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CHANGING FARM STRUCTURE AND AGRICULTURAL COMMERCIALISATION: IMPLICATIONS FOR LIVELIHOOD IMPROVEMENTS AMONG SMALL-SCALE FARMERS IN NIGERIA

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ACRONYMS

APRA	Agricultural Policy Research in Africa
FIES	Food Insecurity Experience Scale
HCI	household commercialisation index
HIMCI	household input market commercialisation index
LGA	local government areas
MDD_W	Minimum Dietary Diversity for Women
MSF	medium-scale farm (farmer)
MSME	micro, small and medium enterprise
SSF	small-scale farm (farmer)
WEI	Women Empowerment Index
YIA	Youth in Agriculture

EXECUTIVE SUMMARY

Recent evidence suggests that changing structure of land ownership in sub-Saharan Africa 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 (MSF) sector. While national development policy strategies within the region (including most national Comprehensive Africa Agriculture Development Programme 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 farm structure and food value chains in Africa.

The main objective of this working paper is to examine MSF¹ as a potential pathway toward increased agricultural commercialisation. Specifically, the study achieved the following objectives: (i) understand the characteristics of MSF in Nigeria, pathways into MSF, the rate of land expansion of MSF, and to consider the policy implications of consequent changes in farm structure and the concentration of food production and marketed output, (ii) determine whether the pace of acquisition of agricultural land by medium- and large-scale investors, through de facto land administration policies, may be foreclosing on the potential to achieve official development goals that remain predicated on area expansion for smallholder-led development, (iii) examine the implication of such dynamics on rural youth land accessibility and out migration in the context of customary tenure systems, (iv) investigate the existence of spillover effects from MSFs to small-scale farmers (SSFs),² (v) understand the relationship between farm size and efficiency, including the range of factors and policies that might condition this relationship, and (vi) examine the impacts of medium-scale agricultural operations on the incomes and welfare of millions of smallholders around them.

The study draws from the Nigeria-APRA two-wave panel dataset from Ogun and Kaduna states. The first wave was conducted in 2018 and covered 1,010 MSFs

and 1,099 SSFs. The second wave of data collection was conducted in December 2020 and covered 643 households from the 1,010 MSFs from the first wave, and 662 from the 1,099 SSFs. Data analysis involved descriptive statistics of the variables of interest. To gain a full understanding of the changes in farm-scale among panel households, we categorised households into six groups: (i) farms that have remained consistently small scale since farming commenced, (ii) currently SSFs, that is, farms that were initially medium scale but shrunk to small scale between 2018 and 2020, (iii) currently MSFs – farms that started as small scale and transitioned to medium scale in 2018 and 2020 (stepped up), (iv) consistently MSFs since they started farming (stepped in), (v) farms that were reported as small scale in 2018 and transitioned to medium scale in 2020, and (vi) farms that were reported as medium scale in 2018 but shrunk to small scale in 2020.

Results from the descriptive analysis found the following: observed differences between MSFs and SSFs suggest that years of schooling and productive and durables assets may be important drivers for agricultural commercialisation in the study area. The youth have little participation in MSF, and farming in general, and have thus been generally excluded from the commercialisation process. In terms of changes in farm sizes between the two periods, the key finding observed is that the percentage of farms that dropped from medium to small scale between 2018 and 2020 is more than half the percentage that stepped up from small to medium scale.

Farmers considered land availability as the most important factor for enabling stepping up, implying that land availability has increased in importance/prevalence between 2018 and 2020 as a major constraint. Commercialisation indicators showed that MSFs were consistently more commercialised than SSFs in both product and input markets between 2018 and 2020. Furthermore, farm households, irrespective of scale of operation, were less commercialised in 2020 compared to 2018, probably because of the effects of COVID-19 on the sector. On the other hand, the

1 Farming on land between 5ha and 100ha.

2 Farmers operating on less than 5ha of land.

engagement of MSF households with input markets increased in 2020 relative to 2018; for SSF households, it was the opposite. Interactions were found to exist between MSFs and SSFs in their neighbourhoods, especially in extension services, access to farm inputs, tractor and implement rentals. These identified areas of interaction can be explored by policymakers to relax the constraint that SSFs face, especially in southern Nigeria, regarding low productivity and land preparation, which has limited their abilities to increase marketable surplus and the scale of operation. The results further show that MSF who transitioned from SSF status interact more with SSFs than MSFs who started initially as MSF in terms of provision of extension services, rentals of machinery, purchase of inputs together, rentals of other farm machinery services. Conversely, MSF who were consistently MSF interacted more with SSFs in terms of sales of farm inputs only. Thus, MSFs who stepped up seem to interact more with SSFs than those who stepped in.

Analysis by welfare indicators shows that MSF households are generally better off than SSFs households when poverty is measured in terms of

income poverty index. In addition, we find that MSF households who transitioned into MSF from small scale are poorer than those investor farm households who stepped directly into farming as MSFs. MSF households tend to be better-off than SSF households in terms of adequacy of micronutrient intake by household women. Also, women in MSF households are better off nutritionally than those in consistently SSF households, irrespective of the state in which the household is located, and we find that SSF households are generally more food insecure compared with MSF households. A gender analysis revealed that women from MSF households that transitioned from SSF are more empowered than those from consistently SSF households. Furthermore, women from both types of MSF households are more empowered than women from consistently SSF. Generally, the results suggest that welfare conditions among farm households in terms of poverty and food insecurity worsened substantially in the two-year period between 2018 and 2020. On the other hand, women-specific welfare indicators such as the Minimum Dietary Diversity for Women (MDD_W) and Women Empowerment Index (WEI) improved in 2020 relative to 2018.

1 INTRODUCTION

Recent evidence suggests that changing structure of land ownership in sub-Saharan Africa is one of the major new trends affecting African agri-food systems. Research in several African countries shows the rapid rise of a MSF sector. For example, in Ghana, Kenya and Zambia, MSFs of 5ha to 100ha already control more land than large-scale investors and, in Zambia and possibly Ghana, now control more land than large scale and SSF combined (Jayne et al., 2014). While most African countries' national agricultural investment plans and policy strategies officially regard the smallholder farming sector as the main vehicle for achieving agricultural growth, food security, and poverty reduction objectives, the meteoric rise of emergent MSFs warrant consideration of effects on national strategies and specifically, their effects on the welfare and commercialisation potential of SSF households. 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 (Jayne et al., 2014; Chamberlin et al., 2014). The rise of MSFs may be making it more difficult for young, rural people to access land and may be contributing to rapid increases in land prices in favourable agricultural areas. Current land administration policies may be increasingly unable to support 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 current underperforming farming systems. Evidence in support of the inverse farm size/productivity relationship has generally been based on a range of farm scales that do not include medium/large scale farms, and there is reason to believe that such farms may in fact be more productive (land and labour) than smallholdings (Muyanga and Jayne, 2019). Consequently, improving medium-scale farmers' access to land can help the country increase its domestic production of key staple crops. Second, even if they are 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. That is, assuming appropriate institutional arrangements exist or are designed, such activities could improve smallholder community access to agricultural technologies, finance, 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. But there may be adverse effects as well, particularly if MSFs are foreclosing area expansion potential of longstanding SSF household residents.

The broad objective of this study is to examine MSF as a potential pathway toward increased agricultural commercialisation. The specific objectives of the study are as follows:

1. Understand the characteristics of MSF in Nigeria, pathways into MSF, the rate of land expansion of MSFs, and to consider the policy implications of consequent changes in farm structure and the concentration of food production and marketed output.
2. Determine whether the pace of acquisition of agricultural land by medium- and large-scale investors, through de facto land administration policies, may be foreclosing on the potential to achieve official development goals that remain predicated on area expansion for smallholder-led development.
3. Examine the implication of such dynamics on rural youth land accessibility and out migration in the context of customary tenure systems.
4. Investigate the existence of spillover effects from MSFs to SSFs.
5. Understand the relationship between farm size and efficiency, including the range of factors and policies that might condition this relationship.
6. Examine the impacts of MSFs on the economic and welfare of millions of smallholders around them.

2 DATA SOURCES AND ANALYSIS

The study mainly draws from the Nigeria-APRA Project's two-wave household panel survey dataset from Ogun and Kaduna states. The first wave was conducted in 2018 and covered 1,010 MSFs and 1,099 SSFs. Kaduna and Ogun were purposively selected based on the significant strides the states have made in providing the necessary policy environment for the development of commercial agriculture. Next, three local government areas (LGAs) were selected from each state based on land size and concentration of MSFs. In Kaduna, the LGAs selected are Kachia LGA (Kaduna South), Chikun LGA (Kaduna Central), and Soba LGA (Kaduna North) while in Ogun, Ijebu East LGA (Ogun East), Imeko – Afon LGA (Ogun West), and Obafemi Owondo LGA (Ogun Central) were selected. The survey collected information on demographic changes, landholding size, farming practices, the production and marketing of farm products, and off-farm income-earning activities. For more information about the sampling see Muyanga et al. (2019). The second wave of data collection was

conducted in December 2020. Due to budgetary constraints, 643 households were resampled from among the 1,010 MSFs in the first wave and 662 from among the 1,099 SSFs.

We applied descriptive analysis techniques to explore the relationships among the variables of interest. To gain a full understanding of the changes in farm scale among panel households, we categorised households into six groups: (i) farms that have remained consistently small scale since farming commenced, (ii) farms that were medium scale when they started but have shrunk to small scale between 2018 and 2020, (iii) currently MSFs – farms that started as small scale and transitioned to medium scale in 2018 and 2020 (stepped up), (iv) consistently MSFs since they started farming (stepped in), (v) farms that were reported as small scale in 2018 and transitioned to medium scale in 2020, and (vi) farms that were reported as medium scale in 2018 but shrunk to small scale in 2020.

