APRA

Agricultural Policy Research in Africa

CHANGING FARM STRUCTURE AND AGRICULTURAL COMMERCIALISATION IN NIGERIA

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ACRONYMS

ABU	Ahmadu Bello University, Zaria, Nigeria
APRA	Agricultural Policy Research in Africa
ATA-EPWG	Agricultural Transformation Agenda-Economic Policy Working Group
CAADP	Comprehensive Africa Agriculture Development Programme
CAPI	computer-assisted personal interview
DFID	Department for International Development
DHS	Demographic and Health Surveys
FIES	food insecurity experience scale
FMARD	Federal Ministry of Agriculture and Rural Development
GDP	gross domestic product
GISAIA	Guiding Investments in Sustainable Agricultural Intensification in Africa
HCI	household commercialisation index
HIMCI	household input market commercialisation index
IDS	Institute of Development Studies
ISSER	Institute of Statistical Social and Economic Research at the University of Ghana
LGAs	local government areas
LSMS	Living Standards Measurement Study
MDD-W	minimum dietary diversity among women
MPI	multidimensional poverty index
MSFs	medium-scale farms (farmers)
MSU	Michigan State University
NAERLS	National Agricultural Extension and Research Liaison Services, Zaria, Nigeria
NTWG	National Technical Working Group
SSA	sub-Saharan Africa
SSFs	Small-scale farms (farmers)

SSA	sub-Saharan Africa (SSA)
USAID	United States Agency for International Development
WS1	Work Stream #1

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EXECUTIVE SUMMARY

Recent evidence suggests that the changing structure of land ownership in sub-Saharan Africa (SSA) is one of the major new trends affecting African agri-food systems. Research in several other African countries shows the rapid rise of a medium-scale farming sector. For example, in Ghana, Kenya, and Zambia, medium-scale farms (MSFs) already control more land than do large-scale farms, and in Zambia and possibly Ghana, MSFs now control more land than the small- and large-scale farms combined. While national development policy strategies within the region (including most national Comprehensive Africa Agriculture Development Programme (CAADP) strategies and investment plans) officially regard the smallholder farming sector as an important (if not the main) vehicle for achieving agricultural growth, food security, and poverty reduction objectives, the meteoric rise of emergent farmers warrants their inclusion in efforts to understand the changing nature of the farm structure and food value chains in Africa.

At the same time, land pressures are increasing in many parts of the continent and expansion potential may be much more limited than previously assumed. Moreover, the current land administration policies seem to be lagging behind to support more sustainable and inclusive land dynamics in particular, and agriculture and rural transformation in general. Recent policies facilitating the transfer of land to medium/large holders are based on several premises. The first is that medium/large holders are relatively more productive than smallholders. Medium/large-scale farm investment may inject important sources of capital and expertise into underperforming current farming systems. Evidence in support of the inverse farm size/productivity relationship has generally been based on a range of farm scale which does not include medium/large-scale farms and there is reason to believe that such farms may in fact be more (land and labour) productive than smallholdings. Consequently, improving medium-scale farms' access to land can help the country increase its domestic production of key staple crops.

Second, even if medium-scale farms may be less productive than smallholders in some contexts, there may nevertheless be significant positive spillover benefits from medium/large-scale cropping activities to adjacent smallholder communities (assuming appropriate institutional arrangements exist or are designed) that may therefore improve the access of these smallholder communities to agricultural technologies, credit, and extension and marketing services, and thus improve the food security and welfare of smallholders in those communities. Thirdly, medium/large holders may provide a valuable source of off-farm agricultural wage employment (and thus additional income) for an adjacent smallholder community.

The main objectives of the work stream #1 (WS1) in Nigeria is to study the potential opportunities and challenges associated with medium-scale (investor) farms as a pathway into agricultural commercialisation. The study is intended to test the hypothesis that the growth of medium-scale farming promotes agricultural commercialisation in SSA. Changes in farm size distributions have potentially diverse and complex impacts on rural livelihoods, and hence the need to explore how the rise of medium-scale farms affects a range of outcomes. We are particularly interested in how investment by medium-scale farms influences the welfare of small-scale farms (SSFs) that still constitute the vast majority of farms in the region.

Anecdotal evidence of massive investment by medium-scale and large-scale farms in Nigeria raises fundamental questions about the trajectory of agricultural commercialisation under status quo policies, the trade-offs and potential synergies involved with smallholder agriculture, and the appropriate policies to promote equitable agricultural commercialisation, the empowerment of women and youth in agriculture, poverty reduction, and agricultural transformation objectives. Evidence is mounting that the rise of medium-scale investor farms and associated changes in the distribution of farm sizes are occurring in many African countries. These changes in the distribution of farm sizes are creating important and wide-ranging impacts at all stages of agricultural value chains. However, these effects remain poorly understood and have only been examined in a small number of countries to date. A better understanding of the effects of changing farm size distributions is urgently needed

to guide policies aimed at achieving agricultural commercialisation and broader economic transformation objectives.

Consequently, the WS1 study will provide an improved evidence base for policies designed to support equitable and poverty-reducing agricultural commercialisation in Nigeria. It will also have important applications for many other countries in the region that are experiencing rapid changes in farm structure. The study therefore sets out to provide answers to the following major research questions. First, what are the characteristics of these emerging medium-scale farms? Second, what is the nature of the changing farm structure that produces them? Third, how do these medium-scale farmers influence the behaviour and welfare of the millions of small-scale farm households around them? Fourth, are there productivity differences between small- and medium-scale farms? Fifth, on the policy front, should medium-scale investor farms be promoted as a policy tool to promote agricultural commercialisation and transformation? The answers to these questions may differ importantly by age and gender and hence we aim to examine these issues in more depth in the 2019 WS1 work plan.

For the purpose of addressing these research questions, this study was designed to carry out two waves of data primary collection in 2018 and 2020 respectively. The first wave, a primary data collection exercise, was carried out in April/May 2018 in Nigeria. The survey collected information from 1,000 medium-scale and 1,000 small-scale farmers from Kaduna and Ogun states, through a multi-stage sampling procedure that involved a combination of purposive, cluster, and proportionate random sampling techniques. This working paper presents the preliminary results of the first round of analysis of the quantitative data collected through the survey. The technique of analysis in this report is basically descriptive with extensive use of averages, percentages, and tables to organise the preliminary set of findings from this exercise. Additional and more detailed analyses are expected to continue in the form of journal articles using the first wave of data until the second wave is collected in the first half of 2020.

The preliminary analysis based on descriptive statistics is as follows. Observed differences between MSFs and SSFs suggest that years of school, assets, and durables may be important in driving the process of agricultural commercialisation in the study area. The youth have little participation in medium-scale farming, and farming in general, and have thus been generally excluded from the commercialisation process. We document two pathways to agricultural commercialisation in Nigeria; namely, transition from small- to medium-scale farms (stepping up) and the emergence of investor farmers that start off as medium-scale-level farmers (stepping in). Only about 6 per cent of all those who started off as SSFs actually graduated to medium-scale over the past three decades. The implication of this is that there is still a lot of scope for policy to enhance this process of transition from small to medium-scale.

Land availability and accessibility were the most important factors that enabled transition from small- to medium-scale farming. Specifically, land inheritance and increased engagement in the land markets (through land purchase and rent) tend to be important modes of land acquisition for farmers transitioning from small-scale to medium-scale. Unfortunately, security of tenure is very low among both MSFs and SSFs. This high level of tenure insecurity may decrease incentives for long-term investment in land development, which may in turn hinder the process of agricultural productivity growth and commercialisation.

Agricultural commercialisation seems to have positive impacts on a number of aspects. Labour productivity is substantially higher for SSFs compared to MSFs but the converse is true with land productivity. We find that some forms of interactions exist between MSFs and SSFs that could positively affect the welfare of the SSFs. These include, in order of importance, the provision of an extension guide/services to smallholders, sales of farm inputs to smallholders, purchase of farm inputs together with smallholders, and rentals of tractors and farm machinery services to smallholders. The degree of interaction between MSFs and SSFs varies by state.

Poverty indicators provide suggestive evidence that some measure of poverty reduction is associated with 'stepping up' from small-scale to medium-scale farms among the study population. However, agricultural commercialisation does not appear to benefit other outcomes. Specifically, there are only marginal differences in levels of commercialisation between medium-scale and small-scale farmers, both in the input and output market processes. In addition, an increase in farm sizes has little impact on women's empowerment and food security, and may lead to modest decreases in dietary diversity of women in households. Finally, multidimensional poverty indicators show that small- and medium-scale farms are only marginally different once several poverty indicators are considered. Consequently, MPI reduction may require substantial farm size changes and/or intervention from the government.

It is important to note that these bivariate relationships, while providing a fairly consistent picture, do not control for the effects of other variables that are likely to affect our outcome variables of interest. However, these relationships do lead to an important hypothesis for more rigorous evaluation in the next round of analysis.

1 BACKGROUND

The Federal Republic of Nigeria, commonly referred to as Nigeria, is a federal republic in West Africa. It borders Niger in the north, Chad in the northeast, Cameroon in the southeast, Benin in the west, and the Gulf of Guinea on the Atlantic Ocean to the south. It is the most populous country in Africa with a population of about 190 million people, comprising about 350 ethnic nationalities. According to federal government official reports, the country occupies about 91 million hectares in land area, which is largely rural. The country measures about 1,200km from east to west and about 1,050km from north to south. Figure 1 shows the geographical location of Nigeria.

About 82 million hectares of Nigeria's 91 million hectares of land is arable, and about 34.4 million hectares is currently under cultivation. Agriculture is the most important sector in terms of livelihood sustenance, as it relates to employment and food provision. According to the ATA Economic Policy Working Group (ATA-EPWG

2015) and the Federal Ministry of Agriculture and Rural Development (FMARD 2016), the sector provides the bulk (over 60 per cent) of food consumed in Nigeria and over a 70 per cent share of the labour force. The sector, which is made up of 85 per cent crop, 10 per cent livestock, 4 per cent fisheries, and 1 per cent forestry, accounts for 23 per cent of gross domestic product (GDP) and 75 per cent of non-oil export earnings (FMARD 2016).

Nigeria's diverse ecological variability is a major source of the diversification of crops, livestock, and forest products. The vegetation ranges from mangrove forest and rainforest in the southern part to derived savanna and northern Guinea savanna in the middle-belt region. The northern part comprises the Sudan savanna while the Sahel savanna occupies the extreme northern parts of the country. In addition to the ecological variability, Nigeria has a huge water resource endowment consisting of large bodies of surface water (268 billion cubic metres) and underground water (58 billion cubic

Figure 1 Map of Nigeria
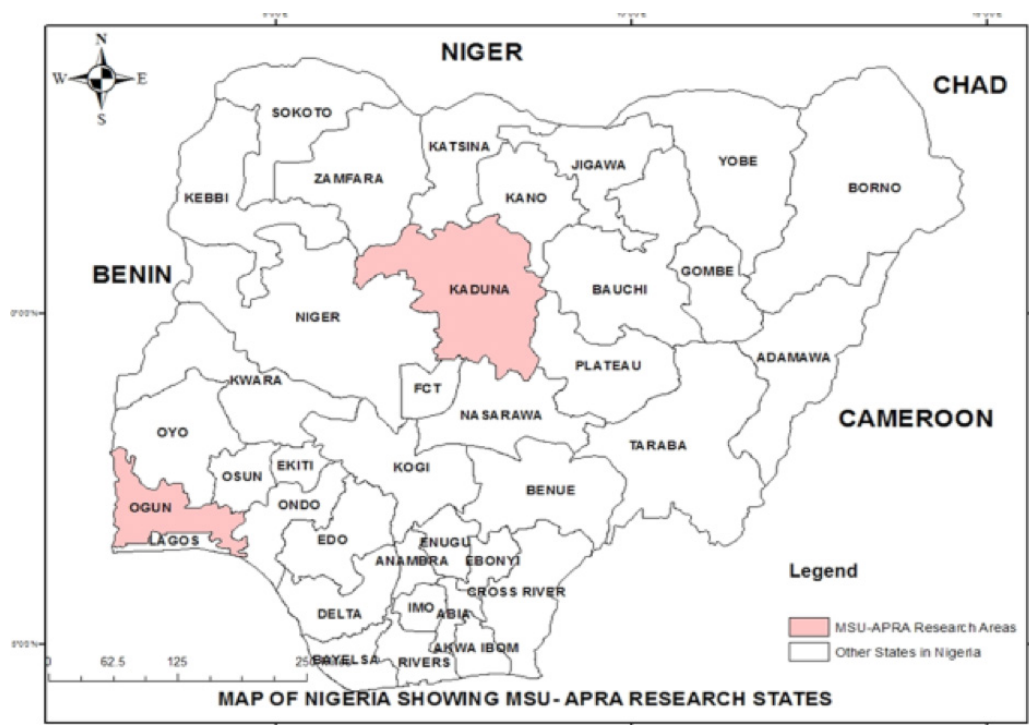
Source: APRA-Nigeria WS1 research team, August 2018.

metres). The country has 3.14 million hectares of irrigable land, and an extensive coastline, coupled with high rainfall (500–4,000mm per annum), signifying a huge potential for agricultural production (NTWG 2009; ATA-EPWG 2015).

