NON-FARM LIVELIHOOD DIVERSIFICATION AND ITS CONTRIBUTION TO RURAL TRANSFORMATION IN KIBAIGWA, DODOMA TANZANIA

ANYISILE AMENYE

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT FOR THE REQUIREMENTS OF THE MASTER OF SCIENCE DEGREE IN AGRICULTURAL ECONOMICS OF SOKOINE UNIVERSITY OF AGRICULTURE. MOROGORO, 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. Rural transformation involves a comprehensive societal change whereby rural societies diversify their economies and reduce their reliance on agriculture because of pressure that is exerted on agricultural land by diversified activities and hence rural societies participate more in non- farm activities. This study is aimed at evaluating 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, analyzing constraints associated with livelihood diversification in the study area. A random sample of 376 households was drawn from 6 177 households in five sub-villages or streets which are in Kibaigwa township. 313 (83.2%) of the total respondents were employed in non-farm activities. Independent sample t-test statistic and descriptive statistics indicate that the mean income from household engaging in non-farm activities was 329 789 TZS which was larger compared to the mean income of 55 189 TZS earned by household engaging in farming activities. The logit regression was used to determine factors influencing the participation in non-farm livelihood activities where education level and age of the household head were among the influencing factors. Moreover, initial and running capital and credit were among major constraints associated with livelihood diversification in Kibaigwa emerging urban center. The study concluded that non-farm activities contribute to rural transformation by providing high income to household's income and employment activities. It is recommended that improvement of infrastructures like roads and electricity could facilitate transportation and growth of agro industries in the study area.

DECLARATION

I, ANYISILE AMENYE, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my original work done within the period of registration and that it has neither been submitted nor being concurrently submitted in any other institution.

_____ _____

Anyisile Amenye Date

(MSc. Candidate)

The declaration above is confirmed by;

_____ _____

Dr. Evelyne A. Lazaro Date

(Supervisor)

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LIST OF ABBREVIATIONS AND ACRONYMS

DANIDA	Danish International Development Agency
DFID	Department for International Development
EUC	Emerging Urban Centers
FAO	Food and Agriculture Organization of the United Nations
GSS	Ghana Statistical Service
HH	Household
IFAD	International Fund for Agricultural Development
KIFISSACCOs	Kibaigwa Financial Services Servings and Credit Cooperative Society
MPRA	Munich Personal RePEc Archive
NBS	National Bureau of Statistics
NFE_S	Non-Farm Enterprises
NMB	National Microfinance Bank
PHC	Population and Housing Census
PRIDE	Promotion of Rural Initiative and Development Enterprise
RUT	Rural Urban Transformation Project
S.E	Standard Error
SACCOS	Saving and Credit Cooperative Society
SNAL	Sokoine National Agricultural Library
SUA	Sokoine University of Agriculture
TZS	Tanzanian shillings
UMAKISO SACCOS	Horticultural Crops Sellers at Kibaigwa Servings and Credit Cooperative Society
UN	United Nations

URT	United Republic Tanzania
VETA	Vocational Education and Training Authority
VICOBA	Village Community Banks
VIF	Variance Inflation Factor
WB	World Bank
^{2}	Chi-square
β	Beta
<	Less than
>	Greater than

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

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 connection between rural and urban areas which are vital 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 and 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 and Adams, 2001). In South Asia, research has supported to combat poverty among small-scale farmers, diversifying livelihoods to non-farm activities remains important (FAO and World Bank, 2001). Households of non-farm companies mitigate the consequences of exposure of their livelihoods to severe impacts such as weather fluctuations, diseases outbreak, variations of prices of agricultural commodities, and information asymmetry causing business failure that are prevalent in most poor nations (Ellis, 2000).

Rural households in Tanzania 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 (Loening and Lane, 2007).

An analysis of changes in rural consumption shows that transitions from agriculture to no n-agricultural activities play a key role in reducing poverty (Tandjigora, 2020). Similarly, in their research on Tanzania's rural non-agricultural activities and poverty alleviation, Kathega and Lufuliro (2014), argued that non-farm practices are found to provide essential way from homelessness.

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).

Participation of rural household into non-farm sector in rural areas seems to be not important in uplifting people's standard of living because these activities are small scaled and families are mostly involving in the sector as coping strategy (Loening and Lane, 2007). These activities are also scattered and the rural household faced limitation such as start-up capital and entrepreneurship skills when commencing or running the non-farm activities (Nmeregini *et al.,* 2019).

Although rural household involvement in non-farm sector seemed to be not helpful because they are small scaled and household mostly engage as a copying strategy, the earnings from these non-farm activities is used for medication and health care payment, school fees, clothing purchases and buying food (Kathega and Lifuliro, 2014).

Moreover, rural-urban spatial linkages which involve the flow of people, goods, money and information between urban centers and rural areas, are important drivers of economic activities (Copus, 2013). Rural–urban linkages also involve sectoral linkages such that demand from rural consumers are crucial for urban enterprises and agricultural producers rely on urban markets, also involves the flow of ideas and diffusion of innovation (Okpala, 2003). The linkages between rural-urban centers play a big role to rural transformation in various places of the country and the world (Adam *et al.,* 2018).

1.2 Problem Statement and Justification

Rural transformation involves a comprehensive societal change whereby rural societies diversify their economies and reduce their reliance on agriculture (Demissie and Legesse, 2013; Czyżewski and 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 and Kuunibe, 2012; GSS, 2014; Owusu and Abdul-Rahman, 2011). A number of studies 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 in nations like improvements 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 study's results will enable governments and donors involved in rural development to commit to supporting the non-farm sector. Moreover, this study will help sustainable development through consideration of allocation of land for agricultural and non-agricultural activities by township development planners.

1.3 Research Objectives

1.3.1 Overall objective

The overall objective of this study was to evaluate non-farm livelihood diversification and rural transformation in Kibaigwa emerging urban center, Dodoma Tanzania.

1.3.2 Specific objectives of the study

Specifically, the study intends to;

i. Analyze the contribution of non-farm livelihood activities to rural transformation in Kibaigwa emerging urban center.
ii. Analyze factors influencing participation in the non-farm livelihood activities in Kibaigwa emerging urban center.
iii. Analyze constraints associated with livelihood diversification in Kibaigwa emerging urban center.

1.4 Research Questions

The study is expected to provide answers to the following research questions;

i. What are the non-farm livelihood activities that contribute to the rural transformation in Kibaigwa emerging urban center?
ii. What are the factors that influencing participation in the non-farm livelihood diversification in Kibaigwa emerging urban center?

iii. What are the constraints associated with livelihood diversification in Kibaigwa emerging urban center?

CHAPTER TWO

2.0 LITERATURE 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 labor will be expected to engage in cultivation whiles a farm household which has a large amount of labor 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. As the true utility function cannot be observed directly, we assume that the observable optimal choice is a linear function of socio-demographic, economic and households' characteristics. The study used logit models for the general diversification decision and the set of specific diversification activities.

2.2 General Diversification Model

The general diversification decision can be interpreted as a binary choice model. The latent utility difference between diversification and non-diversification $y_i^{¿}$, is assumed to be determined by a linear function of observed characteristics plus an unobservable error term $¿_i$) (Verbeek, 2014).

