



Large-scale agricultural investment and female employment in African communities: Quantitative and qualitative insights from Nigeria

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ABSTRACT

This study examines how large-scale agricultural investments (LSAIs) affect employment outcomes of female-headed households in Nigeria. It focuses on wage income and labour allocations of households in communities where LSAIs occurred in comparison with households in communities where LSAIs did not occur. It engages a mixed method approach, which involves the quantitative and qualitative. The quantitative data was sourced from the Living Standards Measurement Study-Integrated Surveys on Agriculture (LSMS-ISA), which was analysed using Propensity Score Matching (PSM). The qualitative analysis entails in-depth interviews (IDIs) and focus group discussions (FGDs). The results show a positive relationship with the household income living in communities with LSAIs, but a negative association with labour allocation to agricultural activities. Also, the findings indicate that households in communities where LSAIs took place received higher wages and spent fewer hours in agriculture. Though, female-headed households spent more time on agricultural activities than the male-headed households, they earn less. The analysis from the qualitative study show, among others things, that female-headed households spent more time on off-farm business despite the fact that they earn less. The study concludes by recommending that the possible adverse employment effects of LSAIs could be reduced by optimising its positive impact, especially with respect to female-headed households in rural communities where most of such investments occur.

1. Introduction

For the last two decades, there has been an increase in the size of large-scale agricultural investments (LSAIs) across the world (Yengoh et al., 2016; Kumeh and Omulo, 2019). Africa has been the most targeted region, with Nigeria as one of the top 20 LSAIs destinations in the world, and one of the first 10 in Africa (Osabuohien et al., 2019; Ahmed et al., 2019; Nyantakyi-Frimpong and Bezner Kerr, 2017; Land Matrix Global Observatory-LMGO, 2020).

The purpose of the LSAIs in Africa includes the acquisition of land to engage in the cultivation of food crops, biofuels, non-food agricultural commodities, unspecified agricultural cultivation, livestock rearing, renewable energy, mining activities, forest logging, timber plantation, and carbon sequestration. The promised benefits of these LSAIs are

contributions to economic development and poverty reduction by creating job opportunities, developing rural areas and providing social amenities in the communities where they are situated (Osabuohien et al., 2019). However, the consequences of these LSAIs are still highly controversial, which include, among others things, loss of lands rights, agricultural activities, food insecurity and employment concerns, thereby aggravating rural poverty (Cotula, 2012; Holden and Pagel, 2013; Mutopo et al., 2015; Osabuohien et al., 2019, 2020).

In sub-Saharan Africa (SSA) and Southern Asia, about 60% of female-headed households engage in one form of agricultural activity or the other (FAO, 2015; Osabuohien, 2020). In Nigeria, the contribution of females to agriculture is estimated at about 60–79% of labour force, especially food production (FAO and ECOWAS Commission, 2018; Matthew et al., 2022; Osabohien et al., 2021). However, only 14% of

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them own the land that they cultivate. Some of the factors that hinder rural female recognition include the customs and norms that deprive them of some essential land rights (e.g., land inheritance). For instance, values are not placed on domestic production embarked upon by women, land tenure system issues and also their failure to meet essential collateral required to access credits and other agricultural input materials (Mtsor and Idisi, 2014; Jayachandran, 2015).¹ Female in rural areas often find themselves in a vulnerable employment situation. Thus, focusing on female employment is essential, considering their role in the society and the high rates of female unemployment in developing countries (Osabuohien, 2020; Asongu et al., 2020). In 2017, the global rate of unemployment for men was 5.5% while that of women stood at 6.2% and there is a projection that it may relatively increase from 2018 through 2021 (International Labour Organization, 2018).

The reason for paying attention to the case of rural women in Nigeria is because females' involvement in small-scale food production is the bedrock of rural livelihood. It means that female-headed households are significant players in Africa's rural agricultural activities where the majority of the LSAs are located (Tandon and Wegerif, 2013; World Bank Group, 2015; International Labour Office, 2016; Mwishu-Kasiwa, 2018; FAO agricultural outlook 2011-2020). Female-headed households work as peasant farmers paid and unpaid workers on family farms, or as entrepreneurs on or off-farm enterprises. They provide the majority of unpaid care and domestic jobs in rural areas by supporting the present and future generation of rural workers within their households and communities (Food and Agricultural Organisation (FAO agricultural outlook 2011-2020).

Across the globe, about 1.6 billion women rely on agriculture for their livelihood, and many are now at risk from the massive rise in LSAs that endanger their food supplies (Tandon and Wegerif, 2013; Osabuohien, 2020). Against these backdrops, this study contributes to the extant literature by assessing the employment effects of LSAs on female-headed households in comparison with the male-headed households in rural communities with LSAs alongside with those in communities without LSAs in Nigeria using the mixed methods of analysis, which is relatively sparse in the literature to the best of the knowledge of the authors. The study is structured into six sections; following this introductory section is the review of related literature, section three is the theoretical underpinning for the study. The methodology, empirical results and conclusion are in sections four, five and six, respectively.

2. Insights from the extant literature

In Africa, women remain largely responsible for food provision at household level thus any issue relating to land affects women (Mutopo et al., 2015). Thus, it is to this extent that, land remains a valuable livelihood asset for rural women. Large-scale agricultural investments across Africa have generally affected rural women negatively, with women losing their identity as well as the rights to land ownership and land use. This is caused by the conglomerates who often ask people to leave their lands and women emerge as poor victims in most communities as they cannot fight for their lands due to patriarchy which insists on land being a male regulated commodity (Mutopo et al., 2015).

Recent studies have shown how land dispossession destabilises the rights of women, worsen their reproductive burden and diminishes their work prospect (Levien, 2017; Li, 2017; Matthew et al., 2022; Nyantakyi-Frimpong and Bezner Kerr, 2017; Tsikata and Yaro, 2014). According to Wily (2021) women are more distressed by land investments than men. Women and girls are exposed to greater risks in patriarchal society, yet they receive fewer or no benefits from such investments. Investors, for example, prefer to offer local employment and

training to men rather than women, based on the assumption that rural women are illiterate and thus unable to obtain professional jobs. Women's cultural family obligation limit the time they can commit to non-farm activities and also restrict their mobility (Engblom and Isacson, 2019). The lower likelihood of women being employed in non-farm activities in the LSAs, due to both family obligations and women's lower educational attainment, reduced the magnitude of benefits that women gain from LIs compared to men.

Before any land deals, poor rural women often do not have reliable access to land, secure land tenure, or customary land rights (Jeckoniah et al., 2020), and when they have access to land, most of the women in that community, engage their lands for agrarian activities and do not sell it, as their male counterparts would do (George et al., 2015). Women also lack access to essential complementary non-land inputs such as fertilizer, pesticides, improved seed varieties, and extension services. Existing literature on the gender implications of the shift to large-scale agricultural investments, a shift that usually accompanies large land deals, finds that these shifts often lead to changes in household dynamics and roles, income-generation activities, and property rights, often to the detriment of women (Jeckoniah et al., 2020).