3 FINDINGS

3.1 Household characteristics

3.1.1 Panel household demographics

Average household size has not changed over the two periods, with an average of six members in SSF households and seven in MSF households. The proportion of male-headed households declined marginally from 96 per cent in 2018 to 92 per cent among SSFs, and from 96 per cent to 94 per cent among MSFs. The average age of household head in 2020 was 46 for SSFs and 50 for MSFs. Household heads in the panel sample spent an average of 12 months a year with their families in both 2018 and 2020. Average years of schooling among household heads was seven among households in 2018 and nine in 2020 – for both SSFs and MSFs. The decline in proportion of male-headed households between the two periods might have contributed to the increase in average years of education. It is important to note that formal education is a potential driver of the process of agricultural commercialisation in the study area.

3.1.2 Youths in agriculture

It is widely believed that getting more youths into farming could be a major driver for agricultural commercialisation in Africa. In general, Table 3.2 shows that the proportion of youths in SSF and MSF declined in 2020 relative to 2018. Figures from the state analysis show that youth engagement in SSF and MSF is higher in Kaduna State compared with Ogun State for both periods. This observed low level of youth engagement in agriculture, especially in southern Nigeria, is in spite of the fact that Nigeria produces thousands of agricultural graduates from its numerous universities, faculties and colleges, as well as government-funded youth empowerment programmes and initiatives, such as Youth in Agriculture (YIA).³ An example of a YIA is the FADAMA youth empowerment programme, jointly funded by the Federal and Ondo State governments, and the Ogun Women and Youth Empowerment Scheme, funded by Ogun State Government. It is important to investigate why these government efforts aimed at encouraging youth participation in agriculture have not been successful.

Table 3.1: Household demographics

	Panel households					
	2018 survey		2018		2020	
	SSF	MSF	SSF	MSF	SSF	MSF
Household size	5.73	6.91	5.59	6.72	5.86	6.88
Proportion of male-headed household	0.94	0.96	0.96	0.96	0.92	0.94
Age of the household head (years)	45.25	47.86	44.48	47.61	46.37	49.51
Number of months household head lived in the household in past year	11.89	11.84	11.88	11.81	11.72	11.75
Education attainment of household head (years)	6.92	7.42	7.11	7.46	8.76	8.62
N	1,087	1,022	654	651	643	662

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

3 YIA aims at promoting positive youth development and vocational training systems that create dynamic and profitable entrepreneurship and employment opportunities for youth focusing especially on agricultural value chains and markets.

Table 3.2: The percentage of youth in agriculture in Ogun and Kaduna states in 2018 and 2020

Farm category	Age category	2018		2020	
		Ogun (%)	Kaduna (%)	Ogun (%)	Kaduna (%)
Small scale	15–24 years	3.89	7.52	2.56	4.24
	25–34 years	22.62	46.08	19.87	50.3
	35–49 years	38.47	30.24	39.74	28.48
	50–64 years	26.37	13.12	28.37	14.24
	65 and over	8.65	3.04	9.46	2.73
	Total		100	100	100
Medium scale	15–24 years	3.18	9.43	2.47	5.54
	25–34 years	23.34	33.46	20.99	35.78
	35–49 years	40.61	37.86	40.47	38.43
	50–64 years	22.65	14.72	25.79	16.02
	65 and over	10.22	4.53	10.29	4.22
	Total		100	100	100

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

4 IDENTIFICATION OF PATHWAYS INTO MSF

4.1. Characterisation of changing farm scales

This panel study primarily posits the rise of MSFs through new acquisitions of farmland or expansion of land area cultivated as a major pathway to agricultural commercialisation. Under this section, we discuss the changing farm scales in terms of APRAs livelihood trajectories of agricultural commercialisation namely: stepping up, which refers to improving and investing in existing agricultural activities; stepping in, which refers to moving into commercial agriculture from non-farm base; hanging in, which refers to maintaining subsistence level activities, and dropping out, which refers to slipping into destitution due probably to shocks and stresses.

We observe four major trajectories aligned with the changing farm scales among farm households in Nigeria. The first category is current (2020) MSF households who started off as SSF – that is, MSFs who stepped up from SSF by expanding their scale of operation. The second category is current (2020) MSFs who started off initially as MSFs – that is MSFs who stepped in directly by moving into MSF from a non-farm base. The third category is current SSF households who started off as MSF initially – that is

MSFs who dropped out of MSF into SSF because of some form of shock. The fourth identified category is the SSFs who started off as SSF and are still SSF in 2020 – that is, SSFs that are hanging in or have remained small scale up to 2020.

Table 4.1 shows that of all the SSFs in 2020, 94.25 per cent started initially as SSFs, while 5.75 per cent started off as MSF. This implies that a larger number of SSF in 2020 have been hanging in since they started operation, and a small percentage have dropped out from medium scale to small scale. Of the 5.75 per cent that dropped out from MSF to SSF, 3.11 per cent did so between 2018 and 2020, while 2.64 per cent did so before 2018 and remained small scale in 2020.

The results further show that about 50.15 per cent of all current MSF in 2020 are investor farmers who stepped in directly into MSF from the non-farm sector, while about 49.85 per cent stepped up from SSF. Out of the stepping up group, 45.16 per cent did so before 2018 and remained up till 2020, while 4.68 per cent did so between 2018 and 2020.

Thus, we find that between 2018 and 2020, the percentage of farms that dropped out from medium to small scale (3.11 per cent) is more than half the percentage that stepped up from small to medium

Table 4.1: Changes in farm scale since the household started farming to 2020

Farm scale category in 2020	Groups: Changes in farm scale	Number	Percentage by farm scale
SSF (2020)	Group 1a: Consistently SSF (started farming as SSF and still SSF in 2018 and 2020 – hanging in)	606	94.25
	Group 1b: Currently SSF in 2020, but started farming as MSF – dropped out from MSF to SSF	17	2.64
	Group 1c: Currently SSF in 2020, but was MSF in 2018 – dropped out from MSF to SSF	20	3.11
	Total panel subsample of SSF in 2020	643	100
MSF (2020)	Group 2a: Currently MSF in 2020 but started farming as SSF – stepped up	299	45.16
	Group 2b: Currently MSF in 2020 and started farming as MSF – stepped in	332	50.15
	Group 2c: Currently MSF in 2020 but was SSF in 2018 – stepped up	31	4.68
	Total panel subsample of MSF in 2020	662	100
	Total panel subsample of SSF and MSF in 2020	1,305	100

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

scale (4.68 per cent). This implies that policies to encourage the growth of MSFs through stepping up might need to also direct some efforts at reducing the percentage of farms that are dropping out from MSF to SSF.

State by state analysis of farm household trajectories shows that hanging in of SSFs, who started operations as SSF, was more common in Ogun State compared with Kaduna State, while dropping out of MSFs, who started off as medium scale, to SSFs was more prevalent in Kaduna compared with Ogun State. The results also show that the proportion of SSFs that stepped up to MSFs between 2018 and 2020 was higher for Ogun State compared with Kaduna State. Further, the proportion of MSFs that dropped out to SSFs between 2018 and 2020 was 4.76 per cent for Kaduna State and 1.52 per cent for Ogun State. The higher incidence of dropping out of MSF in Kaduna relative to Ogun may not be unrelated, with the relatively higher level of insecurity in Kaduna State compared with Ogun State in the period between 2018 and 2020.

This deduction is supported by the findings of Adelaja et al. (2020a) that conflicts and droughts negatively affect the ability of farm households to expand the land area under cultivation.

Results in table 4.2, we also observe that stepping up from SSF to MSF was more common in Ogun State (56.21 per cent) relative to Kaduna State (41.67 per cent). The reverse is however the case for the stepping in category. Further, the results show that stepping in is a more common phenomenon in Kaduna State (58.88 per cent) compared to Ogun State (43.79 per cent). Thus, Kaduna seems to provide a more favourable environment for investor farmers without prior experience in farming to move into MSF. One important reason for this is that access to land for MSF is easier in the northern savannah region of Nigeria relative to the southern rainforest zone. Farmer focus group discussion interviews revealed that communities in Ogun State (in southern Nigeria) are more reluctant to lease large expanses of land to intending farmers compared with communities in Kaduna State (northern Nigeria).

Table 4.2: Transition matrix of the 2020 sub-sample by states

		Status when household started farming			Status in 2018 survey		
		SSF	MSF	Total	SSF	MSF	Total
Ogun	Current status (2020 survey)						
	SSF	319	9	328	323	5	328
	%	97.26	2.74	100	98.48	1.52	100
	MSF	190	148	338	20	318	338
Kaduna	%	56.21	43.79	100	5.92	94.08	100
	SSF	298	17	315	300	15	315
	%	94.6	5.4	100	95.24	4.76	100
	MSF	135	189	324	11	313	324
	%	41.67	58.33	100	3.4	96.6	100

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

Table 4.3: Period of stepping up or stepping into MSF

Period when household became MSF	Formerly SSF		Consistently MSF	
	N	%	N	%
Prior to 2000	70	21.21	95	28.61
2000–2004	59	17.88	50	15.06
2005–2009	51	15.45	60	18.07
2010–2014	52	15.76	56	16.87
Post 2015	98	29.70	71	21.39
Total	330	100	332	100

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

4.2. Analysis of stepping up and stepping into MSF

We have identified that stepping in and stepping up to MSF are two important pathways to agricultural commercialisation in Nigeria. It is however important to examine how this process has progressed in the past several decades and identify important factors that drive the process. Table 4.3 shows how long current MSFs have become medium scale, either through transitions (stepping up) or through moving into MSF from a non-farm base (stepping in). The results show that about 79 per cent of MSFs who transitioned from small scale did so after the year 2000, which implies that transition from SSF to MSF is a recent phenomenon in Nigeria. Analysis by the state, however, shows that stepping up is a more recent phenomenon in Kaduna State compared with Ogun State. Thus, stepping in as a mode of entry into MSF is also a more recent phenomenon in Kaduna than Ogun State.

