

Performance of large farms and benefits for smallholders: challenges and opportunities in Malawi's estate sector

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The agricultural estates in Malawi (1.5 million hectares), mostly held by domestic commercial farmers, are underperforming. Data from three sources (digitized agricultural leases, a georeferenced farm survey, and satellite imagery) are used to analyze this. It shows that estates are underachieving compared to smallholders in terms of yield, productivity, and land use intensity. Estates also fail to generate positive spillovers for smallholders. Moreover, more than 70 percent of estates have expired leases, so government is losing ground rents while it is also a source of tenure insecurity for estate holders. In addition, overlapping claims affect 140,000 hectares (9 percent of total area under estates). Clarifying boundaries and lease status for estates should be the first step toward systematic demarcation and preparation of customary estates under the recently enacted Land Acts, once gazetted. Failure to follow this sequence could, however, add another layer of unconnected rights, exacerbate tenure insecurity and discourage investment in productive performance.

Measuring estate performance

No consensus has yet emerged on how to analytically tackle impact assessment of large-scale land based investment. If access to modern technology is limited or factor markets are imperfect, commercial farm establishment may benefit neighboring smallholders by improving their knowledge of improved techniques and allowing easier access to factor and output markets. The conversion of customary land into leaseholds also generates public revenue in terms of ground rent. Beyond such potential beneficial effects, the literature has long pointed out that large farms may compete with local smallholders for resources, most prominently land but also water. The rapid

expansion of large farms since 2008, has raised many concerns, and a large body of literature now exist on its risks.

Malawi is of interest for measuring the performance of estates and effects for smallholders, given the scale of large farm investments and the length of time for which these have been in operation. The government leased about 1.5 million hectares to commercial farmers in the 1980s and early 1990s, representing 20% of the country's agricultural land. The goal was to help commercialize the agricultural sector, while overcoming limitations in regulatory regimes for customary tenure.

The over 25 years of experience with large farms in Malawi allows discerning longer-term impacts and identifying challenges not yet apparent in other African countries where land transfers have happened more recently. Such analysis is also highly policy relevant as it can directly feed into the policy debate on commercial agriculture and tenure security, and the review of the estate land policy. The analysis also provides guidance for the 2016 enacted new land laws, the implementation of which still needs to be regulated.

A novel analytical methodology

Most available studies on large farms assess the impact of specific investments. Although providing valuable insights on the dynamics of establishment and performance of these estates, it is difficult to determine the extent to which these findings are representative of the estate sector at large. Addressing this subject at the sector level would require dealing with two issues. First, data on the universe of

land transfers is needed to avoid that results are due to sample or case selection. Second, time series information will be desirable for assessing how different policies affect outcomes.

Traditionally, such data has come only from censuses or sample surveys. This paper, shows possibilities for using additional data sets and new analytical approaches. Three data sets are used: Georeferenced survey data, digital administrative data held by land agencies, and satellite imagery based land use analysis.

Land registries administrative records contain a wealth of information, allowing for routine monitoring of large investments' performance, but is often locked up in analog form. To enable the Malawi government to better manage its estate sector, digitization of all leasehold contracts was supported by a World Bank project in 2016.

Machine learning algorithms using medium-scale imagery at rather high frequency is now available for free on cloud-based platforms. The methodology has shown to generate information on land use, and potentially even crop type or yield at field level, as long as fields are of a minimum size. These combined data enable us to trace the evolution of Malawi's estate sector and allow making inferences on the longer-term impact of large farms.

Evolution of Malawi's estate sector

Malawi has traditionally been characterized by a dualistic land tenure structure geared towards cash crop production. In colonial times, cultivation of tobacco, the country's main cash and export crop, was restricted to

white settlers who had preferential access to land, labor, and credit, and guaranteed market access via a quota system. After independence in 1964, this estate land was transferred to Malawians.

To boost commercial crop production, the government introduced 21-year leases for public land in the late 1980s. A large number of estates, most sized from 10 to 30 hectares, were carved out of what was deemed unutilized customary land and transferred to aspiring commercial farmers, covering almost 800,000 hectares in 1994. Only estates were allowed to produce and sell tobacco directly, while smallholders had to sell their output to the marketing board at low prices. The surplus thus generated by the government was funneled to estate owners in the form of soft loans, providing an implicit subsidy that reinforced the dualistic structure of the country's agriculture sector.