The cash/industrial crops produced in the country include oil palm, cocoa, rubber, timber, groundnut, cotton, fruits, soybean, coffee, bambara nut, kola nut, sisal, pineapples, banana, plantain, sunflower, castor, and sesame (FMARD 2016). Many of these crops were once exported but are now sold mostly domestically. The food security crops, which constitute the main staple food items but which are also widely sold for cash include sorghum, millet, maize (corn), rice, yams, cassava, cowpeas, and cocoyam. While most of these cash and staple food crops are under rain-fed agriculture, crops such as rice, wheat, tomato, onions, pepper, cabbage, lettuce, and maize are grown extensively under irrigation. Cattle, raised through pastoral farming, supply the bulk of the animal protein needs of the entire country, supported by a fast-growing poultry and aquaculture industry (ATA-EPWG 2015). According to FMARD (2016), it is estimated that Nigeria currently has 13 million cattle, 35 million goats, 22 million sheep, and 80–120 million chickens.

The agricultural sector also provides food for livestock such as feeds, pasture, offal, fodder, haulms, and grains. It also provides raw materials for the agro-based industries such as vegetable oil, flour, leather, textiles, packaging, canning, and livestock feed industries, as well as other value chain activities. This is an indication of vertical and horizontal integration of agriculture with other sectors and the manifestation of linkages to agricultural input markets, packaging, and other distribution or supply chains. However, agriculture continues to provide foreign exchange earnings to the country from the export of crops such as cocoa beans, rubber, sesame seeds, and cocoa butter (FMARD 2016).

Nigeria has historically demonstrated its huge agricultural potential by being a leader in the supply of food products such as cocoa, groundnut, palm, and poultry in Africa. This is despite the high share of small-scale farm operators, cultivating between 0.5 and 4 hectares, who operate under low productivity conditions. Unfortunately, in recent years, Nigeria has lost its previous position as a leading supplier of crops such as cocoa due to a dramatic decline in production.

2 CORE RESEARCH ISSUES

The overarching objective of the Agricultural Policy Research in Africa (APRA) project is to produce new information and insights into different pathways to agricultural commercialisation. This is in order to assess their impacts on rural poverty, women's and girls' empowerment, and food and nutrition security in sub-Saharan Africa. Agricultural commercialisation is the process of transformation of agriculture from subsistence to market-oriented production in a way that substantially influences the livelihoods of farm households. Specifically, it involves the transformation of the decision-making processes of subsistence farmers with regard to product and input choices, based on the principle of comparative advantage, which becomes possible with the development of markets for labour, land, farm commodities, cash inputs, and finance. The commercialisation process enables farmers to intensify their use of productivity-enhancing technologies on their farms, achieve a greater output per unit of land and labour expended, produce greater farm surpluses, expand their participation in markets, and ultimately raise their incomes and living standards.

There are several potential channels through which agricultural commercialisation can be achieved. However, this paper focuses on farm size growth as a pathway to commercialisation. Specifically, the main objectives of the work stream #1 (WS1) in Nigeria is to study the potential opportunities and challenges associated with medium-scale (investor) farms as a pathway into agricultural commercialisation. We are particularly interested in how investment by medium-scale farms influences the welfare of the small-scale farms that still constitute the vast majority of farms in the region. Recent evidence documents the changing structure of land ownership in sub-Saharan Africa (SSA) as one of the major trends affecting the agri-food systems. Studies in several other African countries such as Ghana, Kenya, and Zambia suggest a rapid rise in medium-scale farming (Jayne et al. 2016; Anseeuw et al. 2016). Anecdotal evidence of massive investment by medium-scale and large-scale farms in Nigeria raises fundamental questions about the trajectory of agricultural commercialisation under status quo policies, the trade-offs and potential synergies involved with smallholder agriculture, and the appropriate policies to promote equitable agricultural commercialisation, empowerment of women and youth in agriculture, poverty reduction, and agricultural transformation objectives.

Evidence is mounting that the rise of medium-scale investor farms and associated changes in the distribution of farm sizes are occurring in many African countries. These changes in the distribution of farm sizes are creating important and wide-ranging impacts at all stages of agricultural value chains. However, these effects remain poorly understood and only examined in a small number of countries to date. A better understanding of the effects of changing farm size distributions are urgently needed to guide policies aimed at achieving agricultural commercialisation and broader economic transformation objectives.

Consequently, the WS1 study will provide an improved evidence base for policies designed to support equitable and poverty-reducing agricultural commercialisation in Nigeria. It will also have important applications for many other countries in the region that are experiencing rapid changes in farm structure.

3 RESEARCH QUESTIONS

The key research questions of this study are as follows:

1. What are the characteristics of these emerging medium-scale farms?

2. What are the drivers of changing farm structure?

3. How do these medium-scale farmers influence the behaviour and welfare of the millions of small-scale farm households around them?

4. Are there productivity differences between small and medium-scale farms?

5. Are there differences in welfare of medium-scale farm households compared with small-scale farm households?

6. Should medium-scale farms be promoted as a policy tool to promote agricultural ccommercialisation and transformation?

4 METHODOLOGY

4.1 Sampling

Most of the available nationally representative farm household survey datasets in sub-Saharan Africa, such as the LSMS, contain too few medium-scale and large-scale farms to form accurate conclusions about them.[1] Since the LSMS surveys follow population-based sampling, they tend to obtain a small sample of medium- and large-scale farms because these farms constitute only a small fraction of the total farm population. The LSMS thus generates small sample sizes and imprecise estimates of the total numbers of such farms. In other cases, the LSMS excludes non-smallholder farming sectors by design.[2] Another source of under-representation of medium-scale and large-scale farms is that the LSMS tends not to prompt urban households about farmland they may cultivate or own away from their main urban residences.[3] Because urban-based households appear to constitute a sizeable proportion of new investment in commercialised medium-scale and large-scale farms, there is mounting evidence that existing farm surveys increasingly miss a major and dynamically growing segment of the farm population – medium-scale farms (Jayne et al. 2016).

Owing to this under-representation of medium-scale and large-scale farms, existing survey data could not serve as an appropriate sampling frame or could not be used for power calculations. Correcting this informational blind spot required a new kind of sampling method. This involved the compilation of lists of the full population of households controlling and/or operating five hectares of land and above in the selected study areas.

Listing of medium/large-scale farms

Nigeria is administratively divided into 36 states and one Federal Capital Territory. In the first stage, two states, Kaduna and Ogun, were purposively selected for inclusion in this study (Figure 2), Kaduna State from the northern part and Ogun from the southern part. The two states were selected based on the giant strides they have made in providing the necessary policy environment for the development of commercial agriculture. Each state is sub-divided into three senatorial districts. In Kaduna State, the three senatorial districts are Kaduna South, Kaduna Central, and Kaduna North

while in Ogun State they are Ogun East, Ogun Central, and Ogun West. Each senatorial district is sub-divided into local government areas (LGAs).

The second stage of listing involved the systematic selection of three LGAs, one from each senatorial district from the selected two states. We purposively picked the largest LGA based on land size from each senatorial district. In Kaduna, we selected Kachia LGA (Kaduna South), Chikun LGA (Kaduna Central),[4] and Soba LGA (Kaduna North) (Figure 3a). In Ogun State, we selected Ijebu East LGA (Ogun East), Imeko Afon LGA (Ogun West), and Obafemi Owondo LGA (Ogun Central) (Figure 3b).

The third stage was a complete listing of all households controlling (owned, rented in, borrowed, etc.) or operating five hectares and above in all the selected LGAs, by a team of 40 enumerators using a household listing protocol (available upon request). LGAs consist of wards (administrative units within LGAs numbering between 9 and 12), and each ward contains several communities, which may be villages or towns. The listing exercise was carried out across all three selected LGAs in both Kaduna and Ogun states between October 2017 and March 2018. These listing exercises resulted in the listing of 9,361 and 5,848 household holdings and operating, respectively, five hectares and above in Kaduna State, and 6,224 and 2,345 households in Ogun State (Table 1).

Figure 2 Map showing research states in Nigeria

Source: APRA-Nigeria brochure (with author modifications).

Figure 3 Map of Kaduna and Ogun states showing selected local government areas

3(a): Kaduna State
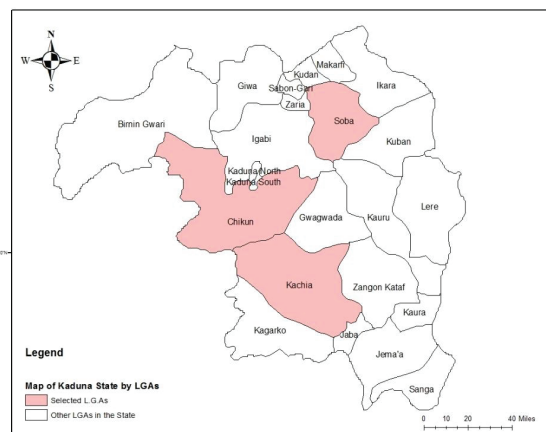
3(b): Ogun State
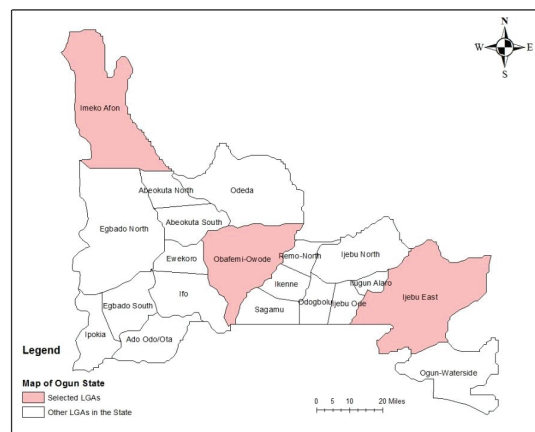
Source: APRA-Nigeria WS1 research team, August 2018.

Table 1 Medium- and large-scale farms listed by state and local government area

State	Local government area	Land holdings: five hectares and above	Land operated: five hectares and above
Ogun State	Imeko Afon	2,261	896
	Ijebu East	1,779	767
	Obafemi Owondo	2,184	682
	Ogun total	**6,224**	**2,345**
Kaduna State	Chikun	1,734	1,233
	Karchia	4,184	2,573
	Soba	3443	2042
	Kaduna total	**9,361**	**5,848**

Source: Field survey, April/May 2018.