4.3. Factors that enable transitions from small scale to MSF

Another major research question of the study is ‘What are the possible causes of the observed changing farm structure?’ This regards the potential transition drivers from SSF to MSF – a trend clearly observed among MSFs in Nigeria. Table 4.4 provides some insight into possible answers to this question. Approximately 40 per cent of respondent farmers indicated in 2018 that land availability is the most important factor that enabled them to transit from small to medium scale. That is, owning extra uncultivated pieces of land made the decision to scale up easier to implement. This proportion grew by 16 per cent in 2020, implying that a

higher proportion of farmers depended more on the use of already-owned land rather than new acquisitions or access through the market to scale up. Thus, increased security of tenure would be an important consideration in efforts to increase the capacity of SSFs to scale up to medium scale. Results also show that 23 per cent of respondents stated that the ability to acquire additional land for farming was the most important factor in both 2018 and 2020. Thirdly, 19 per cent and 17 per cent of respondents in 2018 and 2020, respectively, stated that access to land through rent and borrowing is the most important factor in enabling stepping up. The implication of this finding is that underdeveloped land markets is a major constraint to scaling up by SSFs between 2018 and 2020. Land reform policy is needed to address this constraint.

However, since expansion in area operated must be complemented by an increase in the use of other production inputs, land reform policies must be complemented by policies that would enhance access to all weather roads, established output markets and complementary inputs, such as credit, mechanisation services, irrigation, agro-input supplies, extension services.

4.4 Household livestock and assets holding

Table 4.5 presents household livestock, productive assets and household durable holdings by farm scale category. The results show that out of all six farm scale groups in the 2020 sample, consistent MSFs had a higher average value of productive assets, followed by those who were SSF in 2018 but stepped up to MSF in 2020, and those who were SSF at start of

Table 4.4: Primary factors enabling smallholder transition to medium-scale status by year of survey

Factors	2018 (%)	2020 (%)
Land availability (already had more than 5ha and was able to start operating)	39.93	56.43
Land acquisition (acquired additional land under ownership that brought operated farm size to > 5ha)	23.49	23.36
Land accessibility (rented and/or borrowed enough land to operate > 5ha)	18.79	16.8
Able to secure enough labour among family members to operate > 5ha	3.36	0.79
Able to secure enough hired labour to operate > 5ha	4.03	0.79
Purchased mechanisation equipment which allowed operation of > 5ha	0.34	0.26
Rented mechanisation equipment which allowed cultivation of > 5ha	0.34	0.26
Purchased irrigation equipment which allowed profitable operation of > 5ha of land	7.38	1.31
Other	2.35	0.00
N	298	381

Source: Authors’ own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

farming, stepped up to MSF in 2018, and remained MSF in 2020. Thus, MSFs were found, on average, to possess higher-value assets than small-scale farms. Given the findings of Adelaja et al. (2020b) that asset investment increases farm household resilience to shocks, policies that encourage the growth of MSFs could positively impact household resilience to impacts associated with conflict and drought, thereby reducing the negative effects on livelihood outcomes.

We observe four major trajectories aligned with the changing farm scales among farm households in Nigeria. The first category is current (2020) MSF households who started off as SSF – that is, MSFs who stepped up from SSF by expanding their scale of operation. The second category is current (2020) MSFs who started off initially as MSFs – that is MSFs who stepped in directly by moving into MSF from a non-farm base. The third category is current SSF households who started off as MSF initially – that is MSFs who dropped out of MSF into SSF because of some form of shock. The fourth identified category is the SSFs who started off as SSF and are still SSF in 2020 – that is, SSFs that are hanging in or have remained small scale up to 2020.

The results further show that SSFs that started business as SSF – and are still hanging in – in 2020 had higher total productive asset values, followed by farms that started farming as MSF and remained SSF in 2018 and 2020, and SSFs who dropped out from MSF to SSF between 2018 and 2020. This result suggests that the low level of asset acquisition could be responsible in part for hanging in by some SSFs and dropping out

by some MSFs. The implication is that an increase in productive asset ownership could lead to expansion in land use, as suggested by Adelaja et al. (2020b).

Another important finding is that those farm households that started off as MSFs and dropped out to SSF by 2020 had the highest stock of farm animals compared with other farm household categories (Table 4.5). This suggests that those MSFs that reduced their farm scale in terms of land area cultivated seem to have divested into livestock production. Thus, dropping out for this category of farm households may have had positive rather than negative effects on livelihood outcomes.

4.5. Mode of land acquisition and land use pattern

4.5.1. Sources of land for farming

Table 4.6 shows that for all households, except MSFs in 2020 who stepped up from being SSF in 2018, inheritance is the most predominant source of land for farming in the study area across farm scale categories. More specifically, those farms that were consistently small scale from the start of operation to 2020 (Group 1a), those who stepped in from the start of business, those who dropped out to SSF from MSF, and those who stepped up from SSF to MSF, acquired their farmland through inheritance. On the other hand, land acquired from the market through outright purchase, government allocation, borrowing, rent and lease, is more common with farms that stepped up to MSF between 2018 and 2020, followed by those who dropped out from MSF to SSF between 2018 and

Table 4.5: Household livestock and asset holding by farm type in 2020

Asset types	Small scale (2020)			Medium scale (2020)		
	Hanging in SSF from start to 2020 (1a)	MSF from start but dropped out to SSF by 2020 (1b)	MSF in 2018 but dropped out to SSF in 2020 (1c)	SSF from start but stepped up to MSF by 2020 (2a)	Stepped into MSF from start and remained MSF in 2020 (2b)	SSF in 2018 but stepped up to MSF in 2020 (2c)
Value of animal owned (₦'000)	225.23	164.32	23.85	48.90	137.25	40.70
Total productive assets (₦'000)	56.05	37.84	28.81	89.54	134.33	102.62
Total durables (₦'000)	136.07	129.63	139.01	241.12	232.84	369.49
Value assets, durables and animal owned (₦'000)	417.35	331.79	191.67	379.56	504.42	512.81

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

2020. Thus, the existence of land markets seems to aid both stepping up and dropping out.

4.5.2. Land access, ownership and operation⁴

The results in Table 4.7 further confirm that land is indeed a major constraint to scaling up for SSF in the study area. SSF households had an average landholding of 3.65ha in 2018 and 3.7ha in 2020. This is a far cry from the 5ha threshold for stepping up/transitioning into medium scale. The implication of this is that the average SSF does not currently have access to enough land required to scale up to medium scale; access to a functioning land market therefore needs to be enhanced and the ability to acquire land from the market substantially boosted by policy.

The results also show that SSFs are currently cultivating less than 70 per cent of the total landholdings accessible to them. The average operated farm size in 2018 was 2.35ha and this increased slightly to 2.39ha in 2020. Thus, it is not sufficient for policy to address land access issues alone; attention must also be given to removing the constraints that prevent SSFs from fully utilising the land resources under their control. Major among these constraints are access to credit facilities for land preparation, purchase of complementary inputs, access to produce markets, and increased downstream sector activities.

For MSFs, the average landholding was about 11ha in 2020 down from 12ha in 2018 and average area

operated declined from 10.1ha in 2018 to 9.9ha in 2020, probably due to the negative effect of the COVID-19 pandemic (Aromolaran et al., 2021). The percentage of landholdings operated however increased from 83 per cent in 2018 to 88 per cent in 2020. Given the finding of Omotilewa et al. (2021) that MSFs become more productive relative to SSFs from 25ha and above, policies directed at increasing the average size of MSFs to above 25ha could potentially increase on-farm and off-farm employment – through higher productivity and marketable surplus.

We also observe that among SSFs, the average proportion of landholdings operated was higher in 2020 (70 per cent) compared with 2018 (63 per cent). For MSFs, the share of farm landholding operated was 82 per cent for 2018 relative to 88 per cent for 2020. In addition, the average operated farm size among SSFs increased slightly from 2.35 to 2.39, while that of MSF declined slightly from 10.1 per cent in 2018 to 9.9 per cent in 2020.

Analysis by the state revealed that land access, ownership and operations among SSFs increased slightly in both Ogun and Kaduna states in 2020. Among MSFs, the average farm size marginally declined and land ownership marginally increased in both states in 2020. Thus, MSF households in Ogun State operated larger pieces of farmland in 2020 (10.8ha, which is 75 per cent of land owned) compared with Kaduna State (9ha, which is 102 per cent of

Table 4.6: Sources of farmland by farming type in 2020

Parcel acquisition	SSF in 2020			MSF in 2020		
	Group 1a	Group 1b	Group 1c	Group 2a	Group 2b	Group 2c
	Hanging in SSF from start to 2020	Started as MSF but dropped to SSF by 2018 and remains in 2020	MSF in 2018 but dropped to SSF 2020	Started as SSF, stepped up to MSF by 2018 and remains MSF in 2020	Stepped into MSF from start and remains MSF in 2020	SSF in 2018 but stepped up to MSF in 2020
Inherited	57.03	36.59	54.00	51.48	56.19	40.51
Family land	7.79	21.95	0	5.02	7.83	5.06
Purchased	7.60	12.2	14.00	13.47	12.50	13.92
Allocated	4.56	2.44	4.00	5.59	3.50	2.53
Borrowed	2.57	14.63	4.00	2.51	2.57	2.53
Leased	3.04	0	4.00	5.71	1.52	15.19
Rented	14.26	4.88	20.00	12.56	12.85	15.19
Other sources	3.14	7.32	0	3.65	3.04	5.06
Total	100	100	100	100.00	100.00	100

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

4 Note that land operated includes land in fallow.

land owned). On the other hand, small-scale farm households in Ogun State operated smaller areas of farmland in 2020 (2.26ha, which is 53 per cent of land owned) compared with Kaduna State (2.53ha, which is 96 per cent of land owned). In summary, it can be said that land constraints are more intense in Kaduna State compared with Ogun State, and this constraint worsened in 2020 relative to 2018.

