

Addis Ababa
University

(Since 1950)



**ADDIS ABABA UNIVERSITY
COLLEGE OF DEVELOPMENT STUDIES
CENTER FOR RURAL DEVELOPMENT**

**Rural-Rural Migration and Its impact to Crop Production,
Commercialization and Asset Possession in North Gondar,
North Western Ethiopia**

**Doctoral Dissertation:
In Partial Fulfillment of the Requirements for the Degree of
Philosophy of Doctor in Development Studies (Rural
Development)**

Kibrom Adino Abate

Research Advisors

1. Bamlaku Alamirew Alemu (Ph.D)Major advisor
2. Degye Goshu Habteyesus (Ph.D).....Co-advisor

Addis Ababa University

Addis Ababa

August 2019

**Rural-Rural Migration and Its implication to Crop
Productivity, Commercialization and Asset Possession in North
Gondar, Western Ethiopia**

Doctoral Dissertation:

**In partial Fulfillment of the Requirements for the Degree of
Philosophy of Doctor in Development Studies (Rural
Development)**

By:

Kibrom Adino Abate

Research Advisors

1. Bamlaku Alamirew Alemu (Ph.D) Major advisor
2. Degye Goshu Habteyesus (Ph.D).....Co-advisor

Addis Ababa University

Addis Ababa

August 2019

DECLARATION

I declare that this dissertation, which I submit for the degree of PhD in Development Studies (Rural Development) at the Center for Rural Development, College of Development Studies of Addis Ababa University, is my original work and no material in this document has previously been submitted to another university for any degree. References from other authors have been duly acknowledged.

Name: Kibrom Adino Abate

Signature: _____

Date: _____

Place: _____

Date of submission: _____

This dissertation has been submitted for examination with my approval as university supervisor

Supervisor name: _____

Signature: _____

Date: _____

Addis Ababa University School of Graduate studies

This is to certify that the dissertation prepared by Kibrom Adino Abate, entitled: **Rural-
Rural Migration and Its implication to Crop Productivity, Commercialization and Asset
Possession in North Gondar, Western Ethiopia** and submitted in fulfillment of the requirements for the Degree of Doctor of Philosophy (Development Studies) complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Signed by the Examining Committee:

Examiner _____ Signature _____ Date _____
Examiner _____ Signature _____ Date _____
Advisor _____ Signature _____ Date _____

Chair of the Center or Graduate Program Coordinator

Manuscripts Status

1. The Impact Of Rural-Rural Migration On Crop Production In North Western Ethiopia: An Application Of Endogenous Switching Regression Model, Ethiopian Journal of Development Research, status received by the journal editors
2. The implication of Intra-rural Migration on Crop output Commercialization in Ethiopia, journal of Migration and Development , ID # 195400705, Status, it is under review
3. Rethinking the patterns of internal Migration in Ethiopia: The case of rural-Rural Migration in North Western Ethiopia, ongoing for manuscript preparation (proceeding at Dilla University)

ABSTRACT

Migration is one of the livelihood strategy for the rural farm household that supports the farm agricultural household in different ways. Among the various types of migration, internal migration took the leading which is 10 percent of the world population. In Ethiopia, migration is a part and parcel of the livelihood of rural farmers. The historical accounts of migration in Ethiopia, though was attached with political motive; it has been formally recognized since 1950s and 1960s now as an economic motive following the wider development of commercial agriculture in the country. Since then, rural-rural migration is a leading phenomenon in Ethiopia exceeding rural-urban migration. Evidences suggested that rural to rural migration since 1999 to 2013 shows, 37.4 percent 46 percent, and 34.6 percent respectively that still witness its dominance over other patterns of migration. However, the emphasis for rural-rural migration has been given very low in the development discourses in the context of poor countries. Unless obsessed by the urban bias migration literature, the rural-urban migration is not like what the majority of the literatures arguing in developing countries. In Ethiopia, rural to rural migration continues to lead the internal migration pattern. In this study, one of the prime purpose is to show how migration income affected the use of agricultural inputs and thereby influence smallholder commercialization which is the critical to transform the agriculture as well as the overall rural economy. On top of that, there are studies currently that suggest the need to delve deeper into the impact of migration on agricultural production and asset possession. Cognizant to these gaps, the study has delve deeper into the impact of rural to rural migration on three important outcomes (crop production, crop output commercialization and asset possession) in North Western part of Ethiopia. The study used the combination of quantitative and qualitative research approach in which quantitative analysis such as econometric models (Like Endogenous Switching Regression Model, Propensity Score Matching Model, and Seemingly Unrelated Regression Model) as well as descriptive analysis with qualitative data from focused group discussions and key informant interviews. The findings of study revealed that rural to rural migration has positive and statistically significant impact on values of crop output production. Specifically, we found that migration has showed positive impact on the migrant household which is an equivalent to 235.96 kg or 2.35 quintal of Teff that dominantly grown in the area. On the other hand, we found no effect on the technical efficiency of the migrant households. On the reverse, had the non-migrants migrated the study confirm improvements in technical efficiencies. With the same vein, labour migration had positive and statistically significant impact on crop output commercialization and overall asset possession. As a way forward, this study points the need to examine the synergies that exist within the rural economy itself and also rethink the implication of rural-rural migration as how it reinforces each other for the success of rural development through mainstreaming rural-rural migration into development policies, strategies and plans at various levels.

ACKNOWLEDGEMENTS

First and foremost, let me praise the almighty God for his unreserved protection of my family and who is restlessly by my side to bring my dream come true. Secondly, I would like to give my deepest gratefulness to my benevolent mother, who is truly the symbol of endurance and icon of strength for my life.

Secondly, my special intellectual appreciation goes to my advisor **Bamlaku Alamirew Alemu** (PhD) for his innumerable supports and suggestions from the beginning to the finalization of my research. Without his guidance and follow up the paper couldn't have the current structure and quality that this full dissertation have. Similarly, the academic support of my co-supervisor **Degye Goshu Habteyesus (PhD)** should be given much credit for his unreserved support from the proposal development to my final write-up.

My wife you're the great one, you shouldered all the family responsibility, without your courage and support the long journey of the PhD degree would have not been imagined. Meklit, my daughter, you came to my way and flushed sweet flavor to my life at the start of my PhD degree which was the juncture that life gave me more lesson to be strong for life.

It is also my great pleasure to thank different organizations and individuals such as, North Gondar Agricultural Bureau, North Gondar Social and Labour Affairs, district level agricultural and rural development offices of Dembia, Wogera and West Belesa for their collaboration during the data collection process.

Finally, I would like to forward my appreciation to the staff members of the College of Development Studies (CDS) as whole and the Center for Rural Development (CRD) in particular for their genuine academic supports and commitments from the beginning of the PhD program to the final thesis work activities. Without the collaboration and integrity of all staff members the success of the PhD program couldn't be imaged.

Table of Contents

Abstract	iv
Acknowledgements	v
List of Tables	viii
List of Figures	x
List of Abbreviation.....	xi
CHAPTER: ONE.....	1
1. Introduction.....	1
1.1 Background of the study.....	1
1.2 Statements of the problem.....	3
1.3 Research Questions and objectives of the study	5
1.3.1 Research Questions	5
1.3.2 General objectives of the study.....	6
1.4 Scope and Limitations of the study.....	6
1.5 Significance of the study	7
1.6 Organization of The Dissertation.....	8
CHAPTER: TWO.....	9
2. Review of Related Literature	9
2.1 The origin and concept of migration	9
2.2 Major Theories in Migration and Development.....	10
2.2.1 The Neo-classical theory of Migration.....	11
2.2.2 The World System Theory of Migration	11
2.2.3 The New Economics of Labour Migration (NELM).....	12
2.2.4 Migration System and Social Network Theories	13
2.3 Empirical review	13
2.3.1 The Trends of Internal Migration in Sub-Saharan Africa	13
2.3.2 The Factors Behind Migration Decision.....	15
2.3.3 Characterizing Internal Migration in Ethiopia	17
2.3.4 The Impact of Internal Migration on Agriculture, Commercialization and Welfare	20
2.4 Operational and Conceptual Framework of the Study.....	23
CHAPTER: THREE	27
3. Research Methodology	27
3.1 Description of the study Area.....	27
3.2 Research Design.....	32
3.2.1 Research Philosophy and World View	32

3.2.2	Research Approach	35
3.2.3	Methods of Data Collection	36
3.2.4	Sample Size and Sampling procedures	38
3.2.5	Methods of Data Analysis	41
3.2.5.1	Descriptive Analysis	41
3.2.5.2	Econometric Analysis	42
3.2.6	Ethical Considerations and guiding principles	62
CHAPTER: FOUR		64
4.	CHARACTERIZATION OF RURAL TO RURAL MIGRATION	64
4.1	Introduction	64
4.1.1	Migration, Demographic and Socio-economic Characteristics	64
4.1.2	Peculiar Features of Rural-Rural Migration to the Low Land Commercial Agriculture	70
4.1.3	The Determinants of Rural to Rural Migration in the Study Area	83
CHAPTER FIVE		88
5.	RURAL-RURAL MIGRATION, AGRICULTURAL PRODUCTION, TECHNICAL EFFICIENCY AND COMMERCIALIZATION	88
5.1	Variations in terms of Improved Technology Utilization	88
5.2	Impact on Crop Productivity and Technical Efficiency	91
5.2.1	The Impact Migration on Crop Productivity	91
5.2.2	Impact on Technical Efficiency	101
5.3	The Impact of Migration on Crop Output Commercialization	107
CHAPTER SIX		117
6.	RURAL TO RURAL MIGRATION AND ASSET POSSESSION	117
6.1	Descriptive Analysis of Asset Possession	117
6.2	The Impact Of Rural-Rural Migration On Overall Asset	120
CHAPTER SEVEN		129
7.	Conclusions, The Way Forward And Areas For Further Study	129
7.1	Summary and Conclusions	129
7.2	The way forward	134
7.3	Areas for further study	136
8.	References	137

LIST OF TABLES

CHAPTER THREE

Table 3.1: Total Population Distribution in the Districts by Sex (Study districts)	28
Table 3.2: Road Infrastructure in North Gondar Zone	31
Table 3.3: Philosophical Assumptions in Quantitative and Qualitative Studies	34
Table 3.4: Sample Size for the Selected Kebeles	40
Table 3.5: Hypothesized variables for the decision Rural-Rural Migration	43
Table 3.6: Determinants of Technical Efficiency A Survey of Empirical Literature	51
Table 3.7: Conditional Expectations, Treatment and Heterogeneity Effect	58

CHAPTER FOUR

Table 4.1: Demographic and Socio-Economic Characteristics of The Respondent Households .	65
Table 4.2: Number of Migrants per Households in The Study Area	69
Table 4.3: T-Test for Some Continuous Demographic Variables	70
Table 4.4: Frequency of Migration to the Commercial Agricultural Belts.....	72
Table 4.5: Migrants Duration in the Destination Area	73
Table 4.6: Sources of Information about Destination Employment	78
Table 4.7: Perceived Transportation Costs and Conditions for Migrants.....	80
Table 4.8: Maximum Likelihood Estimation for Decision of Rural-Rural Migration	85

CHAPTER FIVE

Table 5. 1: Chi-Square Test for Migrants Family and Non-Migrants Family for Dummy Variables	89
Table 5. 2: T-Test for Fertilizer and Other Chemical Expenditures by Migration Status	90
Table 5. 3: Definition and Summary of the Variables Used for both OLS and ESRM.....	92
Table 5.4: Parameter Estimates of Migration Decision and Crop Output Values Equation.....	94
Table 5. 5: Average Expected Crop Output Values, Treatment and Heterogeneity Effects (All Samples).....	96
Table 5. 6: Disaggregated Treatment Effects on the Basis of Different Criterion	97
Table 5.7: Matching Quality Test: Balancing Property	99
Table 5. 8: Average Treatment Effect Based on PSM.....	100
Table 5. 9: Results of the OLS and MLS (Stochastic Frontier Estimation: Translog)	102
Table 5. 10: Descriptive Summary of Technical Efficiencies for the Two Functions	103

Table 5. 11: Technical Mean Difference between Migrants and Non-Migrants Household.....	105
Table 5.12: Average Expected Technical Efficiency, Treatment and Heterogeneity Effects (All Samples).....	106
Table 5. 13: Average Treatment Effect Based on PSM.....	107
Table 5. 14: Mean Prices for the Major Crops Produces in the Study Area.....	108
Table 5.15: Crop Output Market Participation for the Main Crops Produced.....	109
Table 5.16: Mean Comparison of Crop Commercialization for Major Crops in the Study Area.....	111
Table 5.17: Percentage Mean Difference of Commercialization Index for the Two Groups.....	114
Table 5.18: Average Treatment Effect Based On PSM.....	115
Table 5.19: Simultaneous Estimation of Production and Market Participation.....	116

CHAPTER SIX

Table 6.1: Mean Difference for Continuous Asset Possession Indicators.....	117
Table 6.2: Chi-Square Test for Discrete Variables.....	119
Table 6.3: Descriptive Statistics All Asset Indicators	121
Table 6.4: List of Final Asset Indicators Used for Composite Asset Index Development.....	123
Table 6.5: Matching Quality Test: Balancing Property	126
Table 6.6: Average Treatment Effect Based on PSM.....	127

LIST OF FIGURES

CHAPTER TWO

Figure 2.1: Trends of Internal Migration in Ethiopia	19
Figure 2.2 : Conceptual Framework of the Study (Own construction, 2018).....	26

CHAPTER THREE

Figure 3.1: Map of the Study Region, Zone and Districts (Hailu, 2018)	30
Figure 3.2: Health Service Institutions in the Zone	31
Figure 3.3: Multi-Stage Sampling Procedure.....	40
Figure 3.4: Stochastic Production Frontier (Source: Battese, 1992:9)	46

CHAPTER FOUR

Figure 4.1: Rural-rural Migration Status	66
Figure 4.2: Total Migration Status in the Study Area.....	66
Figure 4.3: Sex of the Migrants	67
Figure 4.4: Major Sources of Employment in the Commercial Belt (Source: Own result).....	73
Figure 4.5: Main Activities and the Respective Income to be generated	75
Figure 4.6: Main Seasons of Migration	77
Figure 4.7: Remittance Income Use by Rank in terms of Percentage	78
Figure 4.8: Purpose of Remittance (Migrants' Response)	80

CHAPTER FIVE

Figure 5.1: Common Support Region for Treated and Untreated Groups.....	98
Figure 5.2: The Distributions of Technical Efficiencies from the Mean (Translog)	104
Figure 5.3: The Distributions of Technical Efficiencies from the Mean (Cobb-Douglas).....	105
Figure 5.4: Disaggregated Crop Commercialization Index	110
Figure 5.5: Level of Crop Output Commercialization.....	112

CHAPTER SIX

Figure 6.1: Percentage Distribution of the Composite Asset Index Level	124
Figure 6.2: Common Support Region between the Migrants' and Non-Migrants	125

LIST OF ABBREVIATION

ANRSCO.....	Amhara National Regional State Communication Office
CBoSLA.....	Central Gondar Zone Bureau of Social and Labour Affairs
CSA.....	Central Statistical Agency
DOI.....	Digital Object Identifier
ESRM.....	Endogenous Switching Regression Model
ESSP.....	Ethiopia Strategy Support Program
FAO.....	Food and Agriculture Organization
FGD.....	Focus Group Discussion
FIML.....	Full Information Maximum Likelihood
IFAD.....	International Fund for Agricultural Development
IOM.....	International Organization for Migration
MCA.....	Multiple Correspondence Analysis
MoFED.....	Ministry of Finance and Economic Development
NELM.....	New Economics of Labour Migration
NGFEDD	North Gondar Finance and Economic Development Department
PCA.....	Principal Component Analysis
RRM.....	Rural to Rural Migration
SBN.....	Sesame Business Network
SSA.....	Sub-Saharan African
UNECA.....	United Nations Economic Commission for Africa
WB.....	World Bank
WBDAO.....	West Belesa District Agricultural Office
WFP.....	World Food Program

CHAPTER: ONE

1. INTRODUCTION

This introduction chapter presents the background of the study, statements of the problem; research objectives, the scope of the study, and relevance of the study.

1.1 BACKGROUND OF THE STUDY

Migration is the common phenomenon for the livelihood of the rural poor in Sub-Saharan Africa countries. Among the various types of migration, internal migration took the leading in which nearly 740 million people were estimated to be migrants within their own country (IOM, 2015). The recent evidence shows that 10 percent of the world population is moving within a country, whereas about 3 percent are migrating out of country (FAO, IFAD, IOM, and WFP, 2018). In the past half a century, the discourses in migration studies have exhibited tremendous shifts from pessimism to optimism views of migration-development interactions (de Haas, 2010; Nzima, Duma and Moyo, 2016). Though the nexus between migration and development has got a growing support for its developmental effect, the impacts on agriculture have still remained contesting among the various empirical studies (Ochieng, *et al.*, 2016).

As a result, recently, there is an emergent concern on role of migration on agriculture as risk minimization and livelihood diversification strategy (Massey, *et al.*, 1993; Taylor, 1999) and its implication on rural poverty alleviation (Dey, 2014). Specifically, its relevance to augment financial constraints in poor countries for the agriculture sector has got great momentum (Massey, *et al.*, 1993; Taylor, 1999). Notably, the smallholder agriculture, which is the base for Africa's total food supply contributing 70% of export of agricultural commodities (IFAD, 2013) has intricate linkages with migration of labour. In Ethiopia, agriculture is the prominent sector, which contributes more than 46.89 percent to GDP, hosts about 80 percent employees, contributes 60 percent of countries export earnings and is hoped to play a leading role for food security and poverty reduction (MoFED, 2011).

However, this sector in SSA including Ethiopia is characterized by smallholder farmers with interlocking challenges of poor market integration, limited credit facilities, and low level of technology adoption that critically constrained agricultural productivity and made the rural

population to host the burden of poverty (WB, 2007; Salami, Kamara and Brixiova, 2010; Kirsten, Mapila, Okello, Sourovi De, 2012). Due to these fact, labour migration and the agricultural sector have intertwined linkages as strategy of livelihood diversification for income improvements of the agricultural households. It is also recognized that migration is not only response against shocks rather a strategy for livelihood improvement for the vast majority of the world poor population (Deshingkar and Grimm, 2005).

In Ethiopia, migration is a part and parcel of the livelihood of rural farmers. The historical accounts of migration in Ethiopia, though was attached with political motive; it has been formally recognized since 1950s and 1960s now as an economic motive following the wider development of commercial agriculture in the country (World Bank, 2007). For instance, 75 % of rural workers were engaged in only 16 large scale farms through migration (Ibid). Since then, rural-rural migration is a leading phenomenon in Ethiopia exceeding rural-urban migration. Even recent evidences suggested that rural to rural migration exceeds rural-urban migration in the three successive national surveys (CSA, 2014)¹. In the present study area, driven by the low land commercial agriculture as well as ample non-farm income opportunities in North Western part of the country; there are plenty of evidences for labour migration in Metema, Quara and Dansha-Humera high crop value production belts (Gebrehiwot and Fekadu, 2012; Kibrom, *et al.*, 2015). On the top of that the nearby urban areas have very limited job opportunity for rural labour (Kanta, 2014), that further made the cash producing areas as lucrative for labour workers.

However, there is clear understanding that rural to urban migration has been the only attention in policy concerns and micro-economic livelihood analysis (Lucas, 1997; Lucas, 2007; Linger and Terefe, 2018) and international migration takes the frontline in migration studies. On top of that, to the best of the researchers' knowledge the impact of rural-rural migration on agricultural production and on crop commercialization and whether it has the effect on rural asset possession has been seen to be very limited. Therefore, on the bases of the above backdrop, this research aimed at the study of rural-rural migration in North-western part of the country and its implication on crop productivity; crop commercialization and asset possession.

¹ 37.4 %, 46%, and 34.6% in 1999, 2005, and 2013 respectively,

1.2 STATEMENTS OF THE PROBLEM

The role of agriculture to put Africa's development into the required level is unequivocal. However, the predominance of smallholder agriculture which is embedded with multiple factors has constrained the progress significantly (WB, 2007; Salami, Kamara and Brixiova, 2010; Kirsten, Mapila, Okello, and Sourovi, 2012). To transform the agriculture sector; it demands to invest on smallholder producers so that they can integrate in both input and output market. The government of Ethiopia has prioritized smallholder commercialization as a basis to transform agriculture and the overall economy of the country under its Growth and Transformation Plan (GTP I and II) (MOFED, 2010; National Planning Commission, 2016).

However, despite the tremendous efforts in the agriculture sector; the level of smallholder commercialization in the country has been noticed to be very limited in different studies including achievements in the GTP I (Gebreslassie, Kebede and Kiros-Meles, 2015; National Planning Commission, 2016). This is mainly caused by low level of farm-productivity enhancing input utilization due to low income or limited financial arrangement for the agricultural households that promised to have effect on productivity and market integration through better input access (Lerman, 2004; Ephraim and Miriam, 2012; Martey *et al*, 2012 and Agwu, Anyanwu and Mendie, 2013).

Currently, bringing smallholder farmers into market through better agricultural productivity and market integration is the critical element for agricultural transformation in particular and rural transformation in general (World Bank, 2008; Berhanu, and Jaleta, 2010). To this effect, improving smallholder farmers' tendency towards commercialization through better technology adoption and input utilization has been seen to play significantly in various studies (Asfaw, *et al*, 2010; Asfaw, *et al.*, 2011; Leykun and Jemma, 2014; Tigist, 2015). However, in developing countries like Ethiopia, where low level of credit facilities and poor institutional arrangements are installed, adoption of productive agricultural technologies and input utilization is meager. Thus, among the various alternative livelihood diversification strategies for poor farmers; migration is the one, which helps to bridge the financial gap and input requirements of the rural farmers and 'asset accumulation' (Ellis, 1999; Ellis and Freeman, 2005:5). The World Bank also strongly advocates labor and migration as the "complementary path-ways out of rural poverty" in poor countries like Ethiopia (WB, 2007:73).

Though smallholder commercialization is argued to be the ‘virtuous cycle’ within which better input and output market could reinforce each other (Jayne, Haggblade, Minot, and Rashid, 2011); income growth and financial services are initial prerequisites to switch the vicious circle in to virtuous circle. It is with this principal argument that this study tried to argue how agriculture, commercialization and rural welfare are associated with the strategies that aimed to improved income through labour diversification (i.e. migration).

Studies are ample concerning migration and development, notably in international migration and rural-urban migration. However, emphasis for rural-rural migration has been given very low attention in the development discourses in the context of poor countries (Lucas, 2007; Carr, 2009; Atsed, Penker and Wurzinger, 2016; Linger and Terefe, 2018), as a result remained ignored. Unless obsessed by the urban bias migration literature, the rural-urban migration is not like what the majority of the literatures arguing in developing countries (Carr, 2009). At the same time, previous studies fail to recognize the need to see the synergies existed within the agricultural economy itself given its heterogeneous agro-ecological and diverse production potential and thus, rural–rural migration remained ignored (Lucas, 1997²; Lucas, 2007); thereby rural to rural migration has been seen buried in migration studies (Ekpenyong and Daniel, 2015). On the top of that, there are still studies that pointed for the need to delve deeper on the impact of migration on agricultural and rural development (Kaninda and Greg, 2014).

Despite these facts, limited rigorous studies have been conducted linking the two agricultural activities of the smallholder production and the large scale commercial agriculture; notably, its implication on agricultural production, smallholder commercialization and welfare effect. At the same time the dynamic effect of migration and its outcome has questioned the development of general conclusions. At the same time, the impact of internal migration in the country has been found to be mixed (Carter and Rohwerder, 2016). This clearly informs the need for in-depth research on location specific studies on migration and its effect on livelihood outcomes to generate site-specific implication of migration.

² It clearly informs that the persistence of the dualistic approach in the contemporary studies as stated in Lucas, (1997:729) “...the early dualistic development models envisioned a rather homogeneous rural sector, within which migration was seen to confer no real benefit.”

In the present study area, driven by the combination of push and pull factors (huge labour demand of the commercial agriculture (Woldie, *et al.*, 2010; SBN, 2013³; NLSAD, 2016 and Linger and Terefe, 2018); smallholder farmers undergoing rural-rural migration as temporary (once or four times a year) and sometimes for long from low level of agricultural production areas to cash crop producing areas of the country; particularly in North-Western part of the country such as in Metema, Quara, and Tegedie, West Armachiho and Dansha-Humera large scale commercial agricultural belts (Gebrehiwot and Fekadu, 2012; Kibrom, *et al.*, 2015). Therefore, this study aimed to contribute to the discourses of agricultural development and labour migration; through illuminating the underestimated synergies existing within the rural economy which is manifested through rural-rural labour migration with meticulous methodological organization.

1.3 RESEARCH QUESTIONS AND OBJECTIVES OF THE STUDY

1.3.1 RESEARCH QUESTIONS

The following are the specific research questions that this study intends to address:

- What looks the existing rural to rural migration in the study area?
- Do migrants utilize improved technologies better than (like fertilizer, HYV) non-migrants for agricultural production improvement?
- Does rural-rural-migration have an impact on crop productivity?
- What is the impact of rural-rural migration on technical efficiency in crop production?
- Does labour migration have implication on smallholder crop output commercialization?
- Is there any difference in the possessions of productive assets among the migrants and non-migrants?
- Is there a difference between migrants and non-migrant households' in terms of overall asset possession?

³ As cited in SBN, 2013: huge labour are required from land preparation up to loading and unloading of the final harvest.

1.3.2 GENERAL OBJECTIVES OF THE STUDY

Broadly, this study intended at investigating rural to rural labour migration in North-Western Ethiopia, and its implication on the smallholder agricultural production and commercialization and asset based rural welfare.

1.3.2.1 SPECIFIC OBJECTIVES OF THE STUDY

The following were the list of specific research objectives that this study purports to conduct:-

- To characterize rural-rural migration in the study area;
- To compare the variations existing in terms of improved technology utilization among households with migrants and non-migrants;
- To investigate the impact of rural-rural migration on smallholder crop productivity and technical efficiency;
- To analyze the impact of rural-rural migration on crop commercialization;
- To examine the effect of rural-rural migration on the asset-based welfare of migrants' household.

1.4 SCOPE AND LIMITATIONS OF THE STUDY

Issues in the discourses of migration and agricultural development are multi-facet. An attempt to address the details of such intricate issue is impractical with a single study. Therefore, this study had been mainly limited to the rural-rural labour migration and its impact on crop production, technical efficiency, and crop commercialization and to investigate whether it has effect on the asset based welfare of the farm households. With regard to the unit of analysis, this study focused on household level guided by the New Economics of labour Migration (NELM) which is a recent advance in migration theory that advocates the relevance household level analysis for effective impact study in agricultural economy as well as viewed migration as a family livelihood strategy.

The following were seen to be the limitations of this study. Firstly, the study mainly relied on the cross-sectional data for its impact evaluation. As a result the dynamism in the migration trend will not considered under cross-sectional data. Though recall type of panel data is suggested in some cases, it suffers from report and measurement errors as we have many measurement issues under

our objectives. Thus, such types of study could be better improved through panel data which is not available for such types of migration. Secondly, our study has been argued for the theory of New Economics of Labour Migration based on data at household level. Thus, a single family or if the whole family migrated not accounted in this cross-sectional survey, but their migration could have important impact of their agricultural activities. Moreover, the results from the propensity score matching model should be cautiously interpreted as it mainly relied on observable covariates as a result doesn't consider unobservable covariates.

1.5 SIGNIFICANCE OF THE STUDY

There is a pleasant consensus on the significance of transforming subsistence agriculture in to commercial as prime root towards successful economic growth and to have impact on rural poverty and food insecurity. To this effect, the agreeable challenges for subsistence producers are imperfect market inter alia, that couldn't avail credit and financial services to ignite agricultural productivity at gross root level. Due to this fact, farm households have intricate linkages with other sources of income to finance agriculture and household consumption. Thus, the significance of this study are as follow if required to distill them. Firstly, this study is among the few forerunner as far is the researchers' knowledge concerned switched the customary urban bias studies such as (rural to urban migration) into rural based analysis through rural-rural migration and the synergy existed within the rural economy itself. Secondly, the study also provided empirical evidence on the mixed implication of migration on crop productivity, crop commercialization and asset endowment with meticulous methodological organization. Thirdly, at broader level, this study could have policy implication to illuminate the underestimated synergies existed within the rural economy and thereby helps to influence the nature and direction of development at macro-level. The last but not the least, is that this study has a significance of brining the under-represented labour migration phenomenon in to the statistical and economic analysis in less developed countries like Ethiopia. Moreover, study tried to use the multi-dimensional asset indicators and econometric models that control for sample selection bias and endogeneity problems for robust result.

1.6 ORGANIZATION OF THE DISSERTATION

This monograph is organized as follow. The first chapter presented above mainly devoted to present the background of the study, the statements of the problem and the main research questions and objectives addressed in the dissertation. The ensuing chapter two has made an attempt to go through the review of related literature from the conceptual understanding of the term rural to rural migration to the empirical and theoretical explanations of the migration discourses. The third chapter focuses on the methodological bases of this study. Under the third chapter, the research design, the research philosophy, and methods of data collection and analysis are presented in detail. The results and discussion of this study are presented in chapter four, five and six respectively for migration characterization, migration and crop production, technical efficiency and commercialization and migration and asset possession. Finally, the last chapter, chapter seven presents the summary, conclusion, the way forwarded and pointed areas for future studies.

CHAPTER: TWO

2. REVIEW OF RELATED LITERATURE

In the second chapter of this research, the related literatures in migration studies have been reviewed and presented. In this chapter, firstly, the major theories in migration studies as well as the moves in migration theory since 1950 and 60s' up to the contemporary developments were discussed in detail. Then, empirical studies carried out so far pertinent to the objectives of this study with respect to migration and its effect agricultural production and asset possession were discussed to critically scrutinize the methodological progress in migration studies. Finally, the conceptual genesis of migration, internal migration and rural-rural migration have been clearly conceptualized.

