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Non-Farm Livelihood Diversification in Kibaigwa, Dodoma Tanzania

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Abstract
In many countries, rural transformations are being shaped much by rural towns and small cities due to the role played in boosting the rural non-farm economy. This study evaluates non-farm livelihood diversification and rural transformation in Kibaigwa emerging urban center. Specifically, the study is aimed at analyzing the contribution of non-farm livelihood activities to rural transformation, analyzing factors influencing participation in the non-farm livelihood activities. Independent sample t-test statistics, descriptive statistics and logit regression were the methods employed for analysis. Moreover, mean income from household engaging in non-farm activities was 329789 TZS which was larger compared to the mean income of 5189 TZS earned by household engaging in farming activities while education level and distance to market were among the influencing factors in participation in non-farm livelihood activities. Thus, it's concluded that non-farm activities contribute to rural transformation by providing high income to household's income and employment activities.
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1. Introduction

Rural development is the mechanism of enhancing people's quality of life and economic well-being in rural areas, often sparsely populated and relatively isolated areas (Chambers, 2014). Traditionally, rural development has focused on natural resources that are land intensive such as agriculture and forestry (Nampula *et al.,* 2016). Many rural households and development have been contributed by small urban centers because small urban centers provide the market for agricultural yield from the surrounding rural areas, provide the distribution of goods and services to the surrounding rural areas and act as the center of economic growth as well as consolidation of non-farm activities (Sharifinia, 2013).

Furthermore, rural development is attributed by rural–urban linkages which are important tools for understanding the complexities of people's livelihoods and their strategies, which involve mobility, migration and the diversification of income sources and occupations. The remittances that most rural households depend on are the result of this mobility and migration (Van Lindert & Steel, 2017). High levels of multiple activities are also the result of the income and occupation diversification that most rural individuals and households' practice when combining farming with non-farming, as well as with off-farm activities. This is especially true among the younger generations and unmarried young women in rural and peri-urban areas (Akkoyunlu, 2015).

About 30-50% of rural households in most Sub Sahara Africa, earn income from non-farm activities such as agro-processing, constructions, trading, transport, government services, trading (Alobo, 2015; Diao *et al.*, 2018). In Tanzania, rural household perceive non-farm activities as a significant economic and social livelihood strategy (Diao *et al.,* 2018). Evidence seems to indicate that rural non-farm activities in Tanzania have significant impact on family well-being (Wineman, 2019).

Rural household involvement in Tanzania's non-farm activities is caused by several factors. Firstly, reduced agricultural crop productivity caused by rising production costs has reduced reliance on agriculture activities as the primary source of cash income and employment for rural household. Secondly, land shortage due to increased population and reduction in soil fertility due to unreplaced continuous use. Thirdly, failure and delay in paying reasonable prices to the farmer (Chamicha, 2015).

Moreover, spatial rural-urban linkages, which involve the flows of people, goods, money and information between urban centers and rural area and are important drivers of economic activities (Arndt *et al.*, 2018). The linkage between rural-urban centers acts as the driving force of the rural transformation in various parts of the country and the rest of the world (Adam *et al.,* 2018).

Rural transformation involves a comprehensive societal change whereby rural societies diversify their economies and reduce their reliance on agriculture (Demissie & Legesse, 2013; Czyżewski & Smędzik-Ambroży, 2015). It encompasses the change from agrarian to non-agrarian focus of the awareness of the people and introduction of new economic activities such as small industry development, infrastructure development, market

growth and financial market developments. Among other factors, there is a decline in agricultural activities (decline in the number of people who derive their livelihoods from agriculture activities) due to pressure that is exerted on agricultural land by the diversified activities. Hence, rural societies engage more in non- farm activities (FAO, 2017).

In Sub Saharan Africa many rural smallholder farmers have increasingly diversified their livelihoods through non-farm activities and migration (Losch *et al.,* 2012). Moreover, migration cause decline in the productivity of agriculture and loss of farming knowledge in area of migrants' origin and support off-farm and non-farm development in the area of destination (FAO, 2017). Non-farm activities are taking new face in changing societal livelihood diversification in emerging urban centers due to interplay of rural-urban linkages (Dary & Kuunibe, 2012; GSS, 2014; Owusu & Abdul-Rahman, 2011). Most important non-farm activities include agro- processing industries.

There are number of studies that have analyzed livelihood diversification in rural areas but little is known on non-farm livelihood diversification in the face of rural transformation. Rural transformation can lead to numerous positive developments in the lives of people and the nations. These developments include improvement in education, health, water and sanitation, increased rural and urban employment opportunities (IFAD, 2016). The current study focused on non-farm livelihood diversification in the face of rural transformation in Kibaigwa emerging urban centre.

The overall objective of this paper is to evaluate non-farm livelihood diversification and rural transformation in Kibaigwa emerging urban center. Specifically, the paper intends to; analyze the contribution of non-farm livelihood activities to rural transformation in Kibaigwa emerging urban center, factors influencing participation in the non-farm livelihood activities Kibaigwa emerging urban center. The results of the study will provide timely and evidence-based information to policy makers and donors interested in rural development to devote and provide support to the non-farm sector. Moreover, this study will contribute to sustainable development through consideration of allocation of land for agricultural and non-agricultural activities by Township development planners

2. Literature review

This section discuss on theoretical and conceptual framework and empirical review.

2.1 Theoretical Review

2.1.1 Asset and Insurance Diversification Theories

This study is based on asset and insurance diversification theories as well as the utility theory. Non-farm livelihood diversification was classified by Ellis and Freeman (2004) under asset-based or insurance-based diversification theories. The theory of asset-based diversification suggests that the degree and extent of diversity in the livelihood mix of a farm household reflects the degree of diversity in the resources or assets to which it has access or own. These assets include; financial, human, physical, natural and social. For example, a household which possesses a large area of land proportional to the amount of labour will be expected to engage in cultivation while a farm household which has a large amount of labour relative to farmlands will be expected to specialize its operations in the non-farm sector. On the other hand, the insurance-based diversification theory argues that income failures and shocks dictate and pushes the farm household to diversify its activities.