Dissatisfaction with the results of such a strict distinction between estates and the customary sector led to a moratorium on lease issuance in 1994. Tobacco quotas were gradually extended to smallholders. Rapid take-up led to marked improvements in socio-economic indicators and soon brought small farmers' share in tobacco production to some 70%.

Yet these reforms did little to improve smallholders' security under customary tenure that historically allowed egalitarian land access and high levels of tenure security by community members, but over time, however, these systems came under increasing stress. Land scarcity became a growing concern due to population growth, migration,

and increased frequency of land transactions with outsiders, and causing disputes. Perceived tenure insecurity increased with negative impact on farm productivity and output, especially by females.

The launch of a more comprehensive land policy reform process in 1996, culminated in 2016 in Parliamentary approval of a series of Land Bills. One change is the introduction of the 'customary estates' defined as all land owned, held or occupied as private land within a Traditional Land Management Area (TLMA).

Characteristics of the estate sector

The 1997 *Estate Lands Utilisation Study*, or ELUS, is a key source of information on the establishment of the sector. Most estates are established by Malawians (table 1). Some 57% of estate land were newly cleared with the remainder used as customary land before. In fact, a sizeable share of new estate owners seems to have converted land they previously farmed under customary tenure, either to be able to grow tobacco or to increase tenure security. About half of owners were absentee, with a quarter indicating that they rarely visited their estates. Encroachment was an issue on 52% of estates above 500 ha, but affected a much smaller share (5%) of estates below 20 ha.

ELUS reported that tenancy on estates was widespread, with some 72% reporting to employ tenants who were estimated to account also for 52% of estates' labor force.

The 2006/07 National Census of Agriculture and Livestock (NACAL) reported that about a third of estates have tenants; the share of estates with tenants peaks at close to 50% in the 10–100 size category.

NACAL also illustrates that most estates (73%) are owned by Malawian persons; 11% are owned by "others", most likely legal entities, and 10% by expatriates. The ownership share of expatriates and government peaks at 100–500 ha and that of 'others' in the > 500 ha group.

Textual data in the digitized administrative records shows that in 2016, the estate transfers cover some 1.5 million ha, (1.35 and 0.14 in agricultural and non-agricultural estates, respectively) in 58,733 leases (35,140 and 23,593 for agricultural and non-agricultural land, respectively).

Using the original data of establishment, Table 2 illustrates that from a basis of 16,725 ha registered estates in the pre-independence period, transfers to the estate sector in the form of leaseholds, accelerated considerably after independence in three main phases, differing in volume of leases issued, and mean size. Following the 1994 moratorium, overall issuance of new agricultural leases dropped sharply, while issuance continued apace for non-agricultural estates.

Agricultural estates measure 39.8 ha on average and most agricultural estates are in the 10–30 ha group (73%), 8% (111,884 ha) and 0.7% (99,752 ha) of estate area is in estates larger than 50 or 500 ha, respectively (see Table 2).

Table 1: Agricultural Estate characteristics by size

	Size category in ha					
	All	5–10	10–50	50–100	100–500	>500
Estate ownership						
Years run by the current owner	18.99	12.54	15.28	21.13	19.84	30.77
Owner is Malawian (%)	72.58	82.76	92.42	80.21	50.52	29.75
Owner is expatriate (%)	10.48	0.00	1.18	4.17	29.17	20.66
Owner is government (%)	2.19	0.00	0.00	3.13	5.21	4.96
Land and labor use intensity						
Area owned	433.86	8.52	21.61	74.28	272.36	2,544
Area operated (%)	15.4%	67.7%	47.5%	36.9%	29.4%	11.6%
Total wage bill per ha (US\$)	131.95	144.42	133.60	174.62	138.21	77.64
No. of obs.	860	29	422	96	192	121

Source: Own computation from 2006/07 NACAL.

Quality of land records

The formal process to obtain a lease comprised four steps: An application stating size, intended use, and location of the desired piece of land ("sketch map"), together with a 'no objection' document by the chief, certifying that neither chief nor village headman object to the proposed transfer, had to be submitted. Having validated the application, Government issued an offer that details the length of the lease, permitted land use, assessed fees, and annual ground rent, ideally accompanied by a survey plan describing the property's location more precisely. Acceptance transformed the offer letter into a preliminary lease contract that would then be formalized by an officially registered deed. As each step normally

required side payments, the actual process followed was often quite different or remained incomplete.