$i = ¿\beta_i X_i + \varepsilon_i$ logistic (0,1)
$y_¿$

$$y_i = \begin{cases} 1, \wedge if\ y_i^¿ > 0 \\ 0, \wedge if\ y_i^¿ < 0 \end{cases}$$

where X_i represents a vector containing socio–demographic and economic factors. The error ε_i is assumed to follow a standard logistic distribution. The probability that the observable dependent variable y_i is one equals the probability that the utility difference is positive.

2.3 Empirical Review

2.3.1 Non-farm livelihood activities and contribution to rural transformation

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 and 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 stimulates 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 labor market has experience deep structural change with labor 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. Also, in their study Reddy *et al.* (2014) found that there is decrease in labor force and decline in employment for both male and women in agriculture and the decline in the workforce of women was much higher than that of men in agriculture. Furthermore, Ranjan (2008) in their study found that non-farm sector is granted, especially in rural areas with broad recognition 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 and 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.

Ohlan (2016) empirically measured the pattern and extent of rural transformation using a comprehensive assessment system based on three multidimensional indices, namely rural development index, rural transformation index, and urban–rural coordination index. Through the constructed rural transformation index, they found that a dramatic change

has taken place in rural India during decade of sharp economic growth. Also, the transformation observed with an increase in the rural development level and small decrease in interaction between urban and rural areas between 2001 and 2011.

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 involve 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.

2.3.2 Factors affecting non-farm livelihood activities

Families with smaller assets of land depended too much on non-agricultural activities in while families with adequate assets of land were usually food secured and as a result, engage less in non-farm activities whereas, families with inadequate or no asset of land

were mostly food insecure and engage more in non-farm activities (Fritzsch, 2012 and Rantso, 2016).

Behera (2015) in the study of sectorial transformation in India, corroborates the view that livelihood diversification from farming to non-farming activities is highly affected by non-farm revenue, differences in real wages between countryside and town areas, capital and other variables like urban population.

Asfaw *et al.* (2017) examined the determinants of non-farm livelihood diversification from rain fed-dependent smallholder farmers in northcentral 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 lack of capital, poor infrastructure, and lack of training were the major constraints which hindered farmers from undertaking non-farm activities. The regression model result revealed that several factors determine the propensity of smallholder farmers' participation in non-farm activities. Moreover, they argued that strengthening agricultural extension services, providing 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 where total number of 60 respondents were selected and both descriptive and inferential statistics were used as the analytical tool. Factors influencing diversification of livelihoods among rural farmers were loan service, number of family member, farm size,

and marital status and the major limitation to livelihood diversification were unstable electricity (78.3%), poor market access (65%), inadequate market price of good (58.3%), inadequate access to loan (51.7%), inadequate skilled labour (51.7%), elevated expense of business premises (51.7%).

Meraner *et al.* (2015) researched determinants of farm diversification in the Netherlands. The study used a binary logit model to determine the characteristics influencing the diversification decision in general. Additionally, the study categorized the specific diversification activities in order to estimate a multinomial probit model, analyzing three choice categories simultaneously. This enabled the authors to compare determinants of farm diversification in general with determinants of specific activities. They found that socio- demographic, economic, and geophysical farm characteristics drives household to undertake diversification decision.

Kassie *et al.* (2017) investigated the factors that decide the odds ratio of a farmer participating in diversification for non-agricultural revenue. Logit model was employed to investigate the odds that a farmer engages in non-agricultural income diversification activities in outskirt. Estimation showed that variables such as secured perception of land ownership and being membership in coop have major impact on the odds of participation of farmers in non-farm operations.

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).

According to Oluwatayo (2009), researched on diversification determinants where a Tobit model was employed and found that sex, number of family member, poverty status and loan service accessibility coefficients were significant. This implies that any increase in the value of these variables will increase the odds of affecting the outlook of diversification index. In addition, years of schooling, employment, marital status, and primary livelihood were adverse. Therefore, the increase in value of any of the variables will reduce the odds of affecting the outlook of diversification index for livelihoods.

2.3.3 Constraints associated with livelihood diversification

Swargiary and Mahanta (2019) in their study of constraints of rural livelihood diversification: they applied Garrett Ranking technique and the constraint with higher Garrets Mean Scores accorded higher rank. The constraints were classified under three categories which are social, economic, and infrastructure constraints. The study has observed economic constraints more prominent than others. Lack of own finance emerged as the most significant constraint of livelihood diversification followed by lack of institutional credit facilities. Moreover, livelihood diversification was also found to be constrained by low level of education and lack of training facilities for skill development.

Punitha *et al.* (2018) assessed constraints of livelihood diversifications. They employed Garrett ranking technique for prioritizing the constraints. Lack of proper road and absence of small scale enterprises were the infrastructural constraint followed by lack of savings, lack of good market price of the produce, unavailability of credit due to common property

resources, and lack of water resources in winter months were the resource and economic constraints expressed by farmers. Inadequate experience in expected livelihood, lack of role entrepreneur in the village, fear of taking risk were the social constraints, followed by less high yielding varieties in farm land, lack of organic weed control method were the constraints highlighted by farmers. Furthermore, they provided the recommended solutions on these constraints such as common market place for cluster of villages, transport subsidy for agricultural commodities, creating and showcasing role model and successful entrepreneur, developing high yielding varieties for farmers, popularizing weed control strategies were the strategies recommended to alleviate constraints to diversify livelihood and for forest resources conservation.

Saha and Bahal (2016) studied constraints impeding livelihood diversification found that although there are number of opportunities to farmers so as that they can diversify their livelihoods either in farm or non-farm activities, they face hampering factors such as lack of product facilities, absence of storage facilities, lack of initial capital for business, lack of improved technology, lack of new career experience, shyness in doing socially underestimate work, and absence of wide market for the non-farm output.

According to Khatun and Roy (2012), found that low resource, lack of knowledge and training facility, lack of rural infrastructure, lack of opportunities in non-farm sector were major challenges for non-farm diversification. Additionally, household head age, educational level, social status, training, access to credit, rural infrastructure, agro-climatic condition, and the overall level of economic development were the main driving force towards livelihood diversification. Moreover, they suggested that in order to encourage effective diversification of livelihoods, a number of strategies need to be created particularly for poor people. This includes the development of rural infrastructure

like roads, markets, energy, telecommunication, warehousing, and institutional innovation for purpose of reducing the cost of entry and the challenges to disadvantaged livelihood groups.

According to Yona and Mathewos (2017), found that rural non-farm sectors have different implications to rural families like improving their living standard, although the opportunity was not equal for all rural households. Also, in their study they found the major challenges for non- farm diversification were lack of skill and expertise (68%), lack of initial capital (62%), lack of demand and raw materials (54%), negative social attitude (52%) and inadequate infrastructure (47%) respectively were reported.

2.4 Push and Pull Factors for Non-farm Livelihood Diversification

2.4.1 Push factors

Push factors are negative factors that may cause farm households to undertake additional activities in and outside the farm. Push factors tend to dominate high-risk and low-potential agricultural environments, subject to drought, flooding, and environmental degradation (Haggblade *et al.,* 2007). Push factors are associated with various forms of risk such as seasonality and climate uncertainty (Ellis, 1998, 2000). Others include land constraints driven by population increase and limited land holdings, market access problems, and higher price for transaction (Barrett *et al.,* 2001).