Few studies available on the impact of large-scale agricultural investments have revealed that large-scale agricultural investments reduce women's land and resource assets and tenure security which has had adverse effects on their livelihood and welfare (Chung, 2020; Hajjar et al., 2020). If people directly lose their land without compensation or adequate resettlement, they will likely become worse-off and more food-insecure (Keeley et al., 2014). If women had the same access to (productive) capital as men, their yield could be increased by 20–30%. In developing countries, this will increase total agricultural production by 2.5–4%, thereby reducing the number of hungry people in the world by 12–17% (2012; Patil and Babus, 2018). These statistics indicate that if women are given adequate land for agricultural production, food produce will increase thereby increasing food security. Uplifting the status that women have more access to land could lead to a reduction in the number of global undernourished people by 95–100 million people (Bhandari, 2021; Mawoko, 2019).

Given this information, it stands to reason that large-scale agricultural investments may exacerbate poor conditions of female land access and ownership or further limit poor rural women's opportunities for income generation, impact their livelihood and food security (Behrman et al., 2012; Meinzen-Dick et al., 2014). Large-scale agricultural investments could lead to the displacement of smallholder farmers. Displacement also has negative implications for food security and nutritional levels of rural households. When land deals are entered into between governments and investors, often the concerns of rural women are not taken into serious consideration (Edafe et al., 2021). Men and women have varied land rights and opportunities due to socially established gender norms; therefore they have diverse experiences with land negotiations.

A characteristic of the revitalisation of the agriculture sector has been the recognition that past efforts have been less than satisfactory in their outcomes because they overlooked women's role in the sector and the role of gender inequalities in reducing agricultural productivity (Abali et al., 2014; Oparinde, 2021). Though women constitute a large portion of the farming population, women's possibilities in agriculture are hindered by formal and traditional rules. Generally, the extent of gender involvement in agricultural production varies across ethnic groups in Nigeria. Nigerian women farmers work alongside their male counterparts with some clear distinctions in activities between them. In most cases, the men execute the tedious tasks such as land clearing and felling of trees, gathering and burning of bush, and making ridges, while the women engage in planting, weeding, harvesting, on-farm processing, and marketing of farm produce (Edafe et al., 2021). Osabuohien et al. (Osabuohien et al., 2019) investigated the impact of LSAs on female labour outcomes in Tanzania. The study employed the LSMS-ISA data set which was complemented with two case studies of two communities in

¹ Since all women are females and all the females interviewed during the fieldwork are above 18 years, this study uses women and females almost synonymously.

Tanzania. The study findings revealed that LSAIs have limited effect on agricultural wage and have a negative relationship with female-headed households' welfare in communities where LSAIs are located. [Dancer and Sulle \(2015\)](#) examined the gendered impacts of agricultural commercialisation in the production of Sugarcane in Kilombero District, Tanzania. The study findings revealed that if the gendered effect of commercialisation of agriculture is addressed, it will help in reducing the vulnerability of women in Tanzania.

The study by [Mutopo et al. \(2015\)](#) examined how large-scale land acquisitions affect females in Zimbabwe. The study reveals that females are less favourable when compared to their male counterparts in Zimbabwe due to some factors such as low level of education. Also, [Agarwal \(2015\)](#) examined how large-scale agricultural investments have adverse effects on women due to displacements from their lands of tribal inheritance. [Li \(2017\)](#) examined the inter-generational displacement caused by land grabbing for oil-palm in Indonesia. The study found that land grabbing causes a triple displacement impact. First, women access to land is being reduced. Second, when women have limited access to land, they cannot be involved in their primary farming occupation. Third, the skills that they acquired and which can be employed in other farm-related activities will depreciate over time and become inadequate for these new jobs they will be offered in the communities where lands are grabbed. Also, [Bottazzi et al. \(2018\)](#) utilised a case/control method, to investigate the LSAIs effect on local livelihoods in Northern Sierra Leone. The results showed that farmers in the LSAI areas experienced lower yields, reduction in agricultural area for food production and spend more on external labour. On the other hand, LSAI-impacted villages experienced a rise in their total monetary

income, an improvement in food and water security, and increased spending in food consumption. Nevertheless, for landowners, the increase in financial income was higher than for renters, and access to wage labour benefitted men than women which suggested that LSAI tends to increase local inequalities.

From the literature, there is limited empirical evidence that examines the implications of LSAIs on employment creation, particularly when considering gender dimensions in LSAIs host communities using mixed methods in Nigeria. The degree to which LSAIs keep to their promises is highly contentious and under-explored, especially for women who find themselves in disadvantaged positions ([FAO agricultural outlook 2011-2020](#)) and are highly vulnerable to socio-economic shocks. Thus, this study provides new empirical evidence on the implications of LSAIs on employment creation by focusing on disaggregated data across gender dimensions in the host communities.

3. Theoretical underpinnings

The guiding theory for this study is the welfare enhancing theory. It assumes that property rights are already well established and enforced ([Deininger and Byerlee, 2011](#)) Thus, large-scale agricultural investments (LSAIs) can lead to mutually beneficial outcomes for both investors and smallholders or community members, especially women smallholders. Here, the local farmers would benefit by renting out their lands and engaging in contract farming, while those who do not own or have access to land, most times women, can get wage employment and receive wage payment for their labour supply. LSAIs would then provide employment opportunities, infrastructure, and access to the market,

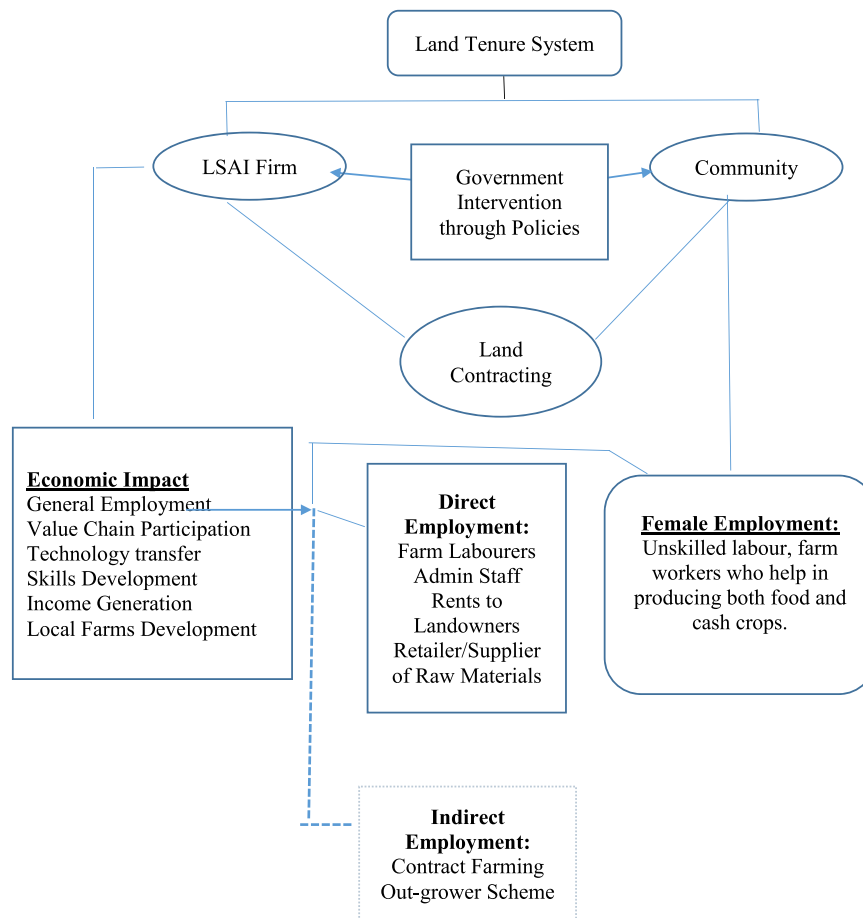


Fig. 1. Large-scale agricultural investments (LSAIs) and female employment.

