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Employment Patterns in Clusters of Foreign Agricultural Investments Farms in Rural Areas

Festo Maro[1,2]*, Rikke Broegaard[3], Evelyne Lazaro[4], Khamaldin Mutabazi[5], Helle Munk Ravnborg[6]

[1]Copenhagen University, Copenhagen, Denmark
[2]Sokoine University of Agriculture, Morogoro, Tanzania
[3]Institute of Geography and Natural Resource Management, Copenhagen, Denmark
[4]Department of Agricultural Economics, Sokoine University of Agriculture, Morogoro, Tanzania
[5]Department of Food and Resource Economics, Sokoine University of Agriculture, Morogoro, Tanzania
[6]Danish Institute for International Studies, Copenhagen, Denmark
Email: *marofesto@gmail.com, rike.broegaard@ign.ku.dk, lazaroa@sua.ac.tz, khamaldin2011@gmail.com, hmr@diis.dk

Abstract

Employment outcomes from foreign land-based agricultural investments (FAI) are contested despite existence of paucity in literature on why individuals seek such employment. This paper assesses individuals' motives for seeking or not seeking employment in FAI farms using multiple correspondence and cluster analysis to understand employment seeking patterns and their association with age, gender and household poverty. Analysis based on stratified proportionate random cross-sectional data collected in Karatu, Iringa and Njombe districts from populations near foreign farms. Three FAI farm employment seeking patterns were established namely individuals motivated by lack of employment alternatives, individuals preferring FAI farm employment and individuals who were curious to learn new knowledge, ideas and skills. FAI employment seeking pattern was independent of age or gender but it was significantly associated with household poverty (p = 0.05). Individuals seeking FAI employment due to lack of employment opportunities frequently belong to poorest households while individuals belonging to less-poor household preferred employment for curiosity to learn. Therefore, FAI doesn't move individual out of poverty or make individual poor but is frequently attractive to individuals from poorest households with limited employment opportunities while those from less-poor household is a preferred employment for additional source of immediate income.

Keywords

Foreign Land-Based Agricultural Investments, Employment, Household

Poverty, Multiple Correspondence Analysis

1. Introduction

The food price boom in 2007/08 triggered a rise in foreign agricultural land-based investments (FAI)[1] in developing countries including Tanzania to satisfy global demand for bio-fuel, bio-materials, and food supplies to net importing countries. The phenomenon renews optimismpathway. However, outcomes vary with projects and geographical areas. Nolte & Ostermeier (2017); Schoneveld, German, & Nutakor (2011); Väth, Gobien, & Kirk (2019) found that establishment of FAI has led to displacement and impoverishment of people around such investments while Herrmann (2017) found that such employment contributes to household welfare. Therefore, FAI employment pathways in reducing household poverty have positive and negative effects on population in the vicinity of such investments.

Employment pathway is frequently cited as social benefit to hosting communities, but there is paucity in the literature on FAI employment effects among segments of population in the vicinity of such investments. Existing evidence attributes employment outcome to FAI investments operations which are scattered and confined on specific case studies arguing that FAI creates few employment opportunities compared to the number of people displaced or those who lose land from establishment or expansion of FAI farms (Schoneveld et al., 2011). But it is not known if all who are displaced or those who lose land prefer FAI employment or have other options. Studies using national level data are such by Ahlerup and Tengstam (2015); Jann, Kerstin, & Kacana, (2018) are emerging, but they only consider land poor or smallholders as beneficiaries and implicitly a reason to seek such employment. Instead of deducing observations or confining findings to a prior hypothesis as Ahlerup & Tengstam (2015) did, this paper explores different motives among individuals seeking FAI employment. The motives were explored based on FAI employment outcomes reported from different livelihood contexts such as Nolte & Ostermeier (2017); Schoneveld, German, & Nutakor (2011); and Smalley (2013) who reported low wages, long working hours, working conditions such as provision of transport or health services, gender related tasks or employment opportunities and also FAI employment as additional sources of income. There is no study which provides a broad understanding of the employment seeking pattern based on individuals' experiences and their livelihood options given employment opportunities available from FAI farms in their vicinity. Consequently, it is not clearly known why some individuals are attracted or not attracted to such employments and the extent to which FAI employment seeking pattern differs within the population segment and in different geographical areas.

The study on which this paper is based survey conducted in Karatu, Iringa and Njombe districts. Over 65% of households in the areas were engaged in ag-

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[1]FAI in this study comprised of foreign and non-local owned commercial farms. Non-local are nationals investors but they do not live in the village where the farm is located.

riculture production which is the main source of employment for the majority of the rural population in poor households. Agricultural employment is an important pathway which most rural households rely on to improve their wellbeing (Herrmann & Grote, 2015; Herrmann, 2017; Schüpbach, 2014). Tanzania and most other developing countries promote and facilitate commercial farm investments from both foreign and local investors with the aim of contributing to improving rural household welfare (URT, 2017). Tanzania is part of and also benefits from the Grow Africa partnership, Danish Agribusiness Fund (DAF) and the New Alliance on Food Security and Nutrition (URT, 2011). Foreign investors under new alliances firmly promise to contribute positively to development outcomes in terms of catalyzing economic activities at local level such as employment generation, enhancing food security, generating revenues through sourcing of local products and services, contract farming arrangements, improved infrastructure, and creating economic opportunities for smallholder farmers (Deininger & Byerlee, 2011; Oya, 2012; World Bank, 2014).