According to the advocates of the theories based on asset and insurance, there are various views on the justification of diversification of non-farm livelihoods by farm household and other folks. Diversification in non-farm livelihoods could emerge as a tactic of survival against high risk to catastrophes and shocks, asset shortage and poverty (Ellis and Freeman, 2004).

2.2.2 Utility Theory

Theoretical framework of the utility maximization model, it is assumed that the diversification decision is based on the rational choice of each farmer or household. Moreover, we assume that the decision maker has perfect discrimination capability between several risk-management strategies. This implies that the optimal strategy chosen by each farm reflects its utility-maximizing option. It also inevitably leads to the conclusion that the observable diversification choices are always the optimal ones.

2.2 Conceptual Framework

The framework briefly indicates the factors that may drive the farm household to diversify or participate its livelihood into non-farm activities. These factors range from push factor to pull factors. Push factors are the negative factors that can cause farm households inside or outside the farm to pursue additional livelihood opportunities and they tend to dominate high degree of risk in agriculture it include factors such as seasonal fluctuations and variability of climate which leads to drought, food shortages, inadequate access to land, the need to increase family income, the need to earn income to finance farm investment while pull factors reflects potentials for non-farm sector livelihood improvements that encourage certain individuals to engage in the non-

farm sector. Such factors may include better market access, improved infrastructures, less risky nature of investment in the non-farm livelihood activities, and improvement of non-farm labour opportunities. Moreover, household factors such as education level and size of the household play an important role of household to participate in various non-farm activities.

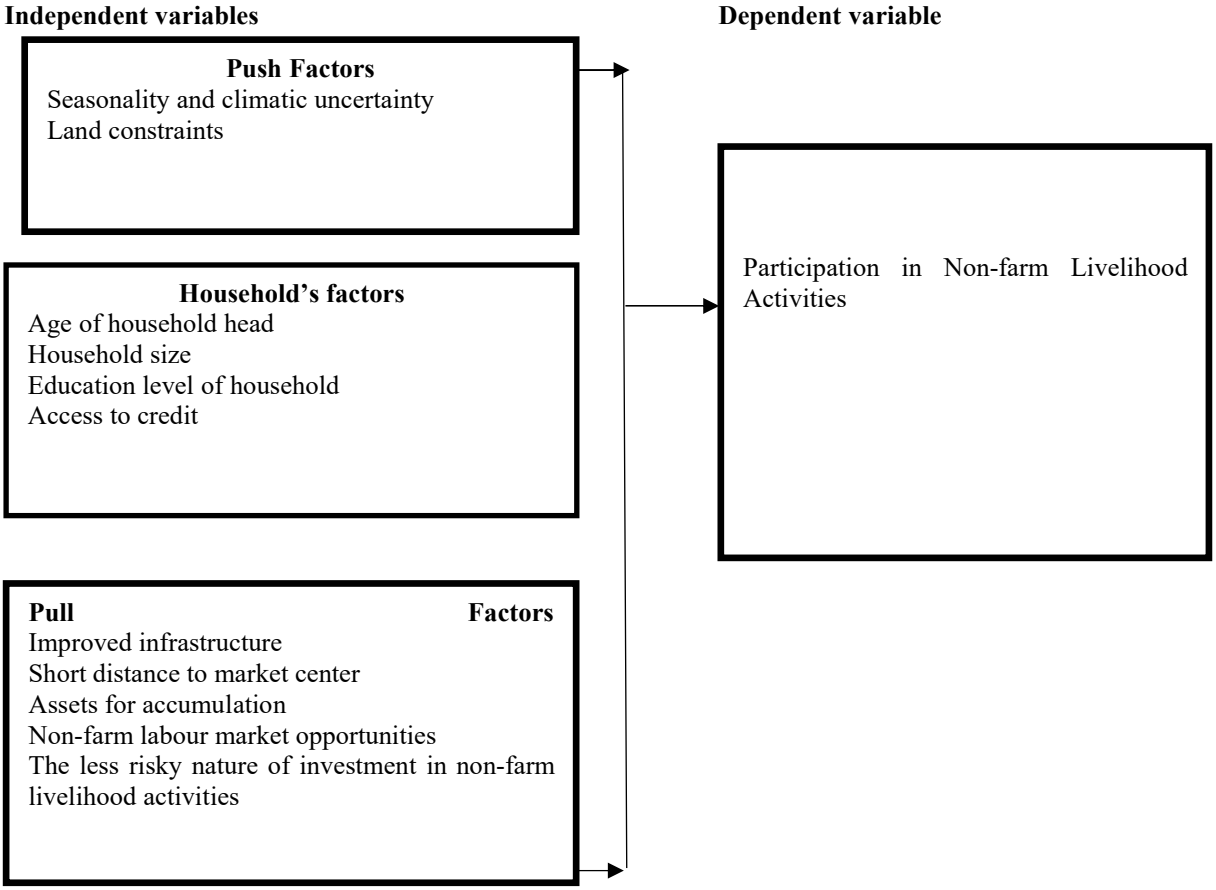

FIGURE 1: CONCEPTUAL FRAMEWORK

2.3 Empirical Review

Lazaro *et al.* (2017) rural transformation has formed land use change, economic and social development for generations. However, in explaining the dynamic shifts, global drivers have become increasingly important at the moment such as more producers in the marketization of farming production, diversification of rural economies to various types of rural non-farm occupations and growth of small urban centers in rural regions which act as center for market and service in the rural economy, will lead to rural transformation.