Source: The Authors'. Note: This study covers only the direct employment that LSAIs offer to the host communities. The indirect form of employment is also important, which can be taken up in future research.

enhance the welfare of the people, which would lead to rural transformation. Fig. 1 shows that in LSAs contracting, the key actors are LSAI firms and the community (community leaders, family Heads, Agents). Women are not key actors because they seem not to have a voice, yet they are largely responsible for food provision at the household level. Therefore, the presence of LSAs could affect them (Shah, 2012). Women group can, however, have a voice in LSAI contracting if they collaborate with community leaders and landowners (it is assumed that women do not have access to land) for their concerns to be taken into consideration in the LSAI deals of negotiation. The government intervenes where there are some disagreements in land contracting, through policies.

LSAI firms can impact positively through General Employment, Value Chain Participation, Local Farm Development, Technology transfer, Skills Development, Income Generation, Provision of Social and basic amenities, among others. It could offer employment to women as LSAs encourage the inflow of land investors as a means for development based on agreed terms between the investor and landowners (Friis and Reenberg, 2010). LSAs offers general employment in terms of direct and indirect employment. Direct employment in the form of engaging them as Farm labourers, Administrative Staff, Drivers, Rents to landowners, Retailers/Suppliers; and as indirect employment in the form of contract farming, Out-grower scheme, employing labour for building social amenities and infrastructures.

Employment can also be offered to women who can work as unskilled labour, farmworkers who help in producing both food and cash crops and livestock production, Cooks, Marketers, etc. The community (women) could benefit (employment) where the government has developed capacities to handle such land deals. Cotula (2009) acknowledged the potentials of large-scale agricultural investments. Still, they warned that these might not be handy if host governments (or community leaders) fail to build capacities to negotiate better terms for their people. To ensure better employment prospect for women, host countries could establish better bargaining power for the community to ensure that employment of the people, especially women in areas where LSAs occur is given priority attention.

4. Methodology

The study employs both the quantitative and the qualitative data to achieve its objectives.

4.1. Quantitative analytical approach

4.1.1. Estimation technique for the quantitative approach

The Propensity Score Matching (PSM) is employed to analyse the quantitative data. Rosenbaum and Rubin (1983) introduced the PSM as a reliable and effective method that can be used to generate the equivalent non-participant data. The PSM enables one to design and analyse a non-randomised study to make it look like or mimic some of a randomised controlled trial (Austin, 2011). Descriptive statistics and Kernel density plots were also employed in this study. The objective of this empirical approach helps in comparing the estimated mean effect on households between communities with Large-scale agricultural investments (LSAs) and communities without LSAs with respect to the three outcome variables. The key benefit of this research approach is its ability to produce a comparison of group of households with a common distribution of characteristics in communities with LSAs and communities without LSAs.

4.1.2. The empirical model

In this study, households affected by the investment (treatment group) and who have similar basic observable characteristics to the non-affected ones (comparison) but differing only in intervention (LSAs) were matching using the propensity score matching (PSM) technique. The matching was based on a distinctive variable, that is, the propensity score. The main purpose of PSM is not to predict treatment but to bal-

ance covariates across treated and comparison groups, efficiently control the confounding, and thus reduce bias (Rosenbaum and Rubin, 1983). According to Rosenbaum and Rubin (1983), the conditional probability that a given household is exposed to a treatment (LSAs) given pre-treatment characteristics X is expressed as:

$$p(X) = P(Z = 1|X) = \Phi(X\beta) \quad (1)$$

where Φ is the Cumulative Distribution function (CDF) of normal distribution, X is a multidimensional vector of pre-treatment characteristics (covariates), and β is a vector of coefficients. In the potential outcome model, for each household i , the difference between the outcomes of treated and comparison groups (treatment effect) can be expressed as:

$$\delta_i = Y_{1i} - Y_{0i} \quad (2)$$

Where δ_i is the treatment effect.

Y_{1i} represents the household wage and labour hours (outcome variables) of i th affected household, and

Y_{0i} represents the household wage and labour hours (outcome variables) of i th non-affected household.

However, the fundamental issue in this model is that we cannot estimate.

$\delta_i = Y_{1i} - Y_{0i}$ for each household i , for the reason that two potential outcomes ($Y_1 - Y_0$) for the same household cannot be observed simultaneously (Guyalo et al., 2022). The unobserved outcome is often called the counterfactual outcome (Rosenbaum and Rubin, 1983) – “What would have happened to the wages and labour hours of the households who are exposed to the investments if they had not been exposed to or experienced such event”.

If the propensity score, $p(X_i)$, for each household i is properly estimated, then following Rosenbaum and Rubin (1983), the Average Treatment Effect on the Treated (ATT) can be estimated as follows:

$$ATT = E\{Y_{1i} - Y_{0i}|Z_i = 1\} \quad (3)$$

$$= E\{E\{Y_{1i} - Y_{0i}|Z_i = 1, p(X_i)\}\} \quad (4)$$

$$= E\{E\{Y_{1i}|Z_i = 1, p(X_i)\} - E\{Y_{0i}|Z_i = 0, p(X_i)\}|Z_i = 1\} \quad (5)$$

4.1.3. Data source

The study relies on data from the Living Standards Measurement Study-Integrated Surveys on Agriculture (LSMS-ISA). The World Bank usually conducts the LSMS-ISA data in conjunction with the National Bureau of Statistics (NBS) of other African countries, including Nigeria.² The LSMS-ISA data for Nigeria covers the 36 States of Nigeria, including the Federal Capital Territory (FCT), Abuja. The data is grouped into: community, households, and agriculture for the agricultural seasons (i. e., post-planting and post-harvest) of the survey.

This study engages Wave 4 (2018/2019)³ of the LSMS-ISA dataset, using the Propensity Score Matching (PSM) and the Probit regression techniques. The Wave 4 contains the requisite data. The reason for using Wave 4 is to have the latest information on the issues of interest. Also, wave 4 is used in order to avoid household misrepresentation. This is because some of the households in previous waves may no longer be available in the recent wave due to reasons such as relocation, death among other things. In addition, it was reported that a modification of sampled households was done in wave 4 with 3600 new households included which was not available in previous WAVES and approximately 1500 households were retained from previous sample (NBS & World Bank, 2019).

² Details are available online at <http://surveys.worldbank.org/lms/our-work/data/data-table>

³ The reason for using Wave 4 is to have the latest information on the issues. Also, period corresponds closely to the time the fieldwork was carried out.

4.1.4. Measurement of variables

Outcome variable: There are two outcome variables of interest in this study and they include – household agricultural wages and labour allocation to agricultural activities. The outcome variables capture the different ways through which LSAs can influence female employment. For household agricultural wages, the estimate is based on the total monthly wage the household earns from agricultural activities such as agricultural labour input. The second outcome variable is measured as the total average hour spent on agricultural activities.