This paper assesses FAI employment seeking motives of individuals living near FAI farms to establish FAI employment seeking patterns which are important to understand who and why individuals seek such employment opportunities and their relation with household poverty. Conceptually, a decision to seek or not to seek such employment opportunities is an outcome which is caused by several subjective underlying motives or reasons; together they are called causal mechanisms (Meyfroidt, 2016). Causal mechanism is an event, fact or variable which in itself is sufficient or insufficient but also a necessary part of combination with other events, facts or variables sufficient for an outcome, in this case a decision to seek or not to seek FAI employment (Meyfroidt, 2016). These causal mechanisms are subjective and could be good payment, provision of transport or health insurance, or good working conditions. They could also be individuals' desire of gaining knowledge or ideas in FAI farms that produce same crops to what individuals are producing or skills related to operating machines or servicing farm equipments in a workshop. Some individuals' reasons to seek or not to seek FAI employment could be related to lack of farming land because of large family size in relation to available family land or those individuals have sold land which was given to them as inheritance or purchased land. Such individuals' own farming is not an option but other types of employment including FAI farms. Other individuals seek FAI employment because their family has lost part of their land, and they no longer have other alternatives for gaining income but seeking farm employment. Other individuals seek or accept FAI farm employment because of risks associate with their own farming such as wild animals or unreliable rainfall or inability to afford pesticides if insects invade their farms. Other individuals work in FAI farms because of lack of other employment opportunities available in the area, but others may not work because FAI employment is not a preferred type of employment or they have other types of work.

According to Meyfroidt (2016), a combination of several similar or different

reasons resulting into similar outcomes or different outcomes is called equifinality. However, the outcome may differ with few other contextual factors or small contingent events differences. If changes occur due to few other contextual factors or small contingent events it leads to "non-mono-consequentialism" or multifinality. These concepts allow disentangling complex underlying for commercial farms contributing to reducing rural poverty through employment causes and outcome relationships which move beyond simple correlation of whether an individual worked or not worked in FAI farm toward a causal pathway in understanding employment outcomes or the pattern of individuals in seeking/accepting or not seeking/accept FAI farm employment. As explained, individual employment outcomes could be a result of one or several similar or different underlying reasons. The same is also to individuals who did not accept/seek FAI employment leading to equifinality. The outcome could be experienced differently by each individual in the rural population defined by age, gender and socio-economic status with respect to different areas leading to multifinality

2. Materials and Methods

2.1. Selection of Study Areas and Respondents

The study was done in Karatu, Iringa rural and Njombe Town Council (TC) districts under the Agriculture Investors as Development Actors (AIDA) project. Karatu, Iringa rural and Njombe TC are designated by the Government of Tanzania as investment corridors to attract foreign agricultural investments. The procedure for selecting specific study areas is explain in detail by Ravnborg et al. (2021)[2]. However, the selection considered agro-ecological suitability, presence of export crops, connectivity to regional markets, and presence of multiple commercial farms to provide different explanation for FAI employment seeking patterns. Proportionate stratified random sampling was used to obtain 1203 respondents of whom 397 were from Karatu, 405 from Iringa and 401 from Njombe. Calculation of the sample size is co-authored in Ravnborg et al. (2021). A struc-

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[2]Multiphased research approach was used to identify research sites and respondents. First identifying agriculture land-based foreign investments in Africa that received loan or blended financing from Danish Agricultural Development Funds followed with selection of farms based on the following criteria; investment must be on land-based production of crops or livestocks; investment must be in East Africa. In Tanzania Karatu, Iringa and Njombe were found to host such investments. Secondly, wards surrounding the investments in each districts were purposely chosen based on Deininger and Xia (2016) who found that development effects from FAl farms can reach a radius of 25 Km. Thirdly, wards population was used to determine proportionate number of villages and in each district a fixed number of 20 villages was used. Fourthly, population register from each selected villages was updated before listing all individuals with 18 years and above. Based on Krejcie and Morgan (1970) a predetermined sample size of 400 respondents was adequate to provide statistical tests. Hence forth, in each research location 400 sample size was used to proportionately determine the sample size for each village. Random number was generated to obtain individuals for interviews. Structured questionnaire was administered to collect individual and household level information on household characteristics (i.e. age, household size, education, place of birth), quality of housing, assets ownership, sources of employment and income, remittances, crops and livestock or livestock products sales, intensity of working or not working in FAI farms in the area, use of farm of labor and technologies, food security, and health.

tured questionnaire was used to collect information for three months. The respondents were asked if over the previous two years they had worked in FAI or non-local commercial farms. A follow up question was asked on why they had decided to seek or not to seek such employment.

2.2. Characteristics of the Study Areas

Karatu district is within the Northern Investment Corridor while Iringa district and Njombe district are within the Southern Agricultural Growth Corridor of Tanzania (SAGCOT). The weather and agro-ecological characteristics of each of the districts are attractive for agricultural investments. Karatu and Njombe districts have cooler weather than Iringa district which attracted European migrants before independence. In Karatu, early European migrants invested in coffee estates on fertile volcanic soils on hills along the border with Ngorongoro conservation area. Table 1 shows the population density in Karatu district is high compare to Iringa and Njombe districts which increases pressure on fertile land. Scarcity of land for agricultural or livestock keeping activities limits employment alternatives, making agricultural wages employment an important source of livelihood to the majority of landless households. According to a survey of 399 individuals by AIDA in the area, it is a relatively less-poor population (Ravnborg et al., 2021), where 40% of the households are characterized as less-poor, 45% as poor and only 15% as very poor (Footnote 3[3] and Table A1 in Appendix A elaborate how household poverty was estimated). With a population density of 106.2 person/km^2, poverty is more widespread in Karatu than in Iringa and Njombe.

About 40% of the households belong to the poorest households; 36% are poor and 24% are less-poor (Table 1). According to the AIDA survey, 10% of the households in the Karatu research area are landless. More than 15% have less than 1 acre of land, and 34% of the households have only between 1 and 2 acres, and 27% of the households have between 2 and 5 acres of land. Only 7% of the households have between 5 and 10 acres of land (N = 397).