2.1 THE ORIGIN AND CONCEPT OF MIGRATION

The origin of migration is as old as the history of mankind. However, the discourse in academic line dated back to the seminal work of Ravenstein in 1880s when he wrote on the laws of migration (Grigg, 1977). Since then, the concept of migration has moved across various conceptual and operational definitions. In this study the prime focus is internal migration, notably the rural to rural migration and its impact on agriculture and the asset possession of the migrant's household. Thus, it is worth mentioning to elucidate the conceptual notions of each of the elements that have been covered in this study.

The international Organization for Migration (IOM) (2011:51) has defined internal migration as

“A movement of people from one area of a country to another area of the same country for the purpose or with the effect of establishing a new residence. This migration may be temporary or permanent. Internal migrants move but remain within their country of origin.”

However, internal migration though defined to have limited geographical mobility within once own country in terms of space; it can have various temporal forms and spatial patterns of migration. From spatial perspective, internal migration can be categorized as rural-urban, rural-rural, urban-rural and urban-urban migrations (Sinha, 2005). In terms of temporal perspective, it can be viewed as permanent for those who stay for more than one year and temporary for those who stay one year

or less (United Nation, 1970). In this definition, there is no clear delineation for the spatial references for temporary migration. However, in some studies to generally categorize migrants from non-migrants staying out of the original residence for two or more months is used as temporal reference for migrants (Garip, 2014).

The interest of this study is rural to rural migration which according to the IOM (2011) defined as the migration of people or groups of people from one rural location into the other rural area of longer or shorter distance. In some studies, the prefix “intra” which represents migration within certain spatial delineation has been also used in migration literature to represent rural to rural migration (Lucas, 1997; Wineman and Jayne, 2016). However, in this study, rural-rural has been utilized and the definition has been adopted from the IOM, (2011) represented as movement of family members from rural origin to rural destination as strategy of labour diversification where opportunities are higher. From the viewpoints of temporal, rural to rural migration according to some studies have been declared if migrants stay away for about a month and above (Atsede and Penker, 2016; Keshri & Bhagat, 2011; Linger and Terefe, 2018). However, it has been recognized that the temporal threshold found to vary from study to study depending on the specific nature of each location. The operationalization of migration concept for this particular study has been presented at the end of this chapter.

2.2 MAJOR THEORIES IN MIGRATION AND DEVELOPMENT

Literature and empirical accounts in migration and development studies had revealed continued changes from 1950 and 60s to 2000 (de Haas, 2010). In the literatures of migration there are a number of theoretical explanations through which the nature, characteristics and drivers of migration can be elucidated. In this regard, the paper by Massey *et al.* (1993) which is viewed as the pioneer for initial organization of migration theories was followed for theoretical articulation in migration studies.

In King (2012) as well as Portes (2010), three major theories such as the neo-classical approach, the world system theory and the New Economics of Labour Migration (NELM) were identified as the dominant theories in migration literature. Whereas, Zanker, (2008) has presented the level of major theories of migration as macro (aggregate migration), meso (on the household or

community) and micro level (individual migration decisions) explanations (Ibid). In this study, theories that are pertinent to the scope of our study were crystalized in the following sub-sections.

2.2.1 THE NEO-CLASSICAL THEORY OF MIGRATION

For the initial theoretical foundation of migration various scholars have been contributed. The early neo-classical theory of migration mainly attributed to the work of Lee through its pull-push argument (Lee, 1966). As per Lee, migration is driven by the combined effect of the origin and destination characteristics; personal factors and other intervening factors like distance and legal restrictions (Ibid). Since then, the essence of the neo-classical theory on migration explained the motive behind labour migration is attached with wage differentials and cost of migration on the bases of individuals' income maximization orientation (Harris and Todaro, 1970; Todaro, 1980). The neo-classical theory of migration explains both macro and micro migration phenomenon as wage differential are the realities within and between countries. Thus, according to this theory migration is inevitable both within and between countries "from labor-abundant to labor-scarce countries is a flow of investment capital from capital-rich to capital-poor countries" (Massey *et al.*, 1993:433). However, due the mechanical reduction of migration factors; unawareness on market imperfection; homogenous view of migrants and underestimation the influences of policies and politics; neo-classical theories of migration are highly criticized (Kurekova, 2011). At the same time in reality this theory forgotten what Lee, (1966) considered as intervening factors for the presence of free mobility (Newbold, 2010). Stated differently, the theory has seen migration as a free movement of people from where benefits are lower to where benefits higher regardless of the migration constraints.

2.2.2 THE WORLD SYSTEM THEORY OF MIGRATION

As stated in Massey, *et al.*, (1993); Zanker, (2008); and King, (2012), it was the work of Wallerstein in 1974 which laid the foundation of world system theory in migration. According to this theory migration is the result of structural and world market interaction. In another words, migration decision is driven by the seed of capitalist system in terms of market expansion which allows the core capitalist to enter in the peripheral agriculturalist which ultimately replace the traditional agriculture in to modern. The resultant force leads in to consolidation of land and the withdrawal of traditional farmer from the sector. Finally, the fate of rural labour will be migration

in to other location where advantages are higher than origin or employed as labour worker in the capitalist large scale agriculture.

Recently, the growth of foreign direct investment in developing countries and the dislocation of the agricultural labour for the purpose of foreign large scale agricultural investment is also linked with the world system theory. The result has different forms either can positively pull labour following the mobility of capital to rural economy or on the other side can be push factor to search for other livelihood option following land confiscation.

At the same time, the capitalist system had created the expansion of capital where land is abundant. In this case, the large scale farming can create an opportunities for less productive agricultural farmers to be employed in the commercial farming; thereby will induce migration within the agricultural sector too. However, this theory is also criticized of being ignoring the individual motivation for migration (Zanker, 2008).

2.2.3 THE NEW ECONOMICS OF LABOUR MIGRATION (NELM)

Against the neo-classical theory of migration, the New Economics of Labour Migration (NELM, hereafter) has showed critical departure on the level of analysis from individual view of migration in to household level (Stark and Bloom, 1985; Stark, 1991; Portes, 2010; Kurekova, 2011; and Kings, 2012). Maintaining decision at household or family level, the NELM argued that migration decision is a product of multi-faceted characteristics of the household and households' response against the prevailing failures of financial, credit and labour market (Massey, *et al.*, 1993). Thus, migration is viewed as household livelihood diversification strategy to minimize risk during market failure; where in developing countries financial markets for the poor are inaccessible (Taylor, 1999; de Haas, 2010⁴). The notion on household level analysis also has got empirical support in agricultural studies due the fact that agricultural production couldn't be disaggregated in to individuals while studying the impact of migration on agriculture (de Brauw, 2014). There are also further support on the NELM as the only theory which helps to study the impact of migration decision on certain livelihood outcomes (Taylor and Fletcher, 2001. Cited in Zanker, 2008). At the same time, the theory argued to be suitable for rural setting and poor countries (King,

⁴ See, de, Haas, 2010: 244 for the commonalities between NELM and the livelihood approach

2012). Despite its significance in the study of migration; it is incapable to explain when the whole family migrates and conflict prevailed within the family members (Ibid).

2.2.4 MIGRATION SYSTEM AND SOCIAL NETWORK THEORIES

Due to the synergies found between social network and migration system theory this paper has grouped them in the same section. The social network theory came to explain migration patterns in terms of connection establishment which helps to minimize the cost of migration in terms of information and psychological risks (de Haas, 2007; Bakewell, de Haas and Kubal, 2011). This theory also explains migration can be facilitated through prior connections established between the sending and receiving parties rooted from colonial, trade and investment linkages (FAO, IFAD IOM, WFP, and 2018). However, the system theory that explained migration from structural and functionalist perspective has been viewed as reductionist that fails to comprehend the nature of migration as social realities are so complex (Bakewell, de Haas and Kubal, 2011). Despite this fact, there is also great respect on the system theories re-incorporation with new notions of such as social relation and social network (Ibid).

In general, due the complexity and the diversity of migration phenomenon there are no fixed agreement on migration theories. Due to this fact, the multi-faceted characteristics of migration can be explained by either of the theories discussed above from the earliest theories of migration to the contemporary development of theories of migration. Notably, for the interaction between migration and development; currently there is a strong shift away from singular theoretical explanation into pluralistic view of migration and development interactions (Nzima, Duma and Moyo, 2016). Moreover, for studies that aimed at examining the impact of migration on sending family agricultural production and related outcomes, the new economics of labour migration found to be appropriate to center the level of analysis at sending household level.

2.3 EMPIRICAL REVIEW

2.3.1 THE TRENDS OF INTERNAL MIGRATION IN SUB-SAHARAN AFRICA

The size of internal migration in some countries, notably in developing countries is greater than to that of the international one (Deshingkar and Grimm Sven, 2005). Migration of people both

internally and internationally is the common feature of Africa. Internal migration is the dominant one as compared to the international for rural households (FAO, 2017). This is mainly due to the fact that international migration is much expensive than internal for rural households. On top of that the same study indicated that higher than 50 percent of the households in Africa found to have at least one migrant who is in rural area (Ibid).

Internal migration is supposed to have immense contribution for poor countries as an instrument of poverty reduction as it is expected to continue in faster rate than the international; due to the presence of lower restriction for poor families and accommodating large size than international migration (Deshingkar, 2006). Specially, at the contemporary time when international migration has become so dangerous and in some European countries are closing doors for migrants'; internal migration is playing significant role for the livelihood of the poor. The volume of internal migration has been seen to far exceeds international migration which is estimated to be 740 million (10%) whereas, for international migration it is estimated to be 232 million (3%) (IOM, 2015; FAO, IFAD, IOM, and WFP, 2018).

Internal migration is not a new phenomenon in Africa; it has been there as long as the history of the continent. Among the different patterns of migration, there are ample studies that witness the higher share of rural-rural movement in sub-Saharan African countries among the four major patterns of internal migration (rural-rural, rural-urban, urban-rural and urban-urban) (Oucho, and Gould, 1993; Wineman and Jayne, 2016⁵). Different studies are also argued still in developing countries, like Asia and Africa rural to rural migration is rampant than the other forms of migration (Carr, 2009; Lucas, 2015; Tacoli, 2011, Linger and Terefe, 2018).

This could be true due to the fact that within the rural economy of the poor countries there are livelihood options that arise from the heterogeneous nature of the agriculture sector in terms of the divide as subsistence vs. commercial; rain-fed vs. irrigated and poor and rich rural locations (Lucas, 2007). Thus, such heterogeneities can trigger migration of labour from less productive to more productive regions of the same country. In Madagascar according to Nawrotzki, *et al.*, (2012) the larger share that accounts 73 % are migrants from rural origin to rural destination that commonly characterize less developed countries with such types of migration patterns. Very

⁵ 68% of the internal migration in Tanzania is within the rural economy, i.e. rural-rural migration

similar result as reviewed by (Deshingkar and Grimm, 2005) attested that 62 percent in India, 68 percent in Nepal, 37 percent Vietnam, are migrants from rural origin to rural destination mainly for different agricultural activities. In the region, the growth of urbanization and industrialization and its linkage which supposed to drive rural-urban migration has been seen to be low in Africa (UNECA, 2017). It is due to these all facts that some studies are arguing that rural-urban migration is not like what ample studies are echoing (Carr, 2009).

2.3.2 THE FACTORS BEHIND MIGRATION DECISION

Apart from the theoretical explanation of the multi-facets of migration, different studies had an attempt to examine the motives for migration to happen. There are general understandings in migration literature that the determinant factors for migration are heterogeneous varying from temporal and spatial perspectives. Meaning, from spatial perspective what is found to be positive factor in one location can be the other way or from temporal viewed what has been perceived positive in the past can be negative in the current study. Thus, it is worth important to review both past and current studies as well as the experiences in different setting for broader understanding of the determinants of migration. In relation to this, as pointed in Todaro (1980:363) the knowledge of the determinants of internal migration is relevant to appropriately mainstream migration in to the development policies and approaches that in one or the other way can have positive contribution to the social-economic development due to migration decision. Similarly, such recognitions has got great momentum also in Africa in which the knowledge of migration patterns, trends and the determinants can help to exploit the benefits of migration positively (Abebe, 2010). In this empirical review different papers have been reviewed to comprehend about the main determinant factors for migration decision. For instance in Ethiopia, the case study by Woldie *et al*, (2010) in Amhara region, indicated that one of the major drive for rural to rural seasonal migrants is the network that they established. According to this study virtually all migrants had been found to have basic information about the destination contacting with experienced migrants or with other networks. Social network apart from obtaining information, it is also viewed as means for reducing migration risk (Morten, 2016). Similarly, the study conducted in Zambia had the same result in which established social network can facilitate the migration of labour in terms of assisting job search, minimizing the cost of psychological and information access (Ito, 2011). On the contrary having migration network can be negatively associated due to the reasons that

experienced migrants didn't tell the truth about employment situation in fear of job competition if they tell them about the existing job opportunities. (Blumenstock Chi & Tan, 2018). However, concerning migration, the dominant empirical suggestion informs that having social network and connectivity is an instrument to minimize cost of migration and thereby positively affect migration decision (Munshi 2003; McKenzie and Rapoport 2007; Linger and Terefe, 2018).

Migration decision at household level is also associated with availability of active labour force within the family. In line with this, some studies in Ethiopia, for instance according to Linger and Terefe, (2018) based on binary logit model they came to recognize that the larger the family has dependents the lower will be the probability to send the family member. Put differently, having larger active labour can be a confidence for sending families either for guarantee for the left behind or can be an opportunity to diversify labour for further livelihood improvement. Having large family size regardless of the age structure also found to be an opportunity to send more than one family member for migration as articulated by the study of Dodd, *et al.*, (2016) in India. This may also be associated with rationale for the more the household have multiple migrate the higher will be the return to the sending family. Earlier studies also recognized the benefits of surplus labour as means for labour diversification through migration (Deshingkar and Start, 2003, Deshingkar and Grimm, 2005). However, it is also noted that having larger family size also can be a push factor in which the more that family size the higher will be the household demand in the origin. Thus, sending part of the family is push factor to support the left behind (Dodd, *et al.*, 2016).

Having resources such land size and livestock possession which is measured in terms of Tropical Livestock Unit been seen to be one of the determinant factors for migration. According to Linger and Terefe, (2018), a unit increase for both assets in terms of the respective measurement has been associated with negative effect on migration decision at household level. Similar study in Southern India also revealed that having alternative income option and possession of livestock found to be negatively associated with migration decision due to the fact that such opportunities can be better options than migration income (Dodd, *et al.*, 2016). At the same time, physical factors like shorter distance and accessibility to roads as well as lucrative employment opportunities as pull factors of inter-district migration in Ghana (Daniel and Bao, 2010).

In general, though it is difficult to generalize on the determinants of migration decision, it is possible to comprehend the multi-faceted determinants of migration. Different micro-level factors

are responsible behind the motive for migration, these days the economic motive is the leading factor for migration decision (Abebe, 2010). At the same time it should be also noted that the drivers of migration are multi-faceted that can be associate with economic and non-economic (conflict and political uncertainty) factors as well as micro-level determinants such as demographic (age, sex, household composition), economic factors (origin and destination income situation, the perception on the destination income) (FAO, IFAD, IOM, and WFP, 2018). More importantly, the pull factor which is explained in terms of positive perception of the destination areas in terms of job opportunities claimed to be the main driver for migration decision (Gyasi and Ayivor, 1992; Kainth, 2010). It is also noted that, primarily migration decision has a strong correlation with household characteristics or family context in which migration finance as well as pull or push factors are emanated from the household (Ibid). At the same time, there general understandings that factors behind migration are common to all types of migration patterns, including rural to rural migration (Carr, 2009).

2.3.3 CHARACTERIZING INTERNAL MIGRATION IN ETHIOPIA

Ethiopia, a country that still depends on agricultural economy has passed across different regimes and associated development policies shifts. The country formally followed the democratic state after the demise of the derg regime in 1991. Since then, the Agricultural Development Led Industrialization strategy (ADLI) has been applied with the hope to take agriculture as spring-board through which industrialization can be realized. Though, the country has showed significant economic growth, still Ethiopia is one of the most populous and still grouped as poorest country with low level of human development index (UNDP, 2018).

Currently, the population of the country is estimated to be 94.4 Million of which nearly 80 percent of them are living in rural areas dominantly with agricultural based livelihood (CSA, 2013). However, the agriculture sector is still blamed to be low in terms of productivity compared to the expectations. Various factors are responsible for the low level of agricultural production improvements of the smallholder farmers. Among these low level of technology use, limited access to credit facilities and market access costs (WB, 2007; Salami, Kamara and Brixiova, 2010; Kirsten, Mapila, Okello, Sourovi De, 2012). Due the meagre nature of agricultural income the farm households also have intricate linkage with labour diversification for rural livelihood improvements (Ellis and Freeman, 2005).

The historical accounts of migration in the country shows tremendous shifts from politically forced and war driven migration in to economic motives (Fransen and Kuschminder, 2009). As pointed in Abebe, (2010) the contemporary migration in Africa is mainly influenced by economic rationale. However, the main challenge for migration research is lack of comprehensive data on various patterns of migration in developing countries. Ethiopia is not different from that having an updated data on different forms of migration is a problem, notably on rural to rural migration. Given its limitation, in Ethiopia, the patterns of migration has been observed to occur in all direction from rural to urban, from rural-rural, from urban to urban and from urban to rural.

Among the different patterns of migration in Ethiopian, rural to rural, rural to urban and urban to urban are the common patterns. However, still studies and reports showed that rural-rural migration dominated the share of overall migration in the country (Getnet and Mehrab, 2010; CSA, 2014; Linger and Terefe, 2018). Rural-urban migration is not like theoretically supposed to be in Africa. In line with this, there is an evidence that urbanization in Africa is not due to rural-urban migration which further implied the lower implication of rural-urban migration in Africa (Jayne, *et al.*, 2017). This is mainly linked with the low level of urban employment creation⁶ and urbanization and industrialization as well as skill compatibility of rural labour in rural areas in the country to remain on rural economic activities as main choice of livelihood diversification (Kanta, 2014; Arkebe, 2018).

⁶ Job search in urban Ethiopia specifically in Gondar could take one up to four years, Kanta, 2014

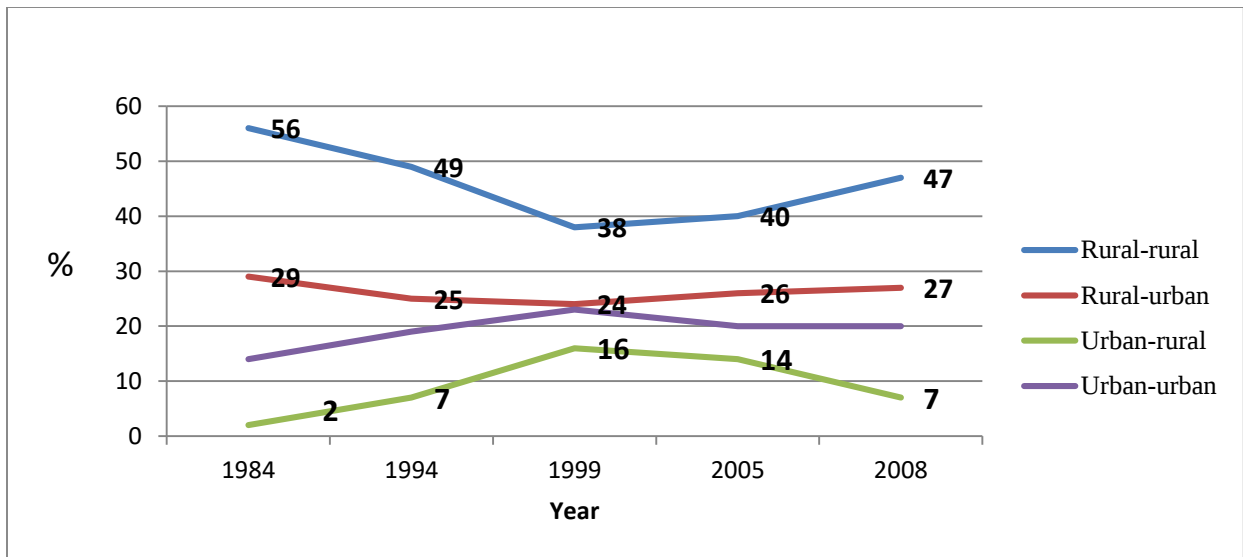


FIGURE 2.1: Trends of Internal Migration in Ethiopia

Source: Adopted From (Getnet And Mehrab, 2010).

In Ethiopia, labour migration from rural origin to rural destination is not a recent phenomenon. Rather it dates back to 1950s and 60s due to the growth of large scale agricultural production in some part of the country. According to World Bank (2007) about 16 large scale farming destination were hosting 75 % of the rural labour migrant workers. At the same time during the imperial regime, following the positive courage of the government for large scale commercial agriculture not only labour migration for work but also rental farmers those who rent land for farming purpose had such a migration experience to Arisi (Chilalo) and Setit Humara large scale farming areas (Dessalegn, 2009). With regard to the employment, the Awash Valley alone had the capacity of hosting nearly 125, 000 employees for permanent and temporary employment opportunities, while the Seti Humera hosts 100, 000⁷ (Ibid). These all are some evidence for rural ward migration trends in the country during the imperial regime.

The low level of rural–urban migration in the country can be explained from different perspectives. In one hand the land policy is argued to be the major hindrance for rural labour to migrate to urban areas and stay for longer. This is due to the fact that the land policy forced them to not to sale their land that could lubricate migration. At the same time, are also forced to live in rural areas not to lose their land (Getnet and Mehrab, 2010; Dorosh *et al.*, 2011). On the pull factor side the studies

⁷ Was an estimated number of employees in 1972, Dessalegn, 2009:96)

also articulated that being among the least urbanized country can be mentioned as main factor for low level of unemployment in urban economy (Dorosh *et al.*, 2011). Further unavailability of employment opportunities and unemployment rate in urban areas of Ethiopia is growing (WB, 2016). This is primarily discouraged the movement of labour from rural areas to urban areas beside to the land policy perspective. On the top of that, either due to skill unfit or non-existence of job the urban market have very limited opportunities from rural labour (Fransen and Kuschminder, 2009).

Generally, due to multiple factors rural-urban migration in the country is not like the expected (Carr, 2009). The land policy, low level of employment opportunities, slow urbanization and industrial growth has led low level of rural to urban migration. These days, still evidences support for the higher share of rural to rural labour migration in Metema, Humara, Quara, Dansha, Benishangul-Gumuz and other sesame producing areas that demands large labour workers. (Woldie, *et al.*, 2010; Gebrehiwot and Fekadu, 2012; Kibrom, *et al.*, 2015; Linger and Tefere, 2018).

2.3.4 THE IMPACT OF INTERNAL MIGRATION ON AGRICULTURE, COMMERCIALIZATION AND WELFARE

Empirical studies with regard to the impact of migration on development and particularly agricultural development are recently growing that shows the shift in migration studies from a mere determinants analysis of migration in to impacts of migration on both origin and destination. However, empirical studies that aimed at internal migration mainly skewed towards the rural-urban migration with no or limited studies are carried out the migration that took place within the rural economy itself.

Broadly, the ways through which migration produced impact on agriculture and rural development can be grouped in to two (Lucas, 2007). In one hand migration could directly affect poverty through its provision of alternative income options to the migrant. On the other hand, out-migration could have also either positive or negative impact on consumption, income and well-being of the remaining families (Ibid). Recently, the study by (Harttgen & Klasen, 2011) interestingly linked in internal migration with human development index in 16 developing countries and showed its stronger positive impact on the improvement of human development index through domestic

migration. Due to its viability to rural households, domestic remittance found to contribute considerably in poverty reduction and positively linked with rural development (Dey, 2014). In connection to this, according to FAO, (2017) having at least one family member migrant for both rural and urban migrants have positive effect on the wealth status of the migrants.

One of the seminal researchers in migration discourses have witnessed that in Vietnam seasonal migration has strong positive implication on poverty reduction. According them, seasonal labour migration has contributed a three percentage decrease in poverty reduction witnessing improvements in the living standards (De Brauw and Harigaya, 2007). In similar vein, in India seasonal labor migration for work has found to improve household income positively. The study further showed that the income share of migration for migrant sending families accounts 60 % of the total annual income (Haberfeld, *et al.*, 1999).

In Senegal, one study by (Kaninda and Greg, 2014) confirmed the significance of both internal and international migration and remittance for rural agricultural households in terms of reducing household risks and financial constraints to expend on productive activities in the rural economy. Notably, the study acknowledged the positive impact of migration and remittance on the adoption of new technologies to enhance agricultural productivity (Ibid). Another study also empirically showed how improvement in agriculture further promotes migration for agricultural households. In line with this, the study in Ethiopia by (de Brauw, 2014), showed that 10 % increase in agricultural productivity has contributed 0.26% increase in the probability of sending family members to migrate.

In Ethiopia on the bases of panel data the study by de Brauw, Mueller, and Woldehanna, (2013) revealed that internal migration has brought an increment of consumption per capita by 110 percent which is even higher than Tanzania as per the study. On contrary, however, the study in Botswana, by Campbell, (2010:151) on the basis of regression result argued that remittance doesn't have significant "effect on the ability of the households to access basic items needed to maintain reasonable standard of living. However, in both studies there is no explicit evidence regarding the patterns of migration either rural-rural or rural-urban or the combination is considered in their study to really isolate the relevant internal migration pattern for policy implication. Similarly, the study in Ghana by Ackah and Medvedev, (2010), showed that internal migration had positive and significant effect on the welfare of migrants' household which is 103 % higher per capital welfare

for those who have migrant households' than non-migrants' household. However, the conclusion was for urban migrants than rural one.

With regard to the impact of migration, notably on the agriculture sector under the paper by Deotti L., and Estruch E., (2016:18-22) has been presented explicitly as follow. From the positive impact perspective; migration could have impact on the origin through more efficient allocation of rural labour and higher wages; remittance in-flows towards the area of origin: ; technology and knowledge transfer; increase in household income and resilience; accumulation of human capital; use of remittances for productive investments in agriculture; increased adoption of modern farming technology. On the other hand, there also short term and medium term negative impacts of migration such as loss of the most productive agricultural labour force; detrimental labour allocation for those left behind; household dependency on remittances; decrease in human capital; social impact on those left behind (Ibid).

With regard to migration within the rural economy itself studies are very limited. Among the few, for instance in Vietnam migration within the rural economy has showed evidences on increased income in short term and accumulation of productive assets in terms of land and savings in long terms (Deshingkar, 2006). While, in Nigeria, rural-rural migration, with simple descriptive statistics informed the significance of rural to rural migration than staying home for the improvements of household socio-economic status and welfare improvement (Ibrahim, Yakubu and Alhaji, 2014). The study by Wineman and Jayne, (2016) in Tanzania has showed great departure from the normal rural to urban migration in to rural-rural migration and its effect on welfare change. The study result is a game changer in the study of internal migration that switched the attention of rural transformation from urban center in to rural based. In Ethiopia, the study by Woldie *et al.*, (2010:66) witnessing the prevalence of rural to rural migrants; they revealed the impact of migration of the sending families as stated qualitatively as

.... repay fertilizer loans on time and cover the down payment on these loans, buy cattle, pay tax, cover the payment for land rent, construct houses with corrugated iron sheet roofs, buy modern clothes, cover festival expenditure, educate children, cover a family's medical expenditure, start a small business, and buy a water pump for irrigation. It also contributes to reducing the household food consumption at home, which in turn improves the households' food security.

Even though, the study doesn't employ any econometric analysis for stringent impact evaluation of seasonal migration, utilization of remittance for repayment of debt (87.5%), purchase of cattle (67.5% and) consumption expenditure (62.9%) are good evidence for the contribution of migration for credit constraint, asset accumulation and welfare of the household.

The study of Atsede, (2018) in North Western part of Ethiopia also has brought an important empirical result in which as compared to the long term migrants short term migrants have strong impact on asset accumulation, investment and overall livelihood improvements. The study further supported the argument in such a way that short term migrants can take the advantage of close supervision of the remittance use and can influence positively the use of remittance on asset improvement.

There are no studies that directly address the impact of migration on smallholder commercialization orientation and participation as far as the researchers' knowledge is concerned. However, though mixed implication, studies have indicated that migration had produced positive impact on agriculture which is one of the proxies for market participation. With this regard studies in Ethiopia by (Abafita, Atkinson, and Kim, 2016), whatever the initial cause, the study confirmed that higher level crop production found to improve smallholder' integration in market and thereby there commercialization participation. In connection to this, one study which is conducted in Tanzania, Guatemala and Vietnam that aimed to see the link between productivity and market participation assured that households that have higher agricultural productivity have higher propensity to participate in crop output marketing (Rios, Masters and Shively, 2008).

2.4 OPERATIONAL AND CONCEPTUAL FRAMEWORK OF THE STUDY

Defining migration is very difficult which could vary depending on the research objectives and the nature of data requirement for specific study (Thomas, 1971) and therefore lacks universally agreed upon definition for the term migration (Sinha, 2005). However, for practical measurement purpose it would be worth mentioning to examine the empirical works and contextualizing it in to the particular research area as migration study requires to be location specific.

As stated in the conceptual elaboration in the above section, the definition of rural to rural migration has been adapted from the IOM, (2011) represented as movement of family members

from rural origin to rural destination as strategy of labour diversification where opportunities are higher. Given this spatial delineation for the operationalization of the study; then it requires now to operationalize migration at household level. Concerning this, one study in Nepal, by Maharjan, Bauer and Knerr, (2013) defined the household during the survey as migrant household if there is at least one family member who is migrant for at least six months duration. Whereas, in Africa according to Wouterse, (2010) the households were declared as migrants household based on one month life time from departure and if the migrant is confirmed to be the member of the household during the survey time. Similarly, the study of Garip, (2014) recently considered the time frame for migrants' as two months to represent the household as migrants' household. While, some studies in India and Ethiopia are also defined migration notably the rural-rural labour migration for the purpose of labour income using one month and above to declare the household as migrant (Keshri & Bhagat, 2011; Linger and Terefe, 2018).

Thus, operationalization of migration or defining households' as migrants' household depends on the pattern of migration, objectives of study and the nature of research design. In this study, the household in the survey were declared as migrants' household following (Deshingkar, & Start, 2003; Wouterse, 2010; Linger and Terefe, 2018), in which if at least one family member had migrated to other rural areas as strategy of livelihood diversification for about a month or more or reported having return migrants in within one year or less. (However, this operationalization has been also strengthen by undertaking preliminary survey on the amount of earning within one month if it has impact on input conversion power in the origin).