Van Lindert & Steel (2017) argued that enhanced connectivity, greater mobility, and better links between rural and urban areas, and rural people are diversifying their livelihoods and transforming agricultural production systems. This will create rural non-farm labour opportunities which in turn stimulate positive socio-economic dynamics. Moreover, better infrastructure in rural areas improve connections between rural people and those in small towns, enhance financial inclusion, and increase opportunities for livelihood diversification as well as governments policies in investment in rural area will stimulate rural livelihood transformation.

Reddy *et al.* (2014) found that rural labour market has experience deep structural change with labour switching from agriculture to non-agricultural activities. Moreover, they found that non-agricultural industry is no longer a residual industry, but an emerging engine of progress and transition in rural areas. Furthermore, Ranjan (2008) in their study found that non-farm sector in recent years being the tool for poverty alleviation and source of providing opportunities for employment in various part of the world which facilitate the development of their livelihoods.

Kathega & Lifuliro (2014) found that rural non-agricultural activities play a greater role in combating income and non-income poverty by making a substantial contribution to household income. It also enabled these households to buy food and consumer products, medication and health care payment, pay for children's education, and invest in agricultural inputs. This in turn improves the productivity of farming operations in terms

of crop farming and livestock keeping and stimulates the transformation of rural farm households.

Bansal (2018) articulated the role of education for rural transformation and performance of various educational theories and practices used for rural development, found that due to education rural sector has witnessed a marvelous transformation due to the fact that education encourages people to get acknowledge with the issues related to rural development, taking effective decision and acting on them as well as gives special attention to the realization of developmental goals set for rural transformation.

According to Berdegué *et al.* (2013), rural transformation is caused by factors that are active across the world namely; Firstly, diversification of rural economies away from dependence almost entirely on agriculture. Secondly, globalization of food systems in agriculture, transformation of the rural overall economic foundation. This also involves people's livelihood strategies as well as the condition under which rural organizations, communities, and companies participate in economic processes in their own countries and beyond. Thirdly, urbanization of rural region. Furthermore, they argue that improvement of infrastructures like telecommunications services and roads are important for rural transformation.

Asfaw *et al.* (2017) examined the determinants of non-farm livelihood diversification from rain fed-dependent smallholder farmers in north central Ethiopia. Data were collected using survey questionnaires and interviews, were analyzed using mean, percentage, chi-square test, one-way ANOVA, and binary logistic regression model. They found that provision of microfinance, entrepreneurial training and skill development, and infrastructure development would enhance the participation of smallholder farmers in non-farm activities.

Etuk *et al.* (2018) studied the determinants of livelihood diversification among farm households in Nigeria. They used multistage sampling technique in sampling the respondents and primary data were gathered through a set of validated questionnaires while descriptive and inferential statistics were used as the analytical tool and they found that loan service, number of family member, farm size, and marital status were the factors influencing diversification of livelihoods among rural farmers.

According to Alobo (2015), provided a comprehensive review of the literature on the nature and evolution of rural livelihood diversification in Sub-Saharan Africa and the situation regarding farm household. Also, provided a mixed finding about the causes and consequences of livelihood diversification on rural farm households adopting this strategy. Moreover, previous studies show that farmers with ample assets are significantly better off, achieving good diversification of livelihoods, mainly through exploiting opportunities and synergies between agricultural and non-farm operations (Alobo, 2017).

Rantso (2016) found that families with smaller assets of land depended too much on non-agricultural activities while families with adequate assets of land were usually food secured and as a result, engage less in non-farm activities.

3. Methodology

3.1 Data Source and Study Area

This study used cross-sectional data collected from the household heads in five sub-villages which are considered as emerging urban center compared to other nine sub village in Kibaigwa Township which is within Kongwa district, Tanzania. The tool for data collection used at household level was structured questionnaire. Further, information was collected using key informant interview guide from Township leaders like ward executive officer, Township trade officer and Township education officer. The Township has the total area of 45 square kilometers and is within Kongwa district is located at 6°12′00″S 36°25′01″E, and is one amongst five districts of the Dodoma Region of Tanzania (URT, 2012).

3.2 Research Design

The study employed a cross sectional research design where data was collected at a single point in time in Kibaigwa Township. Kibaigwa Township was selected purposively due to the fact that there are households diversify their livelihood into non-farm activities like petty trading agro-processing while other households engage in farming activities.

3.3 Sampling and Data Collection Methods

The study employed a multi-stage sampling procedure. In the first stage, Kibaigwa Township was selected purposively because of the presence of five sub village/Streets which are considered as emerging urban centers amongst the 14 sub villages in Kibaigwa Township centers. These five villages have relatively better access to services compared to other nine sub-villages in Kibaigwa Township (Lazaro *et al.,* 2013). In the second stage, a proportionate sampling was used to determine the number of households in each sub village based on the sub-village household register which were obtained from sub village chairmen. Thereafter, simple random sampling was used to select households for interview through the sub village register. The sampling frame entailed all households residing in the study area and the sampling unit was households who are engaging in farming and non-farm activities.

Moreover, both primary and secondary data were used in this study. Primary data was collected using a survey questionnaire, interview technique and key informant interview whereby both qualitative and quantitative data were gathered. The questionnaire contained both closed and open-ended questions.

3.4 Sample Size Determination

Sample size of the five sub-villages was determined through the formulae proposed by Yamane (1967):

$$n = \frac{N}{(1 + N(e^2))} \quad (1)$$

The formula is reliable to 95%, Total population of households in five sub-villages within Kibaigwa Township is 6177 (Kibaigwa Township Authority, 2015)

n= 6177 / (1+ 6177 (0.0025) Sample size was 376

$$n_{o=\frac{6177}{(1+6177\left(0.05^2\right))}}$$

Where; n = sample size required, N = Population size, e= precision level.