Sampling of medium-scale and large-scale farms

The next step after the compilation of the medium-scale farm list was the sampling of medium-scale farms to be included in the in-depth survey. The sampling design takes cognisance of two farming scales that exist in the study area. First are the medium/large farms: these are farmers operating five hectares (this includes area cultivated, land used for animal, aquaculture, and any other agricultural enterprises) and more. Second, the smallholder farms, who are farmers operating less than five hectares of land. The two scales are based on the amount of land operated and not the land under the control of the farmers. Consequently, the medium/large farms group includes farmers controlling or owning less than five hectares of land while the smallholder group includes farmers who could be controlling or owning more than five hectares of land.

A multi-stage sampling technique, a combination of purposive, cluster, proportionate random sampling techniques, was used to select medium/large farms

to include in the study. Due to budget constraints, we limited our sample size to 2,000 respondents, 1,000 respondents from each state. In each state, the sample was apportioned equally between the medium/large (500) and smallholder farms (500).

The sampling was carried out as follows. First, to ensure representation of all the wards in each LGA, all wards were ranked based on the concentration of medium/large farms, and then stratified into terciles (thirds), yielding three relatively equal groups: high concentration, medium concentration, and low concentration of medium/large farms. Then, a ward was selected randomly from each of the three terciles in each of the selected LGAs. Due to the small numbers of medium/large-scale farms in Ogun State, a slightly different approach was adopted.

In each LGA, wards were ranked based on the concentration of medium/large farms. Next, wards were divided into two relatively equal groups: high

concentration and low concentration of medium/large farm categories. Two wards were picked randomly from each category. Thus, nine wards, three from each LGA, were selected in Kaduna State while in Ogun State, 12 wards, four from each LGA, were selected.

The final stage involved a random sampling of medium/large-scale farms. A proportional random sampling was adopted. This means the number of respondents in each ward depended on the population of medium/large farms listed in that ward relative to other selected wards in that LGA.

Listing and sampling of small-scale farms

Among the primary objectives of this study is to understand how the medium/large-scale farms compare with the thousands of smallholder farms around them in terms of agricultural productivity and profitability. To achieve this objective, smallholder farmers at close proximity to the medium-scale farms were included in this study. This involved a complete listing of all the smallholder farmers (farmers operating and controlling less than five hectares of land) in the sampled wards. This list was then merged with the list of smallholder farms operating less than five hectares of land but controlling more than five hectares that had been compiled during the first round of listing. Table 2 presents the number of small-scale farms listed in the sampled wards by state and LGA.

A proportional random sampling of small-scale farms to include in the study followed. Just as in the case of the medium/large farm selection, the number of smallholder samples in each ward depended on the population of smallholder farms listed in that ward relative to other selected wards in the LGA. Tables 3 and 4 present both the small-scale and medium/large-scale samples from Ogun and Kaduna states. It should be

noted that to avoid missing the targeted sample during the interviews, we oversampled by about 5 per cent. Consequently, the percentage sampled in some wards was more than 100 per cent. The oversampling was accounted for in the sampling weights computation.

4.2 Data collection

The medium/large-scale and small-scale farm household-level survey was conducted in April–May 2018. The survey team consisted of 36 enumerators (18 in each state) and they were supervised by six supervisors (three in each state). The fieldwork activities were led and coordinated by the national coordinator, Prof. Adebayo Aromolaran,[5] and two state coordinators, namely, Dr Abiodun E. Obayelu[6] in charge of Ogun State, and Dr Fadlullah O. Issa[7] in charge of Kaduna State.

Prior to the data collection exercise, the survey team went through data collection training between 25 March and 3 April 2018. The training involved the familiarisation of field staff with the use of Survey Solutions, an Android based computer-assisted personal interview (CAPI) software developed by the World Bank. Louis Hodey (ISSER/Ghana) and Dr Milu Muyanga (MSU) led the training with backstopping by Dr Amrita Saha of APRA/IDS.

In addition, the field team was taken through issues and challenges that could arise in the field. Local measurement units were developed and standardised for the purpose of the survey. The survey instrument was pretested in one of the extension villages of the Federal University of Agriculture, Abeokuta Nigeria, after the training (see Figure 4 for fieldwork pictures).

Table 2 Small-scale farms listed by state and local government area

State	Local government area	Number of small-scale farms operating below five hectares
Kaduna	Chikun	2,654
	Kachia	4,770
	Soba	4,427
	Total Kaduna	**11,851**
Ogun	Imeko Afon	2,687
	Ijebu East	1,271
	Obafemi Owondo	1,684
	Total Ogun	**5,642**

Source: Field survey, April/May 2018.

Table 3 Medium/large and smallholder farm samples in Ogun State

Medium/large-scale					Small-scale		
LGA	Ward	Target	Interviewed	Achieved (%)	Target	Interviewed	Achieved (%)
Imekon Afon	Atapele	35	38	109	54	19	35
	Imeko	102	103	101	63	76	121
	Agberiodo	10	12	130	22	23	105
	Obada	20	23	115	28	59	211
Ijebu East	Itele	66	66	100	33	45	136
	Owu	76	75	99	41	36	88
	Ikija	11	12	109	48	48	100
	Imobi	14	17	121	45	51	113
Obafemi Owode	Alapako	46	50	109	72	66	92
	Owode	71	69	97	16	62	388
	Oba	27	28	104	20	35	175
	Obafemi	24	26	108	58	25	43
Total		**502**	**519**	**104**	**500**	**545**	**109**

Source: Field survey, April/May 2018.

Table 4 Medium/large and smallholder farm samples in Kaduna State

Medium/large-scale					Small-scale		
LGA	Ward	Target	Interviewed	Achieved (%)	Target	Interviewed	Achieved (%)
Chikun	Kunai	35	38	109	73	79	108
	Kuriga	38	41	108	29	32	110
	Rido	93	89	96	65	69	106
Kachia	Agunu	87	88	101	105	106	101
	Bishini	29	33	114	23	27	117
	Gidan Tagwai	51	54	106	38	42	111
Soba	Dan Wata	37	41	111	52	54	104
	Gami Gira	111	108	97	59	62	105
	Garu	19	20	105	56	62	111
Total		**500**	**512**	**102**	**500**	**533**	**107**

Source: Field survey, April/May 2018.
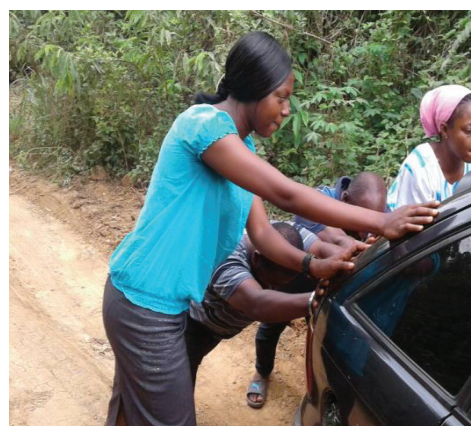
Figure 4 Fieldwork pictures

(a) Survey leadership

(b) Instrument pre-test session

(c) Household interview session

(d) Getting to the villages

Source: APRA-Nigeria WS1 research team, March–June August 2018. Credit: 4(a) and 4(b) Milu Muyanga; 4(c) Abel Gomina; 4(d) Omotosho Ogunmola.

To make the fieldwork more exciting and to improve on the quality of the data, we introduced various awards to recognise outstanding performances in different aspects of the survey work. At the end of the survey, various individuals were recognised for their exemplary achievements. Abel Gomina and Tolu Adeniyi were crowned the best supervisors in Kaduna and Ogun states, respectively. The best enumerators were Makena Wusa (Kaduna) and Omotosho Ogunsola (Ogun). The best field photo awards went to Abel Gomina (Kaduna) and Nike Olukunle (Ogun). We had also requested the field team to document their field experiences.[8] The stories would not only help to inform the interpretation of the analysed data but would also let users of the data appreciate the wealth of information that exists out there that cannot be captured by one questionnaire, and the exciting moments and difficulties that the data collectors go through. The best essay award in Ogun State was scooped by Moses Olayemi, while in Kaduna it went to Mary Joseph Abah.

To the enumerators, the survey work was not just about asking respondents a series of questions and keying the responses. It was also about exposing the enumerators, most of them fresh graduates, to the situations of the rural farm families. It was about experiencing the farm households' way of life, seeing and feeling their rich culture, and learning about the difficulties farm households go through in their daily lives. To APRA-Nigeria, this was an important aspect of the capacity building of future policy analysts and policymakers in Nigeria.

This section examines pathways into medium-scale farming. It should be noted that while our sample initially consisted of 1,031 medium-scale and 1,078 small-scale farms, the final sample had 1,010 and 1,099 medium- and small-scale farms, respectively. This was because of the reclassification of households that had been misclassified into the wrong farm categories during the listing stage. Specifically, some farms that had been classified as medium-scale farms using the listing data were actually small-scale farms, and vice versa.

5 FARM SCALES AND PATHWAYS TO AGRICULTURAL COMMERCIALISATION

During the interviews, we sought to know households' farm sizes when they started farming. We also asked about the time when farms that started as small-scale, graduated into medium-scale status. It emerged that out of the current 1,010 medium-scale farms, 47 per cent of them started as small-scale farms and graduated into medium-scale farming status. We refer this entry into medium-scale farming as the farm-led pathway. Conversely, out of the 1,099 small-scale farms, about 3 per cent of them started farming at medium-scale but shrunk to the small-scale category. Looking at the sample distribution by state, Ogun had 1,065 households, of which 47 per cent (496) were medium-scale famers. Kaduna State had 1,044 households, 49 per cent (514) of which were medium-scale farms. About 54 per cent (267) and 41 per cent (209) of the medium-scale farms in Ogun and Kaduna, respectively, started as smallholder farms.

Consequently, based on farming scales and pathways into these scales, we identified four broad farm groups. The first group is the consistently small-scale farm (Group 1). These are the small-scale farms that started as small-scale farms and remained small at the time of the survey. This farm type represents 97.4 per cent of current small-scale farms. It is important to note that only about 6 per cent of all those who started off as small-scale actually graduated into medium-scale. The implication of this is that there is a potential for policy interventions to facilitate the process of transition from small- to medium-scale farming.

The second group is the transitioned small-scale farm (Group 2). These are farms that started as medium-scale farms but shrunk to small-scale. This group constitutes only 3 per cent of the small-scale farms sub-sample. The third identified group is the transitioned medium-scale farm (Group 3). These are farms that were previously small-scale but have now graduated into medium-scale (farm-led). The group accounts for as much as 47.3 per cent of the current MSFs. The fourth group is the consistently medium-scale farm (Group 4). These are farms that started off as medium-scale farms and remained so at the time of the survey. This group

accounts for 52.7 per cent of MSFs in the sample. We refer to this lateral entry into medium-scale farming as being non-farm income led.

6 HOUSEHOLD CHARACTERISTICS AND FARM PRODUCTION

6.1 Household demographics

The average household size ranged between six and nine persons depending on farm type (Table 5(a)). It is slightly higher among medium-scale farmers compared to small-scale farmers. Males head most of the households. The average age of household heads is 43 and 46 years in the small-scale and medium-scale farms, respectively. Most of the household heads had consistently lived in their household for the previous 12 months. The average years of schooling among household heads ranged between six and eight years. Heads of the small-scale farms have relatively low education levels compared to their medium-scale farm counterparts. Heads in the consistently medium-scale farms have on average eight years of education. It is important to note that the levels of educational attainment was lowest among heads in the households that dropped from medium-scale to small-scale farming.