Data suggest that only 36% of all leases (42% of agricultural ones) are supported by a deed; 34% (37% of agricultural ones) have only a letter of offer; and 30% (21% of agricultural ones) remained at the application stage. Quality of spatial documentation on the administrative records varies. While 2% of leases for agricultural estates (and 18% for non-agricultural ones) are surveyed and accompanied by a deed plan, 52% (and 66% for non-agricultural ones) have not advanced beyond the sketch plan whereas for 46% (and 16% for non-agricultural ones) the sketch was redrawn by the survey department (see also table 3).

By showing that, for 7,819 agricultural estates with a total area of 404,584 ha, documents lack data on lease duration, digitization of all records also points towards gaps in quality of existing documentation that may create challenges for good governance.

Leases' spatial components also point towards significant overlaps, a notion that is indeed supported by categorization of land use based on overlays with medium resolution imagery: 28% of agricultural estates have at least 20% of their area overlap with another estate, an issue affecting a total of 137,064 ha.

Productivity of estates compared to smallholders

Overlaying administrative data on estate boundaries with satellite imagery allows for a rough assessment of land under crops. Information on production and yields requires survey-based information. We use again the 2006/07 National Census

of Agriculture and Livestock (NACAL), which contains information for both smallholders and estates.

Comparing smallholders to estates provides interesting insights in several respects. First, for estates, 15% of allocated land is operated on average. This share decreases from 88% in the group below 5 ha, a figure that is comparable to the intensity of land utilization by smallholders, to 12% in the above 500 ha group. Prima facie this provides some support for claims about un- or underused estate land. Idle estate land has been a recurrent theme in Malawi's policy debate.

Second, production structure and cropping patterns differ between smallholders and estates: 42% of estate area is devoted to tobacco, followed by maize (39%), groundnuts (7%), and other crops. The 2006 data also suggest that for all crops except cassava, smallholders' yields are significantly above those by estates. While these are yields rather than profits, the share of estates using purchased inputs and the mean per hectare value of such inputs by those who use them is significantly above the equivalent figure for smallholders. This suggests that the relationship between farm size and profits is unlikely to be positive.

Benefits for smallholders

Commercial farms establishment has the potential to generate positive effects for smallholders, such as access to technology and markets for credit, input, labor, and output where access to modern technology is limited or factor markets are imperfect. An additional source of positive spillovers is through employment on estates. Small farmers who work on estates as casual workers may also acquire knowledge about new techniques or pick up specific skills that will be useful on their own farms.

Beyond such beneficial effects, large farms may compete with local smallholders for resources, most prominently land. Spatial proximity as a channel for transmission of spillover effects between investors and neighboring households used to investigate economic and social impacts of mine openings or closings, including on female empowerment and, although more limited, to assess the impacts of large farm investment on neighboring small farmers.

While lack of panel data on smallholders in Malawi makes it impossible to identify causal impacts, we can use simple regressions as a descriptive device to assess whether, after controlling for other factors, smallholders' location on or distance to an estate, with or without a valid lease, affects their production outcomes.

Results of our analysis suggest that, mainly because of a larger area cultivated, location on or proximity to an agricultural estate is associated with higher levels of output. This does, however, not translate into higher levels of productivity. In fact, for "squatters" on agricultural estates, output and profit per hectare are negative and significant. Per-hectare profits are higher only for smallholders in closer proximity to the boundary of estates with non-expired leases. While further exploration of this issue with better data would be warranted, this suggests that any indirect benefits from estates for smallholders will be quite limited.

In contrast to other countries where large farms produce bulk commodities and often generate little employment, many of Malawi's estates are labor intensive (see table 3). Permanent or temporary male (female) labor is hired by 64% (27%) and 70% (56%) of estates respectively. Demand for permanent labor per ha increases with size to about 0.9 males and 0.6 females in the largest category though the pattern for temporary labor is more volatile.

Ground rent collection

Government potential for collecting ground rent is eroded over time as leases have expired and were not renewed. In 2016, leases for 74% of agricultural estates had expired. In fact, only 5% of agricultural estates (vs. 41% of non-agricultural ones) had remaining lease terms beyond 10 years and thus a time horizon long enough to make longer-term investments. This

Table 2: Evolution of number and area under agric. and non-agric. estate leases

	Agric estates			Non Agric estates		
	Leases/year	Area/year	Total area transferred	Leases/year	Area/year	Total area transferred
	No.	1000 ha		No.	1000 ha	
1965–86	104	10.79	254050	107	0.18	5080
1987–94	2626	64.85	772850	124	0.14	6210
1995–2006	230	6.71	853340	267	0.42	11290
2007–16	112	9.08	944180	532	0.46	15890

Source: Own computation from the National Geographical Estates Database.

situation may reduce estate productivity directly, as well as limiting the scope for efficiency-enhancing transfers of land to operators with higher levels of ability.