Table 4.8 provides some insight into the differences in land access, ownership and operation between the various farm scale groupings. Farms in group 1a, for example, are hanging in partly because they are severely constrained in terms of land accessibility and partly because they are unable to muster enough resources to fully operate the land available to them. We observe that the average farm in this category has access to only 3.45ha of land and cultivates only 2.34ha. MSFs who stepped in directly have access to more land (13ha) and operate more land (11ha) than those who stepped up – they control and operate

12ha and 9ha, respectively. Thus, the average farm size operated by these MSFs is still far below the 25ha threshold for which Omotilewa et al. (2021) found that productivity increases with farm size. On the other hand, the average operated farm size of 9.1ha for MSFs who stepped up from SSFs is close to the 12.5ha threshold for which a positive relationship between farm size and productivity was observed by Omotilewa et al. (2021). Policy attention may therefore need to focus on increasing the number of MSFs who stepped in with farm sizes above 25ha, as well as the number of MSFs who stepped up to farm sizes above 12.5ha.

4.5.3. Security of land tenure

Results on the land tenure system show that security of tenure is low among both MSF and SSF. Less than 15 per cent of small and MSFs have title deeds on their farms. More specifically, 10 per cent of SSF who were hanging in from the start of operation through 2018 to 2020 have title deeds on their farmlands, while 9.5 per cent of SSF who dropped out from MSF to SSF by 2018

Table 4.7: Land access, ownership and operation by farm scale and year of survey

	Description	When started farming	2018	2020
Small scale	Accessed (ha)	-	3.65	3.70
	Owned (ha)	3.22	3.73	3.42
	Operated (ha)	1.93	2.35	2.39
	% operated/owned	59.94	63.00	69.88
Medium scale	Accessed (ha)	-	12.87	12.50
	Owned (ha)	10.21	12.21	11.23
	Operated (ha)	8.29	10.13	9.93
	% operated/owned	81.19	82.96	88.42

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

Table 4.8: Land access, ownership and operation by farm type in 2020

		Accessed (ha)	Owned (ha)	Operated (ha)	% operated/owned
SSF in 2020					
SSF hanging in from start through 2018 to 2020	Group 1a	3.45	3.30	2.34	70.90
MSF from start, but dropped out to SSF by 2018 and remained SSF in 2020	Group 1b	9.10	6.10	3.39	55.65
MSF in 2018 but dropped out to SSF in 2020	Group 1c	6.60	5.13	3.11	60.66
MSF in 2020					
SSF from start, but stepped up to MSF by 2018 and remained MSF in 2020	Group 2a	11.91	10.18	9.21	90.46
Stepped directly into MSF from start and remained MSF through 2018 to 2020	Group 2b	13.39	12.51	10.77	86.09
SSF in 2018, but stepped up to MSF in 2020	Group 2c	8.56	7.04	7.79	110.66

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

and remained SSF in 2020 have title deeds. Surprisingly, only 9.1 per cent of farm households who started off as SSFs and stepped up to MSF by 2018 and remained MSF in 2020, and 9.2 per cent of MSFs who stepped directly into MSF from the start and remained MSF in 2020, have title deeds on their farmlands. However, as much as 14 per cent of farm households who were SSF in 2018 but stepped up to MSF 2020 have title deeds. This is an indication that tenure security poses a major constraint to the development of a functioning land market, which could, in turn, hinder the process of agricultural commercialisation.

4.5.4. Land use pattern and diversification of income sources as a pathway to agricultural commercialisation among SSFs

Results presented in Table 4.9 show that the predominant use of land in the study area is for crop farming. A larger percentage of operated farmland is devoted to crop farming among SSFs compared with MSFs. More specifically, Table 4.10 shows that 84 per cent of farmland is devoted to crop farming by SSFs and 74 per cent by MSFs in 2018. These proportions declined to 80 per cent for SSFs and 70 per cent for MSFs in 2020. This substantial decline in land allocation to crop farming between 2018 and 2020 may be related to the harsh economic conditions imposed by the COVID-19 pandemic for most of 2020 (Aromolaran et al., 2021).

Table 4.10 also shows that MSFs tend to allocate larger proportions of their farmland to rentals and fallow compared with SSFs. More specifically, stepped up MSFs and stepped in MSFs allocated 20 per cent and 16 per cent of their farmland respectively to rental services and fallow. We further observe from Table 4.10 that apart from the observed decline in land allocation to crop farming between 2018 and 2020, MSFs also allocated less land to mixed farming in

2020 relative to 2018. On the other hand, more land is set aside for rentals and fallow in 2020 than in 2018. This changing pattern of land use in favour of less agricultural production between 2018 and 2020 may not be unrelated to the COVID-19 pandemic in 2020.

Farmers who started off as MSFs but dropped to SSFs practiced mixed cropping on 18 per cent of their farmland and rented out 6 per cent. Furthermore, farms that were MSFs in 2018 and dropped out to SSF in 2020 allocated 10 per cent of farmland to mixed farming and 20 per cent was rented out. Thus, the group of farmers that dropped out of MSF might have divested from cultivating single crops to either practice mixed farming or rent land it out. This behaviour could be regarded as stepping out since it involves divesting from crop farming into livestock production and land rental income. Information from follow-up qualitative investigation supports the inference that income from livestock production and land rentals is being substituted for incomes from crop production to some extent by these categories of farms (those who dropped out of medium scale to small scale). This finding might imply that diversification into livestock production and land rentals could be an important pathway to agricultural commercialisation and livelihood improvement among SSF households in the study area. Thus, dropping out of medium scale into SSF could be a sort of diversification strategy which could improve rather than diminish the livelihood outcomes of farm households.

This diversification explanation for the dropping out category of farms is further strengthened by evidence provided in Table 4.5. The table shows that the farms who started off initially as MSF but shrunk to SSF by 2018 and remained SSF in 2020 made higher investment in animals compared with other categories of MSFs (those who stepped up and stepped in).

Table 4.9: Percentage of household parcels under various uses by farm scale and year of survey

Parcel use	2018		2020	
	Small scale (%)	Medium scale (%)	Small scale (%)	Medium scale (%)
Crop farming	84.25	74.8	79.78	70.39
Mixed farming	4.59	7.99	7.00	5.74
Rented out	1.53	2.61	4.2	8.31
Fallow land	5.05	7.68	5.29	9.67
Virgin land	4.43	6.61	3.11	4.23
Other land use	0.15	0.31	0.62	1.66
N	654	651	643	662

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

Table 4.10: Percentage of household parcels under various uses by farm types

Parcel use	Small scale in 2020			Medium scale in 2020		
	Group 1a	Group 1b	Group 1c	Group 2a	Group 2b	Group 2c
Crop farming	81.02	70.59	50	67.22	73.2	70.97
Mixed farming	6.6	17.65	10.00	6.69	5.42	0.00
Rented out	3.63	5.88	20.00	8.03	8.73	6.45
Fallowed land	5.12	0.00	15.00	12.04	7.23	12.9
Virgin land	2.97	5.88	5.00	4.35	4.22	3.23
Other land use	0.66	0.00	0.00	1.67	1.2	6.45
N	606	17	20.00	299	332	31

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

5 ANALYSIS OF NATURE OF INTERACTIONS BETWEEN SSFS AND MSFS

One of the major objectives of this study is to investigate the existence of spillover effects from MSFs to SSFs. That is to investigate the question: ‘how are rising MSFs influencing the behaviour and welfare of the millions of SSF households around them?’ Important questions that the APRA Nigeria study sought to address include the following:

1. Does increased land acquisition by medium- and large-scale farms expand mechanisation by SSFs, i.e., positive spillover?
2. Does the increased acquisition of farmland by local investor farmers contribute to land scarcity and accelerate out-migration from densely populated rural areas, i.e. negative spillover?
3. Does increased land acquisition by medium- and large-scale farms expand off-farm employment through agricultural growth multipliers, i.e., positive spillover?
4. Is the rise of commercialised MSFs – with greater surplus production – attracting new investment in input and output markets that influence market access for local smallholders, i.e., positive spillover?

These questions will be addressed in more details with more in-depth econometric analysis of the panel data set collected. This section will only provide some limited and purely descriptive answers to the questions about

the nature of interactions between MSFs and SSFs that operate in their vicinity and how these interactions have changed in the space of 30 months.

Results of the analysis show that several spillover interactions, which could immensely benefit SSFs exist between MSFs and the SSFs in their vicinity (Table 5.1). Prominent among these are (in order of importance): provision of extension guidance/services to smallholders, sale of farm inputs to smallholders, purchase of farms inputs together with smallholders, renting out of tractor and farm machinery services to smallholders. These interactions can be explored by policymakers to relax the constraints that SSFs face in terms of low productivity and land preparation, which has limited their abilities to increase marketable surplus and the scale of their operations, especially in the southern part of Nigeria.