The employment opportunities created in the commercial farms owned by non-locals are more numerous in Iringa and Njombe. Twelve percent of household heads take agricultural employment in these types of farms (4.3% for less than 3 months in a year, and 8% for more than 3 months in a year, respectively) (AIDA survey, N = 187 heads of household). The mean daily payment for agricultural labourers is higher for workers in commercial non-local farms than for workers in locally owned neighbouring farms, according to the AIDA survey.

[3]Household poverty was obtained using multidimensional approach based on individual perception of relative wellbeing characteristics. Multidimension poverty is subjective measure based on different characteristics of individual and household levels such as education level, land ownership, assets, ability to hire farm labourers, use of farm mechanization, food production and security, and health. All these characteristics were used to make subjective multidimensional household poverty index and group into less-por, poor and poorest households. Table A1 shows how different levels of wellbeing indicators were used to classify individuals in respective household poverty levels or categories. SPSS ver 24 was used to group respondents to different levels of indicators and aggregated to obtain total score. A cut off point of 0 < 58 was defined as poorest; >58 and <68 was defined as poor and >68 was defined as less-poor.

Table 1. Characteristics of the study areas.

Characteristics of the area	Research area		
	Njombe	Iringa	Karatu
Main crops produced by FAI farm	flowers, tea	seeds, grains, livestock	coffee, wheat
FAI farm Technologies	Low-tech greenhouses	Highly mechanised farming; agro-chemical pest control	Drip irrigation, low-medium farm mechanisation
Export crops	Tea and avocado	Grains, dairy products,	Coffee, Onions
Population density, per/km²	25.5	34.6	106.2
%landless households	0.7	3.2	10.3
% households with less than 1acre	1.5	2.7	15.6
%households with1 - 2 acres	18.5	24.4	34.2
%households with 2 - 5 acres	38.7	34.6	28.2
%households with 5 - 10 acres	29.2	21.2	7.8
%households with 10 - 20 acres	7.5	8.9	2.8
%households with 20 - 50 acres	1	2.7	-
%households with 50 - 100 acres	0.5	0.5	-
% households less poor	40	29	24
%households poor	45	52	36
%households poorest	15	19	40
% of household head take work in non-local farm	2.8	4.8	12.3
% of household head take work in local farms	46.2	24.6	27.3

Source: AIDA survey, 2019.

The mean daily pay for agricultural labourers in local farms in Karatu is 1.74 USD/day, and 2.08 USD/day at commercial, non-local farms (n = 101 local and 37 non-local, respectively).

Separate interviews with employees and non-employees adjacent to the farms revealed different working conditions and employment benefits. Some farms provide lunch, accommodation, transport services for those coming from other regions and health insurance. Others who have worked in the farm complained about delay payments of their wages while others benefitted from on job training provided. Despite low wages in each site, interviewed respondents used salary for various purposes. In Iringa, Karatu and Njombe (Figures 1-3) the respondents used wages to purchase agricultural inputs while some with contracts used salary advance to build houses and pay school fees. Non-employees benefited from increased economic activities and renting rooms or houses to workers.

2.3. Multiple Correspondence Analysis and Cluster Analysis

From analysis point of view, use of individual motives for seeking FAI employment or not poses a challenge and unique consideration of the type of data
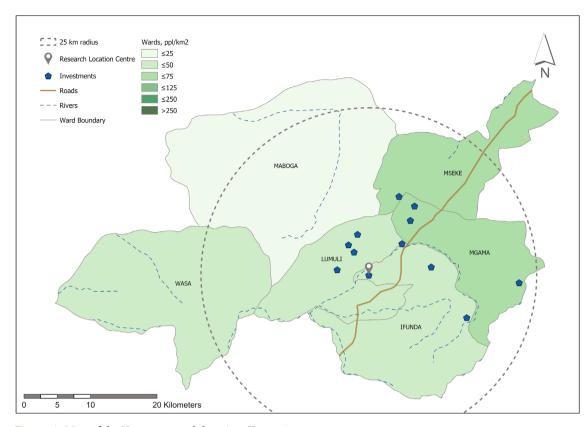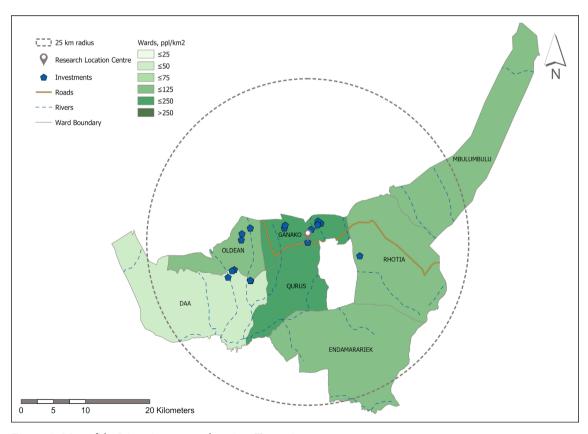
Figure 1. Map of the Karatu research location, Tanzania.

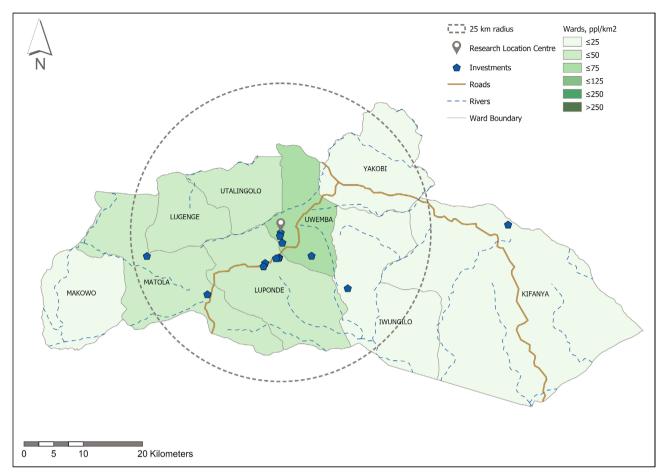**Figure 2.** Map of the Iringa investment location, Tanzania.