The mean annual rent of less than US\$ 1/ha for agricultural estates and US\$ 27/ha for non-agricultural ones, is implying that yield may be below the cost of collection. Low ground rents may also encourage speculative instead of productive land use.

To illustrate the potential revenue from agricultural leases, we note that, the mean market price of an existing lease is US\$ 58/ha. Even a compliance rate of 50% could generate annual lease revenue of some US\$ 35 million, or 5% of Malawi's total public spending, in addition to providing strong incentives for effective land use.

Conclusion and policy implications

Our paper contributes to the debate on how to analytically tackle impact assessment of large-scale land based investment from a methodological and a substantive point of view.

The descriptive statistics presented are derived from the digitized leasehold data base, showing that computerization of administrative data locked up on paper, enables their use for policy analysis and action. Methodologically, we show how combining administrative records with georeferenced survey data and remotely sensed imagery can help address many of the issues that traditionally impeded routine monitoring of large agricultural investments' performance, and that could then trigger swift action in case of deviations.

Substantively, using 2006/07 data we find that Malawian estates failed to live up to their potential. With few exceptions, yields were below and input use above smallholders, who also seem to have derived few spillover benefits, either in terms of technology or market access.

Detailed investigation of land records suggests that difficulties for government to collect ground rent revenue are emanating from expired lease records, while a substantial program for lease renewal, and improving quality of land records is not in place. Tenure insecurity may reduce intensity and productivity of land use. A failure to maintain administrative records not only undermines generation of public revenue, but may also give rise to a collective action problem whereby each private lessee will not have an incentive to keep records up to date although society would greatly benefit from it.

To unleash the potential of properly run estates to contribute to diversification of Malawi's agricultural sector, there is need to renew, cancel, or renegotiate existing estate leases using a systematic process that could then form the basis for continued monitoring of lease performance in

near real time. Policy decisions on procedures for lease renewal, particularly setting levels of ground rent that are realistic, and developing procedures on how to deal with accumulated ground rent arrears, are one precondition for such a process to be feasible.

A second precondition is that a clear hierarchy of evidence among competing claims be established, and procedures to ascertain and adjudicate rights in a way that deals with discrepancies or overlaps through administrative mechanisms be developed. The recent enactment of a set of Land Acts creates enormous opportunities to link clarification of estate leases to securing smallholder land rights. However, not respecting this precondition holds a risk of unintended consequences.

Using sporadic adjudication processes to a set of land records that already contains numerous overlaps, will add yet another layer of complexity, exacerbate tenure insecurity, and increase the level of disputes. To avoid this, it will be essential to allow sporadic adjudication processes only in areas where TLMAs have been determined and estate leases have been clarified in a process followed by adjudication and registration of customary land ownership in an integrated and systematic process.

Future research on estate sector performance and spillover effects, building on more recent data, would be desirable to provide important input into the design and possibly evaluation of a forward-looking program of tenure regularization to improve the productivity and resilience of Malawi's agricultural sector and, given this sector's importance, the country's overall economic performance.

Table 3: Descriptive statistics of estates by lease status

	Total	Agric. estates	Non-agric. estates
General characteristics			
Total area (1,000 ha)	1,487.44	1,348.76	138.68
Mean area (ha)	27.10	39.80	6.60
Lease length ≤21 years (%)	47.88	73.62	9.55
Size less than 10 ha (%)	42.60	8.37	97.83
Size 10–30 ha (%)	45.62	73.22	1.09
Size 30–50 ha (%)	5.90	9.40	0.25
Size 50–100 ha (%)	3.21	5.04	0.26
Size 100–500 ha (%)	2.12	3.24	0.33
Size above 500 ha (%)	0.55	0.74	0.25
Formal documentation			
Has deed (%)	35.80	42.03	26.51
Has offer but no deed (%)	34.47	37.09	30.56
Sketch plan (%)	56.76	51.65	65.81
SD plan (%)	35.53	46.47	16.14
Deed plan (%)	7.71	1.87	18.05
Annual rent (US\$/ha)	10.69	0.79	26.66
Lease term in 2016			
Lease expired (%)	45.35	69.65	9.16
No. of obs.	58,733	35,140	23,593

Source: Own computation from the National Geographical Estates Database.

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