The results further show that MSFs who transitioned from SSF status (stepped up) interact more with SSFs in terms of extension service provision, tractor rentals, input purchasing and rentals of other farm machinery services than MSFs who started initially as MSFs. MSFs who were consistently MSF (stepped in) interacted more with SSFs in terms of sales of farm inputs only.

In terms of trends, Table 5.2 shows a general decline in the proportion of MSFs that interacted beneficially with SSFs between 2018 and 2020. More specifically, we observe that the proportion of stepped in MSFs that

Table 5.1: Services from MSF to SSFs by year of survey

Service	2018		2020	
	%	N	%	N
Rents out tractor to smallholders (those who own tractors)	6.61	257	4.76	231
Rents out other farm machinery service to smallholders	3.82	654	6.18	647
Purchase farm inputs together with smallholder	22.94	654	26.58	647
Sold farm inputs to smallholders	26.91	654	24.27	647
Smallholder sought extension service from MSFs	48.17	654	48.07	647
Provided extension service to smallholder	43.58	654	45.9	647
Smallholder sells farm produce through MSFs	35.93	654	33.33	647

Source: Authors’ own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

Table 5.2: Services from MSF to SSFs by farm type and year of survey

Service	Formerly SSF, now MSF (%)		Consistently MSF (%)	
	2018	2020	2018	2020
Rents out tractor to smallholders (those who own tractors)	2	5.5	6	5.22
Rents out other farm machinery service to smallholders	11	3.3	4	0.87
Purchase farm inputs together with smallholder	20	27.5	27	18.26
Sold farm inputs to smallholders	29	7.7	32	13.04
Smallholder sought extension service from MSF	49	46.2	43	37.39
Provided extension service to smallholder	46	45.1	41	33.91
Smallholder sells farm produce through MSFs	33.33	27.6	36.30	30.3

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

interacted with SSFs in their neighbourhoods declined for all seven identified modes of interaction; for stepped up MSFs, interactions declined for five identified interaction modes. A larger proportion of stepped up MSFs interacted with SSFs by renting out farm tractors and going in together in farm input purchases in 2018 relative to 2020. Extension service provision from MSFs to SSFs in both 2018 and 2020 were mostly in form of use of improved seeds, better planting techniques, use of tractors for land preparation and better timing of farming activities (in order of importance).

6 PRODUCTIVITY COMPARISONS BETWEEN MSFS AND SSFS

This section addresses the objective of this study that has to do with the assessment of differences in productivity between MSFs and SSFs, as well as how these differences have changed over time. Several income indicators were used to assess productivity in this analysis, and the results are presented in Table 6.1. These indicators include a measure 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 aggregate income per adult equivalent.

The results presented in Table 6.1 show that MSFs performed better than SSFs for all labour productivity indices, while SSFs performed better than MSFs with the land productivity index. More specifically, land productivity measured as mean crop income per hectare is higher for SSF (₦313,000) compared with MSFs (₦243,000). This result supports the claim, in some literature, that small farmers are generally more efficient than medium/large-scale farmers in terms of land use. Most of the literature posits that an inverse relationship exists between farm size and productivity (Omotilewa et al., 2021).

Secondly, Table 6.1 shows that labour productivity, measured as crop income per adult person, crop income per day spent on farm, crop income per adult equivalent, and net aggregate income per adult equivalent, is higher for MSFs compared to SSFs. Thus, labour productivity is higher for MSFs than SSFs. This could imply that MSFs possess a greater

capacity to create on-farm and off-farm employment relative to SSFs.

Table 6.1 also shows that for the entire panel sample, productivity among MSFs and SSFs was generally higher in 2020 compared to 2018. However, this observed productivity increase between 2018 and 2020 was mainly driven by Kaduna State farm households. The study also found that most measures of land and labour productivity declined between 2018 and 2020 in Ogun State, while all measures increased between the two periods for Kaduna State.

Tables 6.2 provide results on intensity of labour use across farm scale categories and states. The results show that labour use intensity among SSFs increased from 17 person days per hectare to 20 person days per hectare between 2018 and 2020, but declined from nine person days per hectare to seven person days per hectare among MSFs. Thus, labour use intensity increased, on average, for SSFs and declined for MSFs between 2018 and 2020.

Results by state shows that, for farm households in Ogun State, labour use intensity increased for SSFs from 18 person days per hectare in 2018 to 21 person days per hectare in 2020; but declines from 13 person days per hectare to seven per hectare for MSFs. The opposite is the case with Kaduna State, where labour use intensity declined for SSFs from 16 person days per hectare in 2018 to 13 person days per hectare in 2020; but increased from six person days per hectare to eight person days per hectare for MSFs.

Table 6.1: Productivity indicators by farm scale and year of survey

	2018		2020	
	Small scale	Medium scale	Small scale	Medium scale
	654	655	644	662
Crop income per ha planted (₦'000)	313.16	243.23	445.97	360.56
Crop income per adult person (₦'000)	294.14	868.14	337.27	865.19
Crop income per day spent in the farm (₦'000)	33.84	93.17	39.08	107.92
Crop income per adult equivalent (₦'000)	193.86	582.18	239.01	641.32
Net aggregate income per adult equivalent (₦'000)	263.99	666.01	310.86	703.29

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

Table 6.3 further shows that labour use intensity (six person days per hectare) is lowest for farms that started as SSFs, stepped up to medium scale by 2018 and remained MSFs in 2020. The highest labour use intensity (21 person days per hectare) was for farms that started as MSFs but dropped out to SSF – and remained SSFs in 2020. SSFs that have been hanging in since the start of operation and until 2020 have the second highest labour use intensity ratio (18 person days per ha). Those who stepped in as MSFs from the start and remained MSF in 2020 had an average labour

use intensity of eight person days per hectare. We also observe that labour intensity among SSFs was about double that of MSFs in 2018, and three times as high in 2020. Thus, MSFs are characterised with substantially lower labour use intensity when compared with SSFs.

The observed higher average labour use intensity in 2020 compared with to 2018 might be partly due to the negative effect of COVID-19 on access to off-farm employment for household members (Aromolaran et al., 2021).

Table 6.2: Labour use intensity by farm scale, state and year of survey

Farm category	Year	N	Net value of crop production in ₦	No of days of family labour	Land area operated	Labour productivity	Land productivity	Labour intensity
SSF	2018	654	730,373	33	2	22,133	365,186	17
	2020	643	956,819	40	2	23,920	478,410	20
MSF	2018	651	2,420,064	90	10	26,890	242,006	9
	2020	662	2,978,258	60	9	49,638	330,918	7
Ogun State								
SSF	2018	343	838,199	35	2	23,949	419,100	18
	2020	328	843,928	41	2	20,584	421,964	21
MSF	2018	323	2,988,337	133	10	22,469	298,834	13
	2020	338	2,776,168	60	9	46,269	308,463	7
Kaduna State								
SSF	2018	311	611,452	32	2	19,108	305,726	16
	2020	315	1,074,370	38	3	28,273	358,123	13
MSF	2018	328	1,860,453	58	9	32,077	206,717	6
	2020	324	3,189,079	60	8	53,151	398,635	8

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

Table 6.3: Labour use intensity by farm types in 2020

Farm scale in 2020		N	Net value of crop production in ₦ (Y1)	No of days of family labour (L2)	Land area operated (A)	Labour productivity (Y1/L2)	Land productivity (Y1/A)	Labour intensity (L2/A)
SSF in 2020	Group 1a	606	925,909	39	2	23,640	419,479	18
	Group 1b	17	1,761,542	65	3	27,230	564,278	21
	Group 1c	20	1,209,388	36	3	33,439	415,383	12
MSF in 2020	Group 2a	299	2,358,316	58	8	40,778	307,512	8
	Group 2b	332	3,645,844	62	10	59,212	374,800	6
	Group 2c	31	1,808,066	57	6	31,720	306,318	10

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

7 ANALYSIS OF DEGREE OF COMMERCIALISATION AMONG MSFS AND SSFS

This study has hypothesised the growth of MSF as a veritable pathway to agricultural commercialisation. It is therefore expected that MSFs will rank higher than SSFs on most indicators of agricultural commercialisation. Some important indicators of commercialisation are household commercialisation index (HCI), household input market commercialisation index (HIMCI), share of production sold at plot/crop level, share of land devoted to crops that are sold, and quantity or value of hired labour. In this study, we use the HCI and the HIMCI to assess the degree of commercialisation among farm households.

7.1 Degree of commercialisation in the output market

The second row of Table 7.1 presents the analysis results of the degree of commercialisation with MSFs and SSFs in 2018 and 2020 using the HCI, which measures the proportion of output that is sold in the market. First, we observe that HCI is higher for MSFs compared with SSFs in both 2018 and 2020. This implies that, on average, MSFs are consistently more commercialised than SSFs in the output market. The results also show that HCI for both farm scale groups (SSFs and MSFs) were substantially lower in 2020

compared with two years earlier. This result may be partly traceable to the COVID-19 pandemic, which negatively farm household access to markets and reduced trader visits to communities for the purchase of farm produce (Aromolaran et al, 2021).

Analysis by the state also presents very interesting results, for instance, the HCI for Ogun State farm households, which ranged between 91 and 92 per cent in 2018 and 78–82 per cent in 2020, is higher than for farm households in Kaduna State – which ranged between 55 and 58 per cent in 2018 and 36 and 39 per cent in 2020. The implication is that farm households in Ogun State, irrespective of scale of operation, consistently sold a higher proportion of their farm produce in the market compared with farm households in Kaduna State. A probable explanation for this is the closeness of Ogun State to Lagos, the commercial capital of Nigeria and the Benin Republic border with Nigeria.