Figure 3. Map of the Njombe research location, Tanzania.

analytical approach. First, decision of an individual to work or not is a choice driven by several factors which are either economic or non-economic or circumstantial. Informed by previous related studies, we used statements which describe individual as either attracted or not attracted. The statements were measured as categorical and thus motives for working or not was a multilevel categorical variable because an individual might chose more than one statement. Secondly, there was lack of prior expectation as to the nature of the relation between motives and individual characteristics to verify a priori hypotheses. To address the challenges, multiple correspondence analysis (MCA) was used for the analysis of multilevel categorical responses as exploratory analysis instead of testing prior hypotheses. MCA allows simplifying complex multilevel categorical data yielding hidden patterns of data in terms of similarities which can be used to define and group together individuals with similar behaviour. Groups formed based on employment motives can further be analysed to understand conditions which are associated with household wellbeing.

MCA and K-means cluster analysis was done with the help of Statistical Package for Social Science (SPSS) Ver 24. MCA and clustering approaches are increasingly used in social sciences in detecting and identifying underlying structures in cognitive ageing and customer preferences and patterns (Bejaei, Cliff, & Singh,

2020; Costa, Santos, Cunha, Cotter, & Sousa, 2013). MCA is a non-parametric statistical tests developed for rich and complex nominal data without needing strict assumptions as compared to Chi-square analysis, Fischer's exact test, *G*-statistics, and ratio test. MCA is appropriate in exploring and analysing variables in datasets which may be quantitative or qualitative, temporal or non-temporal, and/or objective or subjective. This is the case in this study where the reasons for seeking or not seeking employment in FAI farms may represent psychological, economic, socio-cultural or other forms of subjective biases, both endogenous and exogenous. MCA generated object scores which were used as inputs into k-means clustering. K-means average object scores from MCA to find centroids or means. Centroids were randomly grouped and iteratively optimized the clustering of centroids. The number of clusters was based on the one which converged to zero with a minimum number of iterations (Costa et al., 2013). Cross-tabulation was used in the preceding analysis to measure any significant association between FAI employment pattern and different segments of population and household wellbeing using Pearson Chi-square, measured at the 5% level of significance.

3. Results

3.1. FAI Employment Seeking Patterns

FAI employment opportunities promised to surrounding communities is frequently in terms of thousands or millions. These promises are used to promote FAI establishments in rural areas as pathways for rural development and contribute to reduce household poverty (Brüntrup, Absmayr, Dylla, Eckhard, & Remke, 2016; German, Cavane, Sitoe, & Braga, 2016). However, it was found that only 8% of individuals either the household head or other members of the household had worked in FAI farms. This is less than anticipated considering that FAI farm employment generating potential is expected to contribute to the majority of rural households' welfare (Gyapong, 2020; Herrmann & Grote, 2015). FAI employment generation potential is also differ from marked statistical significance with respect to geographical locations in which 13% of individuals in Karatu more frequently take such employment than Iringa (7%) and Njombe (4%).

Karatu had more individuals who worked in FAI farms probably due to large proportion of landless households, higher population pressure and larger proportion of poorest households than in the two other districts. This coincides with findings by Ahlerup & Tengstam (2015) that people who own scanty land are frequently attracted to work in FAI farms. It implies that FAI employment generating potential is low but such employment is very important in areas with relatively many poor households, characterized with high population density and land-scarcity. However, Kareem (2018) found that high population density is not important for seeking employment in FAI farms. Therefore, FAI should not be promoted or considered as a sole provider of employment in rural areas
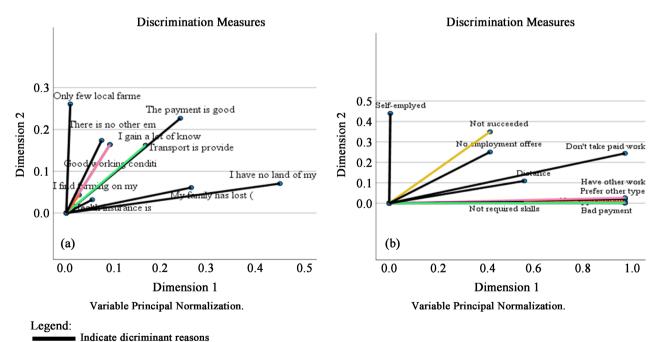
but as an opportunity for additional income.

Table 2 shows that 92% of individuals, either the household heads or other members of the household, did not take FAI employment. The differences in the districts were statistically significant in which Njombe had 96% of individuals who not worked in FAI farms, followed by 93% in Iringa and 87% in Karatu. Individuals who had not worked in FAI were included to learn from their motives for not seeking such employment on livelihood strategies to individuals who had worked in FAI farms. Literature exists about this group of individuals which is too significantly large to ignore. Thus, motives for not seeking FAI employment were analyzed to identify patterns of seeking FAI employment and not seeking such employment.

Figure 4(a) and Figure 4(b) are two-dimension displays of individuals' motives for seeking employment and not seeking employment respectively. The figures provide visual aid in identifying hidden structures of the data in order to

Table 2. Individuals FAI farm employment seeking patterns.