2.4.2 Pull factors

Pull factors are positive factors that may attract farm households undertake additional livelihood activities to improve their standard of living. These factors include opportunities for individuals to extend their range of non-farm income activities by

increasing non-farm income. Such factors tend to dominate in less risky and more dynamic agricultural environments (Haggblade *et al.,* 2007). Moreover, pull factors includes improved non-farm labor market opportunities linked to improved market access, improved infrastructure, and urban proximity (Losch *et al*., 2012).

2.5 Conceptual Framework

The conceptual framework in (Figure 1) indicates 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 labor 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.

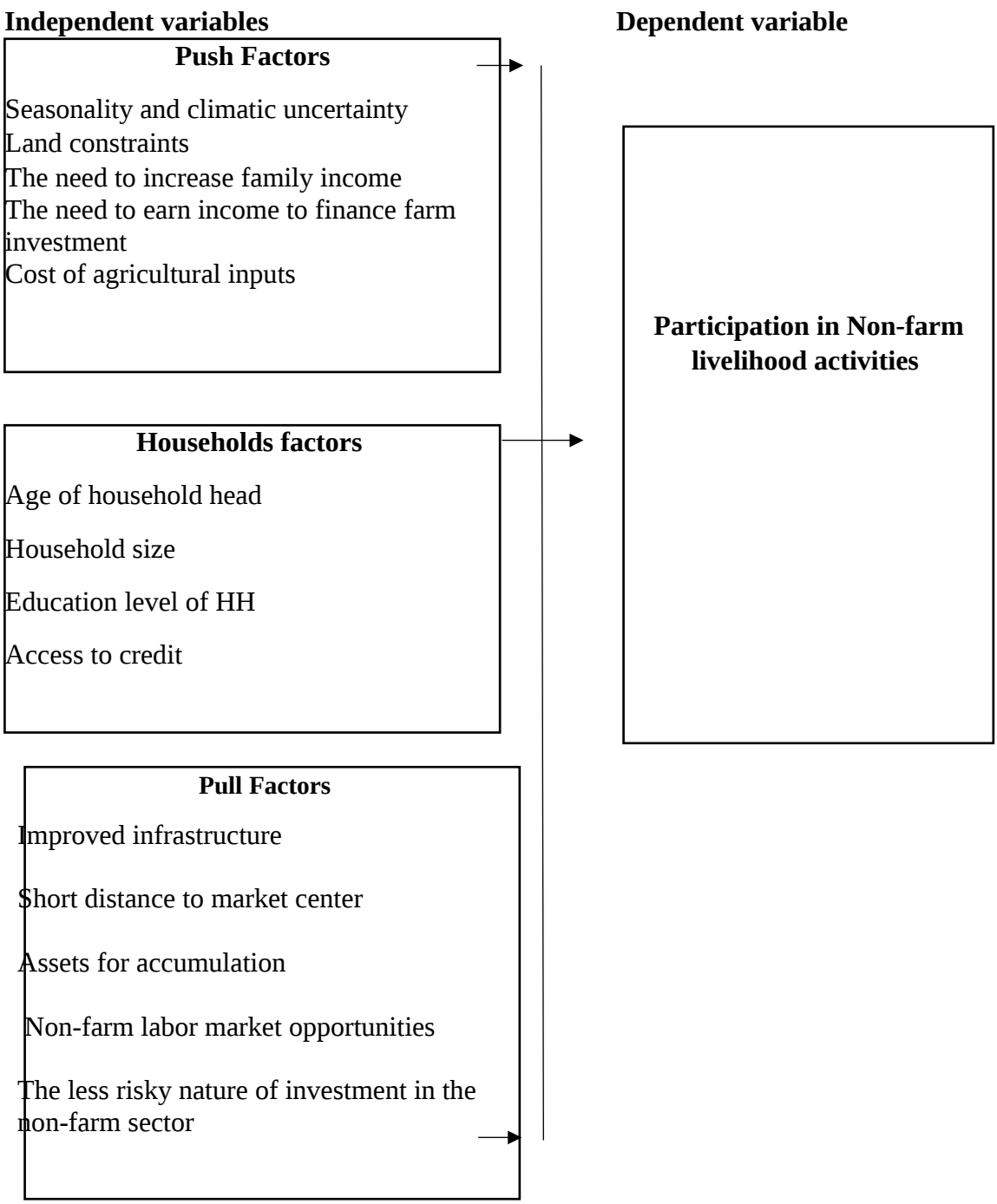

Figure 1: Conceptual framework

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Description of the Study Area

The study was conducted in Kibaigwa Township which is one of the administrative wards in Kongwa district of the Dodoma region. The Township lies between latitude 6^{0} 01' South of Equator and also between longitudes 36^{0}35' and 36^{0}41' East of Greenwich. Cited by Wambura (2012). The township has the total area of 45 square kilometers. Kongwa district is located at 6°12′00″S 36°25′01″E, and is one of the 5 districts of the Dodoma Region of Tanzania. It is bordered to the North by the Manyara Region, to the East by Morogoro Region, to the South by Mpwapwa District and to the West by Dodoma Rural District.

Kibaigwa township authority comprise one ward which is Kibaigwa ward, the ward consists of fourteen sub-villages whereby five sub-villages namely Mpakani, Kawawa, Nyerere, Majengo and Karume have relatively better access to services compared to other nine sub-villages which are Mwongozo, Sabasaba, Berega, Mlimwa, Chang'ombe, Kazamoyo, Msimbazi, Lufukili, and Tanesco.

The study mainly focused on Kibaigwa emerging urban center which is the part of Kibaigwa township. Lazaro *et al.* (2013), considered Kibaigwa emerging urban center comprised of five sub-villages/streets namely Karume, Nyerere, Kawawa, Majengo, and Mpakani. These urbanized streets are characterized by concentration of variety of businesses (such as retail shops, wholesale shops, carpentry workshops, petty trades) and

availability of social, health, and financial services as well as professional services such as lawyer services the other nine.

3.2 Population Size and Composition

According to the National Population Census in 2002, Kibaigwa township had a population size of about 15 345 people, whereby males were 7474 and females were 7871 and its annual growth rate was 3% (Kibaigwa Township Profile, 2008). The social economic survey conducted in June 2007 indicates that the town population had increased to 21 679 with a total number of 3 385 households (Household Survey, 2007). Moreover, according to the Kibaigwa Township Census 2015, there was an increased population size to 43 183 compared 24 761 population reported by Population and Housing Census for the United Republic of Tanzania (NPC, 2012) in Kibaigwa township.

3.3 Justification of the Study Area

Kibaigwa township was selected purposively due to the fact that it is one among other four emerging urban centers where rural urban transformation project is operating namely; Madizini, Kibaigwa, Ilula, and Igowole (Lazaro *et al.,* 2013). Secondly because there are households diversify their livelihood into non-farm activities like petty trading agro-processing while other households engage in farming activities.

3.4 Research Design

Cross - sectional research design was used in order to capture information at a given point in Kibaigwa emerging urban center Dodoma, Tanzania. Cross-sectional study design allows data to be obtained at a single point in time from a selected sample to reflect the large population (Creswell, 2014: Babbie, 2011). Moreover, the design is helpful to decrease biases and affect precision of data collected (Creswell, 2014).