7.2 Degree of commercialisation in the input market

Table 7.1 also presents the analysis results of the degree of commercialisation for MSFs and SSFs in 2018 and 2020 using the HIMCI, which measures the

Table 7.1: Commercialisation index by farm scale and by year of survey – trend analysis

Commercialisation index	2018		2020	
	Small scale	Medium scale	Small scale	Medium scale
N	654	651	643	662
HCI	74.11	74.65	57.8	61.34
HIMCI	14	15.7	11.6	20.45
Ogun State				
N	343	323	328	338
HCI	91.15	91.54	78.03	82.9
HIMCI	7.48	14.4	9.44	22.2
Kaduna State				
N	343	323	328	338
HCI	91.15	91.54	78.03	82.9
HIMCI	7.48	14.4	9.44	22.2

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

proportion of inputs used on the farm that is purchased from the market. First, we observe that HIMCI is higher for MSFs compared with SSFs in both 2018 and 2020. This implies that, on average, MSFs are consistently more commercialised than SSFs in input markets; just as we found for the output market. However, we observe that unlike the output market, where HCI was lower in 2020 relative to 2018 for both SSFs and MSFs, HIMCI declined from 2018 to 2020 for SSFs, but increased for MSFs. This result suggests that SSF households were less engaged with the input market in 2020 compared with 2018, while MSF households were more engaged with input markets in 2020 relative to 2018. A plausible explanation for this result may be that MSFs are more resilient to the shocks created by the COVID-19, which ran through the whole of 2020.

From data analysis by the state, we observe that in contrast to the HCI results, the HIMCI for SSFs in Kaduna state, which ranged between 13 and 21 per cent, is higher than the HIMCI for SSFs in Ogun State,

which ranged between 7.48 and 9.44 per cent. This implies that SSFs in Kaduna State purchase a greater proportion of their farm inputs from the markets compared with SSFs in Ogun State. This seems to be in line with the anecdotal evidence that SSFs in the northern part of Nigeria (represented by Kaduna State) tend to have easier access to the input supply chains, which are heavily supported by governmental and non-governmental agencies, compared with the southern part (represented by Ogun State). Policy may be needed to address this seeming divergence in SSF access to farm input supply chains in different parts of the country.

On the other hand, we observe that, in 2020, MSFs in Ogun State had a higher HIMCI than MSFs in Kaduna State – at 22.2 per cent compared with 18.75 per cent. Thus, MSFs in Ogun State purchase more of their inputs from the market relative to MSFs from Kaduna State. This contrasts with evidence for the same interaction by SSFs, as discussed earlier.

8 WELFARE INDICATORS

An important area of interest to this APRA study is whether the identified pathways to commercialisation reduce poverty, improve food and nutrition and empower women. Under this section, we investigate whether differences in livelihood outcomes exists between farm households under different farm scale categories. Our investigations are based on the following indicators of welfare: poverty, MDD_W, experience of food insecurity, and women's empowerment.

8.1. Poverty indicators

This study investigates the question of whether the growth of MSFs is likely to result in poverty reduction among farm households. To address this question, several poverty indicators, namely head count ratio (a measure of income poverty) and multidimensional poverty index were computed from the data.

Results shown in Table 8.1 show that, in 2020, poverty head count index among SSFs and MSFs ranged between 38 and 56 per cent and 18 and 29 per cent, respectively, according to farm scale groupings. These results suggest that MSF households are generally better off than SSF households, when poverty is measured in terms of income poverty index. The results

from the state by state analysis as presented in Tables 8.2 and 8.3 also show that SSF households are poorer than MSF households in both Ogun and Kaduna states. It can therefore be said that farm households in Kaduna State are poorer than farm households those in Ogun State, irrespective of scale of operation.

Furthermore, we observe that SSFs that remained SSF since start of operation (group 1a) are poorer than those who started operation as SSFs but stepped up to MSF and remain so in 2020 (group 2a). The results also show that MSFs that began farming as MSF and have remained MSFs, have a lower income poverty index of 22.5 per cent compared with those who stepped up from SSF (28.8 per cent). The result suggests that MSF households who transitioned into MSF from SSF are poorer than those investor farm households who stepped directly into farming as MSFs.

The trend analysis results in Table 8.4 show that income poverty among farm households declined substantially – from 65.5 per cent for SSFs and 36.6 per cent for MSFs in 2018 to 53.3 per cent and 25.2 per cent, respectively, in 2020. This implies that income poverty incidence among farm households declined within the two-year window between 2018 and 2020.

Table 8.1: Welfare indicators by farm type in 2020

	Small scale in 2020			Medium scale in 2020		
	Consistently SSF (1a)	Initially MFS (1b)	MFS in 2018 (1c)	Stepped up from SSF (2a)	Consistently MSF (2b)	SSF in 2018 (2c)
N	606	17	20	299	332	31
Income poverty index (poverty headcount)	53.73	38.21	56.07	28.84	22.47	18.52
Multidimensional poverty index (headcount)	44.7	60	13.3	45.3	46.7	31.8
Multidimensional poverty index (adjusted headcount)	18.1	24.1	6.3	18.3	18.5	12.4
MDD_W	24.79	13.33	13.33	28.94	32.35	31.82
FIES	57.29	78.57	40	54.94	53.7	45.45
WEI	42.35	53.33	60	51.69	43.38	36.36

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

8.2. MDD_W

MDD_W is used as a proxy to describe one important dimension of women's diet quality (micronutrient adequacy). It is a dichotomous indicator of whether women 15–49 years of age have consumed at least five out of ten defined food groups the previous day or night. The proportion of women aged 15–49 years who reach this minimum in a population can be used as a proxy indicator for higher micronutrient adequacy.

Table 8.1 shows that MDD_W for MSF households ranged between 28.9 and 32.4 per cent compared with SSF households, which range from 13.3 to 24.8 per cent. This implies that MSF households are better off than SSF households in terms of adequacy in women's intake of micronutrients. We also observe that MSF households that stepped directly into MSF have the highest MDD_W, followed by MSF households that stepped up from SSF between 2018 and 2020, and MSF households that started off initially as SSFs but stepped up to MSF in 2018 and remained so in 2020. State by state analysis, as presented in Tables 8.2 and 8.3, reveals that MDD_W is higher for all categories of MSF households compared with SSFs that are consistently small scale from the start of farming, implying that women in MSF households are better off nutritionally than those in consistently SSFs households, irrespective of location.

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). The FIES is a measure of severity of food insecurity at the household or individual level that relies

on people's direct yes/no responses to eight brief questions regarding their access to adequate food.

The results of our analysis shown in Table 8.1 reveals that FIES for SSF and MSF households range from 40 to 78.6 per cent and 45.5 to 54.9 per cent, respectively. Thus, SSF households are generally more food insecure compared with MSF households. Further analysis shows that SSFs that dropped out from MSF before 2018 and remained SSFs in 2020 are the most food insecure, followed by SSF households that are consistently SSF from start of operation to 2020. Other state by state analysis results presented in Tables 10.2 and 10.3 show that food insecurity is more prevalent among farm households in Ogun compared with Kaduna State.

8.4. Women empowerment

Women empowerment is also an important potential livelihood outcome that could potentially emanate from the process of agricultural commercialisation or, in this case, stepping in and stepping up into MSF. Our results suggest that women from MSF households that transitioned from SSFs are more empowered than those from consistently SSF households. We also observe that women from both types of MSF households are more empowered than women from consistently SSF households. Specifically, Table 8.1 shows that 49.5 per cent of MSF households who transitioned from SSF before 2018, and remained MSF in 2020, have adequate women empowerment, while 43 per cent of MSF households that stepped into MSF from the beginning have adequate empowerment for their women. This can be compared with a WEI of 36

Table 8.2: Welfare indicators by farm type in 2020 in Ogun State

	Small scale in 2020			Medium scale in 2020		
	Consistently SSF (1a)	Initially MFS (1b)	MFS in 2018 (1c)	Stepped up from SSF (2a)	Consistently MSF (2b)	SSF in 2018 (2c)
N	316	7	5	173	145	20
Income poverty index (poverty headcount)	48.05	22.58	60.71	14.75	14.02	5.83
Multidimensional poverty index (headcount)	43.20	50.00	0.00	39.20	42.10	25.00
Multidimensional poverty index (adjusted headcount)	18.00	19.40	0.00	15.10	16.80	9.40
MDD_W	9.89	33.33	0.00	16.20	11.90	18.75
FIES	65.78	60.00	33.33	58.57	61.60	37.50
WEI	47.35	83.33	100	53.15	43.65	37.50

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

Table 8.3: Welfare indicators by farm type in 2020 in Kaduna State

	Small scale in 2020			Medium scale in 2020		
	Consistently SSF (1a)	Initially MFS (1b)	MFS in 2018 (1c)	Stepped up from SSF (2a)	Consistently MSF (2b)	SSF in 2018 (2c)
N	290	10	15	126	187	11
Income poverty index (poverty headcount)	58.16	43.48	54.81	41.86	26.55	33.72
Multidimensional poverty index (headcount)	46.50	66.70	16.7	54.80	50.70	50.00
Multidimensional poverty index (adjusted headcount)	18.20	23.30	7.90	23.30	19.90	20.40
MDD_W	43.19	0.00	16.67	48.39	50.00	66.67
FIES	46.67	88.89	41.67	49.46	46.9	66.67
WEI	36.15	33.33	50.00	49.46	43.15	33.33

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

Table 8.4: Welfare indicators by farm scale and year of survey – trend analysis

	2018		2020	
	SSF	MSF	SSF	MSF
N	654	651	643	662
Income poverty index (poverty headcount)	65.53	36.59	53.31	25.16
Multidimensional poverty index (headcount)	38.40	42.70	44.2	45.5
Multidimensional poverty index (adjusted headcount)	17.00	19.00	17.9	18.2
MDD_W	22.55	21.00	24.11	30.81
FIES	41.85	42.18	57.37	53.9
WEI	33.95	31.26	43.2	46.79

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

per cent for households that have remained SSF since starting farming. State by state analysis presented in Tables 8.2 and 8.3 also shows that women in farm households located in Kaduna State are more empowered than those located in Ogun State. Policy may need to address this imbalance in women empowerment across states.