However, Islam (2018) says that the size of the sample depends on the population size to be sampled, although general rules are difficult to make without familiarity of the specific population. Therefore, many researchers regard 100 cases as minimum. Moreover, Israel (1992) argued that the sample between 30 to 200 elements are appropriate once the attribute is present 20 to 80% of the time such that distribution approaching normality. Moreover, number of respondents from each Sub village was obtained through using proportionate stratification.

$$n_{s=\left(\frac{N_S}{N}\right)*n} \quad (2)$$

Where; n_s is required sample size in each street

N_s= Total number of households in each street

N = Total number of households in all five streets

n is the required sample size in all five streets

Table 1: Sample size distribution in five Sub villages/Streets

Sub village name	Number of households	Sample size per each sub village (n=376)
Karume	2600	158
Nyerere	1234	75
Kawawa	814	50
Majengo	839	51
Mpakani	690	42
Total	**6177**	**376**

Source: Kibaigwa Township Authority (2015)

3.5 Techniques of Data Analysis and Empirical Model Specification

3.5.1 Descriptive Statistics

Descriptive statistics like percentage were used to show the no-farm activities adopted by the household in the study area, independent sample t-test was used to compare the average income earned from farming and non-farm activities, frequency was used to show non-farm activity household are likely to engage more.

3.5.2 Binary Logistic Regression

The binary logistic regression model using maximum likelihood methods was used to estimate the probability of participating in non-farm activities. The purpose of qualitative choice model is to determine the probability and individual with a given attribute to make one choice rather than one or more alternative choices (Gujarati, 1995). Choice models predict the likelihood that an individual will choose an option that will have some relationship to their attributes of socio-economic factors. The binary logistic qualitative choice model is based on the cumulative distribution and is specified as;

$$P_{i=E\left(Y_i=\frac{1}{X_i}\right)=\frac{1}{1+e^{z_i}}} \quad (3)$$

Where

e is the base of natural logarithms, for choice 1 (participate in non- farm activities and Y= 0 (otherwise)
P is the probability that an individual will make a certain choice when faced with two choices: given x; individual characteristics.

$$1 - P_{i=\frac{1}{1+e^{z_i}}} \quad (4)$$

The probability of making one choice relative to the other is calculated by;

$$\frac{P_i}{1-P_i} = \frac{1+e^{z_i}}{1+e-z_i} = e^{z_i} \quad (5)$$

Taking the natural log of Eq (3) will give the values of the logistic (Ld) as illustrated in the equation used in this study as follows;

$$Ln = \frac{P}{1-p} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 \quad (6)$$

Where; $Ln = P/(1-p)$ Is the dependent variable which is the natural logarithm of the probability of Participating in non-farm activities (P) divided by the probability of not participating in non-farm activities (1-P). It takes the values of 1 for participating and 0 for not participating

X_1 = Education level
X_2=Distance to market center
X_3 = Household size
X_4=Dummy access to cred it (X_4=1Yes; X_4=0 otherwise)
X_5= Land size (acre)
X_6 = Dummy entrepreneurial education (X_6=1 skills acquisition; X_6= 0 otherwise)
X_7 = Household-head age
X_8= Cost of agricultural inputs (summation of cost of fertilizer, agrochemicals and farm equipment)
X_9= Dummy Infrastructures (X_9= 1Yes; X_9= 0 otherwise) (market access, electricity access, roads)
X_{10}= Dummy migration status of household (X_{10}=1 Migrant; X_{10} = 0 otherwise)

Table 2: Prior expectations signs of factors affecting participation in non-farm livelihood activities

Variable	Unit of measurement	Expected signs
Education level	Years of schooling	+
Distance to market center	Measured in kilometers	+/-
Household-head age	Number of years	+/-
Access to credit	1 if a household responded as he has access to credit and 0 otherwise	+
Farm size	Measured in hectare	+/-
Entrepreneurial skills	1if the household have Skills acquisition 0 otherwise	+
Household members size	Measured in number	+/-
Infrastructures	1 if yes and 0 if no	+
Cost of agricultural inputs	Price of inputs (Tsh)	+
Migration status of household head	1 if native, 0 otherwise	+/-

4. Results and Discussion

4.1 Socio-economic Characteristics of Respondents

The sampled households comprised of 290 (77%) males and 86 (23%) females. Table 3 shows the average age of the respondent is 41 years. This implies that majority of the household heads participating in non-farm activities and farming activities in the study area because their age falls under the working population. The results also show that most of the household heads in study area have attained primary level education.

Table 3 Descriptive statistics of respondents

Variable	Frequency	Percentage	Mean
Sex of the respondents			
Male	290	77	
Female	86	23	
Age of the respondents			41
19-40	205	54.5	
41-60	145	38.6	
61 and above	26	6.9	
Education level of respondents			
Primary education	284	75.5	
Secondary education	54	14.4	
Adult education	1	0.2	
College or University	10	2.7	
No formal education	27	7.2	

4.1 Participation in Non-farm Activities

4.1.1 Land Access and Engagement in Non-farm Activities

Tables 4 show that majority (89.7%) of the sampled household heads in the study area who have no access of

land diversified into various non-farm activities. Moreover, the cross-tabulation results indicate that the relationship between access to land and involvement in non-farm livelihood diversification is statistically significant at (χ^2 value = 11.940, p = 0.001). Similarly, Mesele (2018) found that farming households involved in non-farm livelihood activities because of the shortage of land.