Control Variables: These include the household-heads' social-demographic characteristics such as age (in years), gender (male/female), and level of education (years of schooling). Other main control variables are health (if stopped usual agricultural activities in the last four weeks prior to the survey due to illness), right to land, household size (household members), household assets (value of assets), and access to land.

4.2. Qualitative analytical approach

The qualitative approach is carried out using fieldwork across three major states in Nigeria, which are Kwara State (North-Central, Nigeria), Ogun and Ekiti States (South-West, Nigeria) during the summer of 2018/2019. The fieldwork is carried out using two main approaches, namely; the focus group discussion (FGDs) and in-depth interviews (IDIs). A purposeful and stratified sampling method was employed in the selection of the LSAs used in the study. Kwara State was chosen because it has the highest concentration of LSAs in Nigeria, especially with foreign investors (Osabuohien et al., 2020). The choice of Ogun State is due to its strategic location and the growing number of domestically owned LSAs. The third state, which is Ekiti State, also has LSAs that operate on a commercial basis just like Ogun and Kwara States.

The respondents for the FGD and IDIs were chosen based on non-probability sampling technique. The rationale behind adopting this technique is because it is not feasible to ascertain the probability of another stakeholders' group (Trochim, 2020). Therefore, individuals were left to decide whether or not they want to participate in the process or not. The respondents include workers on the farm who are the actual farmworkers that is, those who work directly on the farm; the supervisors of these workers; the farm managers and other staff members; or instance, the drivers, cooks, cashiers or accountants; and female groups within the community who do not work on the farms since the study focuses on female employment. The investors were also interviewed.

The respondents were asked questions that include details such as demographics, education status, household details, employment, wages, hours spent on farm work and general questions about the farm. The researchers sought the consent of the respondents and informed them about the confidentiality of their identities that their responses are mainly for research purposes. The FGDs are carried out among the farmworkers in small groups of about 5–6 workers and women groups in the communities. Workers express themselves on issues regarding employment within LSAs such as time spent on farms; wages earned, among others. Notes from the qualitative data were transcribed, identified and analysed through themes focusing mainly on how the respondents view the contribution of LSAs to employment in terms of wages, hours spent, among others.

5. Empirical results and discussion

This section presents the results from the empirical analysis. It covers results from kernel density plots, summary statistics, probit model and balancing tests as well as the qualitative analysis.

5.1. Results from Kernel density plots

The study uses the kernel density plots to examine the agricultural wage income and labour allocations by household's activities. It

compares the trends for the households where LSAs occur with the households where they do not occur.

The kernel density plot for how many households earn averagely per month is shown in Fig. 2. The agricultural wage income density plot of households in communities where LSAs occurred is tilted to the right, while the households in communities where LSAs have not occurred is tilted to the left. It means that the households in communities with the presence of LSAs receive more earnings than households in communities without the presence of LSAs. In effect, the households in communities without LSAs, on the average, earn about ₦31,982 (84.16USD) as wage monthly while the households in communities with LSAs earn an average of ₦34,923 (91.90USD) per month.⁴

The Kernel density plot of the labour allocations of agricultural activities of households is shown in Fig. 3. There is not much noticeable difference between these two households except after the peak where it was slightly lower in communities with LSAs. The result shows that households in communities with LSAs spend less of their time on agricultural activities than the households in communities without LSAs. The results from these kernel density plots for the household agricultural wage income and agricultural labour allocations imply that while households in communities with LSAs have the possibility of devoting less of their time on agricultural activities, they have more household agricultural wage income when compared to the wage income that households in communities without LSAs obtain from agricultural activities.

The analysis also shows the gender dimension of household agricultural income and agricultural labour allocations, as displayed in Figs. 4 and 5, respectively. Considering the household income by gender of the household head, the density plot of male-headed household in communities without LSAI is rightward sloped in comparison to that of the female-headed households that tilts to the left. The implication of this finding is that in communities without LSAI, male-headed households earn more than the households that are headed by females.⁵

In communities where LSAI occurred, the kernel density plot of the male-headed household is also rightward sloped, which implies that in communities where LSAs are located, the male-headed households receive higher household income compared to the female-headed households. The result can be substantiated, given the situation in Nigeria where there is a general belief that the males perform more demanding tasks than females; hence, the males tend to get paid more.

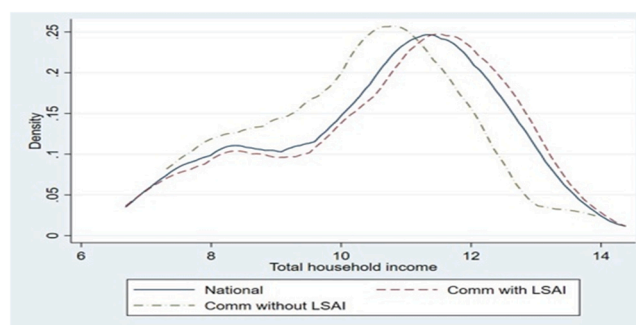


Fig. 2. Household Agricultural Wage Income Kernel Density
Source: The Authors' compilation.

⁴ ₦ is the symbol of Nigeria's currency (Naira). The official exchange rate as at August 2020 was ₦380–1 USD (see <https://www.cbn.gov.ng/rates/ExchRateByCurrency.asp>).

⁵ It is often argued that the nature and quality of employment of the females are essential to their wellbeing, which quantitative data did not provide adequate information on; hence, the need for qualitative data to complement the analysis.

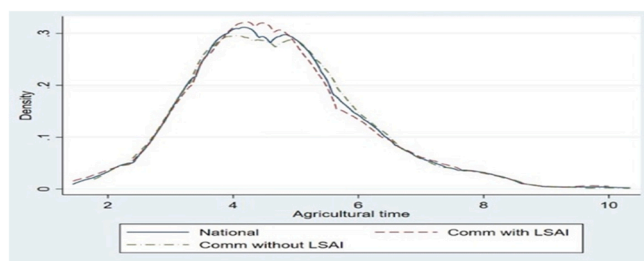


Fig. 3. Household Agricultural Employment Kernel Density. Source: The Authors' compilation.

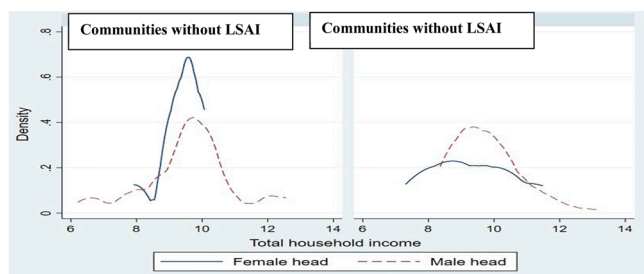


Fig. 4. Kernel Density Plot of Household Agricultural Wage Income across Gender of Household Heads. Source: The Authors' compilation.