8.5 Welfare indicators by scale and year of operation

Table 8.4 presents the trend analysis results for the investigated welfare indicators. Generally, the results suggest that welfare conditions among farm households in terms of poverty and food insecurity worsened substantially in the two-year period between 2018 and 2020. On the other hand, interestingly, the results show that women-specific welfare indicators such as MDD_W and WEI improved in 2020 relative to 2018.

9 GENDER ANALYSIS

Under this section we discuss how various indicators of land acquisition and use, productivity, commercialisation and welfare vary by gender of farm household head across the two rounds of data collection.

9.1. Gender analysis of farm types

Table 9.1 shows that SSFs that have been hanging in since the start of operation and dropping out from MSF to SSFs are more commonly female-headed than male-headed households. On the other hand, stepping into MSF by investor farmers is more common among male-headed households, while stepping up is more common among female-headed households. However, between 2018 and 2020, stepping up became more prevalent among male-headed households compared with female-headed households.

9.2 Gender analysis of land access, ownership, operation, use and productivity

Table 9.2 shows that in 2020, the average land area operated by female-headed households (5.29 ha) was lower than that of male-headed household (6.27ha). Also, female-headed households operated a

lower percentage of farm landholding (79.6 per cent) compared with male-headed households (82.9 per cent). The situation was the same in 2018. Thus, male-headed households, on average, operate larger farm sizes compared with female-headed households.

Table 9.3 shows that the proportion of female-headed households allocating land to crop farming declines from 97 per cent in 2018 to 91 per cent in 2020, while that of male-headed households remained unchanged at 93 per cent across both years. Compared with 2018, more female-headed households did not put their landholdings under crop or livestock production in 2020. Rather, we observe that as much as 10.28 and 10.34 per cent of female-headed households fallowed or rented land in 2020, up from 1.67 per cent and 3.33 per cent, respectively, in 2018.

We also observe that a lower proportion of female-headed households than male-headed households used land for livestock production in both 2018 and 2020. Furthermore, the prevalence of livestock production among female-headed households declined from 5 per cent in 2018 to 3.45 per cent in 2020. Since livestock are assets that increase resilience of farm households, this result could imply that female-headed households are likely to be less resilient to

Table 9.1: Farm types by gender of household head in 2020

Farm scale	Groups: changes in farm scale	Male-headed		Female-headed	
		N	%	N	%
SSF	Group 1a: consistently SSF (started farming as SSF and still SSF in 2018 and 2020 (hanging in))	559	45.89	47	54.02
	Group 1b: currently SSF (started farming as MSF but shrunk to SSF in 2018–2020 (dropped out between 2018 and 2020))	15	1.23	2	2.30
	Group 1c: MSF in 2018 but shrunk to SSF by 2020 (dropped out between 2018 and 2020)	20	1.64	0	0.00
MSF	Group 2a: currently MSF (started farming as SSF but MSF in 2018 and 2020 (stepped up))	274	22.50	25	28.74
	Group 2b: consistently MSF (when started farming and during 2018–2020) (stepped in)	320	26.27	12	13.79
	Group 2c: SSF in 2018 but transitioned to MSF by 2020 (stepped up between 2018 and 2020)	30	2.46	1	1.15
	Total	1,218	100	87	100

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

shocks effecting the crop production sector compared with male-headed households. Thus, female-headed households put a higher proportion of their land to non-agricultural uses such as fallow, land rentage and virgin land, rather than direct use in crop and/or livestock production.

Table 9.4 reveals that land and labour productivity is, on average, higher for male-headed households

compared with female-headed households. We also observe that land and labour productivity increased between 2018 and 2020 for male-headed households. However, for female-headed households, only land productivity increased in 2020 (₦378,190) relative to 2018 (₦349,390), while labour productivity declined. Thus, productivity is higher and more consistently on the rise for male-headed households compared to female-headed.

Table 9.2: Land access, ownership and operation by year and gender of household head

		When started farming	2018	2020
Male-headed	Accessed (ha)	-	8.27	8.21
	Owned (ha)	5.15	8.20	7.56
	Operated (ha)	3.77	6.30	6.27
	% operated/owned	73.20	76.83	82.94
Female-headed	Accessed (ha)	-	8.00	7.42
	Owned (ha)	5.38	8.56	6.64
	Operated (ha)	2.7	5.17	5.29
	% operated/owned	50.19	60.40	79.67

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

Table 9.3: Percentage of household parcels under various uses by year and gender of household head

Parcel use	2018 (%)		2020 (%)	
	Male-headed	Female-headed	Male-headed	Female-headed
Crop farming	92.57	96.67	92.94	90.8
Mixed farming	6.35	5	6.57	3.45
Rented out	2.09	1.67	5.99	10.34
Fallowed land	6.51	3.33	7.31	10.28
Virgin land	5.3	10	3.45	6.9
Other land use	0.24	0	0.9	4.6
N	1,218	87	1,218	87

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

Table 9.4: Productivity indicators by survey year and gender of household head

Parcel use	2018 (%)		2020 (%)	
	Male-headed	Female-headed	Male-headed	Female-headed
N	1,218	87	1,218	87
Crop income per ha planted (₦'000)	273.28	349.39	404.14	378.19
Crop income per adult person (₦'000)	489.39	549.30	613.84	457.18
Crop income per day spent in the farm (₦'000)	50.19	46.09	74.97	57.51
Crop income per adult equivalent (₦'000)	334.92	422.06	447.45	382.15
Net aggregate income per adult equivalent (₦'000)	408.71	509.74	512.59	472.68

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

9.3. Gender analysis of commercialisation indices

Under this section we discuss how the two indicators of commercialisation vary by gender of farm household head across the two rounds of data collection. Table 9.5 shows that HCI for male-headed households (74.6 per cent) was slightly higher than that for female-headed households (71.09 per cent) in 2018. In 2020, the HCI for male-headed households (59.67 per cent) was also slightly higher than the HCI for female-headed household (58.56 per cent). Consequently, male-headed households sold a greater proportion of their farm produce in the market compared with households with female heads. This finding is consistent across the two survey years.

Similarly to HCI, HIMCI was higher for male-headed households (15.08 per cent) than female headed-households (11.33 per cent) in 2018. However, the situation was reversed in 2020, as HIMCI for male-headed households (15.91 per cent) was lower than that of female-headed households (18.59 per cent). The reason why female-headed households engaged more with the input market relative to males in 2020 may be due to the initial impacts of COVID-19. Female-headed households could have devoted more of their farm output – that could have been used as seed – to consumption, due to reduced availability and

higher prices of food occasioned by the pandemic (Aromolaran et al., 2021).

9.4 Gender analysis of welfare indicators

Table 9.6 shows that the income poverty (headcount) index for female-headed households (56.05 per cent) was higher than that for male-headed households (49.68 per cent) in 2018. This index fell substantially for both male- and female-headed households in 2020 – to 37.7 per cent and 41.1 per cent, respectively. The implication is that farm households, without regard to household head gender, became more income-poor in 2020 relative to 2018.

Secondly, Table 9.6 shows that the MDD_W indicator increased from 22.13 per cent in 2018 to 27.78 per cent in 2020 for male-headed households, and from 15.79 per cent in 2018 to 24.69 per cent in 2020 for female-headed households. This implies that women in farm households, irrespective of gender of household head were better off nutritionally in 2020 compared with 2018. We also observe that MDD_W is higher in male-headed households relative to female-headed households in 2020. This implies that women in male-headed households are better off nutritionally than women in female-headed households and this holds across both time periods.

Table 9.5: Commercialisation by gender of the household head and survey year

	2018		2020	
	Male	Female	Male	Female
Parcel use				
N	1,218	87	1,218	87
HCI	74.62	71.09	59.67	58.56
HIMCI	15.08	11.33	15.91	18.59

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

Table 9.6: Welfare indicators by gender of household head and year of survey

	2018		2020	
	Male	Female	Male	Female
N	1,218	87	1,218	87
Income poverty index (poverty headcount)	49.68	56.02	37.72	41.11
Multidimensional poverty index (headcount)	40.30	45.00	45.2	40.20
Multidimensional poverty index (adjusted headcount)	18.00	19.00	18.1	17.50
MDD-W	22.13	15.79	27.78	24.69
FIES	41.67	48.21	56.08	50.00
WEI	30.12	77.19	42.72	71.95

Source: Authors' own, using data from an APRA Nigeria field survey conducted in April/May 2018 and December 2020

Thirdly, Table 9.6 shows that the FIES indicator increased substantially from 41.67 per cent in 2018 to 56.08 in 2020 for male-headed households, and from 48.21 per cent in 2018 to 50.0 per cent in 2020 for female-headed households. This implies that farm households, irrespective of gender of household head, were more food insecure in 2020 relative to 2018. This increased food insecurity may be another reflection of the impact of COVID-19 on farming household livelihood outcomes. Also, we observe that female-headed households were more food insecure relative to male-headed household in 2018, but this situation was reversed in 2020 – with male-headed households being more food insecure compared with female-headed households. The cause of this spike in food insecurity in male-headed households is not clear, but

could be related to the COVID-19-related reduction in incomes impacting food intake more negatively in male-headed households compared with female-headed households. This could imply that when faced with declining income, men are more likely to prioritise non-food expenditure than women.