In Table 5(b), we examine household head age distribution by farming scales. The objective is to examine whether we have youths and young adults in agriculture, and if so, at which scale of farming. It is widely believed that getting more youths and young adults interested in farming could be a major driver for agricultural commercialisation in Africa. The results, however, show that less than 3 per cent of youths (persons aged between 15 and 24 years) are involved in small-scale farming and less than 1 per cent is in medium-scale farming. Also, close to 30 per cent of young adults, persons aged between 25–34 years, are engaged in small-scale farming compared to less than 14 per cent in medium-scale farming. In terms of geographical comparisons, Kaduna State has more youths engaged in farming compared with Ogun State. The finding that more young adults are involved in small-scale farming could be attributed to lack of access to land. The youth population in Nigeria is somehow left out of more commercialised medium- and large-scale farming. This is in spite of the fact that Nigeria has three Federal Universities of Agriculture, several colleges of agriculture, and numerous agricultural training institutes and centres for youth.

Table 5(a) Household demographics (mean)

	Current farm scale					
	Small-scale (SSF)			Medium-scale (MSF)		
	Group 1	Group 2	All small-scale	Group 3	Group 4	All medium-scale
N	1,065	34	1,099	476	534	1,010
Household size	6.24	8.65	6.30	8.22	7.25	7.71
Proportion of households headed by males	0.94	0.96	0.94	0.97	0.98	0.98
Age of the household head (years)	42.74	46.30	42.83	47.21	45.43	46.27
Number of months household head lived in the household in past year	11.87	11.76	11.87	11.91	11.82	11.87
Educational attainment of household head (years)	7.01	4.87	6.96	7.02	8.02	7.55

Source: Field survey, April/May 2018.

Table 5(b) Youth and young adults in agriculture

	Age category	Ogun (%)	Kaduna (%)
Small-scale	15–24 years	1	3
	25–34 years	10	31
	35–49 years	38	39
	50–64 years	35	21
	65 and over	16	6
	Total	**100**	**100**
Medium-scale	15–24 years	0	0
	25–34 years	8	14
	35–49 years	42	49
	50–64 years	33	27
	65 and over	17	9
	Total	**100**	**100**

Source: Field survey, April/May 2018.

Table 6 presents the permanent residence of the farm owners by farm category. The results show that all of the small-scale farm owners reside within their communities,

Table 6 Residency of medium-scale farm household heads

Farm category	Survey region	Current residence of household head		Total %
		Outside community %	Within community %	
Small-scale	Ogun	0.30	99.70	100
	Kaduna	0.00	100.00	100
	All small-scale	0.10	99.90	100
Medium-scale	Ogun	12.50	87.50	100
	Kaduna	1.50	98.50	100
	All medium-scale	4.00	96.00	100
Overall	Ogun	1.80	98.20	100
	Kaduna	0.20	99.80	100
	Total	**0.50**	**99.50**	**100**

Source: Field survey, April/May 2018.

essentially where their farms are located. About 4 per cent of all medium-scale farm owners reside outside their communities, most of them in urban centres. However, in Ogun State, a sizeable number (13 per cent) of medium-scale farm owners reside outside of their communities. The finding that most of the medium-scale farm owners reside within the communities where the farms are located could be a subtle indication that the cross-community land market is not efficient.

To understand some of the factors that facilitate smallholder farm graduation into medium-scale farming status, we elicited information on the household heads' previous/current main source of income. Table 7 shows that almost all the smallholder farm household heads draw most of their income from agriculture. About 18 per cent of the medium-scale farm household heads either are or were previously involved in off-farm or non-farm employment. By state, about 40 per cent of medium-scale owners either currently or previously

relied on non-farm income in Ogun compared to 11.4 per cent in Kaduna.

6.2 Household land access and ownership

Table 8 shows the average amount of land controlled by the households. Land control is broken down into land access, owned land, and operated land. Land access includes owned land and land from other sources (such as rental or borrowed) under the control of the household. Operated land includes area planted and under livestock production. We compare land access currently to access when the households started farming. The land controlled by the household averages 3.18 and 12.58 hectares in small-scale and medium-scale farms, respectively. The households own over 85 per cent of the land controlled. All farms are operating over 90 per cent of their owned land.

Table 7 Previous/current main source of income

Farm category		Previous/current main source of income		Total (%)
		Non-agriculture (%)	Agriculture (%)	
Small-scale		0.20	99.80	100
Medium-scale		17.70	82.30	100
Small-scale	Group 1	0.10	99.90	100
	Group 2	0.60	99.40	100
Medium-scale	Group 3	17.70	82.30	100
	Group 4	17.70	82.30	100
	By state:			
Small-scale	Ogun	0.70	99.30	100
	Kaduna	0.00	100.00	100
Medium-scale	Ogun	39.40	60.60	100
	Kaduna	11.40	88.60	100

Source: Field survey, April/May 2018.

While owned land and operated land have remained almost constant from the time households started farming to the survey year in the small-scale farms, landholding and areas operated by medium-scale farms has increased by 34 and 44 per cent, respectively. Looking at land access by farm category when the household started farming, it emerges that the 34 smallholder households that started farming in the medium-scale category surprisingly control and own more than five hectares of land. This suggests that, in some cases, the reduction in scale of operation is not driven by land constraints but by some other factors.

The amount of controlled, owned, and operated land is slightly higher among the medium-scale farms that have been consistently medium compared to those that started as smallholder farms and expanded their scale of production. It is important to note that farms that grew organically from small-scale into medium-scale farming status are not typical smallholder farms. The average initial landholding sizes (when the household started farming) among those farms was 4.15 hectares and with households operating about 56 per cent of that land. Initial landholding among the typical smallholder farms stood at 2.67 hectares and almost all the land (82 per cent) was in use.

There is an insignificant difference in terms of magnitude of land controlled, owned, and operated between small-scale farms in Ogun and Kaduna states. However, medium-scale farms in Ogun control and own significantly more land than their counterparts in Kaduna (Table 8). Even though medium-scale farms in the two states operate approximately the same amount of land, those in Kaduna State operate a larger proportion (95 per cent) of their owned land compared to 80 per cent in Ogun State. Similar patterns emerge when we consider landholding and area operated at

the time when the medium-scale farms in the two states started farming. The proportion of operated land to owned land was 56 and 87 per cent in Ogun and Kaduna, respectively. The difference in the proportions may be because of relatively high bush-clearing costs in Ogun than in Kaduna. However, these costs may not matter much in areas where high-value crops are cultivated. Qualitative information from the field indicated that the high costs associated with clearing the thick rainforests in Ogun are a major constraint to scale expansion of farms.

Table 9 presents various ways in which households obtain land across farming scales. The results show that land inheritance is the most important source of land in the small-scale and medium-scale farms. It is important to note that land purchases are the second important source of land among the medium-scale farms and especially those who started farming with small-scale status and who graduated to medium-scale farms. This is probably an indication that land markets play an important role in the establishment of medium-scale farms. We sought to know landholding tenure systems by farming scale (Table 10). The results show that the majority of the households own their land without title deeds. Only less than 10 per cent in each farming category owned land with a title deed.[9] Lack of secure tenure systems could be stifling land market operations and by extension the emergence of medium-scale farms. This finding will be investigated further in the forthcoming community-level survey.

6.3 Cropping patterns

In this sub-section, we examine the broad categories of crops grown by farmers. We classified the crops into nine broad categories as follows: cereals (e.g. maize, sorghum, rice, and millet); pulses (e.g. cowpeas and beans); sugar/starches (e.g. yam, sugar cane,

Table 8 Household land access

Farm category		Current				When household started farming	
		Accessed (ha)	Owned (ha)	Operated (ha)	% operated/ owned	Owned (ha)	Operated (ha)
Small-scale		3.18	2.66	2.46	92.43	2.67	2.19
Medium-scale		12.58	11.02	9.98	90.62	7.24	5.59
	All farms	4.24	3.60	3.31	91.83	3.19	2.57
	Farm group						
Small-scale	Group 1	3.06	2.55	2.44	96.04	2.53	1.96
	Group 2	7.51	6.97	3.04	43.64	7.85	10.70
Medium-scale	Group 3	11.64	9.77	9.35	95.70	4.15	2.34
	Group 4	13.43	12.13	10.55	86.97	10.02	8.52
	By state:						
Small-scale	Ogun	3.67	2.81	2.25	80.05	3.38	1.80
	Kaduna	3.05	2.62	2.51	95.83	2.49	2.29
Medium-scale	Ogun	18.34	14.36	11.49	80.05	9.87	5.50
	Kaduna	10.91	10.05	9.55	95.03	6.48	5.62

Source: Field survey, April/May 2018.

Table 9 Sources of land by farming scale

	Currently small-scale		Currently medium-scale	
	Group 1	Group 2	Group 3	Group 4
Sources of land:				
Purchased	5.10	10.89	23.91	13.49
Inherited	69.45	80.83	49.75	67.12
Rented	5.99	3.83	9.17	4.01
Allocated	3.93	0.30	7.50	3.97
Borrowed	1.26	0.72	0.87	1.07
Family land	10.96	1.93	6.48	7.92
Other sources	3.31	1.49	2.31	2.41
Total	100	100	100	100

Source: Field survey, April/May 2018.

Table 10 Landholding tenure system by farming scale

|	Currently small-scale		Currently medium-scale	
	Group 1 (%)	Group 2 (%)	Group 3 (%)	Group 4 (%)
Title deed	1.10	5.80	3.80	8.40
Without title	78.40	76.30	79.40	81.00
Family land	9.90	1.20	2.80	3.60
Leased/rented	6.60	7.60	10.90	3.40
Other	4.00	9.20	3.20	3.60
Total	100	100	100	100

Source: Field survey, April/May 2018.