This study draws its inspiration from the New Economics of Labour Migration (NELM) as it helps to anchor the unit of analysis at household level. Adhered to the radical shift away from individual perspective, ample studies centered on household level analysis based on the new economics of labour migration. Among these, Zhu, *et al.*, (2014) and Qian *et al.*, (2016) in China; Justus, *et al.*, 2016 (Central Africa) Atsede and Penker, (2016) (in North Western Ethiopia).

Based on the conceptual, theoretical and empirical review of literature; this tried to depict the conceptual and theoretical framework of the study as shown in Figure 2.2. Given the heterogeneous impact of migration on agriculture; both the positive and negative implication were depicted that were empirically tested in this study.

Under the conceptual framework, both the push and the pull factors are also considered. Usually, the income and employment situation in the destination is argued to be the main pull factors that drive labour migration from the origin. Though, we grouped it under economic factor, the perception of the farm households about the income and job situation in the destination is viewed as pull factor from the hosting side. On the other hand, push factors mainly for the farm agricultural household are rainfall and soil productivity. In this case, if the farm household believed that the current rainfall situation and the nature of the soil productivity is poor, then as push factors looking for additional income through migration will be the solution. Therefore, the conceptual framework below tries to depict the factors that influence migration from different perspectives as well as how migration through its income affected crop production, Technical efficiency, crop output commercialization and household asset possession.

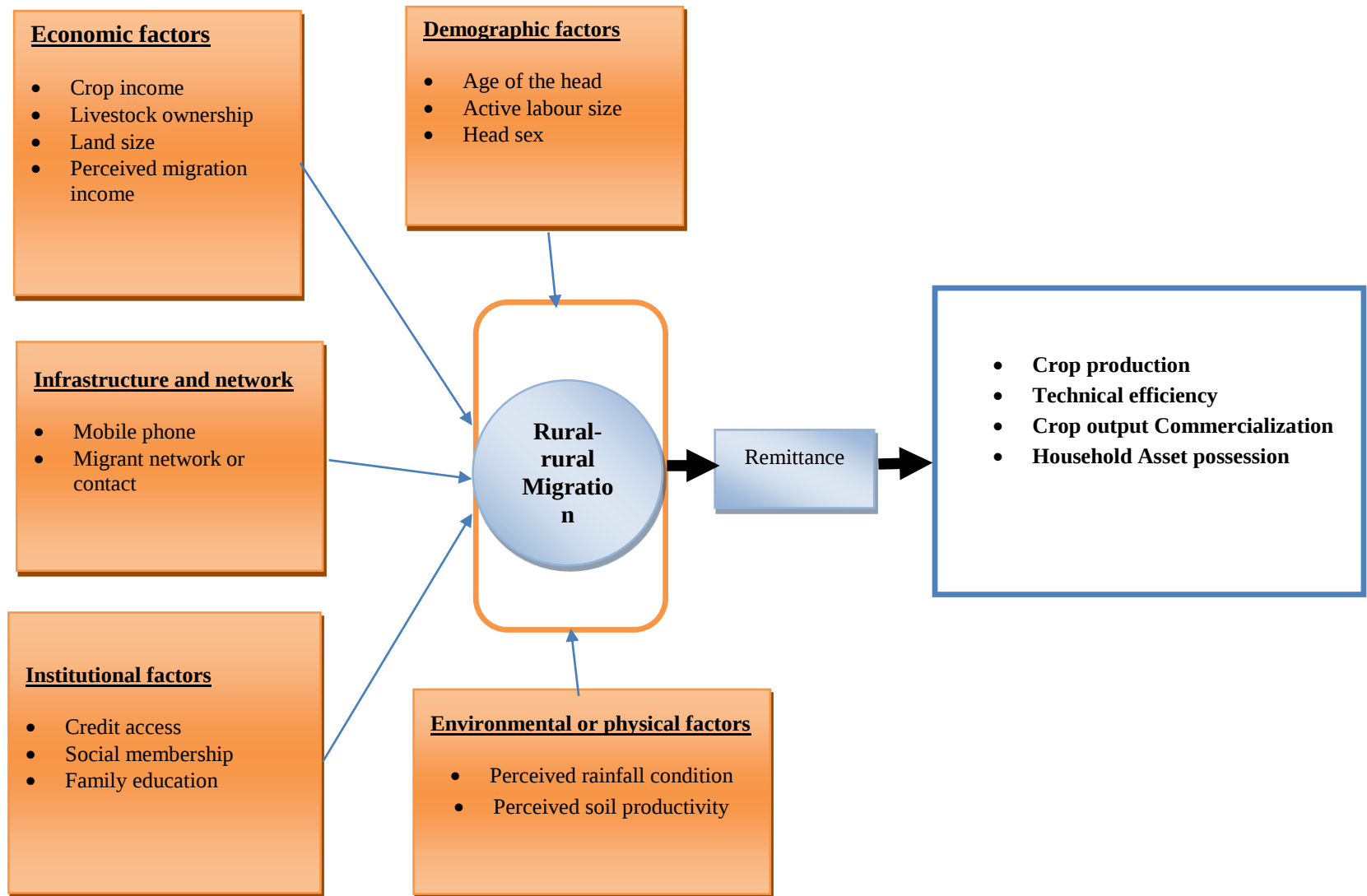


Figure 2.2 : Conceptual Framework of the Study (OWN CONSTRUCTION, 2018)

CHAPTER: THREE

3. RESEARCH METHODOLOGY

The third chapter of this dissertation mainly intends to present, how the initially proposed research objectives and questions could be addressed practically with the help of research tools. Thus, the following sub-sections are equipped to discuss the description of the study area; the research design; ethical consideration while undertaking research and the specific research method of analysis used for each of the objectives stated in chapter one. Moreover, under this chapter the research philosophy that this study followed also presented.

3.1 DESCRIPTION OF THE STUDY AREA

The present study was conducted in North-Western part of the country in Amhara National Regional state. Located in the North-western part of the country, the region neighbored by Tigray region in North, Afar region in East, Oromia region in South and with Benshagule gumize region and Sudan in West. The region has a total of 161, 828.4 square kilometer which accounts 15% of the country's total area coverage (ANRSCO, 2014). Including the present study administrative zone, the region has 10 administrative zones and one special zone (Bahirdar City) (Aynalem, 2014).

North Gondar Zone

The present study Zone, North Gondar is the largest zone in the region which encompasses 24 woredas of which 553 are rural kebeles and 51 of them are urban kebeles (NFEDD, 2011). The Zone is also well known in its diverse agro-ecological encompassing midland, highland and low land with 'kola', 'woynadega' and 'dega' whether conditions. Due to this fact, the zone is very much suitable to be representatives of major agro-ecological for comprehending about the nature of agricultural production. According to the zonal data, the population size is estimated to be 3,375,809 people are configured in the area of 370,156.00 Sq. Km of land of which more than 70 % of the population are living in rural areas (North Gondar Finance and Economy Department, 2014).

Wogera district is one of the study area which is categorized as highland agricultural production. The district located 36 kms away from Gondar town and 736 from the capital city of the country, Addis Ababa. It has an average elevation of 2812 meter asl altitude and annual rainfall within the range of 1000-1200 mm. Among the different land uses, 46.32 % (84,352 ha) of land used as farming land, 22.7 % (41,322.2ha) grazing land, 11% (20, 033ha) forest land and the remaining fragmented land share used for constructions and buildings (DAO, 2016). The major crops grown in the district are Teff, Maize, Bean, Chickpea, Barley, Wheat, Sorghum, Lentil, Vetch and others vegetables (Ibid).

The second study district Dembia which is dominantly a midland agricultural production zone is located 33 kms from the town of Gondar and 733 km from Addis Ababa. With an elevation range of 1800 and 600 m asl, the district also have a rainfall range between 770 and 1800 mm. The total area of the district is estimated to be 148, 968 ha of which 87% is plain and 49,118 ha are cultivable.

The third study district is West Belesa. This district is located 80 km from Gondar town and 706 km away from Addis Ababa. The districts is bordered by Wodera District in North, Libo-Kemkem in the South, Gondar Zuria in the West and East Belesa in the in the East. About 50 % of the topography is characterized by mountains and hilly characteristics. While, the remaining 50 % is plateau. (WBDAO, 2016, cited in Welay *et al*, 2018). The district received the mean annual rainfall between the ranges of 800-1200 mm. The total population size of the three districts as presented in Table 3.1 is 216, 830, 249,298 and 160,371 respectively for Dembia, Wogera and West-Belesa districts.

Table 3.1: Total Population Distribution in the Districts by Sex (Study districts)

District	Male	Female	Total
Dembia	110,167	106,662	216,830
Wogera	126,838	122,460	249,298
West Belesa	81,744	78,627	160,371

Source: North Gondar Finance and Economy Department, 2014

Labour migration in North Gondar Zone

Recently, the office of social and labour affairs has been established at different level. However, with regard to the availability of data on important demographic phenomenon such as migration it is very challenging. Relatively at Zonal level though difficult to get well documented data on the nature and pattern of migration we had some information about the seasonal migration. In North Gondar, due to the large scale agricultural investment in different areas, seasonal labour migration is common. According to the Zonal Labour and Social Affairs department, (NLSAD, 2016) mainly Metama, Quara, West-Armachiho, and Tegedie but also Shinfu, Dansha and Humera, Mai-karda are also the main destinations for labour workers. The zonal estimations showed that:

- West-Armachiho about 214,000 labour workers;
- In Metema about 80,000
- In Quara 38, 000 and
- Tegedie 39, 600, which is totally 371,000 labour workers (NLSAD, 2016)

However, the size of labour demand in the main destination are also varies from different perspectives. Because there are no well documented statistical figures to tell about the trend primary we noticed that from the zonal social and labour affairs about the variability of the labour demand in the study area. Such variability is also linked with the performance of the crops that mainly linked with the rainfall situation. Due to this fact, there could be variation for crop type to be grown in the study area which also influence the size of labour demand. However, whatever, the rainfall condition is, the dominant production in the study area is sesame.

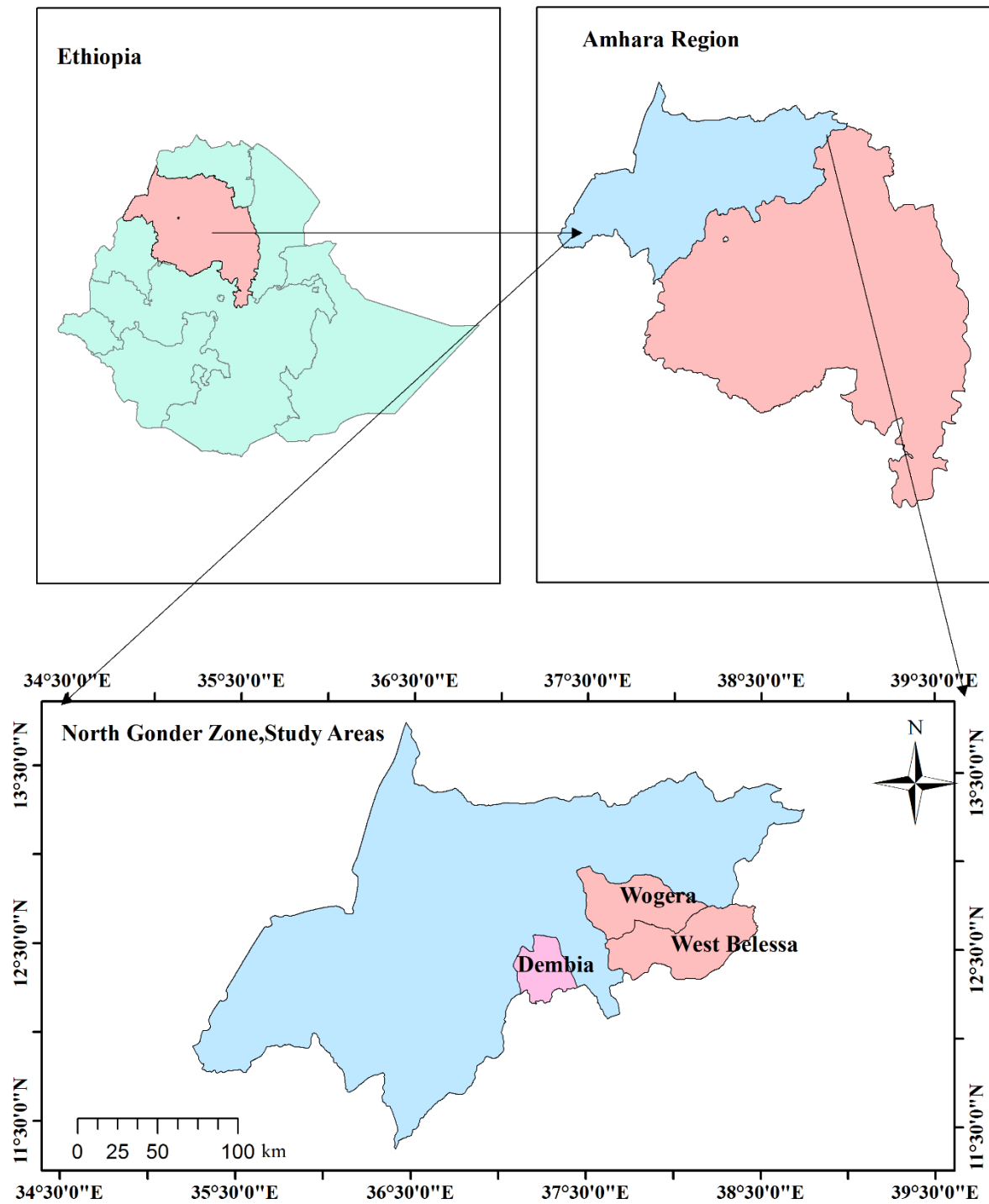


FIGURE 3.1: Map of the Study Region, Zone and Districts (Hailu, 2018)

Road and Transportation in the Zone: The zone has both asphalt and gravel type road infrastructures that connects different Zones and districts. According to the North Gondar Zonal Statistical data the zone has a total of 1639.5 Km of all-weather road in which 512.5 Km is administered by the region while 1127 Km under the Ethiopian Road Authority (ERA). Of the total rad infrastructure 33.7 percent is Asphalt whereas the 66.3 percent is gravel. The road density of the zone is 33.72 per thousand Square Kilometer.

Table 3.2: Road Infrastructure in North Gondar Zone

Road Length and Coverage	Distance in Kilometers
All weather road network (gravel road) under the management of the Amhara Road Authority	512.5
Zonal high way all weather Road under ERA in KM	1127
Total all weather road length in km	1639.5
Asphalt Road in KM	553
Gravel Road in KM	1086.5
Road density /1000 km2/	33.72

Source: North Gondar Finance and Economy Department, 2013

Health Service: In the zone both governmental and non-governmental health institutions are functional at different districts. According to the Zonal data in 2013 there are about 3 hospitals in the Zone including the University of Gondar Hospital, 124 Health Stations and 556 Health posts in the zone however, there are no governmental clinics except the private one.

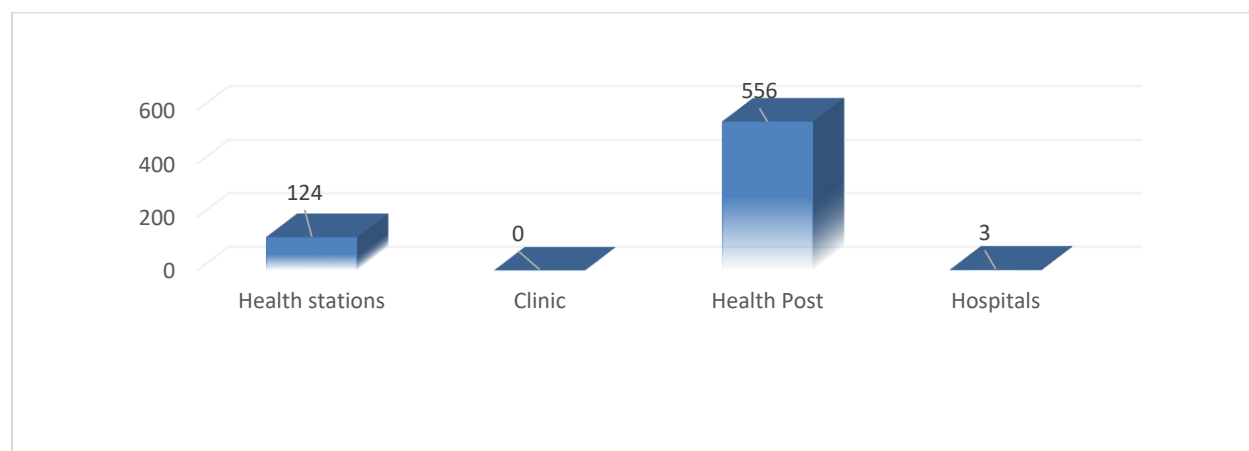


Figure 3.2: Health Service Institutions in the Zone

Credit and Saving Cooperatives: In North Gondar zone there are about 38 saving and credit cooperatives located in different districts of the zone with a total of 1919 members of which 72 percent of them are male while the rest 28 percent are female. The zonal data also indicated that the total saving amount of these all cooperatives is about 1,656, 456.2 Birr.

3.2 RESEARCH DESIGN

Research design is the fundamental instrument in any research undertakings which helps to facilitate research operations and maximize the efficiency given the limited time, resource and finance availability through organized pro-active preparation (Kothari, 2004). Research design though, understood differently in different literature; the comprehensive illustration by (Kothari, 2004; Babbie, 2007; and Creswell, 2009) explained research design, as research plan and procedure which extended from the initial research proposal preparation to the final data collection, analysis and presentation. Within this range, research design involves topic-tailored procedures of data collection, analysis and interpretation strategies as well as the world view of the researcher in relation to the topic of inquiry. Thus, in this section, the overall research design elements such as research philosophy, research approach and specific data collection tools, sampling techniques and procedures as well as method of data analysis are presented in detail.

3.2.1 RESEARCH PHILOSOPHY AND WORLD VIEW

The three basic questions; what do we know; what are going to learn and how can we learn are central for any inquiry which helps to position the philosophical stance of the researcher (Grix, 2002; Nørgaard, 2008). The first question “what do we know” entails that what the researcher already know about the existing knowledge regarding the particular research interest. This question rooted its self from the ontological assumptions of research doing. Ontological assumptions seek about the nature of reality. Putting differently, the first question mainly helps to delve deeper on what is already existed. A good research activity should begin to critically evaluate the existing specific knowledge frontier before going to know what is hidden. Though the question generally asked for the broader level of knowledge, any researcher could extend it from simple conceptual understanding to empirical analysis and theory evaluation. These attempts are bases for fetching the depth and breadth of the existing knowledge and help to equip the researcher about what he/she already knows about the existing reality (Grix, 2002; Nørgaard, 2008). In this study attempts have

been made as presented in the literature reviewed to crystallize the conceptual, theoretical and empirical knowledge in the areas of migration and locate the existing knowledge in migration studies.

Whereas, the second crucial question after knowing the existing knowledge is the question of “what are going to learn?” This question is also has its ground in epistemological assumption that gives room for the researcher to identify the research problem. In fact, this question is hinged on the first phase research question. During the first phase while the existing knowledge is scrutinized, some sorts of knowledge could be hidden, some others could be incomplete or knowledge in specific research interest could be totally absence. So, in either of the three cases, the second question could go to uncover the hidden or to add knowledge to the existing one or it could be to bring new knowledge in to the existing knowledge frontier. Stated differently, the second question is the bases for the development of research questions.

The last question “*How can we learn?*” is the other key question to be answered in good scientific research. The question is about the methods through which the proposed research questions are responded. The secrete behind successful researches is not magic power; rather it is the quality of researches to systematically and logically connect the conceptual in to the theoretical; as well carefully selection of the appropriate research methods that have greater opportunities over the other (Grix, 2002; Nørgaard, 2008).

Finally, it is appropriate to argue that good scientific inquiries are dependent on how robust the researcher is to identify the three key questions; what is already known; what is the knowledge gap and how could the knowledge gap is uncovered. In this study what is known is the prevalence of rural-rural migration in the country (Woldie, *et al.*, 2010; Kibrom, *et al.*, 2015; Linger and Terefe, 2018). However, what impacts have been produced in smallholder agriculture notably, crop production, efficiency of smallholder and crop output commercialization due to migration has been left untouched.

With regard to the research design, following Nørgaard (2008:14) it obeys the principle that stated there is “....*no single best design...*” rather the relevance of the method for specific issue determine the choice among available standard tools. According to Guba and Lincoln (1989) research methods and other research activities are secondary that should follow the research philosophy

which entirely determines the choice of research methods and approaches. Thus, it is invaluable to illustrate the underlining assumptions embedded in qualitative, qualitative and mixed research approaches.

Table 3.3: Philosophical Assumptions in Quantitative and Qualitative Studies

Assumptions	Questions	Quantitative	Mixed	Qualitative
Ontological	What is the nature of reality?	Based on positivism, empiricism; objective reality; independent of human perception;	Mixture of the two	Based on interpretivism and constructivism; Reality is subjective and multiple as seen by participants in a study.
Epistemological	What is the relationship of the researcher to that researched?	The researchers and the researched are independent of each other; carried out value free framework	Mixture of the two	Argued for the presence of multiple realities and truth; reality is socially formulated; interaction between the researcher and the researched is inevitable;
Methodological	What is the language of research? and how the researcher undertake the finding?	Formal, Based on set definitions, Impersonal voice, and Use of accepted quantitative words, survey methods	Mixture of the two	Informal, Evolving decisions, Personal voice, and accepted qualitative words

Sources: Constructed from: (Guba, 1990; Guba and Lincoln, 1994 and Sale, Lohfeld and Brazil, 2002).

Currently there is a growing consensus that there is no single research philosophy that dominated the research doing in academia; rather composite utilization is strongly advocated (Pathirage, Amaratunga, and Haigh, 2008). Therefore, in this study an eclectic approach of selecting philosophies found to be appropriate as it practically combines both quantitative and qualitative studies. Thus, from ontological assumption the positivist dimension of objective reality (Guba and Lincoln, 1994) is highly appreciated as the study requires some objective measurements and quantification; however, taking reality as unchangeable and fixed is unrealistic and therefore, the study complemented the assumptions of post-positivism philosophy of research that recognizes the influence of research in the context in which the research is conducted (Popper, 2005). Moreover, the ontological assumptions of positivism is unrealistic for social science studies that

states “the inquirer must behave in ways that puts questions directly to the nature and allows nature to answer back directly” (Guba, 1990:19).

Epistemologically still the study maintained the post-positivism in that the researcher should not let the research move by itself rather appropriate interpretation were done (Guba, 1990). Methodologically this study adhered to post-positivism assumptions of critical multipleism (Guba, 1990; Guba and Lincoln, 1994). Thus, due to the fact that the methodological assertion of post-positivism is the employment of multiple tools for the purpose of triangulation and maintaining the credibility of the research output. On the top of that, the central theme of post-positivism that argued “causes determine effects” has great relevance for this study (Creswell, 2014:34); as this study have gone to investigate the impact of rural-rural migration on crop productivity, crop output commercialization and asset possession of the rural household. At the same time, in this study deductive approach have been followed that moves from theoretical foundations of a given theme towards its confirmation or rejection. In this study on the bases of the New Economics Labour of Migration (NELM) rural households are assumed to be profit maximizers in which households decide the migration of household member when the benefit is higher than remaining in home. Thus, in this study rural-rural migration hypothesized to have an implication the farm households’ agricultural production, crop output commercialization and asset possession. However, as stated in Morgan, (2007), the pragmatism paradigm which helps to combine quantitative and qualitative studies together were followed in this study as it requires the synergy of the two. Thus, in addition to deduction way of moving from theory to data; this study also follows abduction reasoning “...that moves back and forth between induction and deduction” (Morgan, 2007:71).

3.2.2 RESEARCH APPROACH

Historically it has been understood that from the late 19th century to the mid-20th century quantitative research approach was the dominant which however, during the latter half 20th century onwards qualitative research as well as a mixed method approach came to evade social science research undertakings (Creswell, 2009). Currently, mixed research approach is highly acknowledged to develop the synergy of both quantitative and qualitative methods by neutralizing the limitation of the former by the latter and vice-versa (Ibid). Others prefer mixed research approach for better triangulation of specific data from different sources which are also known as

“methodological triangulation” as it mixes various methods (Dawson, 2009:20; Yeasmin and Rahman, 2012:157). Thus, to maintain confidence on the research result; to justify deviations and to complement the inadequacies of a single research method as cited in Yeasmin and Rahman (2012) in this study a mixed research method approach preferred to mix both quantitative and qualitative tools.

However, it should be understood that mixed research approach is not interpreted as giving perfectly equal weight for both qualitative and quantitative studies; rather it could tend to lean towards qualitative or quantitative as the research objective demands either of them. Thus, in this study the inclination was towards quantitative approach as it requires more measurement for the investigations of the impact of rural-rural migration on production, technical efficiency, smallholder farmers’ crop output commercialization and its impact on the overall asset possession of the migrants’ household.

3.2.3 METHODS OF DATA COLLECTION

To achieve the proposed research objectives; both primary and secondary data types were collected. In data collection, selection of appropriate and relevant data collection methods are among the element that strongly determine the quality of scientific research. Thus, in this section data collection methods for both quantitative and qualitative data are separately discussed in detail based on the significance of one method over the other.

Quantitative studies are research issues that demand quantification of results through the use of statistical tools with the support of survey of research using the commonly employed tools such as questionnaires or structured interviews (Dawson, 2009). In this study, the survey was implemented through the utilization of structured interview schedule to gather the relevant demographic; socio-economic; crop output commercialization; input and output variables of the farmers; asset possession indicators and migration issues pertinent to the objectives of the study. The interview schedule (which is a questionnaire filled by enumerators) were designed to incorporate closed ended questions with supportive open ended question for detail presentation of respondents’ full impression with regard to some questions. The enumerators were selected on the bases of familiarity to the setting and experience in enumeration. At the same time, as stated in Kothari (2004:104) enumerators are expected and informed to bear the qualities of patience, hardworking

and perseverance during data collection. Thus, for this study stringent selection of enumerators among experienced extension workers at the office of agriculture and rural development was done. At the same time, orientation was given to the enumerators concerning respondent approaching; thorough explanation on the purpose and scope of the study; data collection ethics; data recording and management. On the top of that, close supervision and follow up were maintained throughout survey progress.

Whereas, to gather the relevant qualitative data which helps to augment the result of the quantitative data; focused group discussion, Key Informant Interview (KII) and observation/transect walk were the prime tools employed in this study. Firstly, focused group discussion (FGD) a tool that helps to focus on a particular research interest anything from people's feelings about the issue at hand was employed to gather the qualitative data (Bernard, 2006). FGD also helps to gauge and calibrate divergent results from individual interview and open ended responses in interview schedule (Dawson, 2009).

Concerning the implementation of focused group discussion group size matters a lot to have as much as sufficient discussant as possible, as well not to exceed the limit for better participation. Thus, eight to twelve participants⁸ were considered which is argued to be an effective focused group size (Hancock, Windridge, and Ockleford, 2009). For the selection of the focused group participants, formal communication has been made in each of the Districts about the purpose of the study and the role of the participants in the FGD. Additionally, it should be also clear that the researcher as moderator has played the role as a lubricant to maintain the focus of the discussion in to the area of interest with semi-structured focused group guideline.

With regard to Key Informant Interview (KII), in this study migrants in the destination, investors in large-scale commercial agriculture, zonal level officers in social and labour affairs were interviewed with semi-structured interview questionnaire. Finally, transect walk carried out in selected migrant hosting districts to illustrate the migration phenomenon in the destination (Dansha, Metema, Quara).

⁸ Eight, Ten and twelve participants were used for Koladiba, Senbet Debir and Work demo respectively

3.2.4 SAMPLE SIZE AND SAMPLING PROCEDURES

The present study was conducted in North Western part of the country, North Gondar zone as it represents the areas where rural to rural labour market are highly interacting due to the large scale commercial farming and the presence of active rural areas for livelihood options. At the same time, the zone is a typical representative of diverse agro-ecological conditions to address the heterogeneities of agricultural production.

With regard to sampling, in quantitative research sampling is the basic element that should be clearly presented as it significantly influences the quality of research. Sampling survey is the most feasible way of gathering data due to the difficulty of addressing all populations in a single research (Magnani, 1997; Kothari, 2004). Thus, in this study a multi-stage sampling procedure was employed to get the potential respondents for the survey.

In the first phase, three districts from North Gondar zone mainly were randomly selected that represent the three agro-ecological zones (Dega, woynadega, and kola). Then, Kebeles in these districts were grouped as high potential and low in terms of migration experience to have reasonable proportional sample of migrants and non-migrants and to apply simple random sampling⁹. In the third phase, kebeles¹⁰ were selected randomly from the identified districts from which the sample frame was established¹¹. Thus, the overall sampling technique used in this study can be said as stratified random sampling to minimize heterogeneities and sampling error; while taking the sample at household level (Kothari, 2004; Ajay and Micah, 2014). Then on the bases of the established sample frame the sampling size is determined based on some basic determinants of sample size: representation to the study area: reduction of the sample error and avoiding systematic sample biases as stated in Kothari (2004). Thus, taking these in to consideration the total sample of 385 households with a contingency sample of (5%) 20 households were employed using the formula by Kothari (2004) which is given in equation below:

⁹ The classification of high and low potential Kebeles has been done in consultation with personnel's from district social and labor affairs as well as through pre-survey assessment. This was done for the purpose of getting comparable group for impact evaluation.

¹⁰ The lower administrative unit

¹¹ The sample frame are the list of the farm households obtained from the Kebele Development agents for each of the randomly selected Kebeles from the two stratification.

$$n = \frac{Z^2 Pq}{(e)^2} \dots\dots\dots 3.1$$

In which “*n*” represents the sample size of the study households that is distributed proportionally to each kebele. Whereas, “*z*”¹² represented the inverse standard cumulative distribution that corresponds to the level of precision level “*e*” in which in this study which takes the value of 5%. “*P*” represents the estimated proportion that is present in the study population and $q = 1 - p$. When, we don’t have information about the proportion of variability of the study population in terms of migration status, technical efficiency and level of agricultural technology utilization; it is advised to use the value to $p = .5$ which is assumed to be most conservative sample size (Kothari, 2004).

$$n = \frac{(1.96)^2 \cdot .5(1 - .5)}{(0.05)^2} = 385$$

Thus, using 385 sample of households the probability sampling design that helps to ensure representativeness and respect the statistical uniformity has been implemented to get the potential respondents from the established sample frame. To determine the proportional sample size (*Pn*) for each Kebeles; the percentage of proportions that each Kebele have with respect to the total sample frame have been utilized.