Table 4 Land access and involvement in non-farm activities in percentage

Land Access	Household heads not engage in non-farm activities	Household heads engage in non-farm activities	Total (n=376)
No	20(10.3%)	174(89.7%)	194
Yes	43(23.6%)	139(76.4%)	182
Total	63(16.8%)	313 (83.2%)	376
Chi square statistic			
χ^2 value = 11.940			
P value = 0.001			

4.2 Land Size by Engagement in Non-farm Activities

Participation in non-farm activities in emerging urban center is dominated by farm household heads with smaller land size ranging from 0 up to 4 acres (73.5%), this is followed by the household heads who had land size ranging from 5 up to 10 acres (16.9%). The findings show that there were significant relationships between farm size owned by the respondents and the participation in non-farm activities in the study area (χ^2 =15.698, P=0.001). This result implies that, the household heads who had smaller farm size were engaging more in non-farm livelihood diversification compared with household heads that had lager farm size in the study area. This result is in line with findings of studies by Kassie *et al.* (2017), Atamanova & Van den Berg (2012), who observed that, lack of land for farming increases the demand for non-farm livelihoods diversification. Moreover, rural landless and near-landless households depend heavily on non-farm income sources. Those with less than 0.5 hectare earn between 30% and 90% of their income from non-farm diversification.

Table 5 Land size by engagement in non-farm activities

Land size (acres)	Engagement in non-farm activities		Total (n=376)
	No (n=63)	Yes (n=313)	
0-4	49.2	73.5	69.4
5-10	28.6	16.9	18.9
11-15	3.2	1.9	2.1
16 and above	19.0	7.7	9.6
Chi square statistic: χ^2 value = 15.698 P value = 0.001			

4.1.2 Reasons for not participating in Non-farm Activities

Table 6 below presents the results of the analysis of the reasons for not participating in non-farm activities. Results show that 57.5% of the sampled households that are not participating in non-farm activities indicated that they are faced with challenges of lack of initial capital while 23% of the households not participating in non-farm activities indicated that it is because they had previously engaged in non-farm activities but they stopped engaging in these activities because they were not profitable. Moreover 14.9% of the households not engaging in non-farm activities are due to the fact that they don't have enough labour to engage in non-farm activities. The implication of these results is that most of the respondents in the study area are not participating in non-farm activities due to various challenges which act as obstacle to their participation in such diversification in Kibaigwa emerging urban center.

Table 6: Reasons for household heads not participation in non-farm activities

Reason for not participation in non-farm activities	**Frequency**	**Percent (%)**
I don't have enough labour to engage in non-farm activities	13	14.9
I don't have capital to start a non-farm activities	50	57.5
I used to be involved in one but was not profitable now I stopped	20	23.0
There is too much competition here for non-farm activities diversification to generate income	3	3.4
There are no profitable non-farm activities here	1	1.1
Total	**87***	**100**

* Multiple responses allowed

4.1.3 Reasons for Participation in Non-farm Activities

As indicated in Table 7, out of the 313 of the total households who were engaging in non-farm activities, about

30% of the household heads participating in non-farm activities so as to earn income followed by 29.7% of household heads participating in non-farm activities because they want to meet family necessity such as shelter, while 25.4% of these household heads said they engage in non-farm activities because of food security reasons. The results show that income reason is the major reason compared to other reasons that drives household to participate in non-farm activities in the study area. This result is in line with previous findings of empirical studies conducted in Tanzania which indicates that; income accumulation motive is the dominant reason for livelihood diversification of rural households in Tanzania (Khan & Morrissey, 2020).

Table 7: Reasons for Participation in non-farm activities

Reason of participation	Frequency	Percent (%)
Income Reasons	312	30
Risk Aversion	146	14.1
Food Security	264	25.4
Medical Treatment	8	0.8
Family Necessity	309	29.7
Total	**1039***	**100**

*Multiple responses allowed

4.3 Relationship between Non-farm Activities and Rural transformation

The relationship of non-farm activities and rural transformation can approximately be explained by using the percentage of households involved in non-farm activities and amount of income generated from non-farm activities. The income generated from non-farm activities is used in this study as proxy for the relationship between non-farm activities and rural transformation.

4.3.1 Relationship between Non-farm and Household Income

The results in Table 8 below indicates that the mean income from household engaging in non-farm activities is 329 789 Tanzanian shillings which is larger compared to the mean income of 55 189 Tanzanian shillings earned by households not engaging in non-farm activities. Moreover, 83.2% of the total sample is involving in non-farm activities.

Based on independent sample t-test results as presented in Table 8, the results show that relatively higher income is generated from non-farm activities compared to farming activities. And the difference in income is significant ($p<0.05$).

Table 8 Contribution of non-farm activities to household income

Urban activity	Frequency	Percentage	Mean income	S.e	T-Value
Non-farm activity	313	83.2	329 789	39287	5.843***
Farming activity	63	16.8	55 189	25791	

*** Significant at 5%

4.3.2 Types of Non-farm Activities in Kibaigwa Emerging Urban Center

There are various types of non-farm activities in the study area which provide employment to individual household heads. The increased employment generated by engagement in these various non-farm activities helps to propel rural transformation in the study area. The following are the different types of non-farm activities to Township dwellers (in five sub village) are engaging in, which enable them to earn income and transform their livelihoods in the study area. These non-farm activities includes; construction which accounted for 13.4%, driving or transportation accounted for 13.1%, shopkeeper of nonfood item accounted for 11.2%, food vending accounted for 11.2%, shopkeeper of food item accounted for 7.0%, processing of farm produce accounted for 7.0% and middleman accounted for 7.0% as indicated in (Figure 2).This result is in line with findings found by (Lanjouw & Lanjouw, 1997; Gordon *et al.,* 2000a), found that some of common examples of non-farm activities in Sub-Saharan Africa include beer brewing, fish processing, edible oil processing, crochet, pottery, rice husking, groundnut shelling, preparation and sale of prepared foods, and other small trading activities that can be carried from the home or nearby. Moreover, Nagler & Naudé (2017) found that most of rural households in Sub Saharan Africa engage in sales and trade.