cocoyam, sweet potato, and cassava); fruits (e.g. guava, cashew, plantain, banana, citrus, pineapple, orange, and watermelon); vegetables (e.g. okra, garden egg, spinach, cabbage, cucumber, potato, and tomato); beverages (e.g. cocoa, zobo, and coconut); spices/condiments (e.g. pepper, ginger, and onion); oil seeds (e.g. ground nut and oil palm); and nuts (kola nut and bambara nut). The results show that cereals, starches/sugars, and pulses are the three most important crop categories grown by farmers in the study area regardless of scale and location. However, in terms of area planted, cereals and sugar/starches still rank first and second, respectively, while beverages rank third. The implication is that even though more farmers plant pulses relative to beverages, more land is put under beverages compared to pulses (Figure 5).
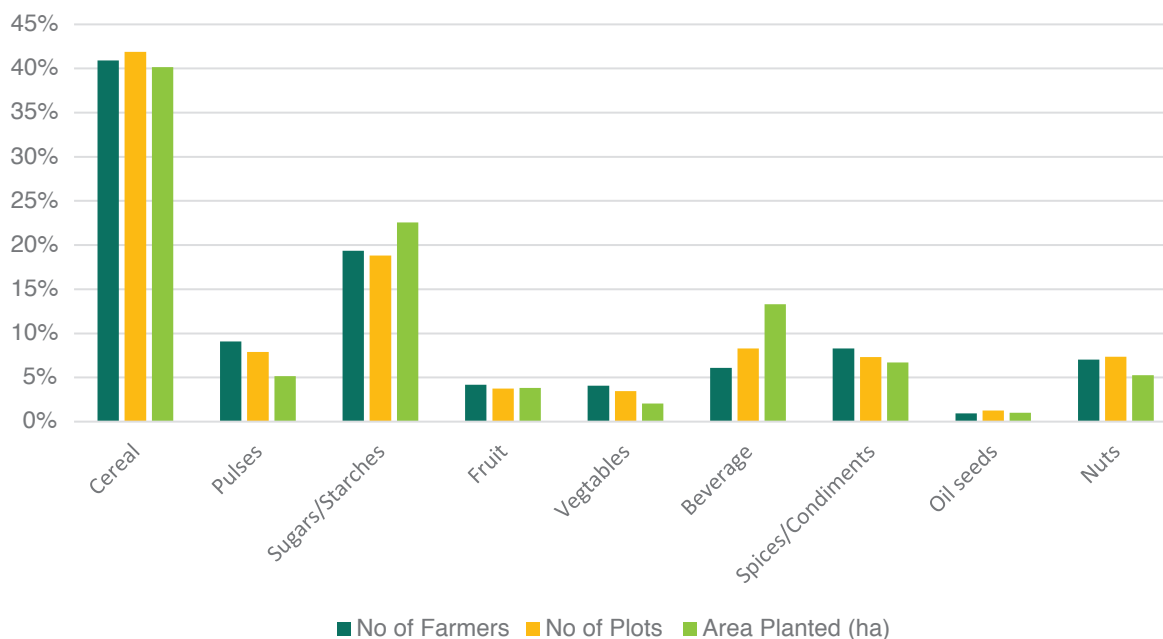
Figures 6 and 7 show that among medium-scale farmers, cereal, pulses, and condiments are the three most popular crop categories in Kaduna State, while
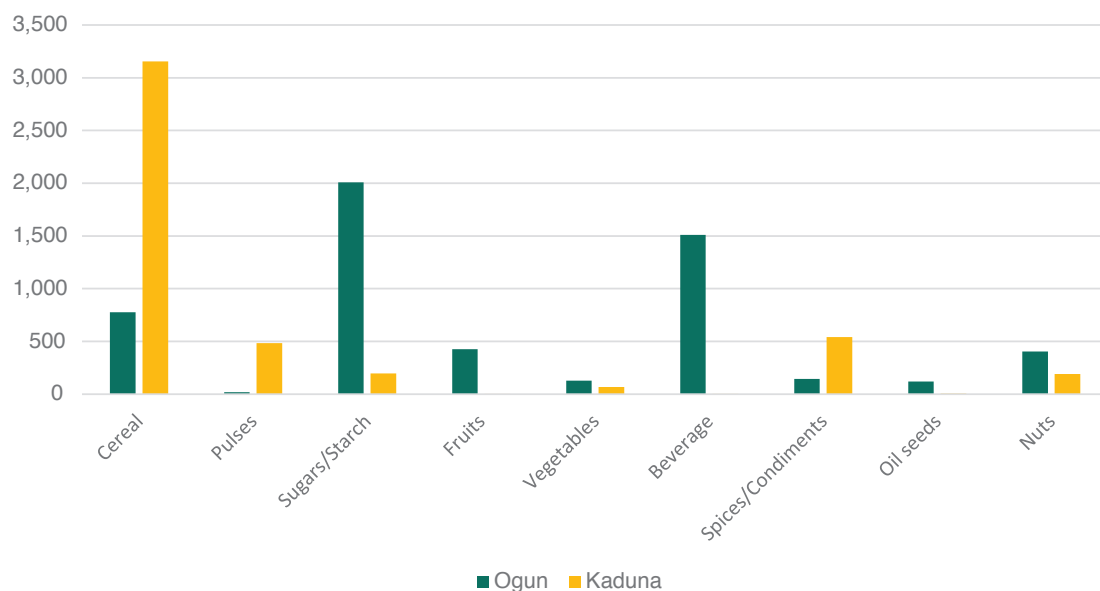
Figure 5 Proportion of farmers, plots, and area planted
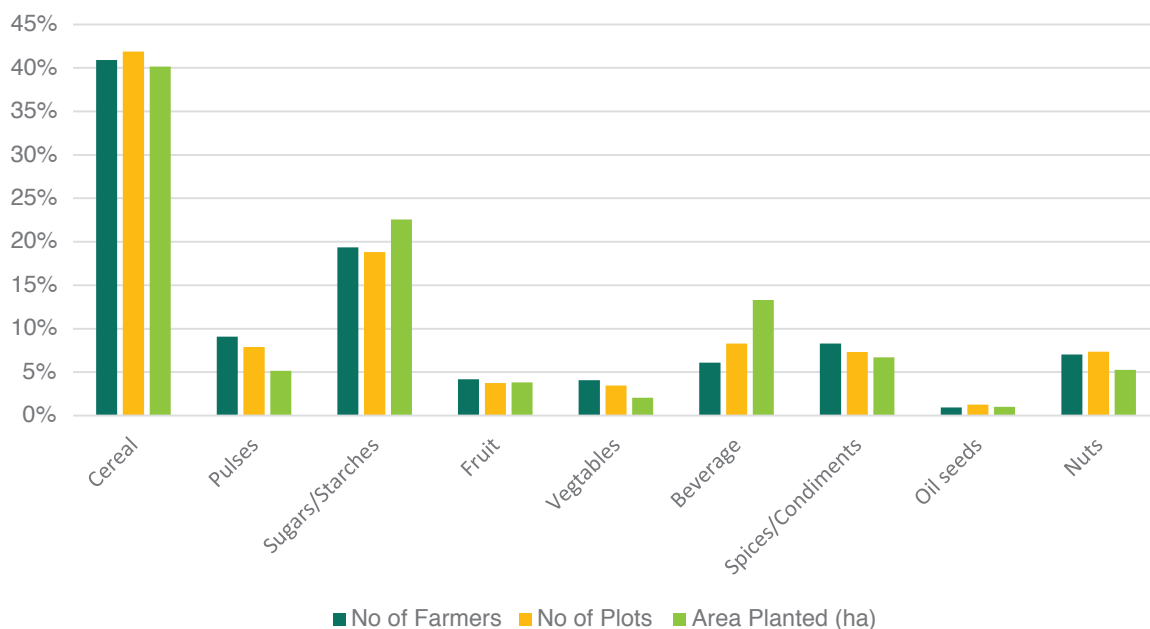
Source: Field survey, April/May 2018.

Figure 6 Number of medium-scale farmers by crop category and state
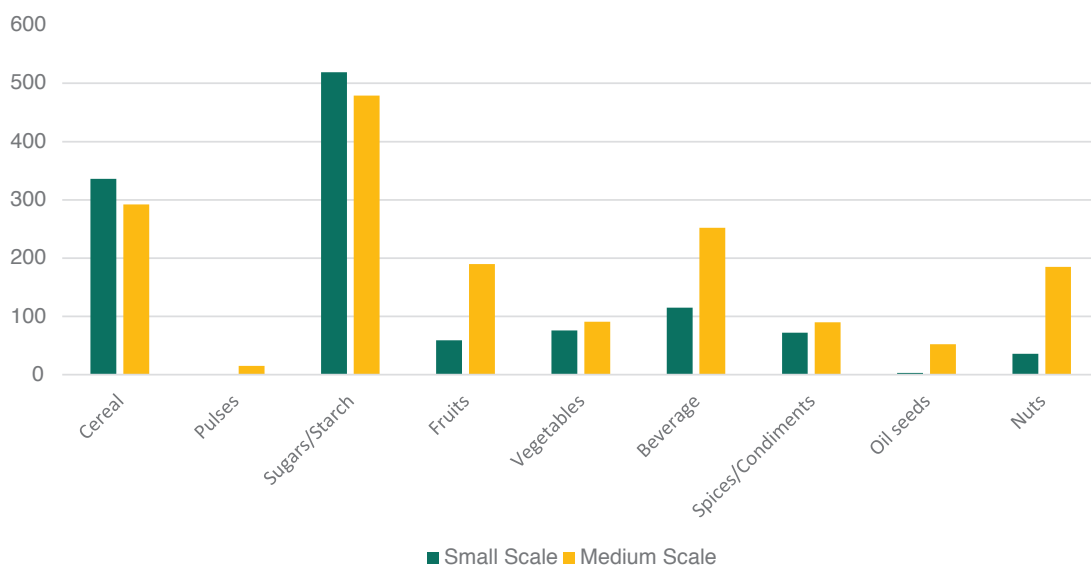

Source: Field survey, April/May 2018.

Figure 7 Total area planted (ha) by medium-scale farmers by crop category and state

Source: Field survey, April/May 2018.

Figure 8 Number of farmers by crop category and scale – Ogun State

Source: Field survey, April/May 2018.

starches/sugars, cereals, and beverages are the three most important in Ogun State.

Figure 8 shows that in Ogun State, only cereals and starch are more commonly planted by small-scale farms relative to medium-scale. On the other hand, beverages, fruits, nuts, and vegetables are more popular with medium- than small-scale farmers. However, in Kaduna, medium-scale farmers outnumber small-scale farmers in growing all crop categories.

6.4 Household livestock and assets holding

Table 11 presents household livestock and durable assets by farm category. The results show that the Group 2 farmers have substantially much more animal stock than the other three farm groups. The value of animals owned on average by SSFs who transitioned from MSFs is N 1.14 million compared with N 0.43 million for consistently small-scale farms (Group 1), N 0.27 million for Group 3, and N 0.32 million for Group 4. This suggests that a major reason for transition from MSFs to SSFs for this category of farmers is probably the substitution of animal farming for crop farming. Their land use thus dropped substantially since animal farming does not require as much land as crop farming. This finding may need to be further investigated through a follow-up qualitative study. The results also show

Figure 9 Number of farmers by crop category and scale – Kaduna State
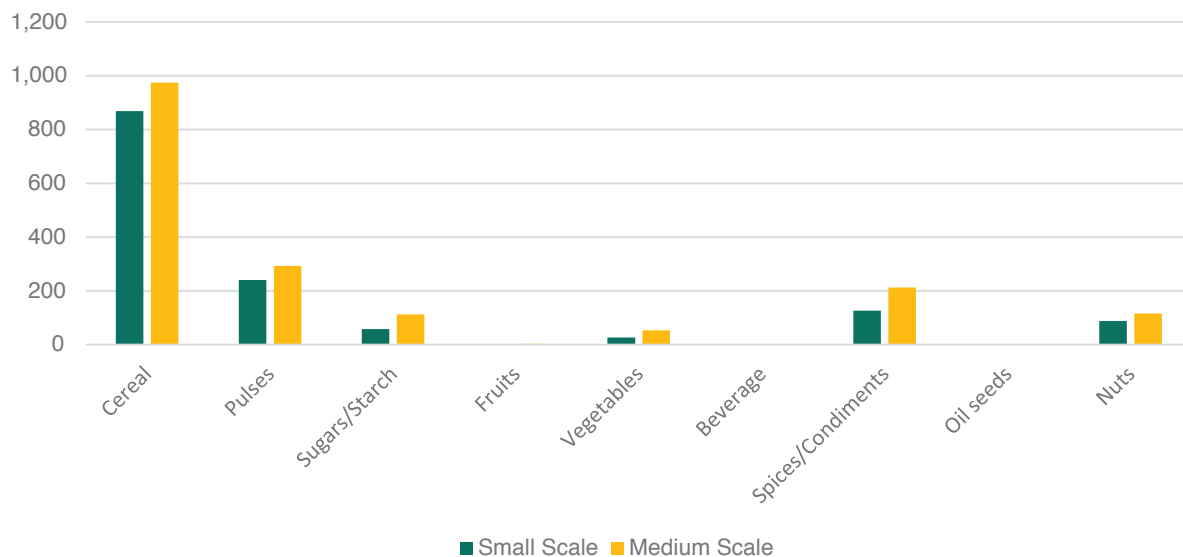
Source: Field survey, April/May 2018.

that the farmers in Group 3 are the highest investors in assets and durables. One of the possible drivers in their process of transition from SSF to MSF seems to be increased investment in assets and durables. The farmers in Group 4 are relatively more invested in assets and durables than the Group 1 farm category. In terms of investment in assets and durables, the group compares poorly with the Transitioned MSF group but better than the consistently small-scale farms (Group 1). The results therefore suggest that investment in assets and durables is potentially an important driver of agricultural commercialisation in the study area.