¹² The value of *Z* is can be obtained the table (the normal curve of 95% confidence level which is 1.96)

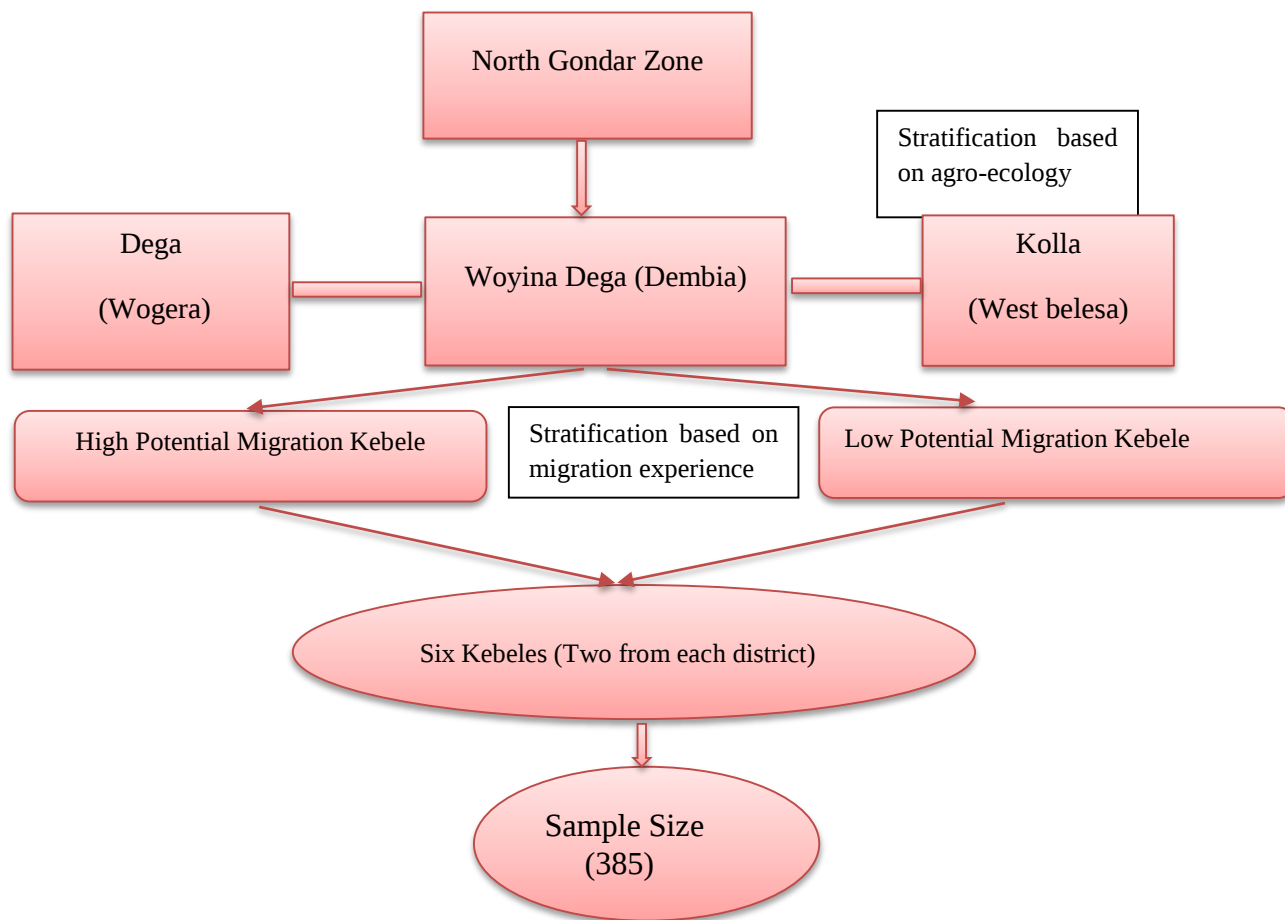


Figure 3.3: Multi-Stage Sampling Procedure

Table 3.4: Sample Size for the Selected Kebeles

Districts	Kebeles	Total Household	Sample proportion (%)	Sample Size
Wogera	Adisge Arbacha **	1571	22	85
	Kosoye*	1046	15	57
Dembia	Senbet Debir**	1092	16	59
	Arebia Diba*	1407	20	76
West Belesa	Kalay **	877	12	48
	Wurara/ebirarag*	1095	15	60
Total	6	7088	100	385

Note that **, * refers to high potential and low potential categories of migration

Before undertaking the entire survey in the study districts, pre-test to test the survey questionnaire. Totally, Forty (40) households were randomly selected in the three districts from Wogera, Dembia, and West Belesa and the result came up with some revisions on the questionnaire development. Then once, the questionnaire refined, the cross sectional survey was implemented from the beginning of February to end of May 2010 E.C¹³. Simultaneously, interviews, focused grouped discussion and observation were also implemented within the above time frame.

In this study, as we are following mixed research approach, it is also worth important to indicate the sample size and techniques followed to select the Key Informant Discussants and Focused group discussants. However, in qualitative studies there are no fixed sample size determination formula, rather is based on how sufficient the researcher believed the data is sufficient to have the required information. Thus, in this study 29 Key Informant Discussants (of which 27 are from the destination and two are from the origin) were used to get the relevant qualitative information for this study. Whereas, for the focused group discussion we employed three focused group discussion.

3.2.5 METHODS OF DATA ANALYSIS

In this study both quantitative and qualitative analysis techniques were employed. For the quantitative part both descriptive and econometrics analysis were employed as the research objectives demand these analysis methods (Using STATA 15 and excel tools). Thus, the details are specified in the following sub-sections.

3.2.5.1 DESCRIPTIVE ANALYSIS

Descriptive analysis employed particularly to preview the socio-economic, demographic and other relevant characteristics of the respondents of the study. At the same time, characterization and description of rural-rural migration; assessment of productive and consumer asset possession among the rural-rural migrants and non-migrants and other comparison were done through descriptive analysis tools. Among these, mean, mode, median and percentage were utilized depending on the nature of the variable and the need for presentation. At the same time, t-test and

¹³ E.C Refers Ethiopian Calendar

chi-square test, which help to compare two groups, in this case migrants' and non-migrants' household with respect to their technology use, commercialization tendency and asset possession were utilized.

3.2.5.2 ECONOMETRIC ANALYSIS

In this sub-section, econometrics analysis for the impact of rural-rural migration on the relevant outcomes (crop productivity, technical efficiency, commercialization and asset possession) and the determinants of rural-rural migration were used. The ensuing sub-section details each of the econometric models as follow:

I) Analysis for characterization of rural-rural migration

The first objective of this study is to characterize rural-rural labour migration in the study area. For this objectives much of the analysis were carried out using descriptive analysis. However, as part of the characterizing the migration phenomenon in the study area, the determinants of migration have been analyzed using binary logit model. For binary response variables we can have either the probit or the logit model. Both models can be used to estimate the effect of multiple explanatory variables on categorical response variable based on maximum likelihood estimation. However, there is no significant difference between the two models with regard to the estimation results. Thus, in this study binary logit model was preferred because of the coefficients can be interpreted in terms of odds ratios.

Thus, based on logit model, the odds ratio the probability of rural to rural migration can be formulated as follow, indicating “ p ” as the probability of success (being household with migrants) and $1 - p$ the probability of failure (being a household with no migrants).

$$\text{Odds of (migration)} = \frac{p}{1-p} = e^{Zi} \dots \dots \dots 3.2$$

Then by transforming the odds using natural logarithm, the linear model $p = a + \beta x$ that suffers from putting the probability of migration outside the range of 1 and 0 can be circumvent as shown the following transformation:

$$\ln(\text{odds}) = \ln\left(\frac{p}{1-p}\right) = Zi = \alpha + \beta_i X_i \dots \dots \dots 3.3$$

Where

α = the intercept. It is the value of the log odd ratio $\frac{P_i}{1-P_i}$, when X or explanatory variable is zero.

β_i = is the estimated coefficient for each of the explanatory variables.

X_i = represents the list of explanatory variables

Table 3.5: Hypothesized variables for the decision Rural-Rural Migration

S/N	Variables	Explanatory Variable (X_i)	Variable nature	Expected influence on RRM Decision (Y)
1.	Age of head	AGEHH	Continuous	+/-
2.	Sex head	SEXHH	Dummy	+
3.	Active labour size	ACTIVE	Continuous	+
4.	Migration income	MIGICOM	Continuous	-
5.	Land size	LAND	Continuous	-
6.	Migration experience	MIGREXPRIAN	Dummy	+
7.	Tropical Livestock Unit	TLU	Continuous	-
8.	Alternative income (Origin)	ALTINC	Continuous	-
9.	Migrants' network	MIGCONTACT	Dummy	+
10.	Cell phone	MOBILE	Dummy	+
11.	Perceived soil productivity	SOIL	Dummy	-
12.	Credit access	CREDIT	Dummy	-
13.	Social membership	SOCIAL	Dummy	-
14.	Perceived rainfall	RAIN	Dummy	-
15.	Education of the family	EDUFAM	Continuous	-

II) Analysis for the impact of labour migration on crop productivity and technical efficiency

In this study the impact of rural-rural migration on important expected agricultural outcomes (crop productivity and technical efficiency) were examined employing appropriate analysis tools. However, the critical issue is how to develop a counterfactual for an effect for what would happen if the threatened group hadn't been received the treatment. In our case, identification of counterfactual for migrants' household net gain will be challenging due the difficulties of getting pre-migration data. Even though this can be circumvented through random assignments of the groups; it is difficult to do so in observational studies in which **self-selection**¹⁴ is the obvious feature in migration decision. At the same time migration and outcome variables such as crop productivity can have reverse causality which violates the principles of exogeneity of the effect variable. Thus, migration decision is **endogenous** which could be facilitated through agricultural income or agricultural income could encourage migration. Thus, the model selection has been selected considering two of the known problems of self-selection (Heckman, 1979) and endogeneity problems (Hausman, 1978). On the top of that there should be also important consideration whether migration decision expected to have an average effect on the whole sample in terms of intercept shift or assumed to have effect on the productivity of crop production ingredients which is reflected in terms of shifts of the production function (Alene and Manyong, 2007).

Thus, the model that is capable in addressing self-selection and endogeneity problem has to be employed. It is strongly advised to employ a blend of tools for robustness check for the output obtained (Khandker, Samad and Koolwal, 2009). Thus, in this study both Propensity Score Matching and Endogenous Switching Regression Model (ESRM) that have greater advantage over the others in terms of addressing the self-selection and endogeneity were employed for examining the impact of rural-rural migration on crop productivity and technical efficiency.

¹⁴ The one who have information about migration income or experience at least can be sources of selection bias in migration studies.

Theoretical approaches in Technical efficiency

The impact of rural-rural migration on technical efficiency in the study area were executed following the seminal work by (Farrel, 1957) and which further elaborated in (Coelli, *et al.*, 2005) in the measurement of production efficiency. To do so, first it is very important to measure the technical efficiency of households' so that it will be possible to employ appropriate models to evaluate the effect of rural-rural migration on technical efficiency. Commonly, there are two approaches named as parametric and non-parametric that are frequently employed in efficiency measurement in varies studies (Jarzębowski, 2013). Thus, at the beginning it requires decision over the selection of approaches to be employed for efficiency measures; as they strongly mislead the conclusions to be drown form the result (Tabak, Cajueiro and Dias, 2014). In practice stochastic frontier method as well as the data envelopment analysis (DEA) are employed for parametric and non-parametric respectively (Ibid). However, the stochastic frontier approach is recommended for agricultural related studies as it helps to capture both the measurement errors (statistical disturbances) and inefficiencies production (Chen, 2007).

Thus, on the bases of the stochastic frontier approach the Cobb-Douglas stochastic production function model can be formulated as:

$$\ln(q_i) = X'_i \beta + v_i - u_i \dots \dots \dots 3.4$$

Where, q_i represents the total output produced by the i^{th} household which will be transformed in to logarithm (ln), and β_i and X_i are a (1xk) vector of unknown parameters to be estimated and a (1xk) vector of inputs used in the production of the i^{th} output respectively. Whereas, v_i measures random error for statistical noise and u_i , is non-negative error term for inefficiency effect in the production process.

The commonly used diagrammatic representation of stochastic production frontier has been depicted from (Battese, 1992) as show in Figure 3.4. The diagram assumed two firms X and J with inputs and outputs measured in along the horizontal and vertical axis respectively. The firm X that employs X_i input has been found to be observed above the deterministic production function $y=f(X, \beta)$ due to $V_i > 0$. Whereas, the firm J that utilizes X_j Input has been found to be observed below the deterministic production function due to $V_i < 0$. Put differently, it is due to the difference in the noise effect for X and J firm which is positive and negative that creates the variation. In both case,

the diagram depicted the observed values are lower than the frontier production value. At the same time the diagram with respect to the deterministic production function has been drawn to show the presence of diminishing returns to scale in the production function.

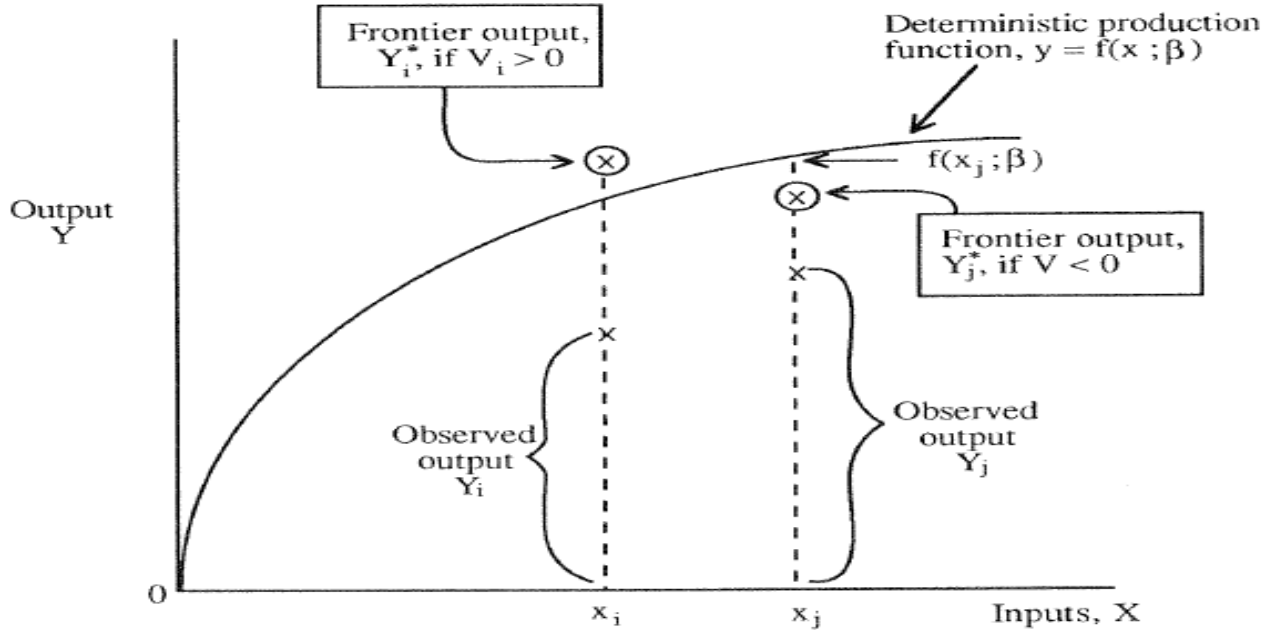


Figure 3.4: Stochastic Production Frontier (Source: Battese, 1992:9)

Obliviously, the stochastic frontier analysis employed to predict the inefficiencies existed within the firm/farm household which is commonly measured through output-oriented measures. According to Coelli, *et al.*, (2005) it can be defined as the ratio of output to the corresponding stochastic frontier output.

$$TE_i = \frac{q_i}{\exp(X'_i \beta + v_i)} = \frac{\exp(X'_i \beta + v_i - u_i)}{\exp(X'_i \beta + v_i)} = \exp(-u_i) \dots \dots \dots 3.5$$

The technical efficiency measurement (TE_i) takes the value between zero and one that represents the lower and the higher efficiency level. It helps to measure the efficiency level of the firm or the household relative to the outputs that could be produced by a fully –efficient firm/ household using the same inputs (Coelli *et al.*, 2005:244).

Empirical specification

In this study on the bases of the above theoretical foundation, technical efficiency was measured following the stochastic frontier production analysis. Since, the purpose of this specific analysis is to estimate the frontier production and the corresponding technical efficiency; thus analysis will carry out the production estimation and efficiency scores for individual households through the following equation;

$$y_i = f(x_i; \beta) e^{v_i} TE_i, \quad (i = 1, 2, \dots, 385 = \text{Samples size}) \dots \dots \dots 3.6$$

Where, $f(x_i; \beta)$ represents the production frontier, e^{v_i} measures random shocks, and TE_i indicates the technical efficiency of the i^{th} household. Whereas, y_i is the output of the i^{th} household, x_i represented the vector of inputs that will be employed by each of the household and β is a vector of frontier parameters to be estimated. As elucidated earlier according to Coelli, *et al.*, (2005) the technical efficiency for the farm household can be examined as the ratio of the expected/observed output to the potentially possible output. The value of the ratio implies full technical efficiency if it is one and inefficient if it is zero or less than one. It can be also specified as follow:

$$TE_i = \frac{y_i}{f(x_i; \beta) e^{v_i}}, \quad \text{where } 0 \leq TE_i \leq 1 \dots \dots \dots 3.7$$

The functional forms commonly utilized for stochastic frontiers research are either the Cobb-Douglas (CD) or the translog (TL) production function. The choice of one over the other is mainly based on the log-likelihood ratio test and the Alkaike Information Criteria. Thus, both the CD and TL functional forms are specified as follow respectively:

$$\ln(y_i) = \beta_0 + \beta_i \sum_{n=1}^n \ln(x_i) + v_i - u_i \dots \dots \dots 3.8$$

$$\ln(y_i) = \beta_0 + \sum_{k=1}^n \beta_k \ln(x_{ik}) + \frac{1}{2} \sum_k \sum_j \beta_{ij} \ln(x_{ik}) * \ln(x_j) + v_i - u_i \dots \dots \dots 3.9$$

Where,

- $\ln(y_i)$ = is the natural logarithm of the monetary value¹⁵ of total annual agricultural output (the monetary value crop production has been suggested as it helps to aggregate all crops produced by the farmer in different studies (Bamlaku, *et al.*, 2018; Wondimagegn and Sebastian, 2018);
- β_i' s = are coefficients of parameters to be estimated;
- v_i = is the idiosyncratic measurement errors;
- u_i = Non-negative random variable placed to measure technical efficiency of the i^{th} household; and
- x_i' s = are important factors/inputs of production

At this juncture, it is very crucial to pinpoint about the distributional assumptions with regard to the non-negative error term u_i . Commonly the half-normal, truncated, exponential and gamma distributions appeared in the literatures of efficiency analysis. However, there is no perusable prescription over the choice of the distributional assumptions prior to the estimation. Thus, accepting the ‘principle of parsimony’ the half-normal was executed in this study (2005:252).

Though not the prime purpose of this study, the determinant factors for technical efficiency can be crystalized as follow based on previous works. To this effect there are empirical studies conducted in Ethiopia and elsewhere in the world concerning the determinants of technical efficiency. According to Getachew and Bamlak, (2014), the study which is conducted in Ethiopia for maize production, age of the household head, education, land size, land fragmentation, extension service, and off-farm income were the significant determinant factors. However, except land size all variables were positively affected technical efficiency. On contrary land size has been noticed to have positive effect on technical efficiency as confirmed by Ahmed, *et al.*, (2013), whereas, education and extension service have agreement with the former study. Concerning land fragmentation, implications are heterogeneous; either negative as shown in Bäckman, *et al.* (2011) or positive as indicated in (Getachew and Bamlak, 2014). This is mainly due to context specific nature of agricultural production and technical efficiency that could vary in accordance with the socio-economic, managerial and environmental characteristics of the study area.

¹⁵ It should be noted that the average local market price was employed for each Kebele to reduce the variability with each Kebele.

Whereas, the study by Diana, *et al.*, (2014) among the various proposed variables, family labour and experience in agriculture were the two important factors that significantly improved technical efficiency of the Malaysian cash crop producers. Generally, ample studies confirmed that demographic, socio-economic, institutional and other environmental and managerial related variables are the broader categories which could either positively or negatively influence technical efficiency of the farm household as shown in Table 3.2.2 below (Rahman, and Umar, 2009; Bäckman, et al., 2011; Larry, *et al.*, 2011; Ahmed and Abdul, 2012; Ahmed, *et al.*, 2013; Getachew and Bamlak, 2014 and Diana, *et al.*, 2014).

Table 3.6: Determinants of Technical Efficiency A Survey of Empirical Literature

Author/s	Selected significant variables and direction of influences
Getachew and Bamlak, (2014) (Maize)	Age of HH head (+)*; Land size (-); Off-farm income (+) Fragmentation of land (+); Formal education (+) Extension service (+)
Diana, <i>et al.</i> , (2014)	Family labour (+); Agricultural experience (+)
Ahmed, <i>et al.</i> , (2013)	Education (+); extension services (+), farm land size (+), livestock holdings (+), farmers training (+); participation in irrigation (+); and Social status (-)
Ahmed and Abdul, (2012)	Male (+); young (+); Delay of irrigation (-); Insufficient irrigation (-)
Bäckman, <i>et al.</i> , (2011)	Numbers of plots (-); experience (+)
Larry, <i>et al.</i> , (2011) (Maize)	Age (+); school year (+); credit (+) and off-farm income (-)
Rahman, and Umar, (2009)	Age HH head (+); Male (+); marital status (+); HH size (-); Land ownership (+); other occupation (-)

Source: (Based on literature, 2017), * age with decreasing effect and HH refers Household

In technical efficiency studies, there are two commonly employed estimation procedures in stochastic frontier analysis. The first one is the two-stage estimation technique that initially estimates technical efficiency of the farm household and then regress the result of technical efficiency against several explanatory variables using OLS. The other one is one stage estimation which is designed to perform estimation of production function and technical efficiencies simultaneously. However, the latter is preferable than the former in which the former can result in biased estimates of technical efficiencies, due the fact that the relationship in the second step is not incorporated into the estimation in the first step (Wang and Schmidt, 2002 and Chirwa, 2007). Therefore, in this study one stage estimation techniques will be employed to maintain the unbiased estimates. There are studies in Ethiopia that employs one-stage procedure for Teff, Maize and Sorghum technical efficiency evaluation (Hagos, 2014). At the same time to really examine the effect of rural-rural migration on technical efficiency PSM (which have greater advantage for self-selection problem) was employed to differentiate the treatment effect on both migrants and non-migrant household (Sauer, *et al.*, 2010).

Application of Propensity Score Matching

Among the dominantly employed tools of impact estimation, Propensity Score Matching (PSM) is the frequently utilized method which helps to compare two groups through the establishment of comparable groups with similar characteristics (Rosenbaum and Rubin, 1983; 1984). Recently, there is a growing interest in recruiting PSM as an important instrument of effect evaluation in migration and remittance studies in different countries including Ethiopia (Jimenez and Brown, 2012; Andersson, 2014; Möllers and Meyer, 2014).

In this study, we have employed the method of PSM that helps to correct for self-selection problem as well as to compare the treated (groups in this case migrants) and non-treated (non-migrant households). In practice there are steps to follow while applying the PSM method. Firstly, it requires estimation of migrants' household using either probit/logit model. Secondly, the estimated parameters from the first step were utilized for the calculation of propensity scores. Thirdly, the calculated Propensity scores were be used to match migrants with non-migrants using appropriate matching procedure and finally, balance and common support were tested. At the same time, the limitation of PSM method particularly its assumption on observable condition variables can explain the differences between the migrant and non-

migrant households were circumvented through the utilization of exhaustive variables in the analysis (as employed in Jimenez and Brown, 2012).

Let we formally specify the basic equation as follow:

$$y_{ij} = \alpha + \tau d_j + x_{ij}\beta + \varepsilon_{ij} \dots \dots \dots 3.10$$

On the bases of the above equation, since the aim is to estimate the treatemt effect of migrants (d); y represented the outome (technical efficiency)¹⁶ conditioned on a set of household and individual chractertics denoted as “j” “i” respectively. Then, the effect of migration, i.e. the average treatmet effect can be driven as follow:

$$\tau_{ATE} = E[y|x, d = 1] - E[y|x, d = 0] \dots \dots \dots 3.11$$

In equation “3.11” τ_{ATE} denotes the average technical efficiency difference between the treatment and the control group. However, it is practically difficult to correctly determine the effect of migration on technical efficiency due to the fact that there are unobservable factors that may be correlated with migration as well as with omitted factors that affect crop production. The basic challenge related with the counterfactual case as we only observe the technical efficiency for households with migration or without migration.

Therefore, in the following equation the Average Treatment effect on Treated (ATT) is preferred than ATE, which is formulated as follow:

$$ATT = E[y_1|d = 1] - E[y_0|d = 1] \dots \dots \dots 3.12$$

In equation “3.12” y_1 and y_0 represents technical efficiency for households with migration and without migration. The counterfactual outcome for treated groups, had not they have migrants is represented with $E[y_0|d = 1]$.

Due to self-selection in to migration switching $E[y_0|d = 1]$ by $E[y_0|d = 0]$ (observable) may not correctly estimate and y_0 for treated and non-treated can systematically differ. Thus, as a

¹⁶ Similarly, y can be to represent productivity, crop output commercialization and asset index since we employ PSM for these outcomes too.

strategy matching will be followed to match those of treated and non-treated groups who have similar characteristics for comparison through propensity score.

In this study propensity score is the probability of migration, $p(x)$ conditional a set of characteristics, X ;

$$p(X) = \Pr[d = 1|X] = E[d|X] \dots \dots \dots 3.13$$

However, as stated above there are important assumptions while employing propensity score. These are conditional independence assumption (CIA) which states the outcome variable (y_0) is independent of treatment (migration status) conditional on a set of observable variables (X) (Smith & Todd, 2005; Wooldridge, 2010); and the common support that enables appropriate comparison.

Propensity Score Matching is a method that finds matched pairs in the probability score. For this effect, there are different matching estimators such as the *nearest neighbor matching* (NN) based on finding the nearby propensity score and *kernel matching estimator* based on weighted average technic in which the treated groups will be matched with weighted average of all control groups. Each of the estimators have limitations and strengths. Thus, in this study, each of the matching algorithm has been used and tested to select one over the other (Dagne, *et al.* 2017). However, it also requires to be cautions for the presence of bad matches to be resolved through the common support restriction. At the same time since it is advisable to check robustness.

Endogenous Switching Regression Model (ESRM)

Firstly, the effect of rural-rural migration on crop productivity which is measured in terms of crop output per hectare will be analyzed. In this case, household migration decision is framed based on the theory of New Economics of Labour Migration (NELM) that helps to center the migration decision at household level and argued migration as a family strategy. At the same time, household decision to migrate is on the bases of utility maximization in which households carryout migration when the utility overweight staying in the origin. Let us represent households migration status as “Mh” for migrant households’ and “NMh” for non-migrants’. Then let P^* denote the difference between utilities that may arise from migration decision and staying home as show in equation 3.14.

$$P^* = Mh - Nh \dots \dots \dots 3.14$$

However, in the above equation the utility is not observable, thus can be represented as latent variable as expressed in equation 3.15, in which P represented to denote households migration status.

$$P^* = \alpha Z + v, \text{ with } P = \begin{cases} 1, & P^* > 0 \\ 0 & \text{otherwise} \end{cases} \dots \dots \dots 3.15$$

Where, P is rural-rural migration decision which takes 1, if the utility is assumed to be positive, otherwise, 0. Whereas, v , α and Z , represents, the error term, parameters to be estimated and the explanatory variables for the migration decision, respectively. For this study, a number of explanatory variables based on previous studies (Ackah and Medvedev 2010; Ebihart and Ezekiel and 2013, Kibrom, *et al.*, 2015; Dodd, *et al.*, 2016) were be assumed to have effect on migration decision. These includes, household characteristics (age of head, sex head, size of active labour, migration experience, Crop income, land size, TLU, perceived migration income, migrants' contact, cell phone, , credit access, social membership, perceived rainfall, and perceived land productivity) were employed to examine the important factors that determines rural-rural migration in the study area.

As stated above, the endogenous switching regression model that exposed farm households for two regimes as migrant and non-migrant with differentials in factors of production for two regimes¹⁷ will be specified as follow;

$$P^* = \alpha Z + v \dots \dots \dots 3.16$$

$$\text{Regime 1: } Y_{1i} = \beta_{1i} X_{1i} + u_{1i}, \text{ if } P = 1 \dots \dots \dots 3.17$$

$$\text{Regime 2: } Y_{0i} = \beta_{0i} X_{0i} + u_{0i}, \text{ if } P = 0 \dots \dots \dots 3.18$$

Where, Y_{1i} and Y_{0i} represent crop production (measured in aggregate values of all crops) for migrants' and non-migrants' household respectively. P is the latent variable which is defined

¹⁷ Against the use of pooled sample that assumed both migrants and non-migrants have the same factors of production and therefore, the difference is only in terms of intercept shift (see, Alene and Manyong, 2007)

in equation 3.4. Whereas, α , β_1 , and β_0 are coefficients of parameters to be estimated. v , u_1 and u_0 are error terms assumed to be have a trivariate normal distribution with mean vector zero and covariance matrix;

$$cov(v, u_1, u_0) = \begin{bmatrix} \sigma^2 u_1 & \sigma u_1 u_0 & \sigma u_1 v \\ \sigma u_1 u_0 & \sigma^2 u_0 & \sigma u_0 v \\ \sigma u_1 v & \sigma u_0 v & \sigma^2 v \end{bmatrix}$$

The error term in the selection equation (v) can be correlated with the error terms in the outcome equation (u_1 and u_0); if unobserved effects are existed. This implies that the expected values of u_1 and u_0 will be non-zero conditional upon the migration regime selection. According to Maddala, (1986) the model can be said as exogenous switching and endogenous switching if $\sigma u_1 v = \sigma u_0 v = 0$ and if either $\sigma u_1 v$ or $\sigma u_0 v$ are non-zero respectively.