3.5 Sampling and Data Collection

3.5.1 Sampling procedure

The study employed a multi-stage sampling procedure. In the first stage, Kibaigwa township was selected purposively because of the presence of five sub-villages/Streets which are considered as emerging urban centers amongst the 14 sub-villages in Kibaigwa township centers. These five sub-villages have relatively better access to services compared to other nine sub-villages 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.

3.5.2 Primary data

To collect the necessary cross-sectional data, a semi-structured questionnaire was developed with reflection of these study objectives. Household questionnaire was employed for data collection from each household in the study area. Also Interview method was employed during the process of collection of primary data as well as observation technique and key informant interview was employed.

3.5.3 Secondary data

Secondary data were obtained through reviewing various publications, journals, internet websites sources, and from Kibaigwa township authority as well as related research

works. These publications were found in National Bureau of Statistics (NBS) and Sokoine National Agricultural Library (SNAL) websites.

3.6 Sample Size Determination

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

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

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

n= 6 177 / (1+ 6177 (0.0025) Sample size was 376

Where; n = sample size required, N = Population size, e= precision level (level of confidence).

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 sample. 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 were obtained through using proportionate stratification.

$$n_s=\left(\frac{N_s}{N}\right)*n\ldots\ldots$$

(2)

Where; n_s is required sample size in each sub-village/street

N_s = Total number of households in each sub-village or street

N = Total number of households in all five sub-villages or streets

n is the required sample size in all five sub-villages or 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)

3.7 Analytical Tools

Empirical literature shows that the dynamics of rural transformation could be explained in diverse ways; (i) how, agrifood systems directly and indirectly come to include more producers in the marketization of agricultural production, thus making more rural producers to depend on global marked dynamics; ii) how rural economies become diversified including various pattern of rural non-farm occupations; iii) how domestic and transnational migration flows express themselves in trans-local connections that increasingly contribute to rural livelihoods iv) how small urban centres in rural regions are growing and functioning as market and service centres for the rural economy (Heinemann, 2014).

This study employed two ways from those discussed above to explain the dynamics of rural transformation in Kibaigwa emerging urban center. The methods adopted were; (i) how rural economies become diversified including various types of rural non-farm occupations and (ii) how small urban centres in rural regions are growing and functioning as market and service centres for the rural economy (Tacoli, 2006).

Moreover, descriptive statistics like percentage were used to show the non-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.

Logit regression model was used to analyze factors influencing participation in the non-farm livelihood activities in the Kibaigwa emerging urban center (objective two). A logit model identified factors that influence the participation or non-participation decision of household in non-farm livelihood activities because participation decision in non-farm livelihood activities is binary choice. The dependent variable in this logit model is participation in non-farm livelihood activities, taking the values 1 or 0. The value 1 indicates a household who participate in non-farm livelihood activities while the value 0 indicates a household who do not participate in non-farm livelihood activities. Participants in non-farm livelihood activities were defined as household who engaged in at least one of the non-farm activities and non-participants were defined as those household who didn't engage in any the non-farm activities.

The probability (Pi) that a household participate in non-farm livelihood diversifications is as follows;

$$Z_i = \beta_O + \sum_{i=1}^{n} \beta_i X_i \quad \text{……..} \quad \text{…… (3)}$$

Where Z_i is equal to one (1) when a choice is made to participate and zero (0) otherwise; this means: The equation represents a binary choice model involving the estimating probability of participating in given non-farm livelihood (Z) as a function of independent variables (X). Mathematically, this is represented as:

$Prob\ Z=1 = (\beta' Xi)$ ……...…… (4)

$Prob\ Z=0 = (1-\beta' Xi)$ ……...…… (5)

Where, Z_i is the observed response for the i^{th} observation of the response variable, Z. This means that Z_i =1 for a participant (i.e. Household who participate in non-farm livelihood activities) and Zi = 0 for a non-participant (i.e. farm household who do not participate in non-farm livelihood activities). β_0 is constant and X_i is a set of explanatory variables which are education level, age of the household heads, farm size, access of credit, distance to the market, migration status of the household head, entrepreneurial education, cost of inputs, and infrastructures, associated with the i^{th} individual which determine the probability of participation(P). The function may take the form of a normal logistic or probability function. The logit model uses a logistic cumulative distributive function to estimate, P given z by,

$$P(Y=\frac{1}{X})=\frac{1}{1+e^{-Z}}$$

…… (6)

$$P(Y=\frac{0}{X})=1-\frac{e^{z}}{1+e^{z}}$$ …….…….

……. (7)

$$Z=\beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X = \sum_{i=1}^{k} \beta_i X_i$$,……..

…… (8)

Where, k represented number of explanatory variables to be analyzed in the study area. The empirical model for the logit model estimation is specified as follows:

$$Z=(\frac{Pi}{1-Pi})=\beta_0+\beta\ 1$$

$X_1+\beta_2X_2+\beta_3X_3+\beta_4X_4+\beta_5X_5+\beta_6X_6+\beta_7X_7+\beta_8X_8+\beta 9X9+\beta_{10}X_{10}+\varepsilon$……(9)

Where

$Ln\ \left(\frac{Pi}{1-Pi}\right)$ = the Log-odds in favour of households' decision to participate in non-farm livelihood activities or not to participate. It is the logarithm of the ratio of probability of participating in non-farm livelihood activities(p) to probability of not participating (1-p)

The ratio $Ln\ \left(\frac{Pi}{1-Pi}\right)$ shows the odds ratio of likelihood of participating in non-farm livelihood activities to not participating in it. This implies that ratio of likelihood of participating in non-farm livelihood activities (p) to not participating in non-farm activities (1-p).

β_1 - β_{10} = the estimated regression coefficient.

X_1 - X_{10} the number of independent variables

X_1 = Education level

X_2 =Distance to market center

X_3 = Household size

X_4 =Access to credit (Yes=1 and 0 otherwise)

X_5 = Land size (acre)

X_6 = Entrepreneurial education (1= skills acquisition and 0 otherwise)

X_7=¿ Household-head age

X_8 = Cost of agricultural inputs (summation of cost of fertilizer, agrochemicals and farm equipment)

X_9 =Infrastructures (Yes=1 and 0 otherwise) (market access, electricity access, roads)

X_{10} =Migration status of household (Migrant =1, and 0 otherwise)

Table 2: Prior expectations signs of determinants 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	+/-

Multiple response technique was used to analyze constraints associated with livelihood diversification in Kibaigwa emerging urban center or township (Third objective). Multiple response analysis is a frequency analysis when there can be more than one response per participant to a survey question, it also provides frequencies and percentages of each response option by total number of responses and by cases.

CHAPTER FOUR

4.0 RESEARCH FINDINGS AND DISCUSSIONS

4.1 Introduction

The main objective of this study was to evaluate the non-farm livelihood diversification and rural transformation in Kibaigwa emerging urban center Dodoma, Tanzania. Specifically, the study intended to, analyze the contribution of non-farm livelihood activities to rural transformation, analyze factors influencing participation in non-farm livelihood activities, and analyze constraints associated with livelihood diversification in Kibaigwa emerging urban center.

4.2 Socio-economic Characteristics of the Sample

4.2.1 Sex of respondent

A total of 376 households were interviewed out of these about 77% were male headed household and the remaining 23% were female headed. This reveals the dominance of male headed households in Kibaigwa emerging urban center and could be attributed to the predetermined role played by men in terms of decision making on issue related to diversification from farming activities to non-farm activities and other family matters.