Research Locations	Employment Seeking in FAI farm (%)		Total (%)
	Yes	No	
Karatu (n = 397)	12.8	87.2	100
Iringa (n = 405)	6.9	93.1	100
Njombe (n = 401)	4	96	100
All (N = 1203)***	7.9	92.1	100

Note: ***Significant statistical association using Pearson Chi-square at 1%.

Figure 4. (a) MCA bi-plot pattern of individual's motives to work in FAI farms. (b) MCA bi-plots of motives for not working in FAI farms.

define pattern of the individuals. The length of the line or vector shows the most discriminant reasons while the short arrows mean the average or common reason for all individuals to work in FAI farms. The reasons that apply to both dimensions are at the centre of the graph. Furthermore, cross-tabulation was done between the motives for seeking and not seeking FAI employment with clusters as a second step to confirm MCA patterns.

Dimension 1 in Figure 4(a) shows lack of own land and that families losing land were the most discriminate features which defines the pattern of individuals seeking FAI farm employment and can be grouped together because they are close to each other. Along the dimension 2 only few local individuals employ others is far from other motives which suggest an outlier. But along the dimension 2 it shows there is no other employment in the area and gaining of knowledge, skills and ideas seems to be almost close to each other as one group. This indicates the pattern of individuals in this group suggests they are curious to learn through employment in FAI farms. In the middle it shows that good payment, good working conditions and provision of transport to lie close to each other which can be considered as another pattern of individuals seek FAI employment. Employment seeking pattern of these individuals was defined as preferred choice of employment. Along the dimension 2 it shows that individuals seek FAI employment because of lack of own land and losing family land as lying close to each other. This pattern was defined as individuals who seek FAI employment because of limited employment alternatives since they lack land or their family lost land or part of it land which means own farming is not an option as main source of livelihood. Close to the centre of the dimension 1 and 2 it shows that provision of health insurance provision and finding own farming too risky are common among all individuals who seek FAI employment.

Figure 4(b) present bi-plot graph which display individuals motives/reasons for not seeking FAI employment. Self-employment motive which lies along dimension 2 is very far from the rest suggesting a potential outlier in this type of analysis. Along the middle are individuals who would like to work in FAI farms but have not succeeded for various reasons is close to individuals who are not seeking FAI employment because of no or limited employment offered by existing FAI farms. The pattern of individuals in this group was defined as individuals who would like to work but not succeeded. In dimension one several motives lie close to each other which includes lack of required skills, bad payment, prefer other types of works, and having other work or employment. This pattern of individual's reasons for not working in FAI farm was defined as Prefer self-employment. Just above it are individuals who do not seek employment in FAI farms because of they don't take paid farm works, and farms are far away. This pattern was defined as "not preferred type of work".

Descriptions of the observations in Figure 4(a) and Figure 4(b) shows there are different causal mechanisms on individual to decide either to take or not take FAI employment which is contrary to Ahlerup & Tengstam (2015); Jann et al.

(2018); Nolte, (2014) who considered only lack of land or displacement as motive for seeking FAI employment. Therefore, lack of land or limited land is a causal mechanism which in itself is not enough to make individual to decide to take or not to take employment in FAI farms. Instead this analysis found decision to work or not to work involve more than one reason or causal factors that were further analyzed to give patterns of seeking or not seeking FAI employment in the studied areas. FAI employment patterns are contextually bound to respondents and geographical areas.

Table 3 presents three types of FAI employment seeking patterns obtained from individuals motives for seeking FAI employment. Individuals who seek FAI employment due to no alternative employment, individuals who found FAI employment is a preferred type of employment and individuals who seek FAI employment for curiosity to learn new knowledge, ideas and skills in FAI farms. Overall with a marked statistical significant difference, 70% of individuals take FAI employment for curiosity to learn new knowledge, ideas and skills in FAI farms followed by 17% of individuals who work in FAI farms due to lack of alternative employment and 14% of individuals who worked in FAI farm as a preferred type of employment. The differences were statistically significant at 5% which means there is association between research location and FAI employment seeking patterns.

Furthermore, distribution of FAI employment seeking pattern due to no alternative employment vary with respect to geographical areas range from 29% in Karatu, to 6% in Njombe while in Iringa there was none. Individuals worked in FAI farms as preferred types vary in different research locations from 18% in Iringa to 14% in Karatu and 6% in Njombe. Curiosity to learn pattern for seeking FAI employment was largely among individuals from Njombe (88%), followed by 82% in Iringa and 57% in Karatu.

Therefore, distribution of FAI seeking employment is not uniform across geographical areas. Individual seek FAI employment due to no employment alternative is more frequent in areas with land availability challenges and high percentage of poverty while individuals who seek FAI employment for curiosity

Table 3. Individuals FAI farm employment seeking patterns by geographical areas.

Research Locations	FAI Employment Seeking Pattern (%)			Total (%)
	No Alternative Employment	Proffered Type of Employment	Curiosity to Learn	
Karatu (n = 51)	29.4	13.7	56.9	100
Iringa (n = 28)	0.0	17.9	82.1	100
Njombe (n = 16)	6.3	6.3	87.5	100
All (n = 95)[a,**]	16.8	13.7	69.5	100

Note: **significant statistical association using Pearson Chi-square at 5%. [a]4cells (44.4%) have expected count less than 5. The minimum expected count is 2.19.

to learn new is more frequent in areas with no land availability and with less poverty. Furthermore, individuals who seek FAI employment as preferred type of employment is more frequent in areas where poverty and availability of land is modest.