The recently employed, an efficient estimation method for endogenous switching regression model is Full Information Maximum Likelihood estimation (FIML) (Lokshin and Sajaia, 2004). Thus, the estimation method for this study for endogenous switching regression model as the Full Information Maximum Likelihood estimation (FIML).

Counterfactual and treatment effect

The next and the basic task, is to estimate the impact of rural-rural migration on crop productivity. To do so, as conceptualized earlier, two groups migrants' household and non-migrants' household will be viewed as treatment and non-treatment of groups respectively. Adopting the procedures from De Falco, *et al.*, (2011) and Asfaw, *et al.*, (2012) and supported with specification of Maddala, (1983), the conditional expected crop productivity (measured in crop output values) of the farm household that has characteristics X and Z and participated in migration can be derived as follow in equation (3.19):

$$E(Y_{1i} / P = 1) = \beta_{1i} X_{1i} + \sigma u_1 v \lambda_{1i} \dots \dots \dots 3.19$$

Whereas, the conditional expected crop productivity of the farm household that has characteristics X and Z and non-participated in migration are specified in equation (3.20):

$$E(Y_{0i} / P = 0) = \beta_{0i} X_{0i} + \sigma u_0 v \lambda_{2i} \dots \dots \dots 3.20$$

Similarly, the conditional expected crop productivity of the farm household that the same farm household would enjoy without migration (Counterfactual Hypothetical Case) will be specified as shown in equation (3.21):

$$E(Y_{0i}/P = 1) = \beta_{0i}X_{1i} + \sigma u_0 v \lambda_{1i} \dots \dots \dots 3.21$$

Finally, the conditional expected crop productivity of the non-migrant household if migrated will be obtained through equation (3.22):

$$(Y_{1i}/P = 0) = \beta_{1i}X_{0i} + \sigma u_1 v \lambda_{2i} \dots \dots \dots 3.22$$

Then to isolate the treatment effect or the Average Treatment effect on Treated (TT) i.e. the increment of agricultural production due to migration decision for migrants' household, we follow Heckman et al., (2001) as the difference between equation (3.19) and (3.21)

$$TT = E(Y_{1i}/P = 1) - E(Y_{0i}/P = 1) = (\beta_{1i} - \beta_{0i})X_{1i} + (\sigma u_1 v - \sigma u_0 v)\lambda_{1i} \dots \dots \dots 3.23$$

Similarly to see the effect of migration on untreated (non-migrants) which is TU, we will use the difference between equation (3.22) and (3.20)

$$TU = (Y_{1i}/P = 0) - (Y_{0i}/P = 0) = X_{0i}(\beta_{1i} - \beta_{0i}) + (\sigma u_1 v - \sigma u_0 v)\lambda_{2i} \dots \dots \dots 3.24$$

The heterogeneity effect that could arise due to unobservable effects regardless of the migration decision has to be taken in to consideration. To this effect we will have heterogeneity effect for migrants and non-migrants named as Base Heterogeneity one (BH₁) and two (BH₂) respectively. Accordingly, base heterogeneity for those who actually have migrants will be the difference between equation (3.19) and (3.22) while for non-migrants; household it will be the difference between (3.21) and (3.20):

$$BH_1 = E(Y_{1i}/P = 1) - E(Y_{1i}/P = 0) = \beta_{1i}(X_{1i} - X_{0i}) + \sigma u_1 v(\lambda_{1i} - \lambda_{2i}) \dots \dots \dots 3.25$$

$$BH_2 = E(Y_{0i}/P = 1) - E(Y_{0i}/P = 0) = \beta_{0i}(X_{1i} - X_{0i}) + \sigma u_0 v(\lambda_{1i} - \lambda_{2i}) \dots \dots \dots 3.26$$

The last, but not the least is the Transitional Heterogeneity effect (TH) that will be calculated as the difference between TT and TU defined above in equation (3.23) and (3.24), respectively.

$$TH = TT - TU = \dots \dots \dots 3.27$$

Table 3.7: Conditional Expectations, Treatment and Heterogeneity Effect

Subsamples	Decision stage		Treatment effect
	To Migrate	Not to Migrate	
Migrants	$(3.19)E(Y_{1i}/P = 1)$	$(3.21)E(Y_{0i}/P = 1)$	TT
Non-Migrants	$(3.22)(Y_{1i}/P = 1)$	$(3.20)E(Y_{0i}/P = 0)$	TU
Heterogeneity effect (BH_i)	BH ₁	BH ₂	TH

Note: (a) and (b) are the observed expected productivity; c & d are the counterfactual expected values of outputs

P = 1 is if the household have migrants and P = 0 if the households have no migrants

Y_{1i}: value of output if the households have migrants

Y_{0i}: value of crop output if the households have no migrants

TT: the effect of the treatment (i.e. migration) on the treated (i.e., households that have migrants)

TU; the effect of treatment on untreated

BH_i: the effect of base heterogeneity for migrants' (BH₁) are non-migrants household (BH₂)

TH= TT-TU, i.e transitional heterogeneity

III) Analysis for the impact of migration on crop output commercialization

In this paper, migration assumed to have impact on smallholder commercialization as it may help improve agricultural production through its liquidation effect. Thus, the empirical analysis in this specific section had been the estimation of the impact of rural-rural migration on smallholder farmers' output market participation as it helps inform about the commercialization tendency of the farm households. As stated above, in estimation of the effect on crop productivity; migrants' households are not assigned randomly that informs about the common problems of self-selection bias. Similarly, variations of households' in terms of observed and unobserved characteristics could influence migration decision and the motives of commercialization and thus, both variables are potentially endogenous. Therefore, it is worth mentioning to be stringent on the selection of models that produces consistent and unbiased estimation.

To that effect, sample selection model and endogenous switching regression model are the common choices. However, the selection of one over the other has to consider the nature of the outcome variable in this case output market participation. This variable has a censored value that could produce larger amount of zeros. As a remedy either Tobit or Heckman sample selection models are usually employed for censored data. However, Tobit model doesn't consider the sources of zeros in the model and therefore, Heckman sample section model is the appropriate due to the fact that sample selection model admits that sources of censored observation are from the respondents self-selection (Heckman, 1979). Thus, the sample selection model resolves the censored regression shortcomings through two-step estimation procedure. In this regard it is a common practice to employ two-stage treatment effect model for binary treatment and continuous outcome variables in different studies on the bases of instrumental variable (Asfaw, *et al.*, 2010). However, in migration studies identification of appropriate instrumental variables is highly challenging (Bertoli and Marchetta, 2014). Thus, in this study the propensity score method which is specified earlier for other outcome variables was employed.

At the same time for the descriptive analyses, the study have computed commercialization index. The quantification of commercialization index was developed following (Govere, *et al.*, 1999 and Kibiti, *et al.*, 2016) on the bases of crop output market participation. As shown in the formula 3.28 below, HOI, has been represented to denote Household crop Output Commercialization Index for each household “i” in “j” year. It should be noted also that average market price in the study area was utilized to value crop outputs.

$$HOI = \frac{\text{gross values of crop sales hhi, yearj}}{\text{gross values of all crop prodction of hhi, yearj}} * 100 \dots \dots \dots 3.28$$

Once, computing the crop output commercialization indexes for crop output marketing, apart from the propensity score matching the t-test has been used to compare at the start to contrast the existence of statistical mean difference between the migrants and non-migrants households. Finally, as stated above, the propensity score matching methods have been utilized for estimating the impact of labour migration on crop commercialization. At the same time, the Seemingly Unrelated Regression Model that is capable to attest the interdependence between crop production and commercialization employed.

Moreover, for better triangulation of the result appropriate qualitative data analysis techniques were followed to augment the quantitative result. To this effect, firstly qualitative data were categorized and organized on the bases of theme identity and then synthesized and narrated where qualitative justification merits more. At the same time, maintaining the anonymity of the sources of the speech direct quotation was considered based on the interest of the interviewee.

IV) Analysis for the Impact on Household Asset possession

In this study asset possession was examined on the basis of livelihood framework asset indicators which viewed migration as one of the livelihood strategy (Chambers and Conway 1991). According to this framework asset is viewed as the combination of physical, social, financial, natural and human capital. Similarly, the study by (Nawrotzki, *et al.*, 2012) have used these five asset indicators in their attempt to study migration and livelihood.

Thus, to examine the impact of rural-rural migration on asset possession; it requires identification of output variables and other factors in the analysis. In this regard, the study has develop an overall asset index based on both productive and consumer assets that which is a combination of all physical, social, financial, natural and human capital that household own during the survey for output/outcome variable, i.e. asset index. This approach is also argued to have multi-dimensional indicators that transcends beyond the traditional consumption and expenditure indicators. Apart from that, the use of quantitative measurements of income and consumption in terms of their respective monetary values is though are relevant; however, the availability and the reliability of such data is in great question, notably in developing countries where economic activities are largely informal (Emorine, *et al.*, 2014). The contemporary approach in different development economics research is circumvent such a problem through multidimensional proxy variables that are easy to remember and to tell can be used to asset indicators (Kolenikov and Angeles, 2009; Caroline, *et al.*, 2010; Gálvez-Soriano and Benitez-Blacio, 2018).

Thus, for this the establishment of overall asset index, the Principal Component Analysis (PCA) which helps to reduce large number of variable in to manageable units was initially proposed. For its effect, the study will follow the methodological elaboration of various studies (Vyass and Lilani, 2006; Córdova, 2008 and Caroline, *et al.*, 2010). While computing PCA,

there are issues to be considered to maintain non-biased estimated for welfare such as, clumping and truncation. Thus, to circumvent these problems inclusion of more variables is recommended (Vyass and Lilani, 2006). Generally, PCA was assumed to be appropriate for continuous data. However, in practical situations there are also a tendency of using dichotomous variables (Filmer, & Pritchett, 1994; Caroline, *et al.*, 2010). However, according to Kolenikov and Angeles (2009) instead of using dichotomous data, they argued that employing ordinal data are appropriate than the dichotomous variables. Empirical studies that employ PCA on the bases of dichotomous data are (Filmer, & Pritchett, 1994, 2001; Caroline, *et al.*, 2010). Kolenikov and Angeles (2009) argue that PCA was developed for multivariate normal data and it is best used with continuous data, although they suggest if PCA is to be used with categorical data, ordinal data is preferable to dichotomous data.

However, among the different empirical studies on the use of either continuous or categorical no one can find conclusive prescriptions. There are also alternative tools that are suitable for categorical asset indicators like multiple correspondences analysis (MCA) (Ezzrari and Verme, 2012). Ample studies have been conducted employing MCA for the purpose of developing a composite index (Booyesen *et al.*, 2008; Canuel, *et al.*, 2014). Though, there is no superiority of one over the other, in this study cognizant to the problems associated with measurement complications of income (either faces underestimation and suffers from culture of rounding) based approach, asset indicators are suitably be analyzed with MCA for categorized indicators.

For the question on the number of dimensions to be retained in MCA analysis, there are no agreed upon rule. However, it is known that the first dimension assumed to explain the highest variability of the asset index and therefore is recommendable to retain the first dimension (Canuel, *et al.*, 2014). At the same time, some requirements must be maintained to use the asset indicators for composite asset construction, such as the requirement of monotonicity that states the composite asset indicators must be monotonically increasing for each the of the primary indicators (Asseline and Tuan, 2008). That is the property of First Axis Ordering Consistency (FAOC-I) must be fulfilled before one attempts to establish the index. According to the same sources, it is recognized that binary indicators are usually fit for this assumption. However,

sometimes if multinomial variables found to be ineligible for this property; they recommend to recodes as dichotomy (Ibid).

Thus, following notable articles in the area (like, Asseline and Tuan, 2008; Booysen *et al.*, 2008; Canuel, *et al.*, 2014), the empirical specification for composite asset index (CAI_h) can be expressed as follow:

$$CAI_h = R_{h1}W_1 + R_{h2}W_2 + \dots R_{hj}W_j$$

Where CAI_h is the household composite asset index, R_{hj} is the response of each of the household in the survey to the category j and finally W is the CAI_h weight for the first dimension applied to category j.

Once computing the asset index, the next step is to examine the impact of rural-rural migration on the established composite asset index. With regard to impact evaluation various tools can be an option. For instance, Andersson (2014) employed Propensity Score Matching (PSM) by developing similar comparison group. In this study also the propensity score matching was employed to isolate the effect of rural-rural migration on the welfare of the rural households as the method discussed above.

3.2.6 ETHICAL CONSIDERATIONS AND GUIDING PRINCIPLES

The study have respected the basic research ethics which are common to social science research undertakings. Specifically, following Dawson (2009); informed consent, anonymity, confidentiality and the right to comment were the guiding principles throughout the collection of both quantitative and qualitative data for the study. Firstly, attention have been given to get the interest of the participants in the study by clearly informing the sole purpose of the study and the depth of information required from the participants with vivid local language. Then, participation in the study was based voluntary involvement to get genuine information. Anonymity is the other essential ethical consideration that considered in this study while presenting the direct tone of respondents. Thus, the representation of respondents with letters (such as P1, P2, P3...etc to represent respondent) was considered during data presentation to maintain the anonymity of the information provider if they are not interested their name to

appear in the paper. At the same time, confidentiality was sole principle of this study to protect information dissemination to the third party except the academic purpose.

CHAPTER: FOUR

4. CHARACTERIZATION OF RURAL TO RURAL MIGRATION

4.1 INTRODUCTION

In this study, primarily three central concerns have been chosen for empirical discussion. Firstly, the implication of labour out migration from rural origin into rural destination on agricultural production, notably its impact on crop productivity and technical efficiency has been critically examined. Simultaneously, the contribution of remittance for technology utilization for sending households were discussed. Secondly, what impacts did rural-rural migration has brought in the sending family in terms of impacting crop output commercialization has been carefully examined with the help of seemingly unrelated model. Thirdly, rural-rural as central theme has been examined how it influence overall asset endowment of the rural sending families.

However, as prelude, it is worth mentioning to preview the demographic and others important characteristics of the respondent households and the peculiar features of rural to rural migration before discussing the basics of this study. Thus, in the following sub-sections, respondents' characteristics and characterization of rural-rural migration, as well the factors that influence rural-rural migration are discussed as follow.

4.1.1 MIGRATION, DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

In this sub-section, the important demographic and socio-economic characteristics of the study households are discussed to provide an overview of the pictures of the study area in relation with their migration status. Accordingly, in the study area, as shown in Table 4.1 from the total sample of 385 households, 86% of the households are male headed whereas, the remaining 14% of them are female headed. The mean age of household head is 48.29 with 20 and 81 years old are the minimum and maximum age ranges respectively. The distribution of the age structure also showed that almost the majority of the head of the household head are within the range of 36-64 followed by 20-36 revealing concentration of productive age groups. Whereas, the marital status of the cross-sectional survey revealed that the higher share (82 %) of them are married that obviously displays the main feature of rural socio-cultural setting.

Table 4.1: Demographic and Socio-Economic Characteristics of the Respondent Households

Variables	Categories	Frequency	Percent
Age	20 – 35	57	15
	36 – 64	273	71
	> 64	55	14
	Total	385	100
Sex	Male	332	86
	Female	53	14
	Total	385	100
Marital status	Single	9	2
	Married	314	82
	Divorced	16	4
	Widowed	46	12
	Total	385	100
Literacy/ Educational level	Non-read/write	262	68
	Read and write	85	22
	Primary or Secondary level	24	6
	Above secondary level	14	4
	Total	385	100
Household size	< = 3	51	13
	4 – 5	163	42
	6 – 7	145	38
	>7	26	7
	Total	385	100
Total land size (hectare)	Mean= 1.11, Minimum = 0.25, Maximum = 3.75		
Formal educated members	Mean= 2.2, Minimum = 0 , Maximum = 7		
Tropical Livestock Unit (TLU)	Mean = 3.057, Minimum = 0, Maximum = 9.35		

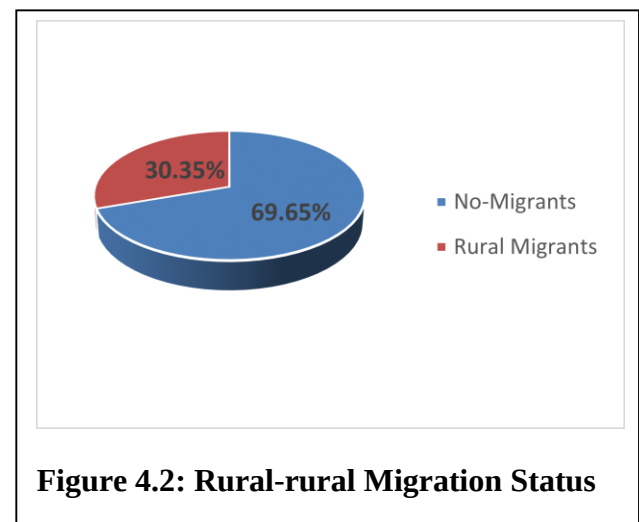
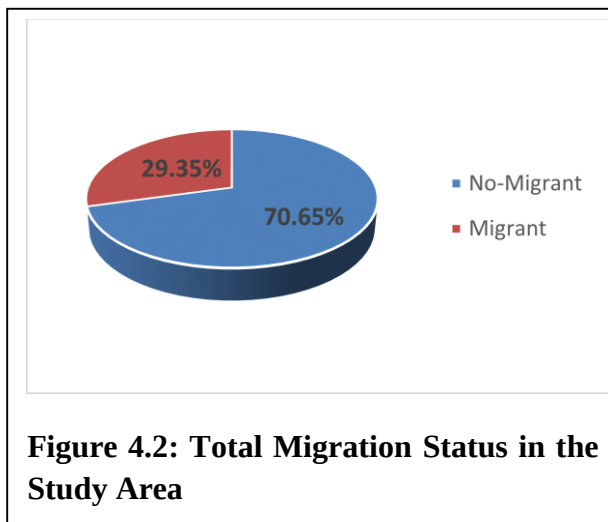
Source: Own Survey, 2019

Concerning the literacy level of the head of the household, it is understood from Table 4.1 that nearly 68 % of them are under the status of who didn't read and write and followed by those who read and write accounting 22 % of the total survey as well as very low percentage of formal primary school and above. Lastly, in the survey there was an attempt to assess the household size distribution across the respondent. The result showed that 42% and 38% of the households have household size of 4-5 and 6-7 respectively. This clearly inform that almost the majority of

the respondents have a larger family size that is in between 4 and 7 that cumulatively accounts for 80% of the total.

Land which is the basic productive resources for agricultural activity is meagerly distributed across the respondents. The mean size of land in the study area is 1.1 ha and the minimum and the maximum land possession in the study area is 0.25 ha and 3.75 hectare respectively. In mixed agricultural practice livestock are also the other indicators of the relative wealth of rural households. As shown in the above Table 4.1 the mean tropical livestock unit is 3.057 with minimum and maximum values of 0 and 9.35 respectively. The relatively good size of the tropical livestock unit in the study area reflects the nature of crop livestock mixed farming system of the study area.

With regard to migration status in the study area, Figure 4.1 and 4.2 shows that from the total surveyed households 29 % of the households are those who send their family member to the large scale commercial agricultural production areas in the production year 2009/10 (E.C) regardless of other patterns of migration. The remaining 71 % of the respondents are households with non-migrants. However, excluding households' with urban ward migrants, the survey showed that from the total 367 respondents 30 % of them have migrants' to-wards rural areas.



About the sex of the migrants, the sending family reported that 91 % of them send only male migrants and the remaining 5% and 4 % are households send only female and both sexes respectively (see Figure 4.2). The dominance of male migrants in the study area is because of

the nature of activity which is entirely agricultural that demand intensive work in the commercial agricultural areas as well as due to the household responsibility of women on the origin area. Similar, study has also showed that the 74 % of the migrants between the rural areas are male (Linger and Terefe, 2018). However, though very small in percentage, there are also employment opportunities for female migrants in low land large scale commercial agricultural areas like ‘Injera’ baking at commercial farming areas. Even according to Linger and Terefe, (2018) the participation of female reached about 26 % witnessing the participation female labor workers in the low land large scale agricultural activities to supplement origin income.

On the other hand for some other countries like India rural ward migrants are dominated by female migrants broadcasting a message that migration characteristics also varies across different cultural settings (Korrah, 2010). Similarly in Ghana, one study showed that 68 % of the migrants are female taking the proximity to the rice farming as an advantage (Gyasi and Ayivor, 1992). However, within India also variations are existed in which according to the study by (Anupama, *et al.*, 2016) nearly 60-75 % of the migrants are male. In line with this study, the data obtained from central Gondar zone showed that from the total 52, 545 migrant labour workers in Tedegie large scale agricultural destination engaged in weeding, sesame harvest and cotton collection 97 % of them are male while 3 % of them are female (CBoSLA, 2019).

On the other hand, from the cross-sectional survey it was possible to recognize that 94% of the migrants are between the age categories of 15-64 years old and the remaining 6 % are in between the age category of 10 -14 years old. This result has association with the fact that the age structure in the survey as showed above is dominated with productive age categories.

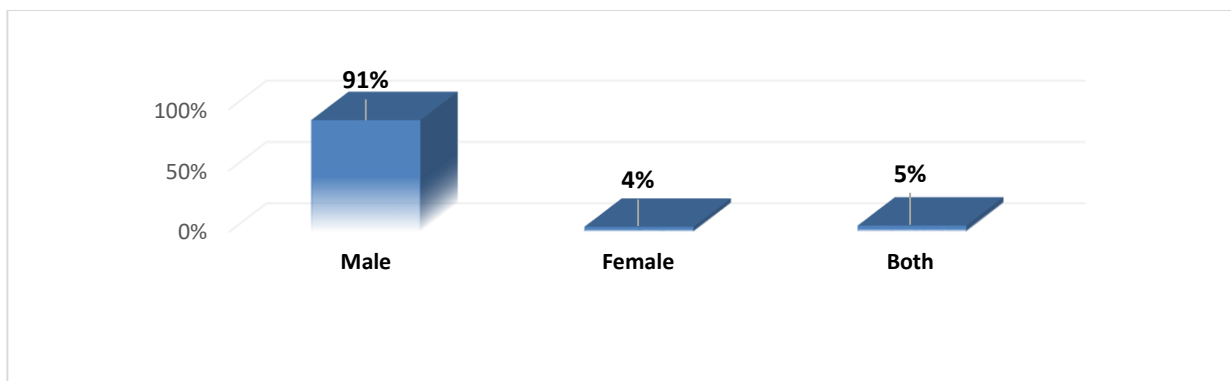


Figure 4.3: Sex of the Migrants

In this study three districts have been selected representing three agro-ecological zone. Thus, it would be worth important to disaggregate migration status across each districts. The statistics in Table 4.2 shows that higher migration status observed in Wogera, West-belesa and Dembia in their order of importance taking the percentage value of 34.36, 27.52 and 23.89 percent respectively. Both Wogera and West-belesa are districts known in terms of poverty characteristics as compared to Dembia district and are districts with large households of food insecurity beneficiaries¹⁸ (NGFEDD, 2014). Thus, the relative higher share of migrants in these districts could be due to the fact that migration can be induced by push factors like food insecurity apart from the pull factor of the destination area.

Table 4.1 District Level Migration Status of the Study Area

Districts	Migration status	Frequency	Percent
Wogera	No-Migrants	107	65.64
	Migrants	56	34.36
	Total	163	100
Dembia	No-Migrants	86	76.11
	Migrants	27	23.89
	Total	113	100
West-Belesa	No-Migrants	79	72.48
	Migrants	30	27.52
	Total	109	100

Source: Own survey Computation

Concerning the number of migrants per households as well as the sex of migrants and age categories; an attempt has been made to examine the important demographic characteristic of the migrants. In this regard, Table 4.3 shows that almost the majority of the households (which is 80%) in the study area sent only one family member towards the lowland large scale commercial agriculture. Despite the fact that there are families who send a maximum of four

¹⁸ A total of 21, 317 and 16, 805 Households of food security beneficiaries in West-belesa and Worega Districts respectively.

family members towards the commercial agricultural production areas, but the percentage is very low which is estimated to be only 2%.

Table 4.3: Number of Migrants per Households in the Study Area

Number of Migrants	Frequency	Percent
One family member	91	80
Two family members	16	14
Three family members	4	4
Four family members	2	2
Total	113	100
Min = 1 Max = 4 , Mean = 1.3		

Source: Own survey Computation

In connection to this, it is important to know the size of active labour force among migrants and non-migrants' households which is an instrument that tells about surplus labour force. In line with this, a t-test has been executed to see the significant mean difference between sending and non-sending families in terms of active labor. As shown in the Table 4.4 below, the t-test result revealed that the mean values of active labour for sending families and non-sending families are nearly 3 and 2.5 respectively that show significant mean difference below 1 % significant level. This seems convincing with the reality that the more the families have active labour, the higher will be the probability to send underutilized labour to the commercial agriculture for labour work to exploit the benefits of remittance. In terms of age of the household head, there is statistically significant mean difference between the migrants' family and non-migrants' but at less than 5% significance level. The t-test suggested that migrants' head are older than the non-migrants implying the older the head the higher the tendency to send family members to support agricultural income.

Table 4.4: T-Test for Some Continuous Demographic Variables

Variables	Migrants		Non- Migrants		T-value	Sig. level
	Mean	St.Dv	Mean	St.Dv		
Active labour	2.96	1.32	2.56	1.12	-3.0291***	0.0026
Age of Household head	50.67	10.72	47.30	12.58	-2.4947**	0.0130

Source: Own Survey, 2019, NB **, & *** represents significance level at 5% and 1 % respectively

4.1.2 PECULIAR FEATURES OF RURAL-RURAL MIGRATION TO THE LOW LAND COMMERCIAL AGRICULTURE

Commonly, the agricultural employment destination areas include Metema, Quara, Humera and Dansha, Mai-Kadra, Abrehajira, Baeker and Sudan (Gelabate and Gedarif sometimes) for such activities of land clearing, weeding, harvesting, livestock look after and rarely loading and unloading the final harvest. However, the migrants from the highland areas are commonly participated in the weeding, harvesting and land clearing in their order of importance. The work arrangement is both contract and daily casual based for both weeding and harvesting of cash crops such as sesame, cotton and in some farms sorghum.

Angaw and Mamush are two of the key informants in Wogera District, Work-Demo Kebele who have repeated experience in labour migration to the low land cash crop producing areas as well as to Sudan, Gedarif agricultural labour works. According to Angaw, the income amount in Sudan is relatively higher than the domestic investors. He earned 15, 000 Sudanese Pound for only two weeks work. Mamush also for his part earned about 10,000¹⁹ Sudanese pound for one month work of weeding.

Thus, in this study, beyond the large scale cash producing regions in the North Western part of the country, this study also came to recognize that the employment opportunities from the border located in Sudan's farm is also another pull factor that hosts laborers from the highland part of North Western Ethiopia. The labour migration to Sudan is also has got international

¹⁹ 1 Sudanese pound is 0.6002 according to 17 March 2019 exchange rate)

recognition for its value as stable livelihood opportunity for both sides. According to (BMM, 2018:2), the two sides of livelihood opportunities is explained as:

.. Seasonal labour migration has become a stable livelihood basis both to Ethiopian families and to the sustainability of farming and agricultural production in Sudan.

It is clear that from the above statement that the contribution of guest based labour migration to the neighboring countries, like the case in Metema Yohannis is one of contributor to the livelihood of the farm households in Ethiopia.

At the same time from the above source the need to have legal framework for better protection and decent employment has been stressed for win-win situation. One of the key informant in Metema Yohannes (P1), he said that relatively the income and the food situation from Sudan farmers is better than the Ethiopian employers. The only problem he mentioned is language which inhibited them to have understandable communication.

Similarly in this study, attempts has been made to examine the migration income, frequency of migration and the major sources of employment activities in the destination areas. For this purpose, in four main hosting Kebeles (44, 22, 19 and 15 percent samples were taken from Metema Yohannis, Shinfu, Kokit and Gelegu respectively) semi-structured interview has been conducted in these areas. This representative sample clearly informs that migrants can be either first comer or can be also a migrant with repeated experience. In connection to this, as shown in Table 4.5 the majority of the respondents that accounts 85% of the total in the study area had migrated in to the lowland commercial agricultural areas either for the first time or two times. While, very small proportions of the surveyed respondents that counts 11 % and 4 % had the experiences of three times and four times respectively to the cash crop producing destinations.

Table 4.5: Frequency of Migration to the Commercial Agricultural Belts

Migration Frequency	Frequency	Percentage (%)
Once	14	52
Two times	9	33
Three times	3	11
Four times	1	4
Total	27	100

Source: Own survey Computation

Duration of migration is one of the important characteristics which informs about its implication on income of sending families. In line with this, the survey shows that nearly 69% of the migrants stay in between one to three months in the low land commercial agricultural areas. Whereas, the remaining 13 % and 18 % of the migrants stay for one year and more than one year respectively. The result has alignment with the major seasonal activities that mostly the extended for up to three months for seasonal labour workers. Out of the common agricultural activities, the low land cash crop production belt also delivers job opportunities like livestock look after that usually extends up one year (See Table 4.6). Mostly, as we came to realize from the KII those who stay for longer are those who engaged in crop farming than casual labour which requires time from land preparation up to the final harvest of sesame. This result also has agreement with the study by (Linger and Terefe, 2018), in which according to them 70 %, 65 %, and 56 % of casual, migrant farmers and full time wage laborers and stay for about 1-3, 7-9 and 7-9 months respectively. On the other word, 70 % of the casual labour migrants stay for short period of time. Our focused group discussion in Dembia also revealed that only migrants for labour work are staying shorter months, however migrants for farming activity may stay for more than four months from sowing to final harvest.