Table 3: Gender of the household heads

Sex	Frequency	Percent
Male	290	77
Female	86	23
Total	**376**	**100**

4.2.2 Age of respondent

The study results in Table 4 reveals that 54.5% of the respondents are within the age range of 19-40 years followed by 38.6% of respondent whose age ranges from 41-60 and

6.9% of the remaining respondent are within the age range of 61 and above. This implies that most of the respondent in Kibaigwa emerging urban center are in their active work age which enable them to engage in non-farm livelihood activities while the average age of the respondent in Kibaigwa emerging urban center is 41years.

Table 4: Age of the respondent

Age of respondent	Frequency	Percent
19-40	205	54.5
41-60	145	38.6
61 and above	26	6.9
Total	**376**	**100.0**

4.2.3 Education level

According to the Sustainable Livelihood Analysis Framework (DFID, 1999: Carney, 1998: Christopher and Helena, 2018), education level is important when studying non-farm activities and diversification. Education also it helps to boost the skills needed for specific tasks and can trigger the training processes that increase confidence, establish useful networks or contribute to productive investment. Table 5 presents the education level of the respondents. Table 5 show that, about 75.5% of the total respondent had attained primary education while about 14.4% had accomplished secondary education. The implication is that, most of the heads of households in Kibaigwa emerging urban center have basic education which could enable them to make decision and participate either in farming or to diversify in non-farm activities. This result concurs with the results of Kajembe and Luoga (1996) who reported that education creates awareness, positive attitude, values and motivation, and is perceived as one of the factors that influence an individual's perception of the world and decision making. Thus, education helps to promote better management of household resources.

Table 5: Education level of the respondent

Education level	Frequency	Percent
Primary education	284	75.5
Secondary education	54	14.4
Adult education	1	0.3
College or University	10	2.7
No formal education	27	7.2
Total	**376**	**100.0**

4.2.4 Access of land disaggregated by sex

As it is indicated in Table 6, about 51.6% household heads had no access to land either through renting or owning for cultivation within the five sub-villages or streets in Kibaigwa township while 48.4% household heads have access to land either through renting from landlords or owning their own land for cultivation. The results also show that there is significant association between access to land and sex of the household heads. The ^{2} value of 8.16 indicated that there is a statistically significant difference in access to land between the male and female headed households. The implication of results is that, most respondents have no access to land which make them to diversify their livelihood in non-farm activities so as sustain their living, it is clear from the literature (Hazell and Haggblade, 1993), that people who have no access to land often diversify their livelihood into non-farm activities. Similarly, Movahedi *et al.* (2012) found that inadequate access to land is a driving force that encourages people to diversify into non-farm activities.

Table 6: Access of land disaggregated by sex in percentages

Land Access	Male headed household (%) n=290	Female headed household (%)n=86	Total (n=376)
No	47.6	65.1	51.6
Yes	52.4	34.9	48.4
Chi-square statistics:			
^{2} value = 8.162			
P value = 0.004			
df = 1			

4.3 Participation in Non-farm Activities

4.3.1 Land access and engagement in non-farm activities

Table 7 show that majority (89.7%) of the household heads in Kibaigwa emerging urban center have no access to land, diversified into various non-farm activities. Moreover, cross-tabulation results indicate the relationship between access to land and involvement in non-farm activities is statistically significant (^{2} value = 11.940, p=0.001).

Table 7: Land access and involvement in non-farm activities in percentages

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			
^{2} value = 11.940			
P value =0.001			

4.3.2 Reasons for not participating in non-farm activities

Table 8 below presents the results of the analysis of the reasons for not participating in non-farm activities. 57.5% of the households that are not participating in non-farm activities indicated that they are faced with challenges 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 because they don't have enough labour to engage in non-farm activities. The implication of these results is that, most of the respondents in Kibaigwa emerging urban center 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 8: Reasons for household heads not participating in non-farm activities

Reason for not participating 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	3	3.4
diversification to generate income		
There are no profitable non-farm activities here	1	1.1
Total	**87***	**100**

* Multiple response allowed

4.3.3 Reasons for Participation in non-farm activities

As indicated in Table 9, 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 findings prove that income reason is the major reason compared to other

reasons that drives household to participate in non-farm activities in Kibaigwa emerging urban center. These finding are in line with previous findings of empirical studies conducted in Tanzania which indicates significant proportion (13.9%) of the income received from non-farm activities are used to purchase food products including grains like maize and rice in rural Tanzania (Kathega and Lifuliro, 2014).

Table 9: 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 response allowed

4.3.4 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 (^{2} =15.698, p=0.001). This result implies that, the household heads who had smaller farm size were engaging more in non-farm activities compared with household heads who had larger farm size in Kibaigwa emerging urban center. This result is in line with findings of studies by Kassie *et al*. (2017), Atamanova and Van den Berg (2012) who found that lack of land for farming increases the demand for non-farm activities. Moreover, rural landless and near-landless households depend more on non-farm income

sources. Those with less than 0.5 hectare earn from non-farm diversification between 30% and 90% of their earnings (Hazell and Haggblade, 1993).

Table 10: Land size by engagement in non-farm activities

Land size (acres)	**Engagement in non-farm livelihood diversification**		**Total (n=376)**
	No (n=63)	**Yes (n=313)**	
0-4	49.2	73.5	69.4
5-1	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			

4.4 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.

4.4.1 Relationship between non-farm activities and household income

The results in Table 11 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 11, the results of the analysis

show that non-farm activities have a significant relationship with rural transformation in terms of higher income ($p<0.05$).

Table 11: 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	39287.81908	5.843***
Farming activity	63	16.8	55 189	25791.37037	

*** significant at 5%

4.4.2 Types of non-farm activities in Kibaigwa EUC

As indicated in Table 12, there are various types of non-farm activities in Kibaigwa Emerging urban center (EUC) which provide employment to individual household heads. The increased employment generated by engagement in these various non-farm livelihood activities helps to propel rural transformation in Kibaigwa emerging urban center. The following are the different types of non-farm activities that township dwellers (in five sub-village) are engaging in, which enable them to earn income and transform their livelihoods in Kibaigwa emerging urban center. These non-farm activities include; construction which accounted for 13.4%, driving or transportation accounted for 13.1%, shopkeeper of non-food 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%. This result is in line with previous empirical findings by Jatta (2013) who found that some of common examples of non-farm livelihood diversification in Sub-Saharan Africa are beer brewing, fish processing, processing of edible oil, crochet, pottery, rice husking, groundnut shelling, preparation and sale of prepared foods, and other small scale- trading activities that can be carried from their home or nearby places.

Table 12: Types of non-farm activities

Type of non-farm work	No. of HH involved	Percentage
Construction	42	13.4
Driving/Transport	41	13.1
Shopkeeper of nonfood item	35	11.2
Food vending	35	11.2
Shopkeeper of food item	22	7.0
Processing of farm produce	22	7.0
Middleman ship	22	7.0
Selling of local beer	12	3.8
Government services	10	3.2
Loading and unloading of agricultural commodities	9	2.9
Other non-farm work such as weaving	63	19.7
Total	**313**	**100**

4.4.3 Indicators for rural transformation in study area

As indicated in the Table 13 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 results 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 livelihoods. This result is in line with findings of Bansal (2018) who found that role of education stimulates rural transformation. In addition, education 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 13: 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	3 700	2 826	-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 13, 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 (Mwongozo, Sabasaba, Berega, Mlimwa, Chang'ombe, Kazamoyo, Msimbazi, Lufukili, and Tanesco). 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 13 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 operating all the time.