Table 4 shows patterns of individuals who did not seek FAI employment. Overall 100% of individual who did not seek FAI employment were self-employment followed by 0.2% who would like but not succeeded and 0.1% of individual who find FAI employment is not preferred type of work. However, the differences were not statistically significant at 5% which means there is no association between individual's patterns for not seeking FAI employment and research locations. Therefore, self-employment is independent of a geographical area because potentially everyone prefers self-employment than being employed. Need for cash including limited livelihood options and other resources for self-employment result into seeking FAI employment. "*I look for employment in FAI farms when I need money to purchase farm inputs before season begin*" interview with youth in Iringa. This was also found in Karatu and Njombe where individuals seek FAI employment to meet various cash needs including school fees, hiring tractor and other social functions.

3.2. FAI Employment Seeking Patterns by Age and Gender

Table 5 shows distribution of gender and FAI employment seeking pattern with respect to research locations. In Karatu, 27% of men and 33% of women more frequently takes FAI employment due to lack of employment alternatives than in Njombe while Iringa there was none. However, in Njombe it was only women who worked in FAI due to lack of other employment alternatives. In Iringa 21% of women more frequently than 14% of men take FAI employment as a preferred type of employment while in Karatu it was opposite where 20% of men more frequent than 5% of women take FAI employment as a preferred type of employment. In Njombe it was a preferred type of work among men only. Men and women seeking FAI employment for curiosity to learn was observed in all research location but in varying proportions. Despite of observed differences,

Table 4. Individuals patterns for not seeking FAI farm employment by geographical areas.

Research Locations	Individual Pattern for not seeking FAI Employment (%)			Total (%)
	Self-employed	Not Preferred type of work	Would like but not succeeded	
Karatu (n = 362)	99.2	0.3	0.6	100
Iringa (n = 384)	100	0.0	0.0	100
Njombe (n = 396)	100	0.0	0.0	100
All (N = 1142)[a,ns]	99.7	0.1	0.2	100

Note: [ns] not statistically significant using Pearson Chi-square at 5%. [a]6 cells (66.7%) have expected count less than 5. The minimum expected count is 0.32.

association between gender and FAI employment seeking pattern was not statistically significant. Therefore FAI seeking employment pattern is independent of gender, which means FAI employment seeking pattern either due to no employment alternative or as a preferred types of employment or for curiosity to learn is not gender or location specific.

Table 6 shows distribution of individual's age categories and FAI employment seeking patterns with respect to research locations. It was found that age categories of individuals and FAI employment seeking patterns do not have statistical significant association which means seeking FAI employment among individuals near FAI farms is independent of age. Both youth and adults seek such employment which is important for their livelihood. However, Table 6 shows a varying proportion of age categories with respect to FAI employment seeking patterns in different research locations. In Karatu it was 29% of each youth and adults frequently worked in FAI farms due to no employment alternatives while 18% of adult frequently take FAI employment as a preferred type of employment than 6% of youth. About 65% of youth frequently seek FAI employment because of curiosity to learn new knowledge, skills and ideas from FAI farms than 53% of adults. In Iringa it was similar to Karatu where 31% of adults more frequently seek FAI employment as preferred type of work than 7% of youth while 93% of youth more frequently than adults (69%) seek FAI employment for curiosity to learn new knowledge, ideas and skills in FAI farms. In Njombe it was 13% of adult more frequently seek FAI employment because of no employment alternatives

Table 5. Distribution of individuals gender and FAI farm employment seeking pattern by geographical areas.

Research Locations	Gender	FAI Employment Pattern (%)			Total (%)
		No Employment Alternatives	Preferred Type of Employment	Curious to Learn	
Karatu[ns,a]	Men (n = 30)	26.7	20.0	53.3	100
	Women (n = 21)	33.3	4.8	61.9	100
Iringa[ns,b]	Men (n = 14)	-	14.3	85.7	100
	Women (n = 14)	-	21.4	78.6	100
Njombe[ns,c]	Men (n = 7)	0	14.3	85.7	100
	Women (n = 9)	11.1	0	88.9	100
All[ns]	Men (n = 51)	15.7	17.6	66.7	100
	Women (n = 44)	18.2	9.1	72.7	100
	All gender (n = 95)	16.8	13.7	69.5	100

[ns]Not statistically significant at 5% measured with Pearson Chi-square; [a]2 cells (33.3%) have expected count less than 5. The minimum expected count is 2.33; [b]2 cells (50%) have expected count less than 5. The minimum expected count is 2.32 computed only for a 2*2 table; [c]4 cells (66.7%) have expected count less than 5. The minimum expected count is 0.44.

Table 6. Distribution of individuals age and FAI farm employment seeking pattern by geographic areas.

Research Locations	Age	FAI Employment Pattern (%)			Total (%)
		No Employment Alternatives	Proffered Type of Employment	Curiosity to Learn	
Karatu[a,ns]	Youth (15 - 35 years) (n = 17)	29.4	5.9	64.7	100
	Adults (36 > years) (n = 34)	29.4	17.6	52.9	100
Iringa[b,ns]	Youth (15 - 35 years) (n = 15)		6.7	93.3	100
	Adults (36 > years) (n = 13)		30.8	69.2	100
Njombe[c,ns]	Youth (15 - 35 years) (n = 8)	0.0	12.5	87.5	100
	Adults (36 > years) (n = 8)	12.5	0.0	87.5	100
All[ns]	Youth (15 - 35 years) (n = 40)	12.5	7.5	80	100
	Adults (36 > years) (n = 55)	20.0	18.2	61.8	100
	All gender (n = 95)	16.8	13.7	69.5	100

[ns]Not statistically significant at 5% measured with Pearson Chi-square; [a]2 cells (33.3%) have expected count less than 5. The minimum expected count is 2.88; [b]2 cells (50%) have expected count less than 5. The minimum expected count is 2.59 computed only for a 2*2 table; [c]4 cells (66.7%) have expected count less than 5. The minimum expected count is 0.44.

while youth it was none. However, 13% of youth frequently seek FAI employment as a preferred type of employment than adults. In terms of seeking FAI employment because of curiosity to learn, in Njombe it shows that both youth and adults work in FAI farm to learn new knowledge, ideas and skills.