Table 4.6: Migrants Duration in the Destination Area

Duration	Frequency	Percent
1 – 3 Months	77	69
4 - 12 Months	15	13
More than 12 Months	20	18
Total	112	100

Source: Own Survey Computation

On the other hand, the main employment activities were also assessed in this study. As previewed in Figure 4.4 below, among the different agricultural related sources of employments in the destination area, weeding is the major sources of employment that hosts 48% of the migrants followed by sesame harvest which host 30% of the migrants in the study destination. Whereas, plowing, land clearing and livestock look after are the others sources of employment that hosts 11, 7 and 4 percent of the migrants respectively.

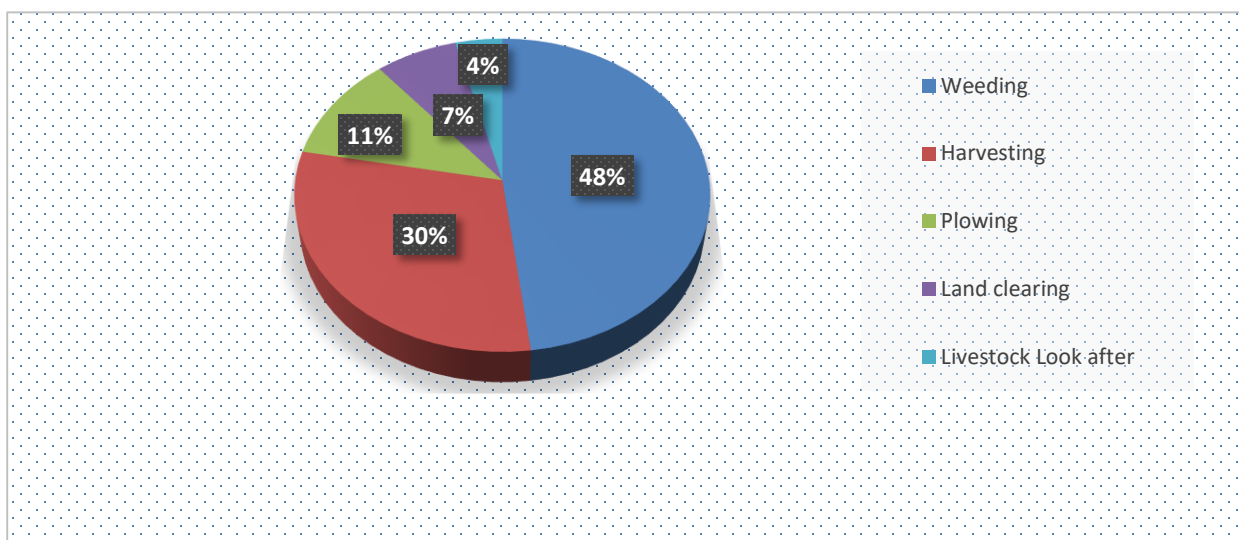


Figure 4.4: Major Sources of Employment in the Commercial Belt (Source: Own result)



Harvested sesame²⁰ or locally known as Hilla (at Lemlem Terara Metema District)

With regard to the income amount to be generated from each of the activities, the assessment for the major activities revealed that on average one can earn 1320 birr for weeding per hectare, 81.66 birr sesame harvest per hila, and 3133.33 birr for plowing per month. It is also understood that the highest labor requirement in the low land commercial agricultural zone is at the time of weeding and harvesting that usually extends from June to November. Among the prime labor hostage in the low land commercial agriculture following weeding is sesame harvesting. By its nature sesame production is highly sensitive to time of harvesting, if it is delayed will potentially cause to shattering and crop loss that is estimated to be 38.60 Kg/hectare (SBN, 2015). Due to this fact, the demand of labour for sesame harvesting is urgent and huge. According to one of the interviewee (P2) who is one of the migrant from Dembia explains the sesame harvest income like this:

...Sesame harvest is one of the major income sources for students like me. I have experience in sesame harvesting in Dansha, Baeker, and Aberehajira large scale farming areas. This year from sesame harvest I had opportunities to harvest from 55 to 70 birr per hila. The good thing of sesame harvest is you can harvest days and nights with the support of headlights. For instance I have harvested 8 hilas per day which is estimated to be 500 birr per day with some rest times for breakfast, lunch and dinner.

²⁰ You can see also sesame at farm level at the stage of flowering attached at the end of this document

Land clearing and preparation is one of the major agricultural activities in the low land large commercial agriculture. Mainly the agricultural production trend in the area is based on area expansion through forest clearing. This has made the land preparation very much costly than the high land agriculture that mainly done through land preparation per see. Due this fact, land clearing alone may cost as low as 250 birr per hectare and as high as 7500 birr per hectare of land. Though this activity may not host huge labor, in terms of its cost it is the highest among others.

At the same time, weeding activities can be undertaken through daily casual basis. In this case, the daily price for weeding will be determined through the two parties one the owner of the farm and second the laborer itself. During the negotiation, the distance of the farm, the nature and type of the weed characteristic and the average current price will be taken in to consideration for price determination. Taking all these factors in to consideration the daily mean price for a single labor is 115. 20 birr a minimum and maximum price of 65 and 180 respectively.

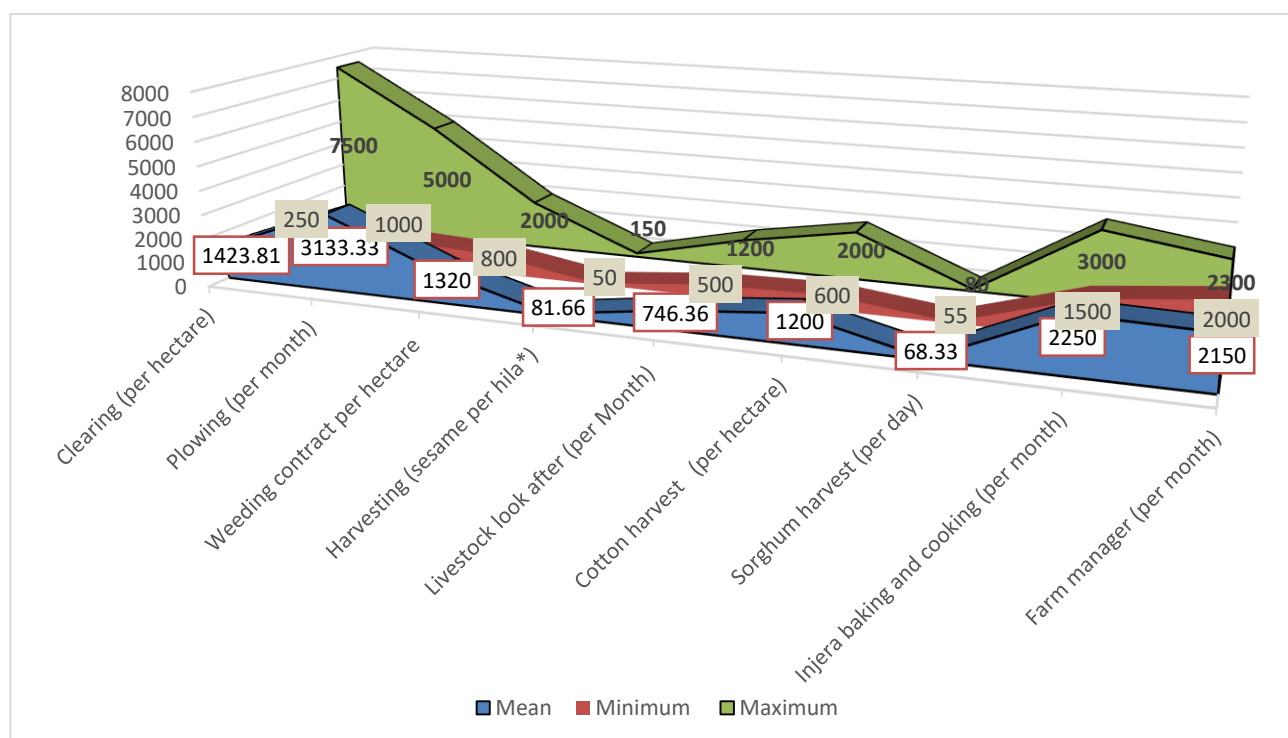


Figure 4.5: Main Activities and the Respective Income to be generated

Sources: (Own survey, 2019), NB: * Hila is locally used term for 400 handful sesame cuts

Plowing and sowing is the other important employment option in the large scale agricultural production belt. Usually, the plowing and sowing activities will start from May and ends by July; though sometimes may vary depending on the nature of rainfall situation.

The work activities mainly started from 7 pm and ends at 6 pm, if the arrangement is a daily casual labor. However, when the work arrangement is on contract based it is up to the worker to decide the start and end of working times. The early they start the faster will be for them to finish their contract and begin another contract.

The casual laborers prefer to work near to the small rural towns to take the advantage of small town services such as relatively good accommodation, and food consumption amenities than far way farms. However, the more the farm is near to the small town, the price will be lower than far away farms. This is due to the fact that farmers near to the small town have ample labor options and easy of accessibilities for labour.

As shown in Figure 4.6, the main months of migration are associated with pick seasons and when the labour requirement became very huge. In connection with this, the assessment shows that 68 % of the families sent migrants between May and August, whereas 29 % of the families sent between September and December. Only 3 % of the families are sending them between January and April. As explained above, between May and August the major and critical agricultural activities such as land preparation, plowing and weeding (first and second round) are the important months through which migrants can exploit the benefits of migration. Similarly, between September and December sesame and sorghum harvesting are the one that hosts huge labour. In agreement with this, the North Gondar zone (former classification) social and labour affairs department confirmed that nearly 371, 000 (Three Hundred Seventy one Thousand) laborers are migrating between June and November signifying the importance of the season (NLSAD, 2016).

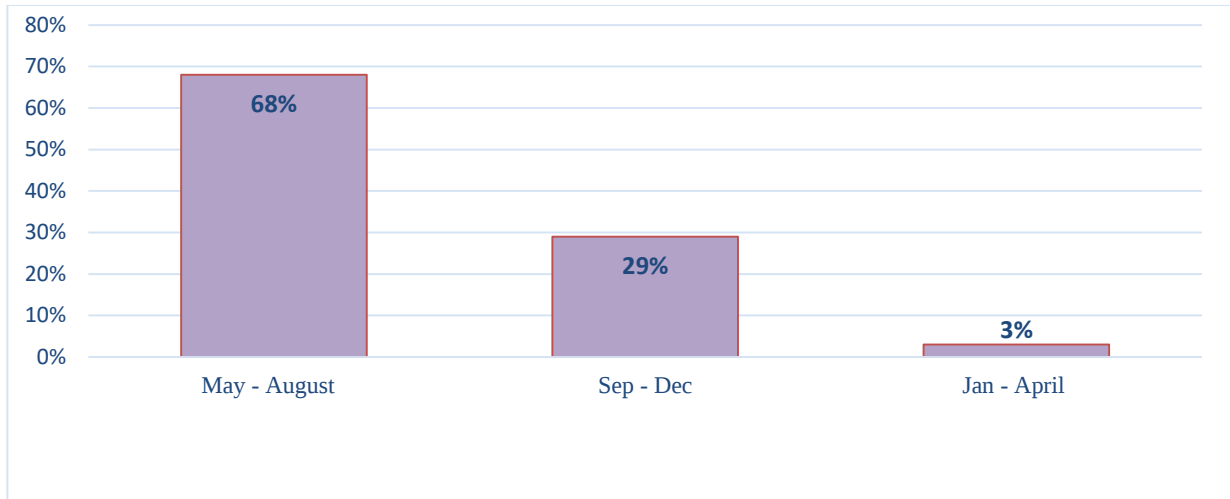


Figure 4.6: Main Seasons of Migration

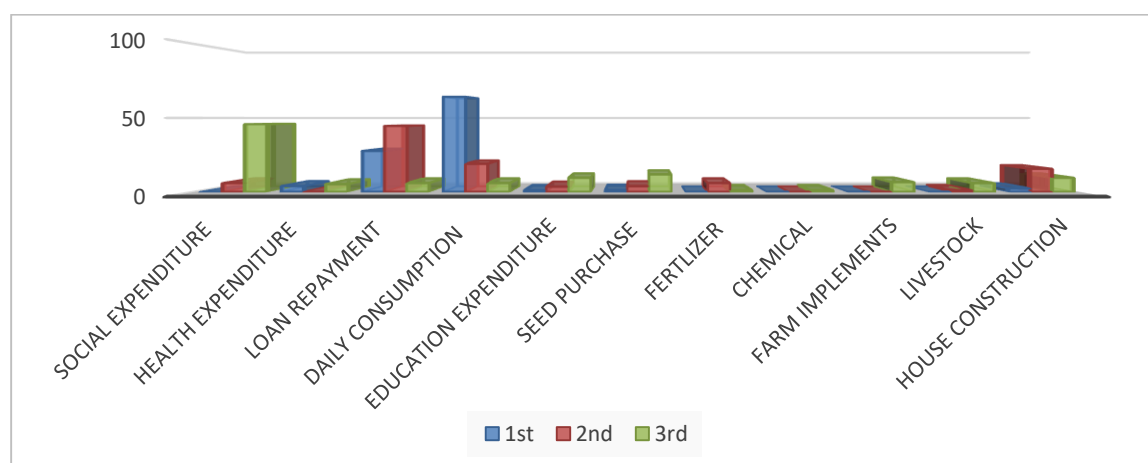
Table 4.7 below presents the major sources of information about the destination employment situations. The main sources of information about employment in the destination areas are media release 48%, personal network 29 %, as well as previous experience 14 % are the major sources of information about the employment situation. Notably, the regional media agency in collaboration with investors in the area annually release employment notice and the size of laborers required in the destination areas, for weeding, sesame harvest as well as cotton harvest activities. There are also a traditional mechanism that the migrants use rainfall situation in the destination an indicator of good migration season. Meaning if the destination have good season the payment is also will be higher in the destination. This is a traditional methods like natural calendar to know when to migrant for labour work which is associated with rainfall situation in the destination. There are also families who send to other rural areas for work without prior information which accounts only 2 percent.

Table 4.7: Sources of Information about Destination Employment

Information sources	Freq.	Percent
Personal network	85	29
Media	138	48
Rainfall	21	7
Previous experience	39	14
Others	6	2
Total	289	100.00

Source: Own Survey Computation

The remittances sent or returnees bring to the origin areas can be expended on different expenditure categories. Thus, it is important to know where does migration remittance has contributions among the various requirements of the sending households. In connection to this, Figure 4.7 shows that mainly daily consumption expenditures, loan repayment, and social expenditures took the higher share for their ranking as 1st, 2nd and 3rd ordering. However, it should be noted that, though the ranking share is lower, remittance income still also have contribution on other requirements such as housing construction, livestock purchase (specifically small ruminants) and other uses such as expenditure for education, purchasing of seed and chemicals too.

**Figure 4.7: Remittance Income Use by Rank in terms of Percentage**

Source: Own survey computation

The interesting result in this study is that from the total survey nearly 21.5 % of them have got loans either from formal or informal opportunities. Among these, the share of credit access by migrants and non-migrants is 28% and 19 %, respectively with a chi-square value of 3.6279 and significance of $p = 0.057$ witnessing migrants' family had greater use of loans. This result further supports the reason why the larger share of remittance use goes to loan repayment following daily consumptions. Similar studies in Ethiopia also have showed the positive contribution of labour migration income on the repayment of loans (Woldie et al., 2010).

One of the key Informant (P3), in fact who has experience in migration to large scale commercial agricultural production area stated clearly that

“..I have repeated experience to Metema and Delelo sesame production areas for labour work. Despite the hard nature of the work the income is attractive. Usually, I pay my loans once I came back from this areas.

He also adds that ... “... Some informal lender also view having a migrant from the family member is a confidence for them to give loans. This is the common strategy for most of the smallholder farmers like me in Wogera district.

Similarly, an attempt to examine the prime purpose of remittance sent or brought to the family members. As shown in Figure 4.8 below, migrants themselves replayed that almost 52% of them have the aim of buying or renting plowing oxen, followed by repayment of loans received. This result also have an agreement with the repose of family members in the origin area in which still loan repayment is been given precedence.

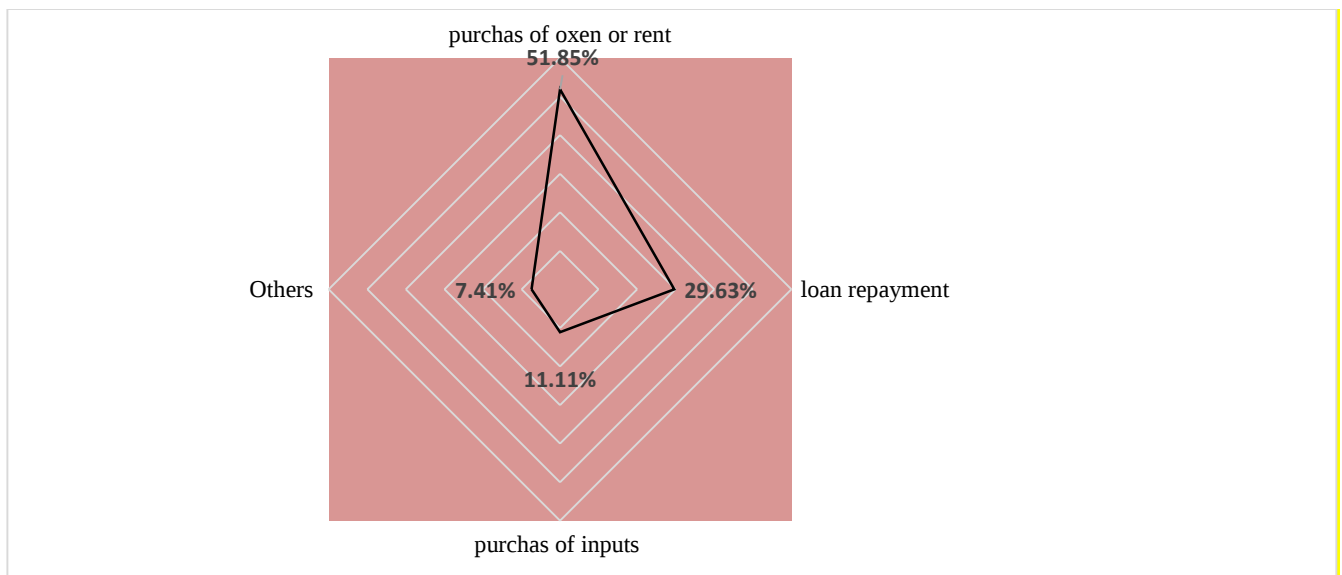


Figure 4.8: Purpose of Remittance (Migrants' Response)

In this study an attempt has been made to recognize the existing infrastructural system, notably the road and transportation conduction in relation to the migrants travel to the destination. In this regard the respondents were asked about the road situation and the cost of transportation in the study area. The results of the descriptive analysis as showed in Table 4.8 almost 63 percent of them replied improved and very improved for the question how do you see the transportation condition for migrants. While, 37 percent of them replied not improved. With regard to the cost of transportation almost the majority of them that accounts 99 percent replied the cost of transportation is expensive and very expensive.

Table 4.8: Perceived Transportation Costs and Conditions for Migrants

Transportation	Responses	Frequency	Percent
Transportation Condition	Very improved	18	9
	Improved	110	54
	Not Improved	77	37
	Total	205	100
Cost of transportation	Very expensive	87	43
	Expensive	115	56
	Cheap	2	1
	Total	204	100

Source: Own Survey Computation

In the above analysis, the message is, though the majority of the respondents replied the improvement in the transportation conditions that can be explained in terms of access to transportation vehicles and road situation; almost all replied higher cost of transportation during the peak periods of migration. In this study from the results of the key informant Interviews with regard to the transportation costs and overall conditions, almost all witnessed the high cost of transportation some times that it could be double and three times higher than the normal tariff.

As shown in the following photos that the researcher had during his observational study across the cash crop producing routes of Gondar-Gendewuha-Shinfa and Quara, it previews that large number of labour employees can be transported with a single Isuzu car that is highly congested with passengers. Apart from this, the price of the transportation was tripled from the normal 40 birr to 120 birr from Gendewuha to Shinfa.



Photo: Labour Employees transportation by ISUZU from Shinfa to Gendewuha

In this study a focused group discussion has been conducted in three places, in Dembia at two Kebele and in Wogera in one Kebele. In Dembia district, notably at Senbet Debir Kebele a

focused group has been conducted with a farmers who have experience in seasonal migration as well as moving in to the low land cash production area for sesame production.

From the overall focused group discussion we came to understand that the large scale commercial belt is not only hosts casual laborers per se, rather it also deliver land that is suitable for sesame production. According to the majority of the participants land can be rented-in in different ways, either renting it for 3000 birr to 5000 birr per hectare or entering into an agreement called four quintal for one which means for every four quintal of sesame the owner of the land will receive one quintal of sesame. However, the participants also revealed the variability in the price of land depends on the nature of the rainfall²¹, the productivity and nearness and farness of the location of the farm land.



Focused Group Participants at Senbet Debir Kebele

Apart from the opportunities mentioned above, an attempt also have been made to examine the existing challenges in the low land labour work and related agricultural activities. On the side of laborers;

²¹ Sesame production is sensitive to rainfall, thus, if the owner of the land believed that the current season is conducive the land price will be higher for that specific season.

- Payment delay and sometimes totally betrayal of the agreement;
- Higher transportation cost at the peak times such as weeding and sesame harvest;
- Conflict and security threat;
- Food accessibility and water sanitation problems;
- Higher cost of medicine in the farm areas (some farm owners also sell medicines by higher price);
- Absence of formal agreement between the investors and labour works;

On the other hand, on the side of famers and investors;

- The risky nature of sesame production;
- The variability in sesame price;
- Laborers sometimes strike not to work unless the investor increases the initial payment²²;
- Higher cost of labor for small scale farmers;
- Dishonesty of the labour workers (for instance reducing the size of handful sesame harvest, covering weeds with soil, time wastage during casual labor work) were the main challenges we examined from both the farmers, labour workers and key informants of such as labour and social affairs, Sesame Business Network (SBN) and Ethiopian Commodity Exchange (ECX) who have close linkage on sesame production and labour employment situations in the study area.

4.1.3 THE DETERMINANTS OF RURAL TO RURAL MIGRATION IN THE STUDY AREA

In this section, the principal aim of discussing the determinants of rural-rural migration is due to the fact that rural-rural migration is rarely investigated in migration discourse as indicated in (Carr, 2009; Linger and Terefe, 2018). Thus, the result will be groundbreaking for internal migration studies that aims at knowing the socio-economic factors that influences migration in different patterns.

²² Commonly, the labour workers they came in the same origin. Locally even they have this name “**anileyayim**” (we will not be separated). Due to that familiarity, sometimes they can have strong bargaining power to hit a strike and ask the investor to increase the initial agreement.

The dependent variable is household migration decision for rural-rural migration and categorized as 1 for migrants and 0 otherwise. (Operationalization of rural to rural migration definition can be seen at end of chapter two).

Therefore, before executing the binary logit model, it is relevant to take into consideration of the assumptions in econometric analysis. According to (Gujarati, 2004) there should be an instrument to exclude the problem of multi-collinearity that may exist between the explanatory variables. For this purpose, the Variable Inflation Factor (VIF) and correlation coefficient were executed for continues and dummy variables respectively. The results (See appendix A1 & A2) confirmed for no multi-collinear problem for continues variables witnessing less than 10 values of VIF. However, for dummy variables the pair-wise correlation metrics confirmed the presence of collinearity between migration contact and migrants experience with a value of 0.67, thus removing either of the variables is recommended to maintain healthy estimation.

$$VIF = \frac{1}{1-R^2}$$

As shown in Table 4.9, from the total thirteen (13) explanatory variables, five (5) of them are statistically significant with different directions of influence on rural to rural migration. These includes, sex of the household (SEXHH), active labour (ACTIVE), contact with migrants' (MIGCONTACT), social participation (SOCIAL) and the perceived migration income (MIGINCOM) are variables that are significantly influence migration decision from rural origin to rural destination.

However, it is important also to evaluate the quality of model before interpreting each coefficients. For this purpose, it is common to use the model chi-square coefficient and its significant value. As shown in Table 4.9 a chi-square has a value of 146.13 with a “p “ value of 0.0000 declaring that all the explanatory variables included in the model have joint importance in predicting the decision of households to send family members in to other rural destination. Similarly, hosmer-lemishow test that states there is no difference between the observed and the predicted value in its' null hypothesis is rejected on the bases of the p-value which is 0.4893. Put differently, the model is appropriately fit with the data.

Table 4.9: Maximum Likelihood Estimation for Decision of Rural-Rural Migration

Variables	Odds Ratio	Std. Err.	Z	P> z
SEXHH	.3326491	.1577599	-2.32**	0.020
AGEHH	1.016905	.0137051	1.24	0.214
ACTIVE	1.444438	.1901576	2.79***	0.005
MIGCONTACT	9.654425	3.690148	5.93***	0.000
LAND	1.338673	.331521	1.18	0.239
TLU	1.060964	.0912324	0.69	0.491
MOBILE	1.63146	.584922	1.37	0.172
EDUFAM	.849944	.1083607	-1.28	0.202
RAIN	1.282388	.4568821	0.70	0.485
CREDIT	1.68287	.6007753	1.46	0.145
SOIL	1.090089	.3864061	0.24	0.808
MIGINCOM				
Same	.4602562	.2122317	-1.68*	0.092
Lower	.2231143	.1210868	-2.76***	0.006
No information	.1060336	.0492533	-4.83***	0.000
SOCIAL	.3614506	.1274774	-2.89***	0.004
_cons	.2484725	.2257456	-1.53	0.125
LR Chi² (15) = 146.13, p = 0.0000				
Correct prediction of all samples = 79.23 %				
Hosmer-Lemeshow chi2(8) = 7.45, p = 0.4893				
Number of observation 366				

Source: Own Survey Computation. ***, **, and * represents the significance level at 1 %, 5 % and 10 % respectively.

Once confirming how good the model is with the above mentioned tests, now it is important to interpret the relevant significant variables that influences migration decision at household level. In this study, the size of active labour in the household and having contact with previous migrants are the two important factors that influences migration decision at household level positively and significantly at less than 1% probability level ($p < 0.01$).

As shown in the above Table 4.9, having contact with migrants (MIGCONTACT) in the large scale commercial agriculture increase the odds ratio of favoring migration decision by a factor of 9.7 at less than 1% probability level ($p < 0.01$). This clearly confirm the importance of having prior information about the migrants destination that helps them reduce psychological cost and to get sufficient information about existing employment opportunities. Previous studies are also articulated that social network is playing the pivotal role for migration lubrication in terms of job gaining, reducing migration stress and information access (Ito, 2011) as well as migration risk sharing (Morten, 2016). However, there are also unique cases in which networking could be against migration in fear of competition (Blumenstock Chi & Tan, 2018). There are also empirical recognitions for that having previous migrants in the villages can be one of the network that can minimize the costs of sending family members to the destinations of migration (Munshi 2003; McKenzie and Rapoport 2007). In Ethiopia, the study by Woldie, et al., (2010) indicated the positive implications of personal network for rural to rural migration.

In the same way, a unit increase in active labour (ACTIVE) found to increase the odds ratio of favoring migration decision by a factor of 1.4, keeping other variables constant. In this study, active labour represents the age categories that are in between 15 and 64. Similarly, regardless of the age structure (Atsede and Penker, 2016), found that larger size had significantly affect migration decision positively for short term migration. More closely to this study, the study of (Linger and Terefe, 2018) supports this result with the same binary logit in which dependents are against migration. Thus, the more the household have active labour in the household, the higher will be the motive to search for job that have greater opportunities than their origin. Moreover, the employment characteristics in the low land commercial agriculture voraciously demand active labour due labour intensive nature the farming activities.

On the other hand, the logit model output also revealed that the three variables, sex of the household head (SEXHH), perception of destination income (MIGINCOM), and participation in social affairs (SOCIAL) found to affecting migration decision negatively with difference significance level. The interpretation is, the odds ratio of favoring migration decision decreases by a factor of 0.33 for male household heads than female household heads, keeping other variables constant at less than 5% probability level ($p < 0.05$). In the other word, the household with female head are the one who seeks supplementary income due to the fact that female

headed households in different studies are confirmed to have low level of income and resources possession as compared to their counterpart (Moepeng and Tisdell, 2008; Mulu and Paul, 2015; Atsede and Penker, 2016).

In the same vein, participation in the social affairs found to influencing migration decision negatively by a factor of 0.36 at less than 1% probability level ($p < 0.01$), holding other factors constant. Commonly the farm household may engage in social and traditional activities like Idir, Debo, Mahiber and other social celebrities in one or the other way could influence the time to have extra-work in terms of labour migration.

Lastly, the perceived income of the lowland commercial agriculture also influences significantly the decision of migration in the study area. As compared to those who perceived income of the destination higher, those who perceived the same are influencing the odds ratio of favoring migration negatively by a factor of 0.46 at less than 10 % probability level ($p < 0.10$). Similarly, those who perceived low and have no information negatively influence the odds ratio of favoring migration by a factor of 0.22 and 0.10 respectively at less than 1 % probability level ($p < 0.01$). In line with this, different studies agreed that higher income in the destination is one of the pull factor for migration which is viewed as economic motive (Gyasi and Sey, 1999). Thus, this study also confirmed that the higher the household are perceiving migration income, the higher will be the probability of migration and vice versa (Kainth, 2010).

At the same time, the focused group discussion carried out in the two districts (Dembia and Wogera) helps us to distilled factors additional to the model result. Among these, accessibility to main roads, the closeness of the large scale farming areas, access to land, huge labour demand for weeding and sesame harvest as well as attractive income in Sudan farming areas were found to be the pull factors of rural-rural migration in the study area. Similarly, the study of Daniel and Bao, (2010), has found that shorter distance and accessibility to roads as well as lucrative employment opportunities as pull factors of inter-district migration in Ghana. From the push factor, low level of land productivity, low labour income, and large family size were mentioned as a forces that trigger migration in the study area.

CHAPTER FIVE

5. RURAL-RURAL MIGRATION, AGRICULTURAL PRODUCTION, TECHNICAL EFFICIENCY AND COMMERCIALIZATION

In this section, the interplay between migration and agricultural production as well as crop output commercialization have been discussed. Firstly, based on descriptive analysis, variations have been assessed between the migrants and non-migrants in terms of improved agricultural technology use, technical efficiency differences and crop output commercialization. Secondly, based on the application of econometric tools the implication of rural to rural migration on the above mentioned outcomes are also examined.