Fourthly, Table 9.6 shows that the WEI indicator increased substantially from 31.12 per cent in 2018 to 42.72 per cent in 2020 for male-headed households, but declined from 77.19 per cent in 2018 to 71.95 per cent in 2020 for female-headed households. Thus, while women were more empowered in male-headed households in 2020 relative to 2018, the reverse was the case for female-headed households, with women becoming less empowered between the two survey periods.

10 CONCLUSION AND POLICY IMPLICATIONS

10.1. Key findings

10.1.1. Characterisation of changing farm scales

1. Youths are less engaged in MSF compared with SSF, and this engagement, which is more prevalent in Kaduna State compared to Ogun State, declined between 2018 and 2020.
2. The percentage of farms that dropped from medium to small scale (3 per cent) between 2018 and 2020 is more than half the percentage that stepped up from small to medium scale (5 per cent). The incidence of stepping up is more prevalent in Ogun State than Kaduna State, while the reverse is true for stepping in.
3. The proportion of farmers who consider land availability as the most important factor for enabled stepping up increased from 40 per cent in 2018 to 56 per cent in 2020. This implies that land availability as a major constraint to stepping up has increased in importance/prevalence.
4. MSFs were found, on average, to possess more productive assets than SSFs, which suggests that increased asset accumulation by farm and non-farm households could enhance the process of stepping up or stepping into MSF.
5. We find that farm households that started off as MSFs and dropped out to SSFs have the highest stock of farm animals, suggesting that they divested from crop farming or stepped out into livestock production.

10.1.2. Land acquisition and use patterns

1. Inheritance remains the most important source of farmland in the study area across farm scale categories in 2020 – as first observed in 2018. However, we find that access to land markets assisted SSFs in stepping up to MSFs between 2018 and 2020.
2. SSF operators are currently (in 2020) cultivating less than 70 per cent of total landholdings, which rose marginally from 3.65ha in 2018 to 3.70ha in 2020, implying that the average SSF still does

not currently control the minimum of 5ha of land required to scale up to medium scale.

3. Farms that have been hanging in as SSFs since starting farming are severely constrained in terms of accessing land and in their ability to fully operate land under their control.
4. The land constraint problem is more intense with MSFs that stepped in, is more prevalent in Kaduna State than Ogun State, and worsened in 2020 relative to 2018.
5. The results show that less than 15 per cent of farm households across farm scale groupings have title deeds on their farmland. This is an indication that tenure security poses a major constraint to the development of a functioning land market, which could, in turn, hinder the process of agricultural commercialisation.
6. We observe a substantial decline in land allocation to crop farming among farm households between 2018 and 2020, while more land is allocated to non-crop production uses, such as rentals and fallow in 2020 than in 2018.

10.1.3. Productivity comparisons between MSFs and SSFs

1. MSFs who stepped in directly operated more land (13ha) than those who stepped up (11ha). The average farm size operated by MSFs who stepped in (13ha) is still far below the 25ha threshold for which Omotilewa et al. (2021) found evidence of increasing productivity with farm size. On the other hand, the average operated farm size of 9.1ha for MSFs who stepped up from SSFs is close to the 12.5ha threshold at which a direct relationship between productivity and farm size is established by Omotilewa et al. (2021).
2. The group of farmers that dropped out of MSF into SSF seem to have reallocated some land previously cultivated to single crops to either mixed farming or to renting out. Information from follow-up qualitative investigations support the inference that income from livestock production and land rentals is being substituted for incomes from

crop production to some extent by this category (dropped out of medium scale). This finding might imply that diversification into livestock production and land rentals could be an important pathway to agricultural commercialisation and livelihood improvement for farm households in the study area. Thus, dropping out of MSF into SSF could also be a kind of coping mechanism for those MSFs who could not continue to productively operate crop land sizes of 5ha and above.

10.1.4. Nature of interactions between MSFs and SSFs

1. Interactions were found to exist between MSFs and SSFs in their neighbourhoods, especially in extension services and access to farm inputs, tractors and other farm machinery. These identified areas of interaction can be explored by policymakers to relax the constraints that SSFs, especially in southern Nigeria, face regarding low productivity and land preparation, which has limited their abilities to increase marketable surplus and the scale of operation.
2. The results further show that those MSFs who transited from SSFs status interact more with SSFs in terms of provision of extension services, rentals of machinery, purchase of inputs together and rentals of other farm machinery services than MSFs who started initially as MSF. Conversely, MSFs who were consistently MSFs interacted more with SSFs in terms of sales of farm inputs only. Thus, MSFs who stepped up seem to interact more with SSFs than those who stepped in.

10.1.5. Analysis of degree of commercialisation between MSFs and SSFs

1. MSFs were consistently more commercialised than SSFs in both product and input markets between 2018 and 2020. Furthermore, farm households, irrespective of scale of operation, were less commercialised in 2020 compared to 2018, probably because of the COVID-19 effects on the sector. While the engagement of SSF households with input markets declined in 2020 relative to 2018, engagements by MSF households increased.
2. MSF households in Ogun State are more commercialised than SSF households in Kaduna State, in both output and input markets. On the other hand, SSF households in Kaduna State are more engaged with the input market and less with the output market compared with SSFs in Ogun State.

10.1.6. Analysis of welfare indicators among farm households

1. MSF households are generally better off than SSF households when poverty is measured in terms of income poverty index. Furthermore, poverty incidence is higher amongst farm households in Kaduna State compared with farm households in Ogun State, irrespective of scale of operation. In addition, we find that MSF households who transitioned into MSF from small scale are poorer than those investor farm households who stepped directly into farming as MSFs.
2. MSF households tend to be better off than SSF households in terms of adequacy of micronutrient intake by women in the household. Also, women in MSF households are better off nutritionally than those in consistent SSFs households, irrespective of location.
3. We find that SSF households are generally more food insecure compared with MSF households and that this food insecurity is more prevalent among farm households in Ogun compared with Kaduna State.

10.1.7. Gender analysis

1. Women from MSF households that transitioned from SSF are more empowered than those from consistently SSF households. Furthermore, women from both types of MSF households are more empowered than women from consistently SSF households.
2. Women in farm households located in Kaduna State are more empowered than those in Ogun State. Policy may need to address this imbalance in women empowerment across states.
3. Relative to male-headed households, a higher proportion of female-headed households remain consistently small scale since the start of operations (hanging in) or have shrunk (dropping out) from MSF to SSFs compared with male-headed households. Furthermore, stepping into MSF by investor farmers was found to be more prevalent among male-headed households, while stepping up was more common among female-headed households.
4. Male-headed households, either small or medium scale, operate larger farm sizes on average when compared to female-headed households.
5. Female-headed households put a higher proportion of their land to non-agricultural uses such as fallow, land rentage and virgin land, rather

than direct use in crop and/or livestock production than male-headed households.

6. Land and labour productivity is, on average, higher for male-headed households compared with female-headed households.
7. Male-headed households sold a greater proportion of their farm produce in the market compared with households with female heads. This finding is consistent across the two survey years.
8. In 2018, male-headed households purchased a higher proportion of their farm inputs compared with female-headed households, but the situation reversed in 2020. This is probably because female-headed households devoted more of their farm output – that could have been used as seed – to consumption, due to reduced availability and higher prices of food occasioned by the COVID-19 pandemic. Generally, the results suggest that welfare conditions among farm households in terms of poverty and food insecurity worsened substantially in the two-year period between 2018 and 2020. On the other hand, women-specific welfare indicators such as MDD_W and WEI improved in 2020 relative to 2018.

10.2 Policy implications of findings

1. There is need for government to step up current efforts by both federal and state governments across Nigeria to encourage youth engagement in the agricultural sector through YIA empowerment programmes.
2. Mechanisation policies that would increase access to land clearing and preparation services may be needed to enhance stepping in of investor farmers in the forest vegetation region of southern Nigeria – represented by Ogun State in this study.
3. Land reform policy that would increase accessibility to land, especially through a better-functioning land market may be needed to increase the capacity of SSFs to scale up to medium scale.
4. Since asset accumulation has been found to increase farm household resistance to shocks, policies that enhance asset accumulation, especially among SSF households, could positively impact the ability to step up as well as resilience of SSF households to shocks from conflict, drought, pandemics etc.
5. Policies that enhance access to credit facilities for land preparation and purchase of complementary inputs, access to produce markets, and increase

downstream sector activities, could help to increase stepping up of SSFs and stepping in of investor farmers into MSF.

6. Policy should encourage existing or potential investor farmers to expand operated farmland area to above 25ha, which is the threshold at which productivity begins to increase with farm size. This increase in productivity could lead to increased on-farm and off-farm employment among farm households through increasing farm income and marketable surplus.
7. These beneficial interactions that exist between MSFs and SSFs in their neighbourhoods can be explored by policymakers to relax the constraints faced by SSFs in terms of provision of extension services, rentals of machinery, sales of farm inputs, purchase of inputs together, and rentals of other farm machinery services.
8. Policies that support the growth of MSFs are likely to enhance agricultural commercialisation, given that MSFs are consistently more commercialised than SSFs in both product and input markets in both 2018 and 2020.
9. There is need to reverse the observed decline in the degree of commercialisation of farm households between 2018 and 2020 through policies that will address the negative impacts of COVID-19 on supply chains of agro-inputs and farm produce.
10. Appropriate policies are needed to address the observed decline in input market commercialisation among MSF households over time.
11. Policies that encourage the growth of MSF could reduce poverty and food insecurity in farm households, and enhance the welfare of women in farming households by increasing micronutrient intake and women's empowerment.

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