3.3. FAI Employment Patterns and Household Wellbeing

Table 7 shows association between FAI employment pattern and household wellbeing with respect to research locations. It was found that household wellbeing as an indicator of poverty associate significantly at 5% with household wellbeing in Karatu but not in Iringa and Njombe. In Karatu it was observed that with a marked statistical significance difference in which employment pattern of individuals belonging to poorest household frequently take FAI farms employment due to lack of employment alternatives (38%) and curiosity to learn (63%) while individuals belonging to less-poor household frequently take FAI employment as a preferred type of employment.

Table 8 shows association between pattern of individual not taking FAI employment and household wellbeing with respect to research locations. It was found that individual patterns for not taking FAI employment do not associate with household wellbeing to which they belong at 5% p-value. This means if individual decide not to take FAI employment is independent of household wellbeing to which he or she belong. It implies someone from rich or poor household can decide not to take FAI employment in any area. It is not only the poor who seek or take such employment or benefit from such employment as reported in Ahlerup & Tengstam (2015).

Table 7. FAI employment patterns on household wellbeing by geographic areas.

Research Locations	Household Wellbeing	FAI Employment Pattern (%)			Total (%)
		No Employment Alternatives	Preferred Type of Employment	Curious to Learn	
Karatu**,a	Non-poor (n = 3)	0.0	66.7	33.3	100
	Poor (n = 24)	25.0	20.8	54.2	100
	Poorest (n = 24)	37.5	0.0	62.5	100
Iringa[ns,b]	Less-poor (n = 10)	-	0.0	100	100
	Poor (n = 7)	-	14.3	85.7	100
	Poorest (n = 11)	-	36.4	63.6	100
Njombe[ns,c]	Less-poor (n = 6)	0.0	0.0	100	100
	Poor (n = 7)	0.0	14.3	85.7	100
	Poorest (n = 3)	33.3	0.0	66.7	100
All	Less-poor (n = 19)	0.0	10.5	89.5	100
	Poor (n = 38)	15.8	18.4	65.8	100
	Poorest (n = 38)	26.3	10.5	63.2	100
	All categories (n = 95)	16.8	13.7	69.5	100

**Statistically significant at 5% Pearson Chi-square x^2 = 12.34, df 2; [ns]Not statistically significant at 5% Pearson Chi-square; [a]5 cells (55.6%) have expected count less than 5. The minimum expected count is 0.41; [b]3 cells (50%) have expected count less than 5. The minimum expected count is 1.25; [c]7 cells (77.8%) have expected count less than 5. The minimum expected count is 0.19.

Table 8. Pattern of individual not taking FAI employment by geographical areas.

Research Locations	Household Wellbeing	FAI Employment Seeking Pattern (%)			Total (%)
		Preferred Self-Employment	Not Preferred Type of Work	Would like But Not Succeeded	
Karatu[ns,a]	Less-poor (n = 94)	97.9	1.1	1.1	100
	Poor (n = 132)	99.2	0.0	0.8	100
	Poorest (n = 136)	100	0.0	0.0	100
Iringa[ns,b]	Less-poor (n = 116)	100	-	-	100
	Poor (n = 205)	100	-	-	100
	Poorest (n = 63)	100	-	-	100
Njombe[ns,c]	Less-poor (n = 161)	100	-	-	100
	Poor (n = 177)	100	-	-	100
	Poorest (n = 58)	100	-	-	100
All[ns]	Less-poor (n = 371)	100	-	-	100
	Poor (n = 514)	99.5	0.3	0.3	100
	Poorest (n = 257)	99.8	0.0	0.2	100
	All categories (n = 1142)	99.7	0.1	0.2	100

[ns]not statistically significant at 5% Pearson Chi-square; [a]6 cells (66.7%) have expected count less than 5. The minimum expected count is 0.26; [b]No statistics are computed because cluster number of cases not worked is constant; [c]6 cells (66.7%) have expected count less than 5. The minimum expected count is 0.23.

4. Discussion

Individuals have multiple motives for seeking or taking FAI employment which were generalized into three patterns of FAI employment seekers. Individual's taking FAI employment due to lack of other employment opportunities, those who prefer FAI employment and those who are curious to learn new knowledge, ideas and skills from FAI farms. No a prior hypothesis was drawn to contrast to the findings because the study was exploratory and the aim was to deduce from respondents underlying causal mechanisms to take FAI employment and contextual explanations to understand complex association to the geographical areas. It is a different approach in exploring association between individuals and FAI employment opportunities reported in other studies (Ahlerup & Tengstam, 2015; German, Cavane, Sitoe, & Braga, 2016; Herrmann, 2017; Osabuohien, Efobi, Herrmann, & Gitau, 2019; Schoneveld et al., 2011).

Differences in FAI farm employment are not about gender or age by itself but it is together with pattern of taking such employment among men or women or youth or adults surrounding FAI farms. Instead of arguing women benefit less than men on FAI employment opportunities it is important to argue by gender or age of the individual's FAI employment seeking pattern to avoid comparing men and women with different FAI employment seeking patterns (Osabuohien et al., 2019). By assuming that men and women or youth and adults have the same interest toward FAI employment is questionable and it leads to incorrect conclusions.