5.1 VARIATIONS IN TERMS OF IMPROVED TECHNOLOGY UTILIZATION

Migration income is also supposed to have implication on the use of improved agricultural input that the current agricultural practice demands so voraciously. In this section specifically the application of new varieties for selected commodities and use of chemical fertilizer were assessed between families with migrants and non-migrants. Firstly, to compare these two groups there should be an assessment to make sure that the dissemination of the technologies in the study area. For this reason, development agents from each district and the zonal level input distribution department assured that fertilizer (Urea, DAP, NPS), new varieties for Teff, Maize, Chickpea and Sorghum are released in North Gondar Zone that are good for comparing migrants and non-migrants with existing new variety application. It should be noted that the use of High Yielding Varieties (HYV, here after) in the study area is understood based on farmers response whether they use HYV or not the during the survey period.

As shown, in Table 5.1 below, for the selected crops such as Teff, Maize, Chickpea and Sorghum, the chi-square test shows statistically significant except Sorghum at less than 1 % probability level. The Table also indicated that 58.94 % of families of the migrants are using improved Teff varieties whereas non-migrants family are only 21.76% with a chi-square and p-value of 39.21 and 0.000 respectively. The result, confirmed that migrants family are in better position for using new varieties for Teff production. Similarly, the chi-square test revealed that from the total migrant's family almost 76 % of them are using improved maize variety at less

than 1 % probability level with a chi-square value of 21.22. Whereas, the non-migrants family are 42.85 % from the total non-migrants. The higher percentage for maize new variety application the in the study area is due to that fact that BH-540 is the widely disseminated variety for maize as compared to other crop technologies. Except sorghum which is not statistically significant, the same result also obtained from the chi-square test for chickpea production. For Chickpea high yielding variety use, the test shows statistically significant percentage difference between migrants' and non-migrants family with 46.15 % and 22.60 % respectively at less than 1 % probability level. Overall, for the three agricultural commodities except sorghum, the chi-square confirmed statistically significant for better use of high yielding varieties by the migrants family than non-migrants.

Table 5. 1: Chi-Square Test for Migrants Family and Non-Migrants Family for Dummy Variables

Variables	Use status	Migrants Family		Non-Family		Chi-square Value	Sig. level
		Number	Percent	Number	Percent		
Teff HYV	Yes	56	58.94	42	21.76	39.21***	0.000
Maize HYV	Yes	54	76	63	42.85	21.22***	0.000
Chickpea HYV	Yes	18	46.15	26	22.60	7.91***	0.005
Sorghum HYV	Yes	3	5.08	6	5.45	0.0104	0.919

Source: Own Survey, 2019, NB: HYV represents High Yield Varieties and *** represents $p < 0.01$

Similarly, for the application of chemical fertilizer which is measured in terms of expenditure for inorganic fertilizers such as (Urea, DAP and NPS) and other chemicals (such as insecticides or anti-weed), t-test is employed to see the mean expenditure difference between the migrants' and non-migrants family. As shown in the Table 5.2 below, there is statistically significant mean difference between migrants' family and non-migrants' at p-value less than 5 %

probability level. Stated differently, the migrants are expending on average 204.95 birr higher than non-migrants' family. However, the t-test confirmed statistically no significant difference between the two groups, for anti-weed and other chemicals though quantitatively we noticed a mean difference 48.82 birr.

Table 5. 2: T-Test for Fertilizer and Other Chemical Expenditures by Migration Status

Variables	Migrants		Non- Migrants		T-value	Sig. level
	Mean	St.Dv	Mean	St.Dv		
Fertilizer (Birr)	934.50	889.39	729.55	783.79	-2.2151**	0.0274
Anti-weed & others (Birr)	261.11	552.48	309.93	588.32	0.7463	0.4560

Source: Own Survey, 2019, NB: ** $p < 0.05$ (Please also note that the higher St.Dv than the mean value for the non-migrants indicates higher variability within the group)

In our attempt, we were also able to find some technologies that require labour have been affected by the absence of family labor. For instance, as explained by one of the Development Agent in Dembia district, the non-application of row-planting of Teff usually justified due to lack of sufficient labour. Thus, sending family members to low land large scale agricultural areas could affect the application of row planting which is supposed to improve productivity. Similarly, in Dembia district some farmers' explaining for not applying row planting technology because of young family members are sent to the large scale agriculture producing areas. This deemed to be convincing due the fact that the row planting technology is labor intensive which requires additional labor for migrant sending families. This clearly, informs that the row planting practices are not devised in a way to be labour saving technology. Though studies are very limited, one experimental study conducted by a group of researchers in Ethiopia also verified that row planting for Teff is very much labour intensive at the same time found not improve land productivity (Vandercasteelen, *et al.*, 2016).

On the other hand, from the focused group discussion, we came to understand that the origin farming (labour sending area) is becoming highly dependent on fertilizer application. From the discussants we recognized that, fertilizer application currently is not like it was when they

started fertilizer for their farm lands. Thus, supplementing farm income through labour migration can augment the agricultural inputs like fertilizer. Some empirical studies are also found that households with a migrant family are spending migration income for the purchase of seed, pesticide and farm inputs to improve crop productivity (Imran, Bakhsh, and Hassan, 2016), confirming how migration income improves the crop production.

Apart from the labour income, migration towards the cash producing areas also can be a means for new farming experience sharing. In line with this, the key informants and focused group discussants narrated that farming experience sharing like zero tillage practice which is locally known as “SHETET” is one of the new experience that migrants can get. SHETET is a plowing activity without pair of oxen which is practiced through sharp soil digging farm implements. According to the discussants such practice believed to be a strategy to reduce the cost of oxen renting but also from the view point of land management such practices are also believed to improve the soil productivity through the reduction of soil depletion. Similarly, in some districts like Belesa District taking sesame production in the low land cash producing areas as an experience have tried producing this cash crop in the origin of migrants which is not known so far in the district. Such learnings if intervened with the support of crop scientist in the field can be one way to switch from staple food production in to cash income generating crops.

5.2 IMPACT ON CROP PRODUCTIVITY AND TECHNICAL EFFICIENCY

5.2.1 THE IMPACT MIGRATION ON CROP PRODUCTIVITY

In this sub-section, to see the impact of labour migration on agricultural productivity and technical efficiency, a number of variables were used as dependent and explanatory variables. In Table 5.3 variables used for production analysis were summarized. However, it should be noted that the variables for technical efficiency will be presented latter following the crop production analysis.

Table 5. 3: Definition and Summary of the Variables Used for both OLS and ESRM

Variables	Description	Mean	Std. dev.
Dependent variable (lny_all)			
lny_all	The log of all crop values in birr	9.847	.826
Explanatory variables:			
Ruralmig	migration (Dummy, Migrants' Household=1)	.2935065	.455961
Llabor	The log of labour used in days	2.279	.549
Lfert	The log of fertilizer used in birr	6.480	.885
lnall_land	The log of land in hectare	-.0983	.684
lnall_chem	The log of all chemical used in birr	6.772	.765
Lseed	The log of seed used in birr	6.168	.813
Tlu	Tropical livestock unit	3.056	2.090
Social	Participation in social issues (Dummy, yes =1)	.5143	.500
Extcontact	Extension agent contact in the last 12 months	6.857	9.934
land_certf	Possession of land certificate (Dummy, Yes=1)	.826	.380
Inland_seed	The interaction between the log of land and seed	-1.173	3.973
lit_stat	Literacy status of the household head (Dummy, 1=Read & write and above, 0, otherwise)	.3195	.467

Source: Own Survey Computation

Commonly, the straightforward analysis to see the effect of one explanatory variable on continuous response variable is the ordinary least square (OLS) estimation. Thus, for ordinary least square estimation the migration status has been plugged-in in the regression model as dummy variable taking the value 1 for migrants household and 0, otherwise. Employing OLS, both the conventional crop production inputs and other important variables including dummy migration (as 1 & 0) variables are included in the model. Based on the ordinary least square estimation, migration as dummy variables has showed negative implication on the values of crop outputs but not statistically significant. With this result one can immediately conclude that migration have negative effect on crop production with no statistically significant result. However, since OLS estimation suffers from endogeneity problems and inability to tell about the counterfactual treatment estimates, identification of instrumental variables and using

endogenous switching regression model has been executed and presented as shown in the last two columns of Table 5.4.

For the selection of instrumental variables, empirical procedures from (Kabubo-Mariara, *et al.*, 2017) were followed. Using the following model, first we regressed the proposed instrumental variables (such as migrants contact, perceived migration income, and migration experience are variables represent z) against migration decision variable (M) and other explanatory variables.

$$z = a_0 + M + x'\beta + u \dots \dots \dots (a)$$

Thus, our assumption is if there is endogeneity, then the $cov(M, z) \neq 0$, but what we need is an instrumental variables which is correlated with the migration decision but that doesn't directly affect crop output values.

Using the above equation (a), we found that the above three proposed variables have statistically significant relationship with “M” declaring their relevance as instrumental variables. The results showed statistically significant relationship between migration and migrants contact (0.204, $p=0.000$). Similarly, the relation between migration decision and perceived migration income and migrants contact have statistically significant relation with migration decision with the values of (0.204, $p=0.000$) and (0.181, $p=0.000$), respectively.

As shown in the bottom of Table 5.4, the correlation coefficient for migration equation and crop output value function is negative and statistically significant for migrants' family (ρ_1) but not significant for non-migrants (ρ_2). As indicated in Asfaw, *et al.*, (2010), the implication is that having statistical significant in either of suggested the presence of self-selection to be considered. Specifically, the significance in former implies self-selection among the migrants' families. While, the likelihood ratio test result suggests that the three equations are jointly dependent, providing evidence of endogeneity that needs to be controlled in the model specification of crop production function. At the same time, the difference observed in coefficients of the crop production equation and the migration decision equation reflects the heterogeneity of the sample.

All the significant variables in the model have signed the expected direction of influence on crop productivity for both migrants and non-migrants household. Firstly, it would be appropriate to see the implication of each of the conventional inputs (land, labour, seed and fertilizer) and other important explanatory variables used in the model such as (social participation and literacy level). The important explanatory variables in this analysis land has showed positive and statistically significant effect on the values of crop outputs. The effect of land for migrants' family is higher which 39% whereas for non-migrants' it is only 15%. This could be associated due to the fact investment on land is more productive for migrants' family than non-migrants' family.

Table 5.4: Parameter Estimates of Migration Decision and Crop Output Values Equation

Model	OLS		Endogenous Switching regression			
			Migration=1		Migration=0	
Dependent	Crop output values (Ln)		Crop output values (Ln)		Crop output values (Ln)	
Explanatory	Coef.	Std. err	Coef.	Std. err	Coef	Std. err
Llabor	0.000636	(0.0557)	0.000887	(0.104)	-0.0282	(0.0668)
Lfert	0.115**	(0.0438)	-0.104	(0.0911)	0.199***	(0.0507)
lnall_land	0.275***	(0.0505)	0.397***	(0.117)	0.158**	(0.0559)
lnall_chem	0.0855	(0.0560)	0.239	(0.123)	0.0152	(0.0592)
Lseed	-0.00399	(0.0410)	-0.187	(0.102)	0.0394	(0.0451)
Tlu	0.0276*	(0.0130)	0.0341	(0.0250)	0.0294*	(0.0142)
Social	0.173***	(0.0519)	0.281*	(0.109)	0.101	(0.0555)
Extcontact	0.00327	(0.00271)	0.00430	(0.00505)	0.00188	(0.00311)
land_certf	0.251***	(0.0670)	0.227	(0.144)	0.221**	(0.0709)
lnland_seed	0.107***	(0.00956)	0.0765***	(0.0194)	0.128***	(0.0108)
lit_stat	0.0708	(0.0581)	0.168	(0.118)	0.0235	(0.0623)
Ruralmig	-0.0902	(0.0566)				
_cons	8.327***	(0.301)	9.807***	(0.846)	8.159***	(0.347)
σ_i			-0.828***	(0.0867)	-.963***	(0.0478)
ρ_1, ρ_2			-.04055*	(0.237)	0.0175634	(0.306)
adj. $R^2 = 0.726$			LR test of indep. eqns.: chi2(1) =19.39 Prob > chi2 = 0.0000			

Source: Own survey, 2019 p < 0.05, ** p < 0.01, *** p < 0.001, Nb: The selection equation is not included

The prime purpose of executing the endogenous switching regression model is to examine the implication of rural to rural migration on crop production. For this purpose, Table 5.5 mainly presents the average expected crop output values, the treatment effect on both treated (Migrants' family) and untreated (Non-migrants' family) and the heterogeneity effect. In the first case, cells (a) and (b) are the expected values of all crops observed in the sample. Put differently, the expected values for all crops produced by the families of the migrants is 28,764.36 birr. While for those of the non-migrants' family the expected values of all crops produced is 31,613.36 birr. At this point, one can make straightforward comparison between migrants' family and families without migrants. On the basis of this result, we can say that non-migrants' family are better off by nearly 10% which is estimated to 2849.23 birr. However, such comparison is misleading due to the fact that they can't tell the isolated treatment effect using the observed characteristics per se (Asfaw *et al.*, 2010). As expected, the treatment effect on treated (the impact of labour migration) is positive and significant which contributes about 20% (4787.77) higher for migrants family. The difference can be equivalently associated with 235.96 Kg²³ or 2.35 quintal of Teff which dominantly produced in the study area. On the contrary, the treatment effect on the untreated is negative and statistically significant, implying the non-migrants' family had they send a family member they may produce about 16 % less than from total production without migration. More importantly, the transitional heterogeneity (TH) found to be positive which further confirms stronger and higher effect labour migration on migrants than the non-migrants' family.

The result of the study confirms that the farm households are rational in terms of the decision to send family members weighting the benefits and the costs that could be linked with labour diversification. Due to this fact, migrants are right to have such decision and non-migrants are right for their decision not to have a migrant due to multiple unknown factors.

²³ The average price for one kilogram of Teff in the study area during the survey period is 20.29 Birr

Table 5. 5: Average Expected Crop Output Values, Treatment and Heterogeneity Effects (All Samples)

Subsamples	Decision stage		Treatment effect
	To Migrate	Not to Migrate	
Migrants	(a)y11= 28764.13	(c)y22 = 23976.36	TT=(a-c)= 4787.77**
Non-Migrants	(d) y12 = 26522.68	(b)y21= 31613.36	TU (d-b)= -5090.959**
Heterogeneity effect (BH_i)	BH ₁ =2241.454 ^{NS}	BH ₂ =7637.281 ^{***}	TH= (9878.73)

Source: Own Survey Computation. NB: *** & ** represents significant level at 1% & 5% respectively, NS=Not significant

This study also have made an attempt to disaggregate the effect of migration on values of crop output in terms of location, land size and connection with migrants, and amount of remittance received. According to Table 5.6 below, the effect of labour migration has showed heterogeneous effect across districts. This could be associated with the internal characteristics that each districts could have. For instance, the effect of migration is higher for Wogera Districts on the contrary its' effect on Belesa District is negative. This can be associated with the distance between origin areas to the destination. In this regards, Belesa District is far away than the remaining districts to the large scale agricultural production areas that costs migrants higher. At the same time, the district is poor in terms of road infrastructure and transportation conditions compared to Wogera district²⁴.

Beyond, location heterogeneity, its effect also varies in terms of contacts that the migrants had with those of who had migration experience to the labour hosting destinations. In connection with this, Table 5.6 shows that those who have such a network with migration experience have larger effect on values crop output which is also statistically significant. On contrary those who have no connection labour migration experienced individuals have negative and non-significant effect on values of crop outputs. This study therefore, clearly tells that having connection with labour migration experienced individuals can smooth migration challenges and could also direct to the most lucrative labour employment options. This also further can reduce the job searching

²⁴ Wogera district has asphalt road which is connected directly to Metema, Dansha and Humera labour hosting destinations, while Belesa District has no asphalt coupled with naturally difficult road conditions

durations as compared to those who have no prior information about the employment characteristics of the hosting districts.

Table 5. 6: Disaggregated Treatment Effects on the Basis of Different Criterion

Disaggregation in terms of		Treatment on treated
District	Wogera	13668.20 ^{***}
	Dembia	4200.53 ^{NS}
	Belesa	-7662.767 [*]
Contact with migrants	Yes	10437.08 ^{***}
	No	-3542.29 ^{NS}
Size of remittance	Above 1000 Birr	5278.73 [*]
	Below 1000 Birr	4787.78 ^{**}

Source: Own Survey Computation. *** & ** represents significant level at 1% & 5% respectively, NS=Not significant

Moreover, from the above Table 5.6, the size of remittance income has showed statistically significant and higher effect for those who received remittance above thousand birr than those who received below thousand birr. However, though statistically significant the magnitudes is about nearly 491 birr higher for those who received above 1000 birr.

Before we jump to the efficiency analysis, as we initially propose, Propensity Score Matching (PSM) also can be used to estimate the impact of migration on treated groups just to check the robustness of the results of the endogenous switching regression model and to determine the best one among the two models for this specific data. For the assumption of common support to hold true, the diagrammatic representation must show overlap between migrants' and non-migrants' family propensity score distributions. The binary logit model and the covariates used for the determinants of migration were used to generate the propensity scores for the two groups. However, at this section the purpose of logit model is to generate the propensity scores for both the migrants and non-migrants' family and then to find matches for the two groups. Before estimating the treatment effect, it is mandatory now to test matching quality and to see the presence of common support between migrants' and non-migrants' household. As shown in Figure 5.1 there are sufficient common support areas between the treated and untreated group which finally let us to have a sample of 314, 298, 311 and 288 respectively for nearest neighborhood, Kernel (0.03), Kernel (0.06) and Radius (0.02)

It is also empirically prescribed that before interpreting the estimation results one must check the result of the quality of matching in terms of testing the results of reduced bias after and before matching. Thus, matching quality test must be taken for the three matching algorithms (Nearest-Neighborhood, Kernel and Radius Methods). The technic says the standardized mean difference of all covariates should be reduced. Simultaneously, the shift from significant level in to non-significant of the p value of the likelihood ratio tests after matching is also informs about the good quality of the matching algorithm.

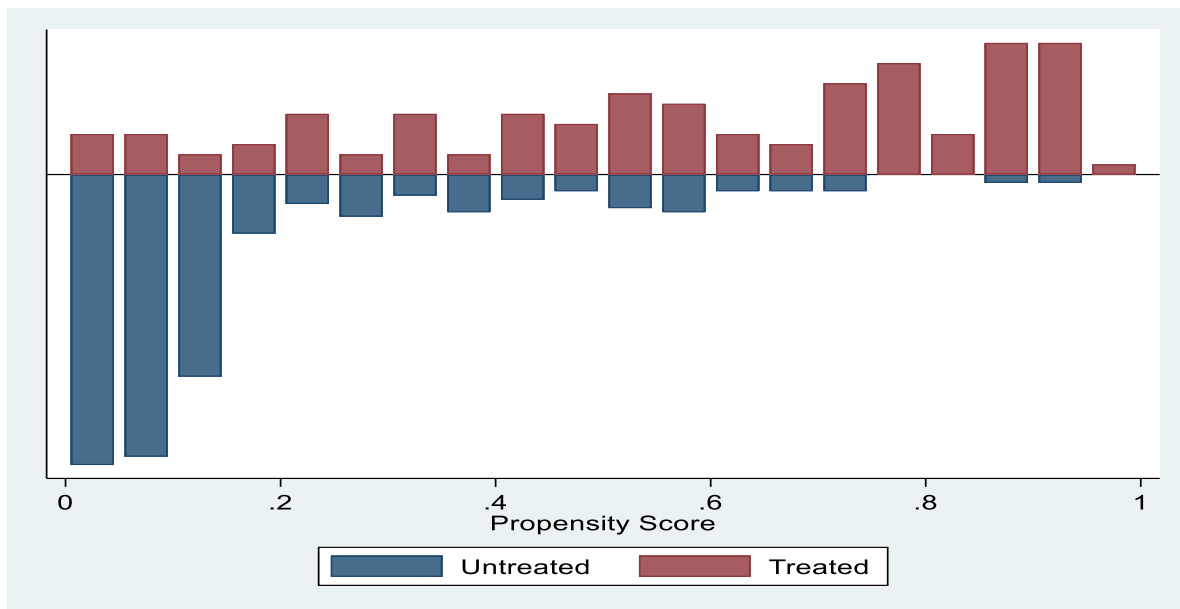


Figure 5.1: Common Support Region for Treated and Untreated Groups

Based on the above mentioned indicators, comparison has been made for the three methods. As shown in the Table 5.7 below, compared with the pre-matching, post-matching has showed a reduction of the standardized mean differences of all the covariates for the three matching methods. But, the radius method has significant reduction as compared to the remaining once. With similar vein, the p-value of the likelihood ratio test expected to be insignificant as indicators for good quality. Except, the first nearest neighborhood, the move from significant to non-significant further confirmed that those four matching methods have relatively good quality. Such, methods of matching quality test also employed by (Dagne, *et al.*, 2017). However, the standardized mean difference is not still lower for all expect the kernel (0.03 and radius (0.02). However, the owners of PSM models also suggested a relaxed criteria in which a standardized difference that is less than 20 is not seen as larger (Rosenbaum and Rubin, 1985).

As shown in Table 5.7, for the Kernel^a, and Radius the reduction in standardized bias is 7.4 and 6.4 respectively from 46.7. At the same time for this two methods, the p-value of the likelihood ratio test that states the joint significance of the covariates before matching has switched in to non-significant for all the methods, confirmed the rejection of the joint significance of the covariates. This is also the other indicator for good matching algorithm.

Table 5.7: Matching Quality Test: Balancing Property

Test for	Before matching	After matching (algorithms)				
		1- Nearest-neighborhood	5-Nearest-neighborhood	Kernel ^a	Kernel ^b	Radius
Pseudo R2	0.353	0.076	0.040	0.016	0.041	0.011
LR X²	152.68	19.54	10.25	3.45	10.35	2.37
p-value	0.000	0.052	0.508	0.983	0.500	0.997
Mean standardized bias	46.7	19.4	12.3	7.4	15.1	6.4
Median bias	31.5	22.6	11.3	4.5	14.9	5.4

Source: Own Survey Computation. NB: Five-nearest neighbors, Kernel and Radius (caliper =0.02) were estimated based on psmatch2 stata command. a and b are the kernel with bandwidth=0.03 and 0.06 respectively.

On the top of the t-test result also after matching these two matching methods (Kernel (0.03) and Radius (0.02)) has shown to be insignificant, confirming good quality. However, the most important test for matching quality is the reduction in the standardized mean difference. Higher percentage of reduction after matching is a good indicators for quality of matching. The idea is the more we reduce the bias between the covariates after matching the higher will be the probability we get comparable groups for both migrants and non-migrants. Thus, based on this barometer, radius (caliper=0.02) matching method and the kernel with bandwidth (0.03) method are relatively good due the fact that these methods can reduce the standardized mean difference by 86 % and 84 % respectively.

Therefore, as presented in Table 5.8, among the three methods relatively we can trust the results of radius (caliper=0.02) and the kernel with bandwidth (0.03) matching method. Thus, based on the Kernel (0.03) matching algorithm the treatment effect on treated is 3602.46 birr values of all crops. While, the treatment effect for the untreated is positive but lower impact 1386.89 birr. However, for both the treated and untreated groups the result is not statistically significant.

While based on radius (0.02) matching technique the treatment effect on treated is about 3840.29 birr values for all crops and for untreated (non-migrants) is 2261.87 birr. Like the kernel method, we found also statistically non-significant effect based on the radius matching algorithm.

Table 5. 8: Average Treatment Effect Based on PSM

Matching algorithm	Migrants' Household	Non-Migrants Household	ATT	ATU	Std. err	P-value	common support (sample)
1-Nearest-neighborhood	27244.55	24201.34	3043.21	2530.99	6527.91	0.279 ^{NS}	314
5-Nearest-neighborhood	27244.55	23152.55	4092.00	-250.47	3689.45	0.198 ^{NS}	314
Kernel ^a	25595.047	21992.57	3602.46	1386.89	3310.69	0.851 ^{NS}	298
Kernel ^b	27432.15	23868.17	3563.97	-966.84	3005.51	0.393 ^{NS}	311
Radius	25218.00	21377.71	3840.29	2261.87	3708.93	0.911 ^{NS}	288

Source: Own Survey Computation

The deviation of the results from the Endogenous Switching Regression Model (ESRM) and Propensity Score Matching (PSM) can be from the results of the latter in which the unobservable heterogeneities may not be accounted. Different studies that attempted to implement both models also found the same inconsistencies, though the contexts²⁵ of the studies are different (Shiferaw *et al.*, 2014; Dagne *et al.*, 2017). The evidence for this can be seen from the reduced bias which is not higher than 86 %. Stated differently, there are about 14 % unobservable characteristics/heterogeneities between the two groups that may distort the results of the model outcome. Thus, among the two models for crop production analysis and for this specific data, the endogenous switching regression is suitable than the PSM. Therefore, only the results of the ESRM are important for policy implication than the results of the PSM for this particular study.

²⁵ The former on adoption and food security whereas the latter on cooperative impact on total income and asset. However, both of them used ESRM and PSM and found inconsistencies of the outcomes

5.2.2 IMPACT ON TECHNICAL EFFICIENCY

The other important empirical question in this study is to examine the implication of labour out migration on production efficiency, notably technical efficiency. An attempt to respond for this question will inform the way through which labour migration compensate the missed labour or if it cause inefficiencies in production. For this purpose, in this study, since we employ cross-sectional data, the two important production functional forms i.e. the Cobb-Douglas (CD) and the Translog (TL) production function were executed prior to the selection of one form over the other. However, once running the stochastic frontier analysis for both models we chose the one with low value of AIC (Alkaike Information Criteria) which is a general recommendation to choose low value.

However, before that some seminal studies on efficiency analysis recommend to implement ordinal least square before one went to the maximum likelihood estimation (Kumbhakar and Wang, 2015). For this purpose initially, we executed the ordinary least square followed by skewness test to make sure that if the skewness test shows negative result and skewed towards the left that will be starting point to declare for the use of stochastic frontier analysis. The test showed the value of $-.743$ which is negative confirming left-side skewness of the residuals from the ordinary least square estimation (See: Appendix IC).

Following the above, it is also important to conduct some tests with regard to model selection (between Cobb-Douglas and Translog functions) and existence of technical inefficiencies. Firstly, the question for the existence of inefficiency in the production process out of the sample households has to be answered. For this purpose, commonly the likelihood ratio test that initially assumes the null hypothesis of no technical efficiency was employed. As shown in Table 5.9 the disturbance term (u) is significantly different from zero, that leads for the outright rejection of the null hypothesis that stated no technical inefficiency ($H_0: \text{Sigma } u=0$). Thus, for the first question we confidently responded that there are statistically significant technical inefficiencies in the data.

Secondly, the choice between the two models was selected based on the likelihood ration test. The result of the likelihood ratio test with $(LR \text{ chi}^2 (7) = 18.49, p= 0.0099)$ has showed statistically significant difference between the restrictive and less restrictive models favoring

translog production function over cobb-douglas. At the same time, the Akaike's information criterion (AIC) for Cobb-Douglas and Translog are 312.624 and 308.13 respectively. This further strengthen the selection of translog function because it has low AIC as compared to Cobb-Douglas function.

Table 5. 9: Results of the OLS and MLS (Stochastic Frontier Estimation: Translog)

Inputs	OLS			MLS		
	Coef.	Std. err.	P-value	Coef.	Std. err.	P-value
Labour	-.82	.8018	0.306	-.66	.69102	0.341
Fertilizer	-.63**	.315	0.047	-.51	.33111	0.120
Land	.86***	.0639	0.000	.84***	.06165	0.000
Seed	.75	.487	0.126	1.13**	.4829	0.019
Oxen	.082	.1549	0.599	.012	.13984	0.929
Labour square	-.34**	.17181	0.047	-.40***	.1521	0.009
Fertilizer square	.097**	.0468	0.039	.086	.0529	0.106
Land square	-.001	.1231	0.993	.043	.10850	0.692
Seed square	-.17*	.0936	0.072	-.23613**	.09457	0.013
Oxen square	.24	.2210	0.271	.29	.1870	0.129
Labour_fertilizer	.087	.10231	0.391	.06082	.08831	0.491
Labour_seed	.158	.11153	0.156	.18	.10053*	0.069
Constant	9.913	2.0129	0.000	8.7157	1.86	0.000
R-square	0.6941			Lambda	2.71	
				Gamma ($\gamma = \lambda^2 / (1 + \lambda^2)$)		
				Wald chi2(12)	665.04	
				Prob > chi2	0.0000	
				# Observation	249	
				Log likelihood	-139.066	

Source: Own Survey Computation *** , ** & * represents significant level at 1% & 5% and 10% respectively

In this sub-section, though we chose translog for effect analysis, we prefer to present the two models simultaneously. As shown in Table 5.10 below, for the two models the technical efficiency score concentrated within the range of 51 % to 75% that accounts 46 % and 49 % for translog and cobb-Douglas respectively. This further can be illustrated in Figure 5.2 and 5.3 that shows the concentration of technical efficiency achievements of the farm households within the ranges specified above.

Table 5. 10: Descriptive Summary of Technical Efficiencies for the Two Functions

Efficiency level	Translog (TL)		Cobb-Douglas (CD)	
	Freq.	Percent	Freg.	Percent
<=.25	4	2	5	2
.25 - .50	46	18	41	16
.51 - .75	115	46	121	49
>.75	84	34	82	33
Total	249	100	249	100
Minimum	.17		.17	
Maximum	.93		.92	
Mean	.65		.65	

Source: Own Survey Computation, 2019, Note: CD=Cobb-Douglas, TL= Translog

From the table we can understand that there is no as such difference between the estimates of the two models. Specifically, they have the same mean values of technical efficiency i.e. 65%. While, the lower technical efficiency for Translog and Cobb-Douglas are 16% and 17 % respectively. On the other hand the maximum attainable efficiency level for the two groups are 93% and 92% respectively for Translog and Cobb-Douglas.