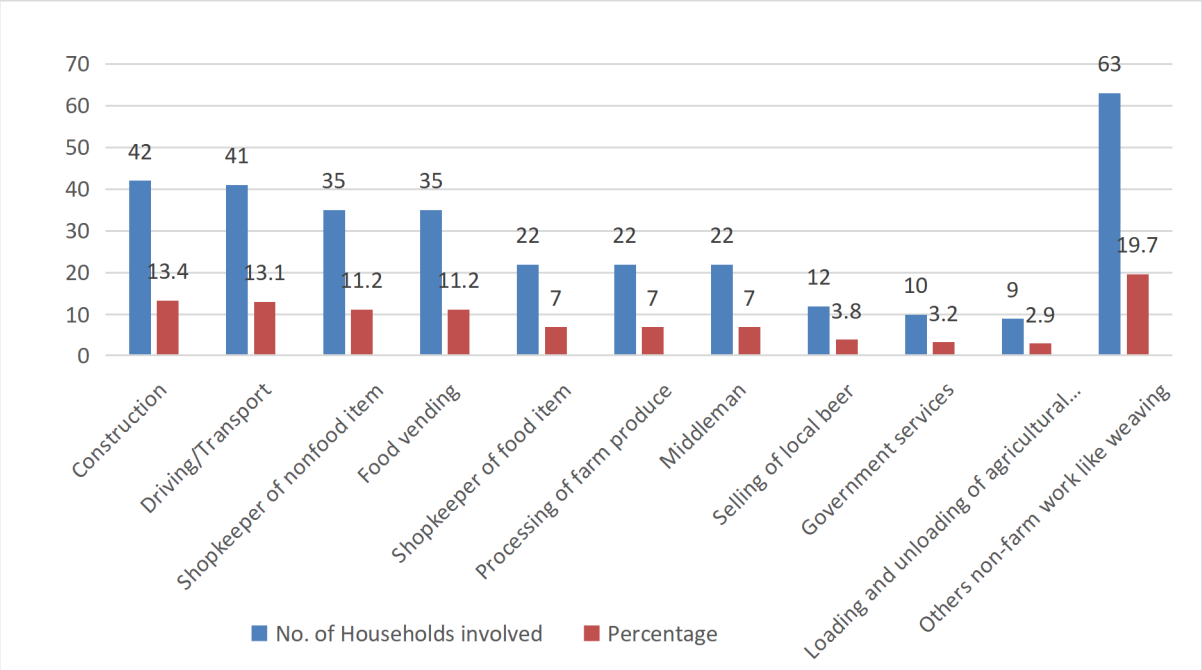

Figure 2: Types of non-farm activities

4.4 Other Indicators of Rural Transformation in Study Area

As indicated in the Table 9 according to the key informant interview, the number of both primary and secondary schools in Kibaigwa emerging urban center has increased from 8 schools in the year 2010/11 up to 14 schools in the year 2018/19 this include both primary and secondary schools (key informant interview). The implication of this result is that, the increased number of schools will enable the majority of the population to acquire knowledge about issues related to rural development which will enable them to transform their livelihood. This result is in line with findings of Bansal (2018), who found that role of education stimulates rural transformation. Education is the doorway to the wider world and it encourages people to get acknowledge with the issues related to rural development, taking effective decision and acting on them and it also gives special attention to the realization of developmental goals set for rural transformation.

Table 9: Indicators for rural transformation in the study area

Indicator	Year 2010/11	Year 2018/19	% change
Schools	8	14	75
Roads	33	53	60.61
Market	2	2	0
Financial services	3	5	66.67
Agro processing	30	66	120
People cannot read write	3700	2826	-23.62
Trade and commerce	280	418	49.29
Health workers	5	16	220
Dispensary	2	3	50
Health center and clinics	5	6	20

Source: (Kibaigwa Township Authority, 2019)

As indicated in Table 9, the number of roads (includes all sub village roads) in Kibaigwa Township authority were 33 during year 2010/11. However, during 2018/19 the number of roads was 53 roads (Key informant interview). This includes the number of paved roads that are within Kibaigwa emerging urban center and Kibaigwa hinterland (Sabasaba, Mlimwa, Kazamoyo, Lufukili, Tanesco, Mwongozo, Chang'ombe, Msimbazi and Berega). This result implies that the increase in number of roads is likely to lead to the increase in the movement of goods, people and other services which will influence growth of economic activities such as trading and transportation and stimulate development and transformation of livelihoods.

Moreover, as indicated in Table 9 the number of markets in the year 2010/11 and the number of markets in the year 2018/19 remain the same. These two markets are grain market and horticultural market which have physical building which are operation all the time.

Results in Table 9 show that there were 3 banks in the year 2010/11. In 2018/19 there are 5 banks and

SACCOS in the period of the year these financial services include KIFI SACCOS, UMAKISO SACCOS CARGO PORTERS, CRDB bank and NMB bank. Other financial institutions are available in the Kibaigwa Township authority offering financial services but they have no permanent offices. These include Equity bank, FINCA and PRIDE. These institutions provide financial services such as loans which enable household to engage in various non-farm activities and facilitate transaction to various traders.

Table 9 also indicates that the number of agro processing have increased in Kibaigwa emerging urban centre from 30 agro processing in the period 2010/11 up to 66 agro processing in the period 2018/19 (Township trade officer, 2019). This further explained in Table 12. This implies that there is an increase of household heads who diversify their livelihood into agro processing industries which enable to earn income and stimulate their development and rural transformation. These results are similar with the findings of Abrham *et al.* (2015), who found that rural Small and medium enterprises play a vital role in ensuring sustainable rural growth, post-transformation processes and the integrated development in the Czech economy of formal and informal rural institutions.