The results in Table 11 show that MSFs are much more invested in assets and durables compared with SSFs. Investment in assets and durables is N 0.53 million for Group 3 and N 0.37 million for Group 4 as against relatively smaller sums of N 0.19 and N 0.21 million in Group 1 and Group 2, respectively. This observed

Table 11 Household livestock and assets holding

	Current farm scale Small-scale (SSF)		Medium-scale (MSF)	
	Farm scale when household started farming		Farm scale when household started farming	
	Group 1	Group 2	Group 3	Group 4
Value of animals owned ('000N)	432.30	1,135.95	272.01	315.08
Total asset ('000N)	14.71	28.10	20.73	75.20
Total durables ('000N)	173.50	180.52	508.64	292.84
Value assets, durables and animals owned ('000N)	620.51	1,344.56	801.37	683.11

Source: Field survey, April/May 2018.

Table 12 Period of 'stepping up' or 'stepping in' into medium-scale farming

	Period when household became medium-scale	Ogun		Kaduna	
		N	%	N	%
Formerly small-scale	Prior to 2000	63	25	38	20
	2000–04	48	16	26	11
	2005–09	61	20	64	28
	2010–14	57	25	50	28
	Post-2015	34	14	23	13
	Total	263	100	201	100
Consistently medium-scale	Prior to 2000	106	48	115	43
	2000–04	33	12	65	18
	2005–09	42	15	55	16
	2010–14	35	19	45	16
	Post-2015	13	6	23	8
	Total	229	100	303	100

Source: Field survey, April/May 2018.

higher investment in assets and durables by MSFs relative to SSFs is evidence of a potentially higher degree of commercialisation relative to SSFs.

6.5 Period of entry into medium-scale farming

Table 12 shows the period in which the current MSFs have become medium-scale either through transitions (stepping up) or through lateral entry into medium-scale farming from a non-farm base (stepping in). The results for both Ogun and Kaduna states show that within the past decade, 'stepping up' as a mode of entry into medium-scale farming is more predominant than 'stepping in'. Specifically, we observe that about 40 per cent (39 per cent in Ogun and 41 per cent in Kaduna) of transitioned medium-scale farms (Group 3) actually 'stepped up' from small-scale to medium-scale within the last decade (between 2010 and 2018), while only about 22 per cent of the farmers 'stepped in' to medium-scale farming within the last ten years.

We also observe from Table 12 that while the 'stepping up' phenomenon increased slightly in the current decade (2010–18) compared with the previous decade (2000–09), 'stepping in' has actually declined. The decline is very small in Ogun State, but fairly substantial in Kaduna State. Specifically, focusing on consistently medium-scale farmers, in Kaduna State, 24 per cent laterally entered into medium-scale farming in 2010–19 compared to 34 per cent that stepped in during the previous decade (2000–09). The reasons behind these findings will be the subject of follow-up qualitative fieldwork under the WS1 study.

7 MEDIUM-SCALE FARM CHARACTERISTICS AND INTERACTIONS WITH SMALL-SCALE FARMS

7.1 Productivity comparisons between small- and medium-scale farms

This section assesses the differences in land and labour productivity between small-scale and medium-scale farmers. This paper uses the income indicators reported in Tables 13(a) and (b). These indicators include measures of land productivity such as crop income per hectare planted, as well as measures of labour productivity, such as crop income per adult person, crop income per day spent on farm, crop income per adult equivalent, and net income per adult.

Table 13(a) indicates that land productivity as measured by net crop income per ha planted is higher for small-scale farms. Specifically, small-scale farmers earn 25 per cent more per hectare compared to medium-

scale farmers. This finding is in line with the literature documenting the inverse relationship between land size and productivity. Some literature has argued that this inverse relationship is likely to be a result of small farms being more labour-intensive than larger farms. The results presented above seem to support this idea. All the measures of labour productivity show that labour is approximately three times as productive in medium-scale farms as in small-scale farms. For instance, crop income per man-days is 36,000 Naira for small-scale farms and 92,000 Naira for medium-scale farms.

Extending the analysis to the state levels provides a few additional insights documented in Table 13(b). First, as noted before, land productivity is higher among small-scale farmers across both states. Small-scale farms are 19 per cent more land productive in Ogun and 32 per cent more productive in Kaduna. On the other hand,

Table 13(a) Productivity indicators by farm category

	Current farm scale	
	Small-scale	Medium-scale
N	1,079	995
Crop income per ha planted '000N	315.15	251.92
Crop income per adult person '000N	283.34	869.38
Crop income per day spent in the farm '000N	35.72	91.87
Crop income per adult equivalent '000N	189.11	589.5
Net aggregate income per adult equivalent '000N	381.76	979.9

Source: Field survey, April/May 2018.

Table 13(b) Productivity indicators by farm category and state

	Current farm scale			
	Ogun		Kaduna	
	Small-scale	Medium-scale	Small-scale	Medium-scale
N	552	484	527	511
Crop income per ha planted '000N	363.68	305.76	263.24	199.95
Crop income per adult person '000N	338.50	1,277.11	225.56	483.19
Crop income per day spent in the farm '000N	38.50	125.65	33.05	66.68
Crop income per adult equivalent '000N	228.16	886.35	147.19	303.05
Net aggregate income per adult equivalent '000N	436.11	1,424.4	324.84	558.88

Source: Field survey, April/May 2018.

Table 14 Output, land, and labour ratios

Farm category	N	Net value of crop production in Naira (Y 1)	No. of days of family labour (L2)	Land area operated (A)	Labour productivity (Y1/L2)	Land productivity (Y1/A)	Labour intensity (L2/A)
Small-scale	866	727,684	34	2	21,402	301,944	14
Medium-scale	735	2,403,910	79	10	30,429	240,632	8

Source: Field survey, April/May 2018.

Table 15 Output, land, and labour ratios by state

Farm category	N	Net value of crop production in Naira (Y1,000)	No. of days of family labour (L2)	Land area operated (A)	Labour productivity (Y1/L2, 000)	Land productivity (Y1/A, 000)	Labour intensity (L2/A)
Ogun: Small-scale	424	781	36	2.27	22	344	16
Ogun: Medium-scale	314	3,149	111	10.88	28	289	10
Kaduna: Small-scale	442	677	32	2.54	21	266	13
Kaduna: Medium-scale	421	1,848	55	9.33	33	198	6

Source: Field survey, April/May 2018.

labour productivity is higher for medium-scale farmers in both states.

The estimated labour productivity gap is larger in Ogun where medium-scale farmers are approximately three times as productive as small farmers. In Kaduna, the gap is smaller, with medium-scale farms being approximately twice as productive as small-scale farms. Finally, farmers in Ogun are generally more productive than farmers in Kaduna across the different productivity measures.

Table 14 extends the previous analyses of Tables 13(a) and (b). Consistent with previous results, labour productivity, measured as income per family man-days (Y1/L2), is higher for medium-scale farmers. On the other hand, land productivity (Y1/A) is higher for small-scale farmers. In addition, small-scale farms are intensive in family labour (L2/A). Family man-days are almost twice as high on small-scale farms than on medium-scale farms. This difference is not driven by differences in household size – Table 13(a) showed that aggregate labour productivity which accounts for both hired and family labour is lower for small-scale farmers.

These patterns generally hold at the state level, as illustrated in Table 15. In both states, labour productivity is higher for medium-scale farmers while

land productivity is higher for small-scale farmers in either state. Small-scale farming is labour-intensive, particularly for Kaduna. A comparison of farms across states shows that medium-scale farmers are more productive in labour in Kaduna than in Ogun, while small-scale farmers are qualitatively similar in labour productivity across states. On the other hand, farmers in Ogun are more productive in land compared to farmers in Kaduna. Finally, Ogun farmers are more intensive in labour use than in Kaduna. In particular, family days per ha are 1.5 times higher for small-scale than for medium-scale farms while in Kaduna the magnitude is twice as high for small-scale farms.

7.2 Commercialisation in small-scale (SSF) and medium-scale farms (MSF)

In this section, we examine agricultural commercialisation levels by farm scale. Some important indicators of commercialisation are: the household commercialisation index (HCI), the household input market commercialisation index (HIMCI), the share of production sold at plot/crop level, the share of land devoted to crops that are sold, and the quantity or value of hired labour. Tables 16(a) and (b) present the results of the initial analysis of degree of commercialisation among different farm types using the HCI and HIMCI.

Table 16(a) Commercialisation indicators

	Current farm scale	
	Small-scale	Medium-scale
N	1,099	1,010
Household commercialisation index (HCI)	73.86	75.35
Household input market commercialisation index (HIMCI)	10.62	11.54

Source: Field survey, April/May 2018.

Table 16(b) Commercialisation indicators by state

	Current farm scale			
	Ogun		Kaduna	
	Small-scale	Medium-scale	Small-scale	Medium-scale
N	569	496	530	514
Household commercialisation index (HCI)	91.04	93.81	55.58	57.83
Household input market commercialisation index (HIMCI)	16.02	19.51	6.22	4.67

Source: Field survey, April/May 2018.

The results show that the HCI is relatively higher among medium-scale farms compared to small-scale farms. Contrary to our expectations, there is no observable difference between the HCI in medium-scale and small-scale farms. The reason behind this observation is unclear and thus warrants further investigation.

Despite the high HCI levels, the household input market commercialisation index is extremely low for both groups of farmers. Only 11 per cent of small-scale farmers and 12 per cent of medium-scale farmers purchase inputs from the market. The small difference in these commercialisation indices between small-scale and medium-scale farmers could be an indication of poorly developed markets that even medium-scale farmers have failed to overcome.

Table 16(b) extends the analysis to the state level. Once again, the HCI is generally higher than the HIMCI for all farm categories, with little within-state differences. However, there are some key differences between states. For instance, the degree of HCI is extremely high in Ogun for both small-scale (91 per cent) and medium-scale farmers (93 per cent) compared to Kaduna whose HCI indices are between 56 per cent and 58 per cent respectively. In both states, the level of HIMCI is quite low. These measures, while low, indicate that input market issues are relatively severe in Kaduna. These results suggest that commercialisation is driven by regional factors beyond the influence of farm scale. Such a scenario may occur, for instance, when market failures are high at regional level such that no type of farmer has any comparative advantage in market access. In addition, low levels of infrastructure development can also significantly affect all farmers.

7.3 Transition to medium-scale farms and interactions with smallholders

Another major research question of the study is, 'What are the possible causes of the observed changing farm structure?' That is, what are the potential drivers of transition of farms from SSF to MSF, as observed among medium-scale farms in Nigeria? During the survey, we elicited information on the factors that facilitated the growth of farms from small-scale to medium-scale farming. Table 17 presents a summary of the reported responses.

First, land availability and accessibility facilitate the growth of small-scale farms. According to the results, 82 per cent of respondent farmers indicated that land availability and accessibility were the most important factors that enabled them to transition from small- to medium-scale farming. More specifically, 47 per cent expanded the land area operated from land already under their control, while 24 per cent expanded the area operated through additional land acquisition. About 11 per cent of farmers had to rent or borrow land in order to expand the area under cultivation. However, since expansion in the area operated must be complemented by an increase in the use of other production inputs, there is need for further investigation of the other factors driving this expansion in the area operated. This is expected to be carried out in a follow-up qualitative study.