FAI employment do not make individual poor or less-poor instead FAI employment is frequently attractive to individuals from poorest household who do not have other employment alternatives in particular to areas with high levels of poverty and few who owns land. This is contrary to Herrmann & Grote (2015); Herrmann (2017) who argue FAI employment improve household welfare through income. Bellemare and Bloem (2018) argue such conclusions have limited internal validity and Meyfroidt (2016) further argue causality and causality mechanisms increases complexity to reach such conclusions. Since there are multiple pathways that potentially contribute to household income not only from FAI employment. Furthermore, those who are less-poor rarely are attracted to work in FAI farms but if they work in such farms it's a preferred type of employment to meet a particular immediate cash needs or they intend to gain knowledge, new ideas and skills. Therefore, attributing FAI employment on household poverty based on FAI employment status is risking to comparing incomparable but also conclusions hardly represent complexity interactions of livelihood options to household poverty.

These results however come with caveats. The data used was based on randomized cross-sectional survey using a sampling frame from updated village population registers. Probability of missing FAI employees who travelled out of the village or moved elsewhere for economic reasons might be missing. Efforts were done to make replacement. This could probably explain a small number of individuals who worked in FAI farms because survey was not done to the FAI farms.

Despite observed challenge, the data analyzed show insights on how FAI employment relates with motives, age, gender and household poverty.

5. Conclusion

This paper contributes to the debate of employment outcomes from FAI by assessing individual's motives for taking or seeking FAI farm employment and generalizing into patterns of seeking or taking such employment. It identified individual who seeks FAI employment due to lack of employment alternatives, a preferred type of employment and curiosity to learn new knowledge, ideas and skills in FAI farms. It was found age and gender are independent of FAI employment patterns. Furthermore, individuals from poorest households are frequently attracted to seek FAI employment because of lack of employment alternatives while individuals from less-poor household is frequently a preferred type of employment or they are curious to learn new knowledge, ideas and skills in FAI farms. In addition, it was found area with relative few who own land, high population density and large proportion of poor households significantly associate with FAI employment seeking pattern and household poverty from which an individual belong in which individual with lack of employment alternative from poorest household more frequently are attracted to seek or take such employment than individuals from less-poor households. Therefore, FAI employment does not move individuals out of poverty but it is more attract individuals from poor households with limited employment alternatives than individuals from less-poor households.

Findings of this study have important contributions to studying the effects on FAI employment outcomes to neighboring population. It points out the importance of exploring the differences in motives for FAI employment and not by employment status often used in the existing literatures (Herrmann, 2017; Schüpbach, 2014). Since FAI employment status is by itself is an outcome which can be explained by causal mechanisms that can take the form of subjective or non-subjective reasons; geographical, economic or social reasons.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix A

Table A1. Household wellbeing characteristics indicators used to categorize household poverty levels.

Indicator	Score*	Description
ILAND	33	Household has access to more than 5 acres of land
	67	Household has access to 1-5 acres of land
	100	Household does not have access to land or has access to less than 1 acre of land
INONAG	33	Somebody in the household has a 'high entry cost' non-agricultural source of income, like being a professional, being permanently employed, owning a shop, business (trading, e.g. timber, agricultural produce, charcoal, transport), renting out rooms, etc.
	67	Somebody in the household has a non-agricultural source of income like tailoring, crafts making, brewing beer, providing transport by driving *boda boda*, making and selling food etc., or the household receives remittances from family members working elsewhere, while nobody is engaged in high-entry cost activities
	100	Nobody in the household is engaged in any of the above non-agricultural sources of income
IANIMAL	33	Somebody in the household has cattle or oxen, possibly together with other animals
	67	Nobody in the household has cattle, but they have other animals (goats, sheep, pigs, chicken, turkeys or rabbits)
	100	Nobody in the household have animals, not even chicken
IHIRE	33	Hire laborers for at least two of the following agricultural tasks: land clearing, ploughing, planting, weeding, harvesting or post-harvest processing
	67	Do not hire laborers or hire laborers for one agricultural task only
IFOOD	33	Have not experienced a period of food shortage within the last year
	67	Have experienced a period of food shortage within the last year which lasted less than two months or which lasted longer but the only recourse taken was eating less meat, using farm products rather than buying so much or buying food or that the husband day-labored more
	100	Have experienced a period of food shortage within the last year which lasted two months or more
IFEED	33	Eat rice at least once a week; fry food at least once a week; and eat meat at least once a month
	67	Eat rice less than once a week, or fry food only occasionally, or eat meat less than once a week
	100	Eat rice less than once a month and eat meat less than once a month
IHOUSING	33	Have houses with walls of bricks or plastered walls and iron or tile roofs, and which are well maintained
	67	Have houses which may have iron/tile roofs or brick or plastered walls, but not both conditions at once, or have both but are in need of maintenance
	100	Have houses with walls made of old tins, banana or mud; or roofs that are grass thatched or made of polythene papers, banana fibre, old tins; or have houses that are in need of major repairs
IHEALTH	67	Nobody in the household had suffered from malaria, T.B., HIV/AIDS, anemia or chest-related diseases during the past year, or had done so, but the household had consulted the clinic with own money without the need to borrow money from relatives, neighbors, etc.
	100	Somebody in the household had suffered from malaria, T.B., HIV/AIDS, anemia or chest-related diseases during the past year, but either the clinic had not been consulted due to lack of money the clinic had been consulted with money borrowed from relatives, neighbors, or made available through the sale of land or other assets
ISCHOOL	33	Have or have had children at secondary school or higher, and do not have children (girls or boys), including orphans, between 6 and 12 years who are not attending school

Continued

	67	Do not have children, including orphans, between 6 and 12 years who are not attending school
	100	Have children (including orphans) between 6 and 12 years who are not attending school
IMARITAL	67	Household head is male or a married or co-habiting woman
	100	Household head is a widow or single or divorced woman

*Scores are arbitrary to indicate different level of wellbeing.