Table 9 indicates that the number of people who cannot read and write in the study area have decreased from 3700 in the year 2010/11 to 2826 in the year 2018/19 including male and female (Township education officer, 2019). The implication of this result is that there is an increase of the number of people who can read and write in Kibaigwa Township. This could enable them to make decision about participating in various development projects as well as various non-farm activities.

As indicated in Table 9, the number of registered business which includes both shops of food and nonfood items in the study area were 280 during the year 2010/11. However, during 2018/19 the number of registered business was 418. Most of these registered businesses were petty trade (means that they did not require high initial capital) and they contribute to revenue of Kibaigwa Township authority and income to the households.

Table 9 indicates that there is an increase in the number of health workers in Kibaigwa emerging urban center from 5 health workers in the period of 2010/11 up the 16 health workers in the year 2018/19 most of these health workers are nurses and clinical medical officers. The implication of this result is that, the increase in the number of health workers ensure good health services to the households. Good health will help individual household in different economic activities and will enable them to stimulate rural development.

Table 9 indicates that, there is an increase of number of dispensaries in Kibaigwa Township authority from 2 dispensaries in the year 2010/11 up to 5 dispensaries in the year 2018/19. The implication of these results is that with the increase of the number of dispensaries will help the households to participate in the non-farm activities such as trading activities such selling food and non-food item to various people visiting these dispensaries. Through trading it stimulates improvement of households' livelihoods. As indicated in the Table 9, there is an increase in the number of health centers and clinics in the study area from 5 in the year 2010/11 up to 6 number of health centers and clinics in the year 2018/19. This implies that, this increase of health centers and clinics in the urban center will help household to diversify their livelihood into non-farm activities through trading of various items around these heath centers with various clients attending these areas of health centers.

4.5 Types and Location of Market in Kibaigwa Township

Table 10 indicates various types of markets in Kibaigwa Township these include grain market, horticultural market, and weekly market which is operating in every Monday in a week. The implication of this result is that, with the existence of grain market and horticultural market and weekly market which involve trading of food and non-food items such as clothes and other items, contributes to non-farm livelihood diversification such as trading activities which will lead to rural development and as well as livelihood transformation though participation in these various economic activities.

Table 10: Types and location of markets in Kibaigwa Township

Market Name	Location	Dominance product
Grain market	Karume Sub –village	Grain product like Maize, sunflower seeds and others
Horticultural market	Karume Sub- village	Horticultural products such as vegetables, bananas and the like
Weekly market	Karume Sub- village	Consumer and non- consumer goods

4.6 Types of agro processing industries in Kibaigwa Township

Agro-processing is an economic activity that contributes to employment creation and value addition to agricultural products. The agricultural processing facilities in Kibaigwa include 12 maize mills in year 2010/11, 16 sunflower oil processing machines and 2 groundnuts shelling during the year 2010/11. In the year 2018/19 there are 24 maize mills, 42 sunflower processing machines while the number of groundnuts shelling machines remain the same as the year 2010/11 as indicated in Table 11.

4.7 Relation of Agro Processing and Rural Transformation

Growth of agro-industrial sector in rural areas would create jobs in local economies, especially for women and youth, improving incomes and supporting overall gains in nutrition, health and food security and contribute significantly to the total value added for the agro-industrial sector overall (FAO, 2017). Agro processing sector also play critical roles in rural transformation processes through the spread of new value-adding technologies (Minton *et al.,* 2015).

Table 11: Types of agro processing industries in numbers and location

Name of agro processing	2010/11	2018/19	% increase
Maize milling	12	24	100
Sunflower oil processing	16	42	162.5
Groundnuts shelling	2	2	0

4.8 Factors Influencing Participation in Non-farm Livelihood Activities

Logit model was used in identifying factors influencing participation in non-farm livelihood activities. Before employing logit, model multicollinearity problem was checked where the mean Variance inflation factor (VIF) was 1.13 and VIF was less than 5 as shown in (Appendix 1), this implies that there is no multicollinearity problem. The likelihood estimation of the logit model indicates that the chi-square (χ^2) statistic of 32.33 was highly significant (P=0.0004) suggesting that the model has strong explanatory power.

Except credit access, household size, cost of agricultural inputs and infrastructure all the 10 hypothesized independent variables were found significantly affecting household decision to participate in non-farm livelihood activities at different probability levels (Table 12).

Table 12: Logit results on the factors influencing the participation in non-farm activities

Variable	Coefficient (β)	S.e	Z	P>|z|	Odds ratio
Education Level	-.1896392	.0887826	-2.14	0.033**	0.82725
Age	-.0421082	.013434	-3.13	0.002**	0.95876
Farm size	-.028849	.0147571	-1.95	0.051***	0.97156
Credit Access	.5198164	.5629961	0.92	0.356	1.68172
HH_Size	.0769226	.07405	1.04	0.299	1.07996
Migration status of HH	.8645885	.4961237	1.74	0.081***	2.37403
Distance to market	.4083536	.2400486	1.70	0.089***	1.50434
Entrepreneurial education	1.780222	.9381362	1.90	0.058***	5.93117
Natural log cost of inputs	-.1042569	.1419827	-0.73	0.463	0.90099
Infrastructure	.3190864	.2198026	1.45	0.147	1.37587
constant	1.727411	1.582137	1.09	0.275	5.62607
LR chi2(10)	32.33				
Prob>chi2	0.0004				
Pseudo R2	0.1399				
Log likelihood	-99.406333				

* *Significant at 5%, *** Significant at 10%

The results in Table 12 indicates that age of the household head had negative influence on participation in non-farm livelihood activities at 5% level of significance ($p<0.05$). It is estimated that a unit increase of age of the household head leads to the decrease odds ratio on participation in non-farm livelihood activities by 95.9% holding other factors constant. Therefore, the result is statistically significant at 5% level of confidence. This implies that younger household heads are more likely to engage in non-farm activities. The results agree with finding of Alemu & Adesina (2017) they found that the household head's age, and asset ownership are assumed to affect non-farm enterprise engagement such that younger are expected to be risk takers, driving them to be more involved in non-farm enterprise activities. Similarly, Barbieri & Mahoney (2009) found that younger household heads have increased need to strengthen the farm business through diversification.