Second, the mode of land acquisition may influence farm size growth. As already discussed in the household land access section, in terms of land acquisition, land inheritance is still the predominant

Table 17 Most important factors enabling smallholder transition into medium-scale status

Factors	%
Land availability (already had more than 5 ha of land and was able to start operating more than 5 ha)	47
Land availability (acquired additional land under my ownership that brought my operated farm size to > 5 ha)	24
Land accessibility (rented and/or borrowed enough land to operate > 5 ha)	11
Able to secure enough labour among family members to operate > 5 ha	3
Able to secure enough hired labour to operate > 5 ha	5
Purchased mechanisation equipment which allowed me to operate > 5 ha	0
Rented mechanisation equipment which allowed me to cultivate > 5 ha	0
Purchased irrigation equipment which allowed me to profitably operate > 5 ha of land	6
Other	3
Total	100

Source: Field survey, April/May 2018.

source of land acquisition in the study area. This source of land acquisition was found to be more predominant with the consistently medium-scale farmers (Group 4) than with the medium-scale farmers that started off as smallholders (Group 3). We also observed that a large proportion of current small-scale farms that dropped from MSFs acquired land through inheritance. Thus, the mode of land acquisition might be an important factor in the observed behaviour of farms that dropped from medium- to small-scale. This observation raises a question as to whether it is easier to substantially reduce the area cultivated to crop when investment in land is minimal. Since the land is not purchased, the cost of reducing the area under crop cultivation may actually be lower. This may be a subject for further investigation in a follow-up qualitative study. Relatedly, the results also showed that participation in the land market is a more predominant phenomenon among medium-scale relative to small-scale farms. Increased engagement in the land market might have played an important role in transitions from SSF to MSF. Over 30 per cent of medium-scale farms who transitioned from small-scale purchased or rented land.

Third, land use patterns may also influence the changing farm structure. Table 18 shows that most households use their land for crop production. More specifically, 84 per cent of MSF land is used for crop farming, compared to 87 per cent in the SSFs. The SSFs who started as MSFs are renting out about 10 per cent of their land, which is far more than it is in other farm categories. In addition, land under fallow is significantly low (0.54 per cent) for this group (Group 2) compared to other farm categories such as Group 4 who fallowed about 2.93 per cent of land under their control. A high proportion of land under fallow is an indicator of good soil management practice. It is important to note that there is a substantial reduction in virgin land. These observations suggest the possibility that land rental is substituting crop production in some categories of

farming. The reasons for this behaviour are a subject for follow-up with a qualitative investigation. This information, together with the high investment in animal farming by the transitioned small-scale farmers (Group 2) as observed earlier on, suggests that this group may have diversified out of crop farming and moved into animal farming and/or the land rental business.

A final observation from Table 18 is that mixed farming is more predominant in MSFs relative to SSFs. The results show that 1.7–3.1 per cent of land operated by MSFs is used for mixed farming while that by SSFs is 0.35–1.28 per cent. While these percentages are small, they might suggest that expansion in the scale of operation is also accompanied by expansion in animal/fish production. Thus, apart from increasing cultivated crop land, MSFs may be better than small-scale farms in combining animal farming with crop farming. An increased incidence of mixed farming is therefore associated with entry into medium-scale farming.

Fourth, security of land tenure may also have important implications on farm size growth dynamics. Table 19 restricts land tenure analysis to the largest plot under the ownership of the household. The results of the investigation into the land tenure system show that security of tenure is very low for both MSFs and SSFs. Virtually no SSFs in Ogun have formal title deeds on land owned, while only 2 per cent of SSFs in Kaduna have titles. Similarly, only 4 per cent of MSFs have titles in Ogun compared to 7 per cent of MSFs in Kaduna. Generally, between 74–80 per cent of SSFs, and 70–83 per cent of MSFs own land without a title deed. Furthermore, the results show that security of tenure is slightly higher in Kaduna relative to Ogun State, though this difference is marginal. This high level of tenure insecurity may reduce incentives for long-term investments in land development, which will in turn hinder the process of agricultural commercialisation. One of the major objectives of this study is to

Table 18 Percentage of household land under various uses

| | Small-scale | | Medium-scale | |
| | Farm scale when household started farming | | Farm scale when household started farming | |
	Small-scale (%)	Medium-scale (%)	Small-scale (%)	Medium-scale (%)
N	1,065	34	476	534
Crop farming	87.26	87.49	84.05	84.22
Mixed farming	1.28	0.35	1.65	3.10
Rented out	3.77	10.70	3.76	1.80
Fallowed land	3.86	0.54	4.18	2.93
Virgin land	3.81	0.91	5.84	5.00
Other land use	0.02	0.00	0.51	2.94
Total	100.00	100.00	100.00	100.00

Source: Field survey, April/May 2018.

Table 19 Land tenure of the largest plot owned by the farmer

Current farm scale	Land tenure	Ogun		Kaduna	
		N	%	N	%
Small-scale	Title deed	1	0	13	2
	Without title	413	74	405	80
	Family land	39	7	55	10
	Leased/rented	101	17	27	4
	Other	15	2	30	5
	Total: small-scale	569	100	530	100
Medium-scale	Title deed	21	4	43	7
	Without title	341	70	410	83
	Family land	6	1	25	4
	Leased/rented	101	19	19	3
	Other	27	6	16	3
	Total: medium-scale	496	100	513	100

Source: Field survey, April/May 2018.

investigate potential spillover effects from medium- to small-scale farmers. This is in an effort to understand how the rise of medium-scale farms influences the behaviours and welfare of the millions of neighbouring small-scale farm households. Some of the important questions that will be addressed in the APRA-Nigeria WS1 study are as follows. First, does increased land acquisition by medium- and large-scale farms expand mechanisation by small-scale farms? Second, does the increased acquisition of farmland by local investor farmers contribute to land scarcity and accelerate out-migration from densely populated rural areas? Third, does increased land acquisition by medium-scale and large-scale farms expand off-farm employment through agricultural growth multipliers? Fourth, is the rise of commercialised medium-scale farms – with greater surplus production – attracting new investment in input and output markets that influence market access for local smallholders? These questions will be addressed in more detail and in more depth in different working

papers that will be produced by the research team from the data collected. This section will provide some limited and purely descriptive answers to the questions on the nature of interactions between MSFs and SSFs that operate in their vicinity.

Table 20 shows that a number of spillover interactions from MSFs exist that would immensely benefit SSFs. Prominent among these are, in order of importance, the provision of an extension guide/services to smallholders, sales of farm inputs to smallholders, the purchase of farm inputs together with smallholders, and rentals of tractor and farm machinery services out to smallholders.

More specifically, 43–49 per cent of MSFs were contacted by smallholders for extension services, while 41–49 per cent actually provide extension services to the smallholders. Between 29–32 per cent of MSFs engaged in sales of inputs to SSFs while between 20–

Table 20 Services from medium-scale farms to smallholders

Services	Formerly small-scale, now MS (Group 3)		Consistently medium-scale (Group 4)	
	%	N	%	N
Rents out tractors to smallholders (those who own tractors)	2	156	6	235
Rents out other farm machinery service to smallholders	11	464	4	532
Purchases farm inputs together with smallholders	20	464	27	532
Sold farm inputs to smallholders	29	464	32	532
Smallholder sought extension service from medium-scale farm	49	464	43	532
Provided extension service to smallholder	46	464	41	532

Source: Field survey, April/May 2018.

Table 21 New technology learnt from medium-scale farms by smallholders

	Frequency	Per cent
Use of improved seed	128	39.5
Better planting techniques	53	16.4
Use of tractor for land preparation	43	13.3
Better timing of farming activities	38	11.7
Other	62	19.1
Total	324	100

Source: Field survey, April/May 2018.

27 per cent worked together to purchase farm inputs. Furthermore, 4–11 per cent of MSFs rented out farm machinery to SSFs, while 2–6 per cent of MSFs rented out tractors to SSFs.

As shown in Table 21, extension service provision from MSFs to SSFs were mostly in the form of the use of improved seeds (40 per cent), better planting techniques (16 per cent), the use of tractors (13 per cent), and better timing of farming activities (12 per cent). These services are particularly very strategic and important, given that the distance to the nearest extension service agent is about 15 km (Table 22), on very rough roads and with poor transportation.

The results further show that MSFs who transited from SSF (Group 3) status actually interact more with SSFs than MSFs who have consistently been MSFs (Group 4) in terms of provision of extension services and rentals of machinery. The group interacts more with SSFs in terms of purchase/sales of farm inputs and tractor rentals. The reasons for this are unknown and may be the subject of further qualitative investigations in the follow-up qualitative study.

It is interesting to note that the spillover-effect producing interactions between MSFs and SSFs seems to differ between states depending on which type of MSF is in focus. Table 23 shows that MSFs who transitioned generally interacted more with SSFs in Kaduna State compared with Ogun State. On the other hand, farmers who were consistently MSFs interacted more with SSFs in Ogun State relative to Kaduna State. The results also show that rentals of farm machinery to SSFs is more common among Kaduna State MSFs compared with Ogun State MSFs, while rentals of tractors are more common in Ogun relative to Kaduna State. Furthermore, interactions between MSFs and SSFs through input sales are more common in Kaduna than Ogun State. The reason for these differences in interactions is a subject for investigation in the follow-up qualitative survey.

Table 22 shows that there is very little difference between small-scale and medium-scale farmers in terms of access to infrastructure as well as markets. While farmers are within less than a kilometre from an all-weather road, they typically have to travel up to two and a half kilometres to access motorable roads. Input and livestock markets are typically further at about 5–6 km away. Extension services and livestock centres are the most difficult services to access – extension services are approximately 15 km away while livestock centres are at least 6 km away on average.

Table 22 Distances to nearest infrastructure and agricultural services (km)

| | Currently small-scale | | All small-scale | Currently medium-scale | | All medium-scale |
	Group 1	Group 2		Group 3	Group 4	
Motorable road	2.21	1.99	2.20	2.45	2.45	2.45
All-weather road	0.66	0.61	0.65	0.68	0.66	0.67
Feeder road	0.74	0.75	0.74	0.77	0.71	0.74
Seed dealer	4.49	4.09	4.47	4.10	3.94	4.02
Crop market	5.63	4.88	5.61	4.94	5.41	5.19
Livestock market	5.67	5.47	5.66	4.90	4.92	4.91
Extension service	15.28	14.81	15.27	15.62	16.51	16.09
Agro-dealer	4.40	4.36	4.40	4.03	3.87	3.94
Livestock services centre	6.42	5.68	6.40	6.51	6.20	6.33
Paravet	5.50	4.76	5.48	4.33	4.45	4.40
Tractor rental service	5.51	5.55	5.51	4.49	4.63	4.57

Source: Field survey, April/May 2018.

Table 23 Services from medium-scale farms to smallholders by state

Services	Formerly small-scale, now MS (Group 3)				Consistently medium-scale (Group 4)			
	State				State			
	Ogun		Kaduna		Ogun		Kaduna	
	%	N	%	N	%	N	%	N
Rents out tractor to smallholders (those who own tractors)	6	71	1	89	9	76	6	159
Rents out other farm machinery service to smallholders	1	263	15	201	2	229	4	303
Purchase farm inputs together with smallholder	17	263	22	201	28	229	26	303
Sold farm inputs to smallholders	17	263	35	201	31	229	32	303
Smallholder sought extension service from medium-scale farm	43	263	52	201	60	229	38	303
Provided extension service to smallholder	41	263	48	201	55	229	38	303

Source: Field survey, April/May 2018.

8 WELFARE INDICATORS

In this section, we examine whether the identified pathways to commercialisation improve household welfare indicators. These include reduced poverty, improved food security and nutrition, and women's empowerment.

8.1 Poverty indicators

First, we investigate whether medium-scale farming is associated with reduced poverty. To address this question, two poverty indicators, namely, the head count ratio (measuring income poverty[10]) and the multidimensional poverty index (MPI) were computed from the data. Preliminary results as shown in Table 24 reveal that poverty levels based on income are higher for small-scale farmers compared to medium-scale farmers. Specifically, 36 per cent of small-scale farmers are income poor compared to 14 per cent of their medium-scale counterparts. However, as the MPI shows, there is no significant difference in poverty levels between small- and medium-scale farms when the poverty index is broadly defined.

These findings suggest that growth in farm size from small- to medium-scale is likely to increase income and thus reduce income poverty. However, such an increase does not result in poverty reductions across the many other dimensions that the MPI includes. This is not surprising given that multidimensional poverty indicators provide a comprehensive assessment of poverty based on multiple factors beyond income. Increases in farm size may increase income but it is unlikely that the improvements in agricultural income are sufficient to change poverty status across different measures. For instance, the use of wood-based energy sources is deemed an aspect of poverty. However, a household graduating from small- to medium-scale farming status may not necessarily change its main source of energy. In some cases, households may desire to switch to electrification but they may be further away from the grid network. Thus, some of these factors that contribute to the MPI, such as electricity use, can be driven by a lack of access. In this regard, it may require substantial public investment to improve the MPI.