As indicated in Table 13, 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 13 also indicated 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 15. 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 13 indicates that the number of people who cannot read and write in the study area have decreased from 3 700 in the year 2010/11 to 2 826 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 13, the number of registered business which includes both shops of food and non-food 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 13 indicate 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 to 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 13 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 this result 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 like selling food and non-food item to various people visiting these dispensaries. Through trading will stimulates improvement of households' livelihoods. As indicated in Table 13, 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, 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 health centers with various clients attending these areas of health centers.

4.4.4 Types and location of market in Kibaigwa township

Table 14 indicates various types of markets in Kibaigwa township these includes 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 14: Types and location of markets in Kibaigwa Township

Market Name	Location	Dominant 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

4.4.5 Types of agro processing industries 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 includes 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 15.

4.4.6 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 the rural transformation processes through the spread of new value-adding technologies (Rankin *et al.*, 2016).

Table 15: Types of agro processing industries in numbers and location

Name of agro processing	2010/2011	2018/2019	% increase
Maize milling	12	24	100
Sunflower oil processing	16	42	162.5
Groundnuts shelling	2	2	0

4.5 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 VIF was 1.13 and VIF was less than 5 as shown in (Appendix 3), 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 of all the 10 hypothesized independent variables were found significantly affecting household decision to participate in non-farm livelihood activities at different probability levels (Table 16).

Table 16: Logit results on the factors influencing the participation in non-farm livelihood activities

Variable	Coefficient (β)	S.e	Z	P>|z|	Odds ratio
Education Level	-.1896392	.0887826	-2.14	0.033**	0.82725
HH_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 16 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 participate in non-farm activities. The results agree with finding of Alemu and Adesina (2017) found that the 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 activities. Moreover, the findings are in line with the findings of Barbieri and Mahoney (2009) who conclude 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 16 implies that, a low level of education of household head decreases the odds ratio 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 findings of Ejigu and Teklemariam (2016) which found that low level of education does not promote private sector development in rural Africa.

Distance to the market center had positive and statistically significant effect on participation in non-farm livelihood activities in emerging urban center at 1% level of significance. The positive coefficient of distance to the market center in the logit regression as indicated in Table 16 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 and Adesina (2017) who found that proximity to Mekelle where the market exists has a positive contribution and commitment to non-farm enterprise and 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 1% level of significance. This implies that 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 mostly safeguarded for food and thus less active in non-farm operations compared with the household with small land size (Rantso, 2016). The coefficient of the farm size variable in Table 16 implies that, a unit increase in farm size in acres decreases the probability of the household's head participation in non-farm livelihood activities by 97.2% holding other factors unchanged. This result is in consistent with the findings of Rantso (2016) who found that families with small areas of land are too reliant on non-farm activities while households with sufficient land ownership are typically safeguarded for food and thus engage less in non-farm operations, while households with minimal to no land ownership are often food insecure. Moreover, similar findings by Alemu and Adesina (2017) found that larger land holdings reduce the likelihoods of engagement in non-farm enterprise.

Migration status of the household head was found to have positive and statistically significant effect on participation in non-farm livelihood diversification at 10% level of significance ($p<0.01$) as indicated in Table 16. The positive coefficient of migration status of the household head implies that a unit increase in the 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. This result is in line with NBS (2009) which shows that rural non-agricultural activities can provide employment for a large number of young people who would otherwise migrate to cities in search of employment. Moreover, the results concur with findings of Liu (2012) who found that families with migrant family members are more likely to be in non-farm business.

Entrepreneurial education was also found to have positive and statistically significant effect to participation in non-farm livelihood activities at 10% level of significance

($p<0.01$) as indicated in Table 16.The positive coefficient of entrepreneurial education implies 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 unchanged. This result is consistent with findings of Speranza *et al.* (2014) who argued that for the purpose of achieving sustainable rural livelihoods it is crucial to provide quality education and training in a variety of rural skills.

4.6 Constraints Associated with Livelihood Diversification

Household heads are faced with the following constraints when involved in livelihood diversification and these challenges are depicted in Table 17.

Table 17: Constraints associated with livelihood diversification

Constraints	Frequency of response	Percent (%)
Initial and running capital	231	35.1
Credit	104	15.8
Electricity supply	64	9.7
Training	51	7.8
Infrastructure	48	7.3
Delay of payment and default of loan	35	5.3
Skills	29	4.4
Injuries	27	4.1
Customers	12	1.8
Opportunities	7	1.1
High competition	7	1.1
Bureaucracy in business registration	5	0.8
High cost of repair	5	0.8
Low return of the business	4	0.6
Delay of salary	4	0.6
Low salary	4	0.6
Local government restriction	3	0.5
Raw materials	3	0.5
Working environment	3	0.5
Tenders for construction	3	0.5
High price of bill	3	0.5
There is no contract	2	0.3
Collaterals	1	0.2
High price of raw materials	1	0.2
Shortage of drugs sometimes	1	0.2
Absent in meeting	1	0.2
Total	**658***	**100**

*Multiple response allowed

4.6.1 Initial and running capital

About 35.1% of the total respondent in the study area they were facing the constraint of initial and running capital. This result is consistent with those of Swargiary and Mahanta (2019) who found that persons having start-up capital stock are in advantage to diversify livelihood by investing in alternative enterprises.

4.6.2 Credit

As depicted in Table 17, credit accounted for about 15.1% of the constraints associated with livelihood diversification. This implies that many dwellers in the study area they

have a constraint of credit because they lack collaterals that can act as mortgage so that they can take loans from various money lenders and commercial banks in Kibaigwa township. This result is consistent with results by Etuk *et al.* (2018) who found that inadequate access to loan was among the high constraint (51.7%) to livelihood diversification. Similarly, Khatun and Roy (2012) found that lack of credit facilities is the major challenge of livelihood diversification. Additionally, Swargiary and Mahanta (2019) reported that lack of own finance has emerged as the most significant constraint to livelihood diversification followed by lack of institutional credit facilities.

4.6.3 Electricity supply

This is the third constraints associated with livelihood diversification in the study area. It accounts for about 9.7% of constraints reported and associated with livelihood diversification in Kibaigwa emerging urban center. The implication of this result is that, there is inadequate electric power to accommodate all economic activities such as processing activities, trading activities, milling activities, and service activities like saloon services, repair service and other livelihood which household heads are diversifying to. This study finding is supported with results found by Etuk *et al.* (2018) who found that unpredictable energy is major limitations to diversification of livelihoods among farm households in Cross River State in Nigeria.

4.6.4 Training

As represented in Table 17, about 7.8% responses from the households reported that another constraint associated with livelihood diversification is training. The implication of the result is that, most of the household heads they don’t have enough training so as to gain skills because some training requires entry cost and this becomes a barrier for them in participating effectively in various types of livelihoods. This result is consistence with

the findings of Khatun and Roy (2012) who found that lack of awareness and training are part of the restrictions on diversification of livelihoods between different groups in the state of west Bengal.