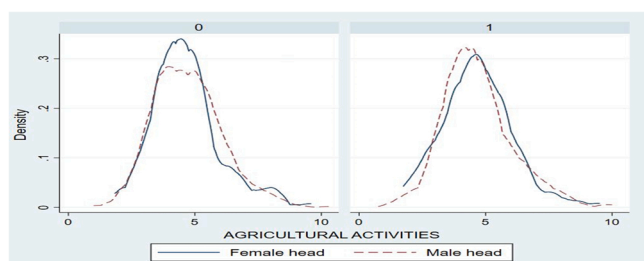


Fig. 5. Kernel Density Plot of Labour Allocation of Household Heads across Gender. Source: The Authors' compilation.

Also, there is the issue of gender disparity in income received, where the males tend to receive more wages than females. From the results, in communities without the presence of LSAs, the male-headed households earn ₦36,601.62 (96.32USD) compared to the female-headed households who earn ₦14,019.14 (36.89USD). In communities with LSAs, the male-headed households earn ₦36,027.68 (94.81USD) in comparison with their female counterparts who earn ₦27,882.49 (73.37USD).

The kernel density plot for labour allocation to agricultural activities by gender is displayed in Fig. 5. For the labour allocation for agricultural activities by gender of the household head, the density plot of male-headed Households in communities without LSAI is rightward sloped when compared to that of the female-headed households. This shows that in the communities where LSAs are not located, the male-headed households spend more time on agricultural activities when compared to their female counterparts. This might be because males have access to land and own their farmlands which they cultivate and perform other agricultural activities.

In Nigeria, for example, in most communities, inheritances are not given to females due to traditional beliefs. Hence, females do not inherit assets, and most times do not also have access to land despite being the ones working on the land and providing food. In communities with LSAI, the males spend less time on agricultural activities while the females

spend more time. The results from these gendered kernel density plots imply that while men spend fewer hours on agricultural activities in communities with LSAs and spend more time in communities without LSAI, they earn more than their female counterparts.

5.2. Results from summary statistics

This study compares the characteristics for households in communities with LSAs with communities without LSAs, which are displayed in the descriptive statistics as presented in Table 1. The selections of the variables are based on extant studies on the determinants of the presence of LSAs, in a country (see (Arezki et al., 2015) and in communities (see (Osabuohien et al., 2015).

It is evident in Table 1 that the average wage earned and time allocated to agricultural activities differ in the two groups. The households in communities where LSAs are located have a higher wage. In essence, they earn wages of about ₦34,923.24 (91.90USD). While those living in communities where LSAs are not located earn wages of about ₦31,982.48 (84.16USD). This reinforces the observation in the kernel density plot. The household in communities with LSAs spend less of their time on agricultural activities while households in communities without LSAs allocate more time on agricultural activities. It is also in line with the kernel density plot. The difference in the time allotted to agricultural activities in households in communities with LSAs and the households in communities without LSAs is significant at 1% significance level.

5.2.1. Disaggregating the results by gender

The female-headed households (FHH) receive higher household income in communities with LSAs than the female-headed households (FHH) in communities without LSAs. This is evident in Table 1. The females in communities with LSAs receive about ₦27,882.49 (73.37USD) when compared to the females in communities without LSAs who receive ₦14,019.14 (36.89USD). For the agricultural labour allocation, the females in communities with LSAs spend more time on agricultural activities than those in communities without LSAI.

The male-headed households (MHH) receive higher household income both in communities with and without LSAs than their female counterparts. Also, it is evident that in communities without LSAs, the male-headed households receive more income than the male-headed households in communities with LSAs. This may be as a result of the male heads owning their farmlands and properly cultivating it, having access to loans, inputs, and seedlings. This will improve productivity and increase in their income compared to when their lands are grabbed by investors.

5.3. Results from econometric analysis

5.3.1. The probit model and balancing tests

The result of the Probit model is presented in Table 2 and this study employed its use to obtain the propensity scores.

For all the households, the size of the household, age of the household head, whether a household is cultivating land or not or whether the household owns or cultivated farm plots are displayed in the first column. The signs of the coefficients are positive for educational qualifications, health, age, whether households cultivate plots or not or whether households own the farm, and the number of household assets. While the signs of the co-efficient are negative for numbers of household members and locality. For all households, educational qualification and health are found to be significantly associated with the employment of females. For the total household, the coefficient of education and health are also significant. The higher the level of education and the better their health, the higher the likelihood of being located in a community with LSAI.

Table 1
Summary Statistics of Variables.

Variables	Communities without LSAI			Communities with LSAI			Difference (a) vs (d)	Difference (b) vs (e)	Difference (c) vs (f)
	Total Household Head Mean (S.D.) (a)	Female-headed household Mean (S.D.) (b)	Male-headed household Mean (S.D.) (c)	Total Household Head Mean (S.D.) (d)	Female-headed household Mean (S.D.) (e)	Male-headed household Mean (S.D.) (f)			
location (Rural=1, Urban =2)	1.002 (0.041)	1.3056 (0.4614)	1.001 (0.037)	1.447 (0.497)	1.450 (0.499)	1.446 (0.497)	-0.045 **	-0.1441	-0.445
Number of Household Members	3.298 (2.242)	3.533 (2.560)	3.258 (2.198)	3.038 (2.032)	2.643 (1.495)	3.094 (2.093)	-0.260	0.890	0.165
Age (years)	23.844 (7.548)	23.729 (7.909)	23.87 (7.471)	26.162 (8.104)	26.467 (8.231)	26.108 (8.088)	-2.317	-2.738	-2.238
Household Cultivate Plot (Yes=1, No = 2)	1.404 (0.549)	1.267 (0.458)	1.427 (0.458)	1.466 (0.410)	1.524 (0.5055)	1.458 (0.499)	-0.062 *	0.2571	-0.031 **
Household Own farmland (Yes=1, No = 2)	1.8270 (0.3801)	1.733 (0.458)	1.843 (0.366)	1.8592 (0.3483)	1.881 (0.328)	1.856 (0.351)	-0.032 **	-0.147	-0.013 **
Educational qualification	3.559 (4.020)	4.098 (4.103)	3.551 (4.019)	3.998 (4.773)	3.667 (2.698)	4.057 (5.056)	-0.439	0.431	-0.506
Health	1.832 (0.154)	1.833 (0.167)	1.831 (0.152)	1.809 (0.178)	1.811 (0.181)	1.809 (0.177)	0.022 **	0.021 **	0.022 **
Number of Household Asset	1.423 (0.8998)	1.733 (1.100)	1.371 (0.858)	1.557 (1.825)	1.548 (1.173)	1.5508 (1.900)	-0.134	-0.186	-0.188
Outcome Variables Wages (per month)	31,982.48 (58646.69)	14,019.14 (7035.88)	36,601.62 (65044.94)	34,923.24 (70092.37)	27,882.49 (36,384.41)	36,027.68 (74192.31)	-0.183	0.007 ***	-0.198
Labour Allocation (Agric.)	4.695 (1.356)	4.641 (1.3669)	4.707 (1.354)	4.671 (1.396)	4.664 (1.397)	4.673 (1.397)	-0.023 **	-0.023 **	0.034 **

Note: * , ** , *** indicate level of significance at 10%, 5% and 1%, respectively
Source: The Authors' compilation

Table 2
Probit model for generating the propensity scores.