In the last four columns of Table 24, we do the same analysis but by state. Within each state, income poverty

Table 24 Welfare indicators by farm type

| | By farm scale | | By farm scale and state | | | |
| | | | Ogun State | | Kaduna State | |
	Small-scale (%)	Medium-scale (%)	Small-scale (%)	Medium-scale (%)	Small-scale (%)	Medium-scale (%)
N	1,099	1,010	569	496	530	514
Income poverty index (poverty headcount)	36	14	24	8	45	18
Multidimensional poverty index (headcount)	43	47	38	40	49	53
Multidimensional poverty index (adjusted headcount)	20	21	16	18	24	25
Minimum dietary diversity among women (MDD-W)	59	44	66	51	50	38
Food insecurity experience scale (FIES)	42	43	48	47	35	38
Women's empowerment index	56	61	49	57	65	64

Source: Field survey, April/May 2018.

is higher among households engaging in small-scale farming compared to those in medium-scale farming. This finding is consistent in both states. Again, there is no significant difference in poverty levels between the small- and medium-scale farms when we consider the broad poverty measures, the MPI. The results show that poverty measures are generally higher in Kaduna than in Ogun State.

8.2 Minimum dietary diversity among women

The minimum dietary diversity among women (MDD-W) indicator captures a very important dimension of women's quality of diet: micronutrient adequacy. This dichotomous indicator measures whether or not women in the 15–49 years age group consumed at least five out of ten of the defined food groups the previous day or night. The higher the proportion of women in this age group that reach this threshold, the higher the micronutrient adequacy.

The preliminary results show that the proportion of women in small-scale farm households are better off in terms of micronutrient adequacy compared with those from medium-scale farm households (Table 24). The MDD-W stands at 59 per cent among small-scale farmers compared to 44 per cent among the medium-scale farmers. One possible explanation for this finding is that small-scale farmers are more likely to grow a variety of crops including fresh fruits and vegetables for household consumption. Medium-scale farms are more likely to grow crops for the market and are thus more specialised in what they grow. Similar results are obtained when we compare small- and medium-scale farms across states. The results also show that women in Ogun are generally better off in dietary diversity compared to women in Kaduna State, irrespective of farm category.

8.3 Experience of food insecurity

Another indicator of farm household welfare that is of interest to this study is the food insecurity experience scale (FIES) also reported in Table 24. The FIES is a measure of the severity of food insecurity at the household or individual level which relies on direct yes/no responses to eight brief questions regarding respondents' access to adequate food. The preliminary results show a high level of household food insecurity across farm types. More specifically, 42 and 43 per cent of small- and medium-scale farms, respectively, are food insecure. Thus, the experience of food insecurity among households does not seem to differ between small- and medium-scale farms in the study population.

One possible explanation for this observation is that both types of households rely on rain-fed agricultural activities, for income and food, which are susceptible to weather shocks. It should be noted that two visits to the households, first during the farming season and second in the slack season, would have been very helpful in shedding some light on this analysis.

Comparisons across states show that food insecurity is moderately high in Ogun compared to Kaduna State. This is surprising considering that farmers in Kaduna were found to be poorer in terms of income poverty and the MPI compared to those in Ogun.

8.4 Women's empowerment

Table 24 also presents results on women's empowerment indicators. This measure is derived from the ability of a woman to choose their own employment and/or income expenditure decisions. The results suggest that women from medium-scale farm households are slightly more empowered compared to those from small-scale farming households. About 61 per cent of the women in the medium-scale farms are empowered compared to 56 per cent in the small-scale farming category. It should be noted that operating large land sizes does not necessarily translate to an increase in women's empowerment. Customs, traditions, and culture play an important role in influencing women's empowerment in African communities.

Comparisons across states indicate that women's empowerment is moderately high in Kaduna compared to Ogun State (Table 24). In Kaduna, the empowerment index is approximately 65 per cent with little difference between women in small-scale farm households and those in medium-scale farm households. In Ogun State, the index is lower among women in medium-scale farm households, who experience higher empowerment compared to those in small-scale farms. Overall, the key welfare differences between small-scale and large-scale farmers appear to be largely income related as shown by the differences in income poverty.

9 CONCLUSION

This section concludes this report with a summary of key highlights. The objective of the study was to test the hypothesis that the growth of medium-scale farming promotes agricultural commercialisation in SSA. Changes in farm size distributions have potentially diverse and complex impacts on rural livelihoods, and hence there is a need to explore how the rise of medium-scale farms affects a range of outcomes. The study therefore sets out to provide answers to the following major research questions. First, what are the characteristics of these emerging medium-scale farms? Second, what is the nature of the changing farm structure that produces them? Third, how do these medium-scale farmers influence the behaviour and welfare of the millions of small-scale farm households around them? Fourth, are there productivity differences between small- and medium-scale farms? Fifth, on the policy front, should medium-scale investor farms be promoted as a policy tool to promote agricultural commercialisation and transformation?

This report presents the preliminary results of the first round of analysis of the quantitative data collected through the survey. The technique of analysis in this report is descriptive, with extensive use of averages, percentages, and tables to organise the preliminary set of findings from this exercise. It is important to mention that the bivariate analysis reported in this paper is a precursor to the more rigorous econometric analysis that will follow in the next phase of this study after the second panel survey that is scheduled to take place in April–June 2020.

The preliminary findings of this first round of data analysis can be summarised as follows:

1. Observed differences in the years of education between MSFs and SSFs suggest that years of schooling may be an important factor in driving the process of agricultural commercialisation in the study area.

2. The youth population is still very much left out of the process of agricultural commercialisation and transformation in Nigeria, as indicated by the low percentage of youth involvement in medium-scale farming. This may not be surprising because it

typically takes time for individuals and households to accumulate the resources necessary to successfully engage in commercialised agriculture.

3. The study identifies two equally predominant pathways to agricultural commercialisation in Nigeria, namely transition from small- to medium-scale farms (stepping up) and the emergence of investor farmers that start off as medium-scale level farmers (stepping in).

4. We find that only about 6 per cent of all those who started as SSFs actually graduated to medium-scale over the past three decades. The implication of this is that there is still a lot of scope for policy to enhance this process of transition from small to medium-scale.

5. While we find relatively few instances of commercialised medium-scale farms slipping down into less commercialised patterns, we find suggestive evidence that established medium-scale farms transition from cropped-based to animal-based forms of commercialisation.

6. We find that MSFs invest substantially more in assets and durables than SSFs and conclude that investment in assets and durables is a potentially important driver of agricultural commercialisation in the study population.

7. The results for both Ogun and Kaduna states show that within the past decade (2010–19), 'stepping up' as a mode of entry into medium-scale farming is more predominant than 'stepping in'. However, in the overall sample of 1,010 medium-scale farms, 476 were formerly small-scale farms that expanded their operations, while 534 started out as medium-scale farms.

8. The majority of respondent farmers that transitioned from SSF to MSF (71 percent) indicated that land availability and accessibility were the most important factors that enabled them to transition from small- to medium-scale farming.

9. Inherited land is the most common source of land acquisition for all MSFs. In addition, it is more predominant with the Group 4 type of MSFs (consistently medium-scale farms) than Group 3 (transitioned medium-scale farms).

10. Besides land inheritance, increased engagement in the land market (through land purchase and rent) is a very important mode of land acquisition among Group 3 (MSFs who transitioned from SSFs).

11. The study also finds that MSFs tend to be more invested in animal farming relative to SSFs. That is, apart from an increase in land cultivated to crops, MSFs also do better than small-scale farms in combining animal farming with crop farming on their farms. An increased incidence of mixed farming seems to be associated with entry into medium-scale farming.

12. The results of the investigation on the land tenure system show that security of tenure is very low among both MSFs and SSFs. This high level of tenure insecurity may decrease incentives for long-term investment in land development, which may in turn hinder the process of agricultural productivity growth and commercialisation.

13. The study finds that some form of interaction exists between MSFs and SSFs that could positively impact the welfare of the SSFs. These include, in order of importance, the provision of an extension guide/services to smallholders, sales of farm inputs to smallholders, the purchase of farm inputs together with smallholders, and the rental of tractors and farm machinery services out to smallholders.

14. The degree of interaction between MSFs and SSFs varies by state. Interactions between Group 3 (transitioned MSFs) and SSFs are more common in Ogun State, while interactions between Group 4 (consistently MSFs) and SSFs are more common in Kaduna State.

15. The results show that MSFs who were consistently MSFs from the beginning (Group 4) performed better than those who transitioned from SSFs (Group 3) on all productivity indices.

16. We find evidence that land productivity is substantially higher for small-scale farms for SSFs compared to MSFs. Conversely, labour productivity is substantially higher for MSFs compared to SSFs.

17. The results also suggest that there are only marginal differences in levels of commercialisation between medium-scale and small-scale farmers, both in the input and output market processes. Instead, commercialisation indicators vary significantly between states.

18. Poverty indicators provide suggestive evidence that some measure of poverty reduction is associated with 'stepping up' from small-scale to medium-scale farms among the study population.

19. Preliminary results suggest that an increase in farm size has little impact on women's empowerment and food security, and may lead to modest decreases in the dietary diversity of women in the household.

20. Multidimensional poverty indicators show that small- and medium-scale farms are only marginally different once several poverty indicators are considered. Consequently, MPI reduction may require substantial farm size changes and/or intervention from the government.

ENDNOTES

1   For example, the 2010/11 Tanzania LSMS contains 11 farms cultivating between 20–50 hectares, and only one farm between 50–100 hectares. In the Uganda LSMS, there are 12 farms of between 20–50 hectares and none over 50 hectares. The Malawi 2010/11 LSMS contains one farm observation between 10–20 hectares, one farm between 20–50 hectares, and zero farms over 50 hectares. These surveys obviously do not contain a sufficient sample size to draw any meaningful conclusions about farms over 20 hectares. This conclusion is also acknowledged by the World Bank in its recent 2017 'Myths and Facts' book with regard to relying on the use of LSMS data (Christiaensen and Demery 2017: 10).

2   For example, Malawi's LSMS surveys, the Integrated Household Surveys of 2003/04, 2010, and 2013 do not cover the 'estate sector' which reputedly contains 30,000 farms and over 1 million hectares of farmland, accounting for over 25 per cent of Malawi's agricultural land. Zambia's Living Conditions Monitoring Surveys of 2002, 2006, 2010, and 2012 similarly exclude from their sampling frame farms cultivating over 20 hectares of land. Out of the 13,212 households sampled in Kenya's Integrated Household and Budget Survey of 2006, only nine were recorded as farming more than 50 hectares, an exceedingly small number from which to extrapolate to the population of farms of this size category.

3   The Demographic and Health Surveys (DHS) are an exception; DHS instruments ask about 'agricultural land' owned by both rural and urban households.

4   While Birnin Gwari LGA was the largest in Kaduna Central, it could not be included in this study owing to insecurity concerns. Consequently, in Chikun LGA, the next largest LGA in Kaduna Central, was picked.

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8   The team's field experience stories are available here: https://www.future-agricultures.org/blog/apra-nigeria-experiences-and-voices-from-ogun-and-kaduna-states/.

9   FMARD (2016: 15) reports that 95 per cent of all agricultural lands are untitled.

10   It is important to note that income poverty measures may be inaccurate in most developing countries. These countries have extensive social networks which provide benefits such as food and gifts that are not typically accounted for in income measures. Thus, consumption through borrowing or social insurance networks are likely to be missed by such methodologies.

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