4.6.5 Infrastructure

These include water and roads access. About 7.3% of total response was focus on infrastructures as amongst major challenges associated with livelihood diversification. For example, some roads are not paved which could help to smoothen the transportation process of agricultural output from rural areas to emerging urban center. Also, most respondents were faced with the challenge of inadequate water supply needed to run their farm activities like irrigation farming and other non-farm activities, for example food vending bricklayer, brick making, and saloon services. This result is supported by Bhattacharjee (2016) who found that poor transportation facility is a constraint for livelihood diversification in India which causes the harvested product does not fetch high income due to huge transportation cost involved in marketing the product. Similar studies by Ewebiyi and Meliudu (2013) have identified lack of infrastructural facilities and poor transportation system as the constraints to livelihood diversification.

4.6.6 Skills

About 4.4% of responses reported that skills as one of the challenges associated with livelihood diversification in Kibaigwa emerging urban center. This is because of the fact that many dwellers in Kibaigwa emerging urban center are doing their activities without acquiring enough prior training. This result suggests that, most of the respondent they don’t have enough skills in diversifying their livelihoods. Punitha *et al.* (2018) published

likewise findings, discovering that inadequate experience in expected livelihood were the social constraints in livelihood diversification in India.

4.6.7 Other constraints

Apart from the major constraints explained already, several other constraints were identified as hindrances to livelihood diversification in Kibaigwa emerging urban center. These include injuries, lack of enough customers and high competition and more as presented in Table 17.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The overall objective of this study was to evaluate the non-farm livelihood diversification and rural transformation in Kibaigwa emerging urban center, Dodoma, Tanzania. The specific objectives were to analyze the contribution of non-farm livelihood activities to rural transformation in Kibaigwa emerging urban center, analyze factors influencing participation in the non-farm activities in Kibaigwa emerging urban center and analyze constraints associated with livelihood diversification in Kibaigwa emerging urban center.

5.2 Conclusion

Participation on Non-farm activities is paramount important for rural transformation (urbanization) and poverty alleviation amongst rural household in Kibaigwa emerging urban center, Dodoma, Tanzania.

Based on the results of analysis in this study, reveal that a high percentage (about 82.3%) of all household heads are employed in non-farm activities in Kibaigwa emerging urban center while about 16.8% of the household heads are engaging in farming activities as way to sustain their living, mean income of the household heads who were employed in non-farm activities is 329 789 per month which is larger compared 55 189 TZS earned by household engaging in farming activities per month.

Based on independent sample t-test statistics, the results show that non-farm activities have a significant relationship to rural transformation in terms higher incomes ($p < 0.05$). Most of the respondent (54%) their age ranges from 19-40 years and 75.5% of the respondent they have primary school education. Also, about 73.5% of the household heads who have farm size range from 0-4 acres are more likely to participate in non-farm activities such as petty trade compared to other groups who have farm size above 4 acres in the study area. Moreover, household head education level, age of the household heads, distance to market center, migration status of household heads, farm size of the household head, and entrepreneurial education which was measured by skills acquisition were significant factors that influence the participation of the households in non-farm activities. 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.

Moreover, initial and running capital, credit, electricity supply, training, infrastructures, skills, injuries, delay of payment and default of loans, customers, opportunities and high competition, bureaucracy in business registration, high cost of repair were major constraints associated with livelihood diversification to most of the household heads in Kibaigwa emerging urban centers. Other minor constraints which had low percent compared to the previous constraints were; low returns to the business, delay of salary, low salary, local government restrictions, raw materials, working environment, construction tender, high cost of water bill, there is no contracts, collateral, high price of raw materials, drugs sometimes, and absenteeism in meeting. Furthermore, other factors that were included in the logit regression but were not significant influencing the

participation of household heads in non-farm livelihood activities were access to credit, infrastructure, cost of inputs, and household size.

5.3 Recommendations

Government and non government organization should strengthen the provision of small and medium loans to farm household which will assist them in getting capital to run their business and it will overcome the constraints of initial and running capital which was the most challenge facing farm household in the study area.

Improvement of infrastructures especially roads and electricity supply in order to facilitate the transportation of agricultural inputs and outputs from urban to rural and from rural to urban and ensure constant supply of power in various agro industries such as sunflower oil processing and maize milling, also it will ensure facilitation of other non-farm activities.

There should be establishment of technical college such as VETA 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.

Factors that contribute negatively to non-farm livelihood diversification should be addressed such as creating conducive environment which will enable livelihood diversifiers to access credit and loans so as to engage in various non-farm activities in the Kibaigwa township.

Government should increase subsidies in the agricultural inputs such as fertilizers pesticides, and agricultural equipment's so as to reduce cost of agricultural inputs. This will encourage household to engage in farming activities and increase productivity in farming sector and help in the development of non-farm activities. The development will increase the portfolio of activities due to the fact that non-farm and farming sector are interdependent because the growth of one sector will lead to the growth of another sector.

There is a need to have a clear policy framework to guide township development planners to consider allocation of land for agricultural production and other non-farm activities like manufacturing, utilities, construction, commerce, government services, agro-processing, trading of unprocessed crop, livestock, forest, and fish products. Allocation of land for both agricultural production and non-farm activities are important for sustainable development and rural development.

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APPENDICES

Appendix 1: Questionnaire for household

SOKOINE UNIVERSITY OF AGRICULTURE

SCHOOL OF AGRICULTURAL ECONOMICS AND BUSINESS STUDIES

Research Title: '**Non-Farm Livelihood Diversification and Its Contribution to Rural Transformation in Kibaigwa, Dodoma Tanzania**

Phone: +255 715091707/ +255 756070451 E-mail: anyisileamenye@yahoo.com

Preamble;

I am **AMENYE ANYISILE**; master's student from Sokoine University of Agriculture (SUA), Department of Agricultural Economics and Agribusiness. The purpose of this study is to assess non-farm livelihood diversification in this area. This exercise is very important for the fulfilment of my studies and formulation of policies. Your household was randomly selected from the village list to participate in this research study. Taking part in this research study is entirely **VOLUNTARY**. Your responses will be kept **CONFIDENTIAL**. Your cooperation will be highly appreciated.

1. Street /Sub-village…….

2. Ward …….

3. Name of respondent……..……

4. Date of interview

5. Questionnaire number …….

SECTION A. BACKGROUND INFORMATION OF THE RESPONDENT

A001.Sex of the respondent

1. Male 2. Female

A002. Level of Education 1. Primary education 2. Secondary education

3. No formal education 4. Adult education 5. College/University

A003. Age in years _____

A004. Martial Status of the respondent

1.Single 2. Married

3.Divorced/Separated 4. Widow

5.Widower

Other specify_____

SECTION B: IDENTIFICATION OF NON-FARM LIVELIHOOD ACTIVITIES

B001 What economic activity that takes most of your labour? _____

B002.What economic activity do you earn most income? _____

B003. Did you engage in non-farm livelihood diversification activities in last 12 months?

1=Yes 0 =No

B004.If Yes in Question B**002** above, which of the following non-farm livelihood diversification activities did you engage during the last 12 months?

