater positive spillover benefits to nearby smallholder farms than did larger farms.

7. DISCUSSION

7.1. Summary of Main Findings

A smallholder-led approach to agricultural development in SSA has been widely embraced in both policy and academic circles. This review has established that medium-scale farms have become an increasingly important force (particularly in countries with considerable potential for area expansion), with poorly understood but potentially important consequences for the region's development trajectories. Acknowledging a limited evidence base, we posit that the rise of medium-scale and larger farms has been driven by several factors, including greater profits in

commercial agriculture due to a sustained upward shift in global food prices since 2007; two decades of strong economic growth; greater numbers of wealthy and educated Africans with the interest and means to undertake land-based investments; and the evolution of institutions in favor of market-based land transactions that facilitate the emergence of medium-scale and larger farms.

Overall, in settings where farm structure is evolving, medium-scale and larger farms are seeing faster improvement in agricultural productivity than smaller farms, indicating a potentially important role in broader agricultural transformation processes. The limited evidence base indicates that farm structure change is also associated with underappreciated effects on rural economies. Medium-scale farms seem to catalyze investments in agricultural input and output markets; their commercial orientation generates spillover benefits to the local rural nonfarm economy; and they can influence the welfare of their smaller-scale neighbors in both positive and negative ways, as through the transmission of knowledge or by setting in motion a shift toward land commodification, which potentially restricts local peoples' access to land.

7.2. Research Agenda

These findings lead to several key questions to be addressed in future research.

How is farm structure changing across SSA? Although we gathered the most comprehensive evidence available on this topic, better data resources (as discussed below) are urgently needed to accurately track this evolution. A comprehensive assessment of farm structure, how it may be changing, and its various impacts will require data sets that include farms whose owners reside elsewhere and nonfamily farms, including both domestic and foreign large-scale land acquisitions of all sizes.

Is the growth of medium-scale and larger farms foreclosing a smallholder-led agricultural development path? We do not yet know the extent to which emergent farmers acquire land directly from smallholders versus from traditional authorities. Where land is acquired in a market transaction, it is important to understand whether a sale occurs under duress or whether being able to liquidate one's landholdings enables the seller to relocate and/or pursue preferred nonfarm activities that may improve their households' welfare. Nor do we know the extent to which land acquired by outsiders from traditional authorities implies displacement of smallholders or restricts the stock of unallocated land for future generations.

What conditions facilitate/stimulate the emergence or establishment of medium-scale and larger farms? What determines whether an initially smallholder-dominated farming system evolves toward more concentrated and/or diversified land holding distributions? We posit that a growing class of African investors has the means and incentives to establish commercial farming ventures. Policy makers need a better understanding of the link between farm size distribution and the evolution of land tenure systems, a topic that can be challenging to investigate where informal land markets exist but are regarded as taboo by potential informants.

Are there causal links between farm size distribution and dimensions of agricultural or structural transformation? Can we attribute some of the surge in downstream investments in agrifood value chains to changes in farm structure that have realigned the incentives for traders, processors, transporters, wholesalers, and retailers?

What is the evidence regarding spillover effects (both positive and adverse) that stem from medium-scale and larger farms, i.e., in which they affect the productivity or livelihoods of nearby smallholder and nonfarm households? A key component of this question involves the extent to which medium- and large-scale land investments generate economic activity and local multiplier effects or, alternatively, whether they are speculative in nature (holding land without putting it to

productive use). It is also important to explore which types of farms generate the greatest impacts in terms of wage employment for other rural residents.

7.3. Data Reforms Needed to Address this Agenda

The standard population-based farm-household survey is not sufficient to address the research agenda of Section 7.2. However, these surveys could be efficiently augmented by including a stratified random sample of medium- and large-scale farms. Repeated cross sections will enable the tracking of changes in farm structure over time. Where resources permit, agricultural censuses can also add much value. In the few countries where agricultural censuses can potentially be used to track farm structure changes over time and space, the data should be made widely available for analysis.

Greater clarity is also needed on land transfers, which are not well captured in typical survey instruments. Where medium-scale and larger farms have acquired their land through purchase, as is common in some settings (Wineman et al. 2020a), we need to better understand the details of the transfer; e.g., what motivated the sale, what are the terms of the transaction, and what subsequently happened to the seller? At scale, we also know very little about the conditions under which land transfers lead to deforestation and land degradation versus sustainable intensification.

Following land parcels over time may illuminate patterns of land transfer, especially in more dynamic settings. Snowball sampling methods may be used to track actors engaged in land transfers who are no longer resident in rural areas. Surveys could also be designed to enable network analysis of linkages between farms of different sizes. Relatedly, more thoughtful integration of qualitative and survey-based methods may illuminate relationships that are not readily perceptible in survey data.

8. CONCLUSION

Despite broad recognition of the need for empirical evidence to guide policy, there are strong indications that few African governments and researchers have an accurate understanding of their countries' farm structure. Large-sample population-based household surveys, such as the LSMS-ISA, focus primarily on small-scale farm households and are not intended to provide an accurate understanding of a country's farm structure. While some African countries have conducted farm censuses, very few have conducted multiple statistically comparable farm censuses that would offer an understanding of changes in farm structure over time. Consequently, neither researchers nor policy makers are capable of discerning changes in farm structure in most African countries, which is a serious blind spot considering the potential impacts on both equity and growth. Based on available data, our review finds a sizable nonsmallholder presence in about half of the SSA countries examined, with this class of farmers growing rapidly in countries with the potential for cropland expansion. Though very limited, the available studies on medium-scale farms indicate that they may be affecting Africa's agrifood systems and smallholder households in important yet poorly understood ways, thereby warranting greater policy and scholarly attention to these changes.

To date, however, there has been strikingly limited systematic analysis of whether, how, and why farm size distributions are changing, deriving in part from the paucity of suitable data. With improved data collection efforts, we would be better able to discern whether and how medium-scale and larger farms have grown in prevalence over time, agricultural productivity differences across farm sizes, and the extent to which changes in farm structure both reflect and fuel the rural transformation process in Africa. To the extent that relatively larger African farms have received any attention, analyses have so far focused on discrete aspects of changes in land use, homing in on either large-scale or medium-scale land acquisitions without maintaining a holistic view of farm

structure and the causes and consequences of changes therein. This review has articulated some of the most policy-relevant knowledge gaps and outlined some ways in which data reform can make a difference. We anticipate that this area of scholarship will grow in the coming years, as data become more available and the relevance of farm structure change to the shape of Africa's rural transformation becomes more apparent.

DISCLOSURE STATEMENT

The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

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