Variables	Total Household Head	Female-Headed Households	Male-Headed Households
Educational qualification	0.074 *** (0.007)	0.073 ** (0.057)	0.073 ** (0.076)
Health	1.332 *** (0.002)	1.116 * (0.079)	1.731 *** (0.006)
thhmem	-0.032 (0.395)	-0.180 (0.729)	-0.050 (0.364)
Age	0.015 (0.124)	0.055 (0.707)	0.027 * (0.069)
HH_cultivateplot	0.331 ** (0.033)	0.182 (0.428)	0.486 (0.026)
HH_ownfarmland	0.000 (0.999)	0.182 (0.821)	0.165 (0.611)
HH_asset	0.0264 (0.722)	0.009 (0.940)	0.045 (0.677)
location	-1.378 *** (0.000)	-1.421 *** (0.001)	-1.326 *** (0.003)
Constant	0.8443	0.8343	-1.725
LR chi2	59.33	27.16	35.70
P-value	0.000	0.007	0.000
Pseudo R ²	0.1365	0.1195	0.172
Log likelihood	-187.628	-100.023	-87.755

Note: Probability values are in parentheses, ***p < 0.01, **p < 0.05, *p < 0.10
Source: The Authors'

5.3.2. Matching quality

Once the researcher completed the estimation of a propensity score for each household, the region of common support is defined to ensure that there was an adequate overlap in the range of propensity scores for the treatment and comparison groups. The validity of common support assumptions was assessed by examining a graph of the propensity score for the treated and comparison groups as seen in Fig. 6. The graph confirms the presence of a sufficient overlap in the distribution of the

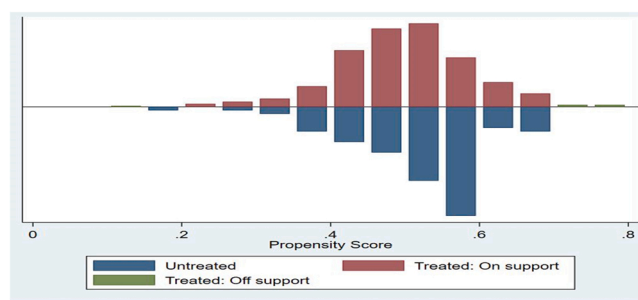


Fig. 6. Propensity score distribution and common support.
Source: The Authors'.

propensity scores across the treatment and comparison groups, suggesting that the identification assumption of common support is met. Following this evaluation, the study carried out balancing tests to check whether or not, within each quintile of the propensity score distribution, the average propensity score and mean of covariates have a similar distribution (balance) across the treated and comparison groups. Fig. 6 shows the histograms of the predicted propensity scores for the treatment and control groups. From Fig. 6, it is clear that the propensity scores have a very even distribution and fall within a similar range, indicating that the treatment and control groups are comparable. The implication of the figure implies that the majority of the sampled households are included in the common support area. Most of the treated households have an equivalent match on the comparison sample; this is crucial for the matched sample in the communities with large scale agricultural investments to be representative of the initial sample.

Before estimating the actual impact, we checked whether or not the treatment and comparison groups were balanced in the matched samples. Statistical techniques such as a two-sample t test, standardised bias (SB), and Percent bias reduction (PBR) were employed. The Pseudo-R² (PS-R²) was also used to check that, after matching is completed, there

should be no systematic differences in the distribution of covariates between both treated and comparison groups, and so the Pseudo-R² should be quietly low. The results of the covariates balancing test before and after matching are presented in Table 3. The two-sample t-test result shows that after matching for all covariates, the mean differences are insignificant suggesting that the covariates are balanced. Moreover, the average standardised bias difference for all covariates was reduced from 26.7 before matching to 3.0 after matching. Significant percent bias reduction after matching was also achieved (see Table 3). Likewise, the Pseudo-R² was notably dropped from 0.115 before matching to as low as 0.002 after matching. When the p-values of the likelihood tests are inspected, it shows that the joint significance test of covariates is not rejected before matching (p < 0.01) but it could be rejected after matching (p > 0.05) (see Table 3). All tests suggest that the specification of the propensity score is effective in balancing the distribution of covariates between the affected and non-affected households.

5.3.3. The propensity score matching results

Table 4 reports the estimation results of the average treatment effect (ATT) for the different outcome variables across the matching algorithms.

The results in Table 4 are compared with the OLS for robustness and sensitivity checks. The estimated average treatment effect for household agricultural wage is positive and significant. The findings indicate that the location of households in communities with LSAs accounts for between a 60% and 70% increase in their total household wages. The existence of LSAs, however, is significantly related to the time the households devote to agricultural activities, and the ATT was negative for all the matching techniques. Therefore, this means that there is a decrease in the number of hours per day allocated to households for agricultural activities. The reduction ranges from 9% to 12%. This result is in line with Herrmann et al. (2018) who found a similar result. However, Osabuohien et al. (2019) found a significant reduction in total household wages for Tanzania.

The female-headed household sub-sample shows a different result while household wage income has a positive average difference when the presence of LSAs is considered. The increase in wages ranges from 69.72% to 82.35% across the different matching algorithms. While the time spent on agricultural activities has a positive average difference, the increase is between 2% and 3% for the different matching algorithms. Thus, the presence of LSAs is associated with positive changes for female-headed household in terms of the time allocated to agricultural activities.

Table 3
Matching Quality.

Variable	Unmatched Matched	Mean		% Bias	% redn. Bias	t-test	
		Treated	Control			T	p > t
location	U	0.609	0.431	36.3	88.4	8.57	0.000
age	M	0.608	0.630	-4.2	78.3	-0.89	0.373
thhmem	U	27.067	24.989	9.9	82.7	2.39	0.017
no_hhasset	M	27.043	27.494	-12.9	56.3	-0.42	0.676
health	U	4.925	5.292	-2.2	88.2	-2.96	0.003
edu	M	4.961	4.989	16.7	58.1	-0.52	0.606
hh_own farm	U	2.313	1.757	7.3	96.9	4.24	0.000
hh_culticatePlot	M	2.168	1.925	22.0	98.7	1.65	0.099
	U	0.680	0.574	-2.6		5.16	0.000
	M	0.680	0.692	8.4		-0.56	0.576
	U	1.177	1.088	3.5		1.98	0.048
	M	1.175	1.138	32.7		0.73	0.463
	U	0.247	0.121	-1.0		8.07	0.000
	M	0.245	0.249	74.3		-0.19	0.850
	U	0.914	0.618	-1.0		16.44	0.000
	M	0.913	0.917			-0.29	0.769
Sample	PS R ²	LR chi ²	p > chi ²	Mean bias		Med bias	
Unmatched	0.115	367.27	0.000	26.7		20.4	
Matched	0.002	5.48	0.705	3.0		1.4	

Source: The Authors'

5.3.4. The impact of large-scale agricultural investments at the individual level

5.3.4.1. Further evidence. In this study, the estimations are based on the household level in terms of female-headed households. Nonetheless, this study takes a step further to consider the impact of LSAs at the individual level. Here, the ATT was re-estimated taking into consideration individual females in communities with and without LSAs. This estimation intends to show the impact of individual females who are not the head of household.