Household head education level had a negative and significant effect on the household's head participation in non-farm livelihood activities at 5% level of significance. This shows that when household head has low education level, they are less likely to participate in non-farm livelihood activities. The negative coefficient of education variable in the binary logit regression in the Table 12 implies that, a low level of education of household head decreases the odds ratio of extent of participation in non-farm livelihood activities by 82.7% holding other factors affecting participation in non-farm livelihood activities constant and the result is statistically significant at 5% level of confidence. This result is consistent with the findings of Ejigu & Teklemariam (2016) which found that low level of education does not promote private sector development in rural Africa.

Distance of residence to the market center had positive and significance effect on participation in non-farm

livelihood activities in emerging urban center at 1% level of significance. The positive coefficient of distance of residence to the market center in the logit regression as indicated in Table 12 implies that, shorter distance to the market center leads to increase the odds or extent of participation in non-farm livelihood activities by 50.4% holding other factors remain unchanged. Similar finding is reported by Alemu & Adesina (2017), who found that proximity to Mekelle where the market exists has a positive contribution and commitment to non-farm enterprise and have a significant contribution to their engagement in non-farm enterprises at a significance level of 1%, meaning that closer heads of households to Mekelle, finds it easier to engage in small business.

Farm size was also found to have a negative and significant effect on the household head to participate in non-farm livelihood activities at 10% level of significance. This implies that the household head with larger farm size are less likely to engage in non-farm livelihood activities this may be due to the fact household with large landholding are usually food secured and as a result participate less in non-farm activities compared with the household with small land size (Rantso, 2016). The coefficient of the farm size variable in Table 12 implies that a unit increase in farm size in acres decreases the probability of the household's head participation in non-farm livelihood diversification by 97.2% holding other factors unchanged. Similarly, Alemu & Adesina (2017) found that larger land holdings reduce the likelihoods of engagement in non-farm enterprise and an increase in land size above 1.43 hectares decreases the likelihood to take part in non-farm enterprise.

Migration status of the household head was found to have positive and significant effect on participation on non-farm livelihood activities at 10% level of significance ($p>0.05$) as indicated in Table 12. The positive coefficient of migration status of the household head implies that a household head being a migrant in Kibaigwa emerging urban center leads to increase the likelihood of participation in non-farm livelihood activities by 37.4% holding other factors constant. The results concur with findings of Liu (2012), who found that households with migrant family members are more likely to be in non-farm business.

Entrepreneurial education was also found to have positive and statistically significance effect to participation in non-farm livelihood activities at 10% level of significance. It is estimated that a unit increase in skills acquisition leads to increase in likelihoods of participation in non-farm livelihood activities by 93.1% holding other factors constant. This result is consistent with findings of Speranza *et al.* (2014), who argued that in order to achieve sustainable rural livelihoods, it is important to provide quality education and training in a variety of rural skills.

5. Conclusions and Policy Recommendation

Participation in non-farm activities is important in emerging urban center in terms of percentage of households involved in non-farm activities and level of income generated.

Furthermore, participation in non-farm activities is important for rural transformation because it helps in transforming the rural societies from direct dependence on agricultural production to other non-farm activities including value addition/agro processing.

The likelihoods of rural households participating in non-farm activities is high in emerging urban centres where there are relatively more services compared to rural villages for providing entrepreneurial education, marketing, diversified population resulted from migration from villages to emerging Urban centres.

The odds ratio of participating in non-farm activities increases with increase of entrepreneurial education, migration status of the household head, nearest distance to market center while the odds ratio of participating in non-farm livelihood activities decrease with increase in age, low level of education of the household head, and increase in farm size of the household.

There is a need to have a clear policy framework to guide Township development planners to consider allocation of land for agricultural production and non-farm activities.

Government and non-government organization should strengthen provision of small and medium loans to farm household which will assist them in getting capital to run their business.

There should be establishment of technical college so as to facilitate the provision of technical skills to various farm household so as to increase the number of household members who have no technical skills like mechanics, carpentry which will enable them to get self-employment and earn income as well as improve their standard of living.

Construction of irrigation schemes and provision of extension education to the households so as to avoid dependence on rain-fed agriculture and attract household to participate in agricultural activities because Kibaigwa Township is a semi-arid area, this also will ensure production of agricultural produce in Kibaigwa hinterlands where agriculture is much practiced and will ensure supply of agricultural produce in grain and horticultural market available in Kibaigwa emerging urban center. Moreover, with provision of extension services will enable farm household to use resistance seeds in sub-villages outside Kibaigwa emerging urban center (nine sub-villages) where agricultural products are mostly produced and its' semi-arid region.

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6. APPENDICES

Appendix 1: Test for multicollinearity problem

Variable	**VIF**	**1/VIF**
Natural log cost of Inputs	1.31	0.765035
Infrastructure access	1.23	0.815681
Farm size	1.21	0.828639
Distance to market	1.11	0.903097
Household Size	1.10	0.907696
Credit Access	1.10	0.911542
Entrepreneurial education	1.08	0.922469
Age	1.08	0.925542
Education level	1.05	0.956005
Migration status of HH	1.03	0.968877
Mean VIF	**1.13**	