1= Shopkeeper of food item

2= Shopkeeper of non-food item for example clothes and utensils

3= Processing of farm produce 4 =Government services

5= Carpentry 6= Driving/ Transport

7=Food vending 8= Dressmaking

9=Construction 10=Saving and credit facilities

11=Specify if others …….

B005 On average how much do you earn per month for the non-farm livelihood activities? _____

B006 If answer is **no to question B002** why did you not engage in non-farm livelihood diversification activities during the last 12 months? (**allow for multiple ranked responses**)

1. I don't have enough labour to engage in non-farm livelihood activity
2. I don't have capital to start a non-farm livelihood activity
3. I used to be involved in one but was not profitable now I stopped
4. There is too much competition here for non-farm livelihood activity to generate income
5. There are no profitable non-farm livelihood activities here
6. I am new here at this village I don't know how to start a non-farm livelihood activity
7. Other specify _____

C007. Which of these factors makes you to participate in non-farm livelihood diversification? You may tick more than one answer.

1=Income 2=Risk aversion 3=Food security 4=Family necessity

5=Specify, if others……

SECTION C: FACTORS INFLUENCING PARTICIPATION IN THE NON-FARM LIVELIHOOD ACTIVITIES

C001. Do you have access to land? 1=Yes 0= No

C002. If yes, how much land do you own in acre? _____
C003. Do you engage in agricultural production? 1=Yes 0=No
C004 what is your total farm size that you cultivated last season in acre **----------**
C005 Did you sell any of the agricultural products that you produced last season?
1=Yes 0=No
C006 On average how much did you **earn per month** from selling agricultural products last season? _____
C007. Have you ever had any credit in the last 12 months? 1=Yes ……0= No

C008. How much money did you get as credit during last 12 months? .....

C009.How did you use the money that you got as credit? **(allow for ranked multiple responses)**

1=Established shop for consumer products (sugar, salt, soap etc)

2= Established timber harvesting business

3= Sent child to school

4= Spent on health services
5= Invested in farming

6= Bought farm land

7=Built a residential house

8= Built commercial house (guest house, or house for renting out)

9= Bought farm implement/equipment (Oxen, power tiller Bicycle)

10= Established marketing agricultural products (tomato, maize)

C010. What was the source of credit that you borrowed?

a) Commercial Bank b) Local Money lenders c) Friends/Relatives d) SACCOs e) Specify, if others……

C011.What is the total number of people your living together in this household ……?

C012. Please, indicate number of persons who depend on you for a living.

.....

C013.were you born in this village/emerging urban center?

1=Yes 0=No

C014.If yes to **C013** above, name the village _____

C015. Do you have a market center around your location?

1=Yes 0=No

C016a. If yes, what is the distance in kilometers from your resident to the market?.....

C016b.If yes, what is the travel time in hours_____

C017. Did you have access to extension officer in the last 12 months 1=Yes 0=No

C018. If, yes how many times the extension officer visited on your farm to teach on proper agronomic practices
If no skip to the next question

C019.Did you use or visit the following infrastructure in the last 6 months?

1. Health facilities 0=No 1=Yes
2. Schools 0=No 1=Yes
3. All-weathered road 0=No 1=Yes
4. Microfinance and banking services 0=No 1=Yes

C020 Do you have electricity connection in your house? 0=No 1=Yes

C021 What source do you use for your domestic water supply

1. Tap water inside the house
2. Tap water on the compound
3. Community water tap
4. Well near the house

5. Well on the compound
6. Other specify

C022 Did you purchase any of the following agricultural inputs in the period last 12 months?

1.Fertilizers (1 = Yes; 0 = No) 2. Pesticides (1 = Yes; 0 = No) 3. Agricultural equipment (1 = Yes; 0 = No)

C023.If Yes how much did you purchase? _____

C024.If, no why didn't you afford to purchase agricultural inputs?

a) Fertilizers ……1. was not available 2. Was too expensive 3. I did not need any 4. Other specify

b) Pesticides ……1. was not available 2. Was too expensive 3. I did not need any 4. Other specify _____

c) Agricultural equipment 1. was not available 2. Was too expensive 3. I did not need any 4. Other specify ……

C025. Did you participate in any skills acquisition training during the last 12 months??

1=Yes 0=No

C026. If, yes what did you learn from training on skills acquisition?

a) ……. b) …… c) ……

SECTION D: CONSTRAINTS ASSOCIATED WITH LIVELIHOOD DIVERSIFICATION

D001. Do you have any constraint by engaging in non-farm activities?

0=No 1=Yes

D002. If yes in **question D001** above, what are the constraints preventing you from engaging in non-farm activities in this area?

1=credit facility	2=initial and running Capital
3=Training	4=Skill and experience
5= infrastructure problem (like road, water	6=no opportunities
8=local government restrictions	9= Unstable electricity supply
10=Bureaucracy in business registration	11= other (specify).....

Thanks for your cooperation

Appendix 2: Questionnaire for township leader

ANALYSIS OF NON-FARM LIVELIHOOD DIVERSIFICATION AND ITS CONTRIBUTION TO RURAL TRANSFORMATION IN KIBAIGWA EMERGING URBAN CENTER DODOMA TANZANIA

6. Ward _____

7.Name of respondent _____

8.Date of interview _____

NON-FARM ACTIVITIES

	Village outside Kibaigwa emerging urban center	**Quantity**	**Village within Kibaigwa emerging urban center**	**Quantity**
A001.Are there any of the following infrastructures in this street/village?' **[Tick all infrastructure you have**]?	School Primary (Public) Primary (Private) Secondary (Public) Secondary (Private) Hospitals and clinics Health Centre Dispensary	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	Schools Primary (Public) Primary (Private) Secondary (Public) Secondary (Private) Hospitals and clinics Health Centre Dispensary	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
	Markets	☐	Markets	☐
	All weatherd roads Others specify a) _____ b) _____ c) _____	☐	All weatherd roads Others specify a) _____ b) _____ c) _____	☐
	Banks	☐	Banks	☐
A002. Do you have the following financial services	village community Bank (VICOBA)	☐	Vicoba	☐
	Money lenders Others Specify a) _____ b) _____ c) _____		Money Lenders Others Specify a) _____ b) _____ c) _____	
A003. Do you have the following investments? **[Tick all** investments	Maize milling Sunflower oil processing	☐ ☐	Maize milling Sunflower oil processing	☐ ☐
	Building like rental house and gest house	☐	Building like rental house and gest house	☐
	Others specify		Others specify	

you have]. **A004**. Do you have following trade and commerce **[Tick all trading and commerce you have].**	a) _____ b) _____ c)_____ Agricultural business Non-agricultural business Professional service Specifiy others a) _____ b) _____ c) _____		a) _____ b) _____ c)_____ Agricultural business Non-agricultural business Professional service Specifiy others a) _____ b) _____ c) _____	

	Item 2010/11	Quantity	Item 2018/ 19	Quantity
B001.Do you have the following? **Tick all item you have**	Schools Health center and clinics Roads Markets Financial services Agro-processing Literacy (both male and female) Trade and commerce Health workers Please specify if others a) _____ b) _____ c) _____		Schools Health center and clinics Roads Markets Financial services Agro-processing Literacy (both male and female) Trade and commerce Health works Please specify if others a) _____ b) _____ c) _____	

Thanks for your cooperation

Appendix 3: Checking for multicollinearity

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**	