The table presented in Table 5 is similar to the results reported in Table 4. That is, there is no difference between the OLS, NNM and KM in Table 5 and those from Table 4 in terms of the signs and significance of the coefficients of the ATT. Women will experience higher wages in communities with LSAs in Nigerian communities and their labour hours input in the agricultural sector in communities with LSAs will also increase.

5.4. Results from qualitative analysis

Respondents were asked questions pertaining to how much they earned, the number of hours worked, the kind of agricultural activities they engage in, the ratio of male to female, the communities' perception of LSAs on female employment. Table 6 shows the summary of sampled LSAs for this study and details about employment outcomes.

The findings of this qualitative sub-section are based on the reports from the farm workers at the three locations of LSAs sampled in Nigeria i.e. Ogun, Ekiti and Kwara States, as well as the female representatives (women leaders) in these communities.

Large-scale Agricultural Investments employment in Ekiti, Kwara and Ogun State.

Large scale agricultural investments (LSAs) in Ado-Ekiti (Ekiti State) employ about 500 workers, while those in Ota (Ogun State) and Omuraran (Kwara State) employ about 80 and 130 workers, respectively. Findings from the IDIs and FGDs show that in LSAs communities in Ekiti State, there are more females than males, that is, about 66.67% (8 out of every 12) of females are employed. For those in Ogun states, there are equal proportion of male and female (50.00%), and about 53.33% (8 out of every 15) of females are employed in Kwara State.

Generally, the proportion of females is higher when it comes to soft-skills such as harvesting vegetables and peeling of cassava. On the other hand, more males are involved in tedious tasks such as clearing of bushes and harvesting of crops than females. This is in line with the studies by

Table 4
Estimated Average Treatment Effect.

	OLS	% difference	NNM	% difference	KM	% difference
Total Household						
Household wages	31,055.71 ** (0.046)	70.24%	23,625.32 ** (0.024)	64.66%	23,610.47 * (0.064)	60.17%
Time allocation	-0.78 *** (0.000)	-9.02%	-1.86 *** (0.005)	-12.89%	-0.78 *** (0.001)	-9.81%
Female-headed Household						
Household wages	47,564.94 (0.108)	82.35%	32,642.76 (0.217)	72%	25,568.60 (0.305)	69.97%
Time allocation	1.89 *** (0.007)	2.07%	1.65 ** (0.029)	1.45%	2.34 ** (0.017)	3.08%

Note: Probability values are in parentheses; ***p < 0.01, **p < 0.05, *p < 0.10.
OLS: Ordinary Least Squares; NNM: 5 Nearest Neighbour Matching; KM: Kernel Matching
Source: The Authors'

Table 5
Estimated Average Treatment Effect for Entire Female Sample.

	OLS	% difference	NNM	% difference	KM	% difference
Total Household						
Household wages	64002.27 *** (0.006)	80.02%	40670.20 ** (0.023)	72.33%	25568.60 ** (0.035)	69.97%
Time allocation	0.75 *** (0.006)	0.89%	0.837 *** (0.012)	0.99%	2.339 *** (0.013)	3.09%

Note: Probability values are in parentheses, ***p < 0.01, **p < 0.05, *p < 0.10
Source: The Authors'

Ahlerup and Tengstam (Ahlerup and Tengstam, 2015) and Osabuohien et al. (Osabuohien et al., 2020) which argued that on the average land, most farming households who do not have access to land, gain more from agricultural investments, especially in terms of employment opportunities. In addition, the findings from this qualitative study show that females are employed as both tenure and casual staff depending on their levels of education while the tenure staffs require some level of education; the casual staff do not require such. So, most times, this paves way for uneducated females to gain employment in LSAs farms just like their educated counterparts.

Findings from IDIs and FGDs also revealed that most females prefer to work on LSAs farms because they do not own their lands or have access to it. Therefore, wages earned from LSAI employments will help in providing for their families. They spent more time on farm work peeling cassavas, making garri, harvesting vegetables, among others, but earn less due to the nature of their soft skilled jobs unlike males who are into tedious works and earn more even though they spend less time. Also, most men own their lands, so they prefer working on their farms and making some earnings from their produce then work few hours on LSAI farms if contacted and still earn wages. This is similar to the results from the quantitative study.

Most times, the men engage in multiple streams of incomes to make ends meet. They consider wages from LSAs as not enough. Sometimes, their level of education will determine whether they remain in that community or migrate to cities in search of greener pastures. As regards how LSAs have impacted female employment especially, the women leaders posit that the communities have enjoyed and benefitted from LSAs in terms of employment opportunities that some of their women are engaged which has made them a pillar of support to their families and have some sense of belongings, even thou at times, these LSAs prefer employing outsiders who have better skills; also, LSAs has helped in the development of the communities as well as made food available.

5.5. Discussion of qualitative results

5.5.1. Provision of Employment in Ekiti, Kwara and Ogun States

5.5.1.1. Ekiti State. Findings from the in-depth interviews (IDIs) and focus group discussions (FGD) indicate LSAs farms in Ado-Ekiti, Ekiti State have an average number of 500 workers, where about 66.67% (8 out of every 12) of females are employed. This implies that more females are employed than males. Major activities performed by the females in LSAs are harvesting, processing, (for instance, making plantain chips, drying of fish), working in the factory, and marketing of agricultural produce.

5.5.1.2. Kwara State. The average number of workers in LSAI farms in Omu-Aran, Kwara State are 130 workers in which about 53.33%, that is 8 out of every 15) of female are employed. This indicates also, that more females are employed than males in Omu-Aran in Kwara State. The females engaged in harvesting, processing maize, cassava, okra, rice, vegetables, animal farming such as fish and poultry. They also work in the factories and market products.

5.5.1.3. Ogun State. For Large scale agricultural investment (LSAI) farms in Ogun State, average number of workers is 80 where there is equal proportion of male and female (50%). The females are into planting of tomatoes, pepper, okra, plantain, banana, harvesting vegetables, processing and marketing. This study differs from Karakara et al. (2021) that used similar approach but focused on the youth segment in the communities.

The interviews with key informants in these LSAI communities, and focus group discussions with female groups revealed that the female seek employment more in the LSAI farm more than the males. This may be due to the fact that most of the females do not own lands to cultivate or have access to land, so they seek wage employment. These wages helped in providing for their families and gave them self-esteem. The males on the other hand, occasionally carried out specific tasks when they are called upon. This might be as a result of them owning their lands. They prefer to cultivate their lands and sell their produce. They

Table 6
Summary of Key Findings from Large-scale Agricultural Investments (LSAIs).

Location	Ado Ekiti, Ekiti State	Omu-Aran, Kwara State	Ota, Ogun State
Geopolitical Zone	South-West, Nigeria	North-Central, Nigeria	South-West, Nigeria
Approximate size of LSAIs under operations in Hectares	1000	880	725
Main LSAIs operative areas	Crops; Poultry farming; Fish farming; Wood works; Processing of produce	Crops; Poultry farming; Fish farming; Processing of produce	Crops; Processing of produce
Average number of workers	500	130	80
Age range of female in the LSAIs employment (years)	21–52	25–56	22–61
Percentage of female to total employment (%)	66.67	53.33	50.00
^a Number of hours of the females LSAIs	8	9	8
^b Wage range per month (in Naira)	34,000–94,000	16,000 to 100,000	15,000–70,000
Major activities engaged by the Females in the LSAIs	Harvesting, processing (e.g. making plantain chips, drying fish), working in the factory, and marketing	Harvesting, processing maize, rice, cassava, okra, vegetables, animal farming such as fish and poultry farming, working in the factory, marketing	Planting (e.g. tomatoes, pepper, okra, plantain, banana), harvesting (e.g. vegetables), processing and marketing

Notes: ^aThe working period ranges from 7 am to 4 pm, 8 am to pm and 7 am to 5 pm for the LSAIs in Ekiti, Ogun and Kwara States, respectively with 1-hour break. However, with set target of finishing the assigned tasks especially those in processing like peeling of cassava do not observe it. ^bThe average exchange rate was of ₦355 to US\$1 at the time the fieldwork was conducted.

Source: Authors' from fieldwork

also work for specific hours on LSAI farms and still earn some wages.

5.5.2. Wages and Hours worked in Ekiti, Kwara and Ogun States

The wages of the workers on the farms are between ₦34,000.00 – ₦94,000.00 (89.47USD – 247.36USD) in Ado-Ekiti, Ekiti State. The workers in Omu-Aran earn between ₦16,000.00 and ₦100,000.00 while those in Ota, Ogun State earn between ₦15,000.00 – ₦70,000.00 (39.47USD – 184.21USD). These wages depend on the level of qualifications and positions of the workers. For instance, the supervisors earn more than the labourers. The female workers earn lower than the males. This might be due to the fact that the males perform more demanding tasks, so they earn more. The females, who perform soft skills like peeling of cassava and making of *garri*, spend more hours on the farm compared to the males. Most times, the men engage in multiple streams of incomes to make ends meet. They consider wages from LSAIs as not enough. Sometimes, their level of education will determine whether they remain in that community or migrate to cities in search of greener pastures.

Large scale agricultural investments (LSAIs) have impacted female employment especially, the women leaders posit that the communities

have enjoyed and benefitted from LSAIs in terms of employment opportunities that some of their women are engaged which has made them a pillar of support to their families and have some sense of belongings. They complained that at times, these LSAIs prefer employing outsiders who have better skills; also, LSAIs has helped in the development of the communities as well as made food available.

5.6. Implication of findings

The results from the Propensity Score Matching (PSM) and the fieldwork carried out submit that LSAIs have a positive association with the household income, but negatively associated with the number of agricultural hours spent by the household individuals. The results from the findings in this study can be considered from this perspective.

The presence of Large-scale Agricultural Investments brings about employment opportunities which are in line with [Zhan et al. \(2016\)](#). This implies that after the investors acquired the lands of the rural dwellers, they were compensated with wage employments and did not completely dispossess these farmers of their lands. It could also be that the investors in these communities introduced and encouraged new farming practices that yielded improved productivity, food security and led to increase in wage income and improved livelihood. This is similar to the findings in [Herrmann \(2017\)](#) where there exist a significant and overall positive impact on household welfare differences between participants of the investments and the respective counterfactual, after investigating the impact of LSAIs on smallholder welfare comparing wage labour and outgrower channels in Tanzania.

The findings in this study differs from the findings of [Karakara et al. \(2021\)](#), that examined the implications of Large-scale agricultural investments on Youth employment and found a negative relationship between LSAIs and the employment. The presence of LSAIs in the communities yielded a reduction in the amount of wages earned by youths, that is, youth in communities with LSAIs earned lower wage rates than the youths in communities without LSAIs. Also, the youth in communities with LSAIs work lesser hours than the youth in communities with LSAIs. Also, the findings in this study also extend that of [Osabuohien et al. \(2019\)](#) which examined the implications of LSAI on female labour participation. The study found a negative relationship with Household Consumption and Household Income but positively related with the number of hours devoted to agricultural activities by household individuals due to weak institutions in Tanzania that can protect disadvantaged population from the Investors.

In addition, the findings in this study also show that females spend more time on agricultural activities in communities with LSAIs and receive lesser wages This supports the findings of [Mutopo et al. \(2015\)](#) which examined the impact of large-scale land acquisition on women and found that when it comes to wages and employment, women are less favourable compared to men in Zimbabwe due to low level of education. Most times, this causes disparity in income.

6. Conclusion

The findings in this study show that LSAIs impact positively on the household agricultural wage income. The study finds that households with LSAIs have higher agricultural wages in comparison to households in communities without LSAIs. The results show that female-headed households are better off living in communities with LSAIs than in communities without LSAIs. The estimation shows a positive and significant agricultural wage income effect for the entire sample while for the female-headed households, a positive but non-significant effect was revealed.

For the entire sample and the female-headed households, the analysis reveals a negative effect on agricultural labour hour input. From the findings in this study, households in communities with LSAIs spend less time on agricultural activities compared to households in communities without LSAIs. Households that work for LSAIs may spend less time in

investors' agricultural activities with the result that they still have time that they spend on other non-farm activities that could generate revenue.

It is evident from the findings that even though female-headed households spend more time than their male counterparts, they receive less wages than the male-headed households. This can be validated given the situation in Nigeria where there is a general belief that males perform more demanding tasks than females and thus tend to get paid more. Furthermore, the study finds that the female-headed households in communities with LSAs earn more than female-headed households in communities without LSAs, which implies that female-headed households in communities with LSAs are better-off than those living in communities without LSAs. The empirical results presented in this study lead us to some policy recommendations.

One of the benefits of LSAs is the generation of employment. As is evident in this study, such employment brings about an increase in household income but can these jobs be sustained? There are cases where the numbers of jobs available have reduced over time and, in most cases, they have been lower than what the investors had promised. Also, there are challenges regarding the types of jobs given, because managerial positions are mostly occupied by professionals who may not come from these communities. The investors tend to employ people outside the communities into such positions.

The authors submit, therefore, that binding agreements should be entered into, stipulating that individuals in communities where LSAs are located will be employed with good conditions and payment terms, and that incentives and compensation will be given to households whose lands have been engaged. Local stakeholders should also be involved in this project. The presence of LSAs could generate large numbers of jobs, but if there are no formal agreements between the LSAs and the rural dwellers, they could lose their jobs at any time or LSAs may prefer to hire people outside the communities who have better skills. Therefore, the government or the communities should provide schemes of service and regulations or contractual agreements that are binding. This will properly protect these small-scale farmers and also guide both parties on the employment and payment terms as well as address issues with dispossession and low wages.

As a suggestion for future research, it will be helpful to complement the quantitative analysis findings in this study by using more Waves of LSMS_ISA so that other impact evaluation techniques, notably the difference-in-difference (DiD) can be engaged. The difference-in-difference method is important because it can compare changes over time in communities unaffected by large-scale agricultural investments to the changes over time in communities affected by large-scale agricultural investments and attribute the difference-in-difference to the effect of these LSAs. The fieldwork for this study was carried out in three states where large-scale agricultural investments occur. For further studies, fieldwork can be done in other States in Nigeria where large-scale agricultural investments (LSAs) also take place. These include States such as Edo, Niger, Ondo, Kogi, Kaduna, Oyo, Rivers, Anambra, Abia and Benue.

Data availability

Data will be made available on request.

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