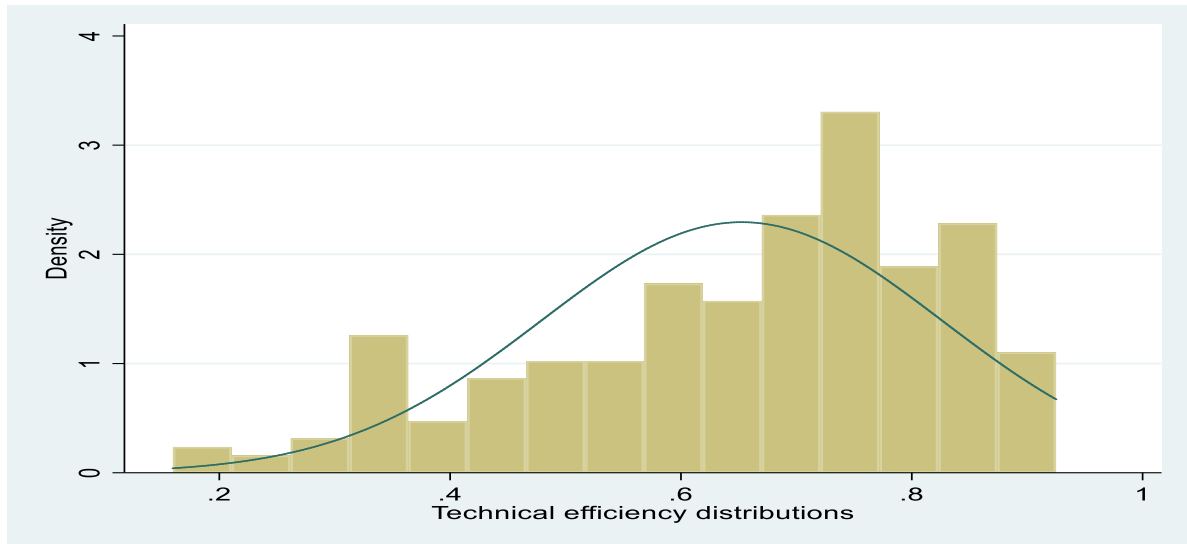


Figure 5.2: The Distributions of Technical Efficiencies from the Mean (Translog)

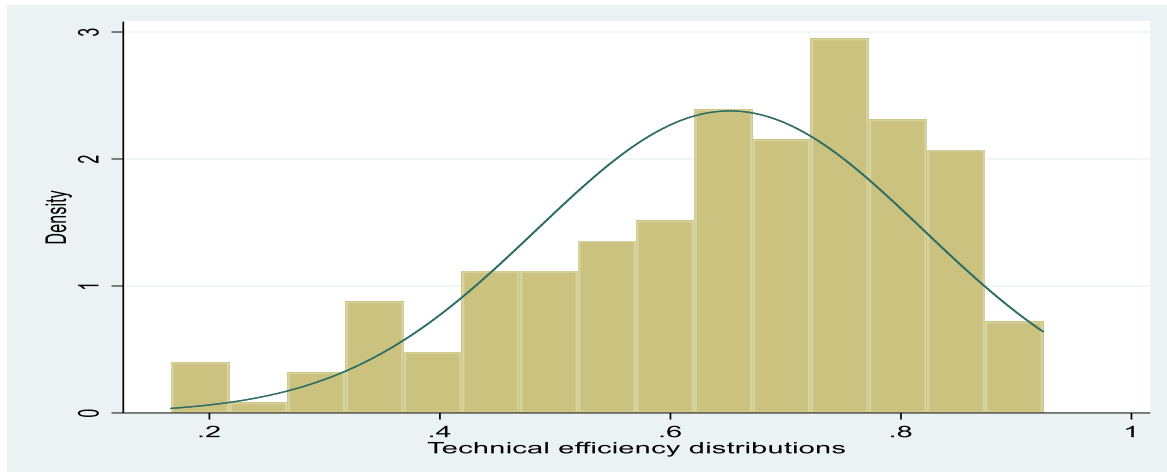


Figure 5.3: The Distributions of Technical Efficiencies from the Mean (Cobb-Douglas)

Once, previewing the descriptive statistics of the technical efficiency of the two models, now it will be appropriate to examine the effect of labour migration on technical efficiencies of the farm households in the study area. For this purpose, the translog estimation and its predicted value has been used due to the fact that we chose this model as explained above. Firstly, the t-test has been used to see technical mean efficiency difference between the two groups. As shown in the Table 5.11, there is no statistically significant mean difference between the two groups. However, it should be noted that t-test can't isolate the problems of self-selection or the skill differences among the migrants' and non-migrants' family.

Table 5. 11: Technical Mean Difference between Migrants and Non-Migrants Household

Variables	Migrants		Non- Migrants		T-value	Sig. level
	Mean	St.Dv	Mean	St.Dv		
Technical efficiency	0.66	.192	0.65	.162	-0.4663	0.6414 ^{NS}

Source: Own Survey Computation, NS non-significant

Thus, in the ensuing procedures the endogenous switching regression model as well as the propensity score matching method were executed that have the power to address problem of endogeneity and self-section problems.

Firstly, based on the Endogenous Switching Regression Model (ESRM) (see, Appendix ID model output) the effect of labour migration on technical efficiency achievements of the farm

households for the two groups were estimated. The results in Table 5.12 showed that the treatment effect on treated is negative though not quantitatively large (-0.014) and not statistically significant. However, the effect of labour migration for those who have no migrants showed positive and statistically significant effect on technical efficiency if they were in a position to send family members for labour income. The treatment effect on untreated (TU) is about 0.031 increment on technical efficiency had they have at least one migrant family member. Further, the transitional heterogeneity effect (TH) which is negative but not statistically significant that explains the effect of labour migration on the migrants is very low whereas for those of the non-migrants sending a family member is larger. On the other hand, the non-migrants if they send family members they can improve technical efficiencies through reducing the congested labour within a given small plots of land. Related with this, different studies showed mixed implication on technical efficiencies. Against this study, in Lesotho labour migration have showed positive effect on technical efficiency (Mochebelele and Winter, 2000). However, the study by Sauer, *et al.*, (2014) labour migration affected farm technical efficiency negatively, that shows agreement with our study though in our study we haven't got statistical significant effect. Generally, from the results of this study we can say that the impact of labour migration on the migrants' level of technical efficiency is not statistically significant implying no change due to migration of labour to technical efficiency. However, non-migrants can be benefited by sending family labour to improve technical efficiency.

Table 5.12: Average Expected Technical Efficiency, Treatment and Heterogeneity Effects (All Samples)

Subsamples	Decision stage		Treatment effect
	To Migrate	Not to Migrate	
Migrants	(a)y11= 0.642	(c)y22 = .657	TT=(a-c)= -0.014 ^{NS}
Non-Migrants	(d) y12 = 0.668	(b)y21= .585	TU (d-b)= 0.0831 ^{***}
Heterogeneity effect (BH_i)	BH ₁ = - 0.025*	BH ₂ = 0.0717 ^{***}	TH= - 0.0971 ^{NS}

Source: Own Survey Computation, NB: * & ** represents significant level at 1% & 5% respectively, NS=Not significant**

Similarly, the propensity score matching method also have been executed. Following the same procedure like we did above, the quality of each of the matching algorithm (Nearest-neighborhood 1 and 5, Kernel and Radius) were evaluated primary on the bases of mean bias reduction after matching. However, as shown in the Appendix IE (from Table d-f) all expect the nearest-neighborhood-5 and the radius (0.05) have poor quality result after matching which is above 14 %. While for the nearest-neighborhod-5 and Radius (0.05) the mean bias reduction relatively found to be better which is 12 % and 13 respectively. As shown in Table 5.13 below, the two matching algorithms have produced statistically non-significant result for both migrant and non-migrant households. Stated differently, according to this model output labour migration has no effect on technical efficiency. However, the result of the PSM model compared to the above ESRM is very poor due the above mentioned criterion. Thus, for the effect of labour migration on technical efficiency the endogenous switching regression model has been found to fit this data and therefore we trust the result of the ESRM based on the quality test. In line with this, it also argued that if one utilized different specification and finally found poor quality it may suggest the PSM may not be appropriate for the comparison of the two groups (Caliendo, 2018). Therefore, trusting the results of the ESRM can be better than PSM for this particular output.

Table 5. 13: Average Treatment Effect Based on PSM

Matching algorithm	Migrants' Household	Non-Migrants Household	ATT	ATU	Std. err	P-value
5-Nearest-neighborhood	.675	.647	.0280	-.0324	.03708	0.416 ^{NS}
Radius (0.05)	.667	.652	.0159	-.0268	.03768	0.887 ^{NS}

Source: Own Survey Computation, NB: NS refers non-significant

5.3 THE IMPACT OF MIGRATION ON CROP OUTPUT COMMERCIALIZATION

Theoretically, it is argued that to ignite the commercialization of smallholder producers' income is a prerequisite. Labour diversification in this regard could augment financial constraints and thereby improve market participation of the farm households. This was one of the research

question that this study have planned to clarify whether labour diversification had contributed for crop output supply to the market. Therefore, before examining the impact of labour migration on the crop output commercialization of the sending families, some descriptive analysis are presented as follow.

The Table 5.14 below shows the price for agricultural commodities produced in the three study districts. Based on the assessment made for each of local markets in the study area on average Teff can be sold nearly 20 birr per Kilogram during the survey period. However, it may also range in between 19 to 20 birr. While, the mean prices for sorghum, Maize, Millet and chickpea are 10, 12, 11, and 22 birr respectively. Some cash crops like sunflower red onion, garlic and black cumin are sold on average by 30, 10, 12, and 31 Ethiopia birr respectively.

Table 5. 14: Mean Prices for the Major Crops Produces in the Study Area

Variable	Mean	Min	Max
Teff	20.2987	19	22
Maize	9.875325	7	13
Sorghum	11.64545	10	13.5
Millet	10.53506	7.5	14.5
Chickpea	21.88961	20	24
Food barley	11.98701	11	13
Malt barley	14.11558	13.5	15
Wheat	16.17273	14.5	18
Lentil	36.08831	33.5	39
Black cumin	30.98182	30	31.5
Sunflower	29.55065	27.5	32
Vetch	10.88571	10	12
Red onion	9.901299	9.5	10
Garlic	12.41558	11.5	13
Fenugreek	22.64935	21.5	23.5
Red pepper	34.46753	33.5	36

Source: Own Survey Computation

The initial task in crop output commercialization study is to assess whether the farm household are participated in output market supply regardless of the amount of sale. In this regard, Teff producers have participated in output supply to marketing that accounts 54.60% from the total producers regardless of the amount of Teff goes to market. Similarly, from the total chickpea producers nearly 67 % of them brought some sort of chickpea produces in to market. However, rest of the crops as shown in Table 5.15 below, the larger share of the production are reserved for consumption or may be for loan repayment in kind or other purpose like gifts. For instance, more than 70 % of the producers of Maize, Sorghum, Millet, Food barley, and Red pepper are used for household consumption than taking it in to market.

Table 5.15: Crop Output Market Participation for the Main Crops Produced

Crops	Participated in marketing		Not participated	
	Freg.	Percent	Freg.	Percent
Teff	172	54.60	143	45.40
Maize	46	21.50	168	78.50
Chickpea	134	67.34	65	32.66
Wheat	5	29.41	12	70.59
Millet	14	9.40	135	90.60
Sorghum	41	19.16	173	80.84
Fenugreek	6	23.08	20	76.92
Vetch	37	39.78	56	60.22
Food barley	17	15.45	93	84.55

Source: Own Survey Computation. NB, frequencies are in the parenthesis

However, crop output market participation alone as an indicator of crop output commercialization may overestimate or underestimate our result. Therefore, crop output commercialization at farm household level has to be explained in terms of the share of total values of sale to the total values of agricultural commodities produced. At the same time, it should be also noted that the farm households could produce more than a single commodities. Due to this fact taking single crop alone could underestimate or overestimate the commercialization level of the farm households. Thus, in this section, the crop output

commercialization has been examined for each of the crops and the aggregate crop commercialization for dominantly produced crops during the survey period.

Crop output commercialization in this study understood as the percentage of the total crops sales value to the total values of crops produced in the given production season was calculated following (Govereh, *et al.*, 1999 and Kabiti, *et al.*, 2016). It should also be noted that local average market price has been used for all commodities. In the following Figure 5.4 crop commercialization indexes are for main crops presented in terms of the percentage share of total sale values to the total crops produced. The dominantly grown crops such Teff, Maize, chickpea and Sorghum have an index of 18 %, 12 %, 20% and 6 % respectively. On the other hand, some high value crops though produced by very limited farmers, found to have better level output market participation such as for Red onion, garlic, sunflower and black cumin.

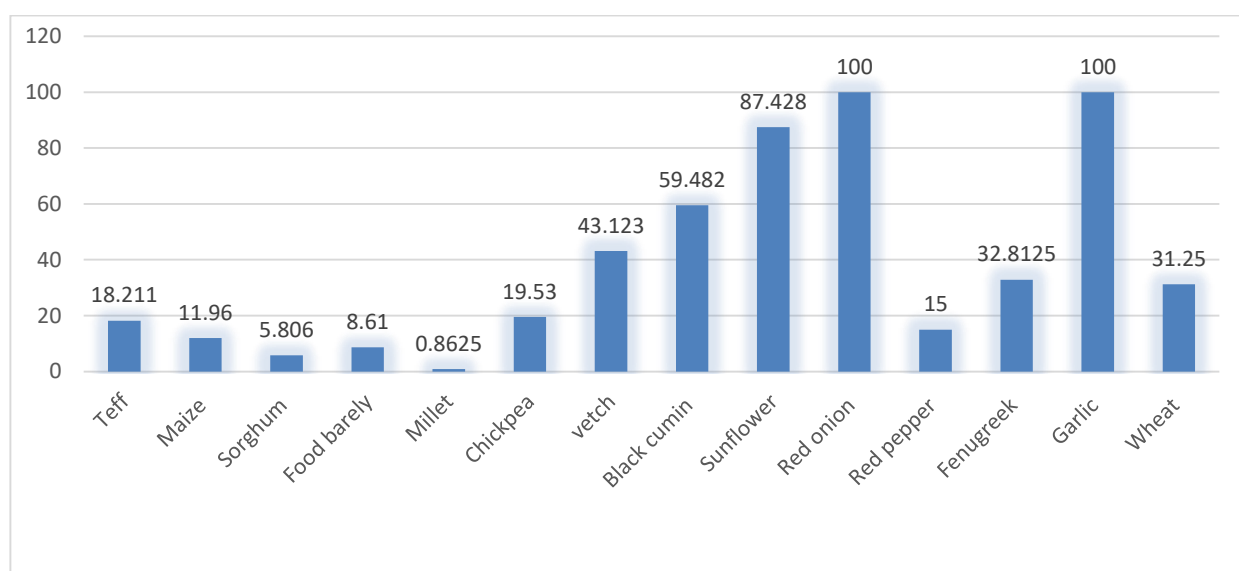


Figure 5.4: Disaggregated Crop Commercialization Index

The t-test also conducted at the start to see the existence of mean commercialization index difference between the two groups. As shown in Table 5.16 the two crops such as Maize and Sorghum found to be statistically significant at 5 % and 10 % significant level respectively. The Table further indicated that for Maize families with a migrants have 9 % higher commercialization index, while for Sorghum families with migrants have 4 % higher commercialization index. However, this descriptive analysis has showed no statistically significant mean difference the remaining major crops.

Table 5.16: Mean Comparison of Crop Commercialization for Major Crops in the Study Area

Crops	Migrants		Non- Migrants		T-value	Sig. level
	Mean	St.Dv	Mean	St.Dv		
Teff	17.14	23.75	19.16	29.81	0.5713 ^{NS}	0.5683
Maize	17.90	33.33	9.03	24.63	-2.0783 ^{**}	0.0390
Chickpea	20.57	16.51	19.93	21.00	-0.1635 ^{NS}	0.8704
Vetch	47.97	26.71	43.79	32.14	-0.3693 ^{NS}	0.7145
Sorghum	8.15	18.00	4.31	11.05	-1.6890 [*]	0.0931

Source: Own survey computation, NB: **, * are significant levels at 5 % and 10 % respectively, NS=Non-significant

While, the aggregate degree of crop output market participation in this study area is about 15.35% revealing low level of crop output commercialization. Studies in Ethiopia in different parts of the country also showed low level of commercialization that have agreement with this study. For instance in Tigray, commercialization of cereal crops found to be 15 %, (Gebreslassie *et al.*, 2015), in central Ethiopia it is about 22.4 % (Leykun and Jemma, 2014). Overall the level of crop commercialization which in this study equated with degree of crop output market participation is very low. Similarly, according to the study by (Birhanu and Jaleta, 2010), average crop output marketing index is in three districts such as Bure, Goma and Meiso is 20 %.

It is also very important to see the level of aggregate crop output commercialization for major crops produced in the study area. Accordingly, the level of overall crop commercialization in the study area, we found that all most the majority that accounts 78 % of the total respondents are under the category of subsistence level with a crop output market participation index less than 25 %. While, 16 % and 6 % of them are within the level of semi-commercial and commercial respectively (See Figure 5.5).

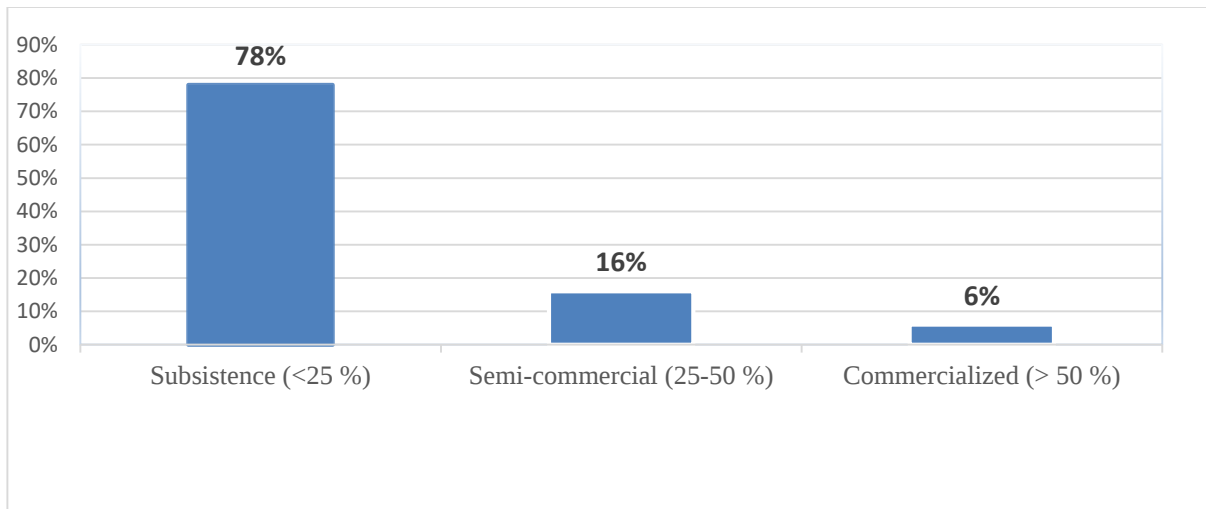


Figure 5.5: Level of Crop Output Commercialization

It is argued that in various studies low level of smallholder crop output commercialization in Ethiopia has attributed by multiple and different factors such as farm characteristics, market characteristics, transportation, adoption of improved technologies, ownership of radio, farming experience and land size (Asfaw, *et al.*, 2012; Asfaw, 2018;). From the survey result, we found that about 45 % of the respondents are also reported the marketing information is not improved or remained worse. Other studies also strongly argued that marketing information not only update farmers about the current selling price or the demand for the commodity; rather it also update them about the current agricultural technologies that enable farmers boost production and thereby influence low level of crop output commercialization positively (Justus, *et al.*, 2015).

At the same time, the distance to the nearest market place that forced them to travel about 2 hours on average and for some respondents about 4 hours for round trip also can be the additional burden to bring commodities in to market. In connection to this, one of the key informant interviewed at Azezo peri-urban market informs us that the cost of market access is still the big headache to sell his Teff. For instance to sell his 40 kg of Teff he had 1:30 hour of travel by foot to the main road to save 20 birr for Bajaj to the nearest local market known as Aymba. However, he chose to move in to Azezo peri-urban market paying additional 10 birr for himself and 20 birr for the 40 Kg Teff. Thus, for his transportation alone for round trip he will expected to pay 60 birr plus 20 birr for his Teff. This clearly informs that the cost of market

access is the other bottleneck for farmers attempt to sell their produces. Different studies are also empirically supports that cost of market access that is expressed in terms of distance to the nearest market are factors behind low level of crop output participation (Berhanu and Moti, 2012).

At the same time, according to (Poole, 2017) market access of the smallholder farmers is constrained by multiple factors of farm and household characteristics, external factors and at macro level the policy environment. The study also pointed out that among the farm and household characteristics education and farm size were mentioned as the main factor for market participation. In this study, all most the majority of the respondent that accounts 68 % of the surveyed household are under the category of no read and write revealing the low level education profile of the household that could play its negative effect on market participation. As the empirical work of (Poole, 2017) showed, this study also confirmed that small land size had attributed for low level of crop output participation in which as per this study the farm households total land size for 48 % of them is less than 1 hectare, 37 % of them owns between 1 – 1.5 hectares of land only very low proportion of them (18 percent) have land size above 1.5 hectares of land. On the top of that, one of the key informant in Dembia District, whose name is Teshager the local official in Senbet Debir strongly pointed out that the current security issue also had negative effect on farmers' crop output participation.

The central question in this section is to see the effect of labour migration on crop commercialization of the farm households. Thus, once the Household Output Commercialization Index (HOCI) is calculated the mean percentage commercialization index were compared between the two groups (migrants' and non-migrants' farm households). The results shown below in Table 5.17, revealed that the mean aggregate crop commercialization index in the study area is 15 % and 20 % respectively for non-migrants' and migrants family which is statistically significant at 10 % significant level ($p\text{-value}=0.0792$). From this result we can understand that families who have migrants' in the low land cash producing areas have higher commercialization index by 5 % level. At this point, though t-test can't have power to say about causation, however, the significant implication of labour migration in crop production as we found above can broadcast a message that migration could also positively affect farm households' tendency towards crop output sell out of consumption.

Table 5.17: Percentage Mean Difference of Commercialization Index for the Two Groups

Variables	Migrants		Non- Migrants		T-value	Sig. level
	Mean	St.Dv	Mean	St.Dv		
HOCI (%)	20.02	29.42	15.42	19.49	-1.7603*	0.0792

Source: Own survey computation

So far, we have presented some descriptive statistics about crop commercialization. Now, once we have the index, we will examine the effect of labour migration on the crop commercialization level of the two groups. As we initially proposed, we used the PSM model following the important procedures to estimate treatment effect on the treated and untreated groups. The common support region has already confirmed above. The quality of matching for each algorithm as we did so far were tested and the Kernel and Radius are still preferable than the nearest neighborhood matching method²⁶.

Based, the propensity score matching model, we have obtained the same result from the Kernel and radius matching algorithm. Table 5.18 showed that for migrants' family the effect of labour migration is positive and statistically significant at 1% and 5 % significance level for kernel and radius respectively. However, the magnitude of impact is nearly 6.5 % for the two methods implying the same estimation. Similarly, the effect of labour migration for non-migrant families is positive and statistically significant. The model output tells that, had the non-migrants migrated the crop commercialization level would be higher by nearly 3 %. Therefore, at this moment we can say that the impact of labour migration for both groups is positive and statistically significant.

²⁶ The quality test for Kernel^a has showed a significant decline in the R-square, LR X^2 , and the standardized mean bias reduction is moved from 46.9 before matching in to 5.4 after matching which is an indicator of good quality. While for radius (0.02) the standardized mean bias reduction reduced in to 4.2 which is another good matching method for treatment effect estimation. It should be also noted that other matching techniques not presented here because of their poor quality. (you can also see Appendix IE (Table a-c) for the remaining test)

Table 5.18: Average Treatment Effect Based On PSM

Matching algorithm	Migrants' Household	Non- Migrants Household	ATT	ATU	Std. err	P-value
Kernel^a	17.99	11.46	6.53	2.71	3.7559	0.005***
Radius	17.96	11.39	6.57	2.55	4.350	0.046**

Source: Own Survey Computation. NB: Kernel and Radius (caliper =0.02) were estimated based on psmatch2 stata command. a refers bandwidth=0.03. The standard errors are estimated using bootstrap with 100 replications

From this result we can say that labour migration income has improved crop productivity as we have seen in the preceding results. Different empirical studies have also found the significant effect of crop production on the crop output commercialization (Birhanu and Jaleta, 2010; Gebreslassie *et al.*, 2015). On the top of that migration income also can improve the entire consumption of production and as a result could support them to sell part of the production in to market. As we presented at the fourth chapter one of the contribution of remittance is to repay the loans used for agricultural inputs to improve agricultural production. Due to this synergies, improvement in production could improve farmers' tendency towards commercialization.

To make sure that if improvements in crop production have brought effect on crop output sale, the Seemingly Unrelated Regression (SUR, hereafter) model recruited that has the quality of examining the interdependency of the two variables. The SUR model is equipped with the quality of efficiency of the estimation of two different equations (Zellner, 1962). Different empirical studies have implemented the SUR model aimed at observing the interdependency two seemingly unrelated equations (Degye, *et al.*, 2013; Sisay, *et al.*, 2016). In this particular, objective, from the result of the seemingly unrelated regression model we confirmed positive interdependence between crop production and crop output sale in which the correlation of the residuals of the two equation found to be 0.403 with the value of Breusch-Pagan test of independence: $\chi^2(1) = 43.965$, $Pr = 0.0000$, which is statistically significant at 1 % level (See Table 5.19 below). Whereas, 40 % and 34 % of the variations of the crop out values and crop values sold are respectively explained by the seemingly unrelated regression model.

The message here is anything that happened positively for crop production have positive interdependence between crop market output sales. Apart from our impact evaluation of migration on crop output commercialization, the positive impact of labour migration on production also strengthen our finding in which improving crop production can be translated in to market participation.

Table 5.19: Simultaneous Estimation of Production and Market Participation

Variables	Coefficients	
	Lnout_val	Lnsold_val
Sex	.122***	.393***
Experience	-.060***	.0151
Sq_experience	0.0008	-.0001
Active	0.0418	-.0200
Land	.540***	.6005***
Tlu	.0065	-.0060
Mobile	.091	.3067***
Extension	.493***	.3722***
Seed	.00036***	
Supincome		-.165
Distance		-.00112
_const	9.318	6.652
R ²	40 %	33.6 %
Correlation matrix of residuals		
	Lnout_val	Lnsold_val
Lnout_val	1	
Lnsold_val	0.4035	1
Breush-pagan test of independence, Chi2(1)=43.965***		

Source: Own survey computation

The study conducted in three different countries such as Tanzania, Guatemala and Vietnam also strongly supported the result of this study in which improvement in agricultural production have found to have positive impact on market participation regardless of the market access constraints (Rios, et al., 2008).

CHAPTER SIX

6. RURAL TO RURAL MIGRATION AND ASSET POSSESSION

6.1 DESCRIPTIVE ANALYSIS OF ASSET POSSESSION

Under this section, to respond for the question whether migration have effect on asset possession, firstly the descriptive analysis are presented to quantitatively show the difference existed between migrants' household and non-migrants household. In rural areas, the major productive resources or assets are land, livestock and farm implements. Since these variables are continuous, the t-test analysis is appropriate to see the mean difference between the two groups. As shown in the Table 6.1 below, except for possession of honey beehive which is not significant, the remaining showed statistical significant mean difference between the migrants' and non-migrants' household. That means, migrants' family have higher mean value for land possession, values of farm implements (including oxen) and the tropical livestock unit at less than 1 % statistical significance level. This could inform that remittances could be translated in to assets like livestock possession, land rental and purchase of necessary farm implements, if we control for other observable characteristics of the two groups.

Table 6.1: Mean Difference for Continuous Asset Possession Indicators

Variables	Migrants		Non- Migrants		T-value	Sig. level
	Mean	St.Dv	Mean	St.Dv		
Land (hectare)	1.315	.0776	1.043	.0388	-3.4923***	0.0005
Farm implements	16129.48	2872.922	10285.05	616.8663	-2.7678***	0.0059
Tropical Livestock Unit	3.537	.198	2.887	.132	-2.7130***	0.0070
Beehive (Number)	.152	.0597	.171	.0378	0.2788 ^{NS}	0.7805
Chairs (Number)	3.517	.1412	2.354	.0650	-8.5795***	0.0000
Bedrooms (Number)	1.812	.104	1.307	.0350	-5.8180***	0.0000

Source: Own Survey Computation NB: *** represents significant level at 1% & NS=Not significant

To augment the quantitative result with qualitative results, an attempt has been made through a focused group discussion, notably the implication of labour migration on livestock possession. The focused group discussion conducted in Dembia District witnessed that mainly the one who have single or no oxen usually will buy oxen borrowing money from others and then will return it upon his return from migration to origin area. The participants also explained some young family members upon their return are participated in animal husbandry and fattening. Thus, the significant result of livestock possession for migrants can be convincing as there are tradition of buying animals after migration from Metema and other labour migration destinations.

Similarly, in Dembia districts (Senbet Debir Kebele) I have asked the development agent whose name is Jemal about the significance of rural-rural migration for asset possession to the sending families. Jemal didn't denied the two side effects of migration to the lowland commercial agriculture at the beginning. In one hand, he amazingly replied on the positive contribution of the remittance income through which families are engaged in animal fattening activities. On the other hand, he also stressed on some challenges associated with the destination such as disease, conflicts and thefts. Despite these, Jemal has no reservation on the significant contribution of labour income from the lowland to improve the asset of the sending families.

At the same time, in the above Table for the two asset indicators i.e. number of chairs and number of bedrooms, the t-test for mean difference showed statistically significant at less than 1% significance level. This tells, migrants' family have good possession than non-migrants' family witnessing the implication of rural labour migration on asset improvements specifically on the above mentioned assets. However, at this stage the results of the t-test should be interpreted cautiously as it merely inform about mean difference rather than causation.

On the other hand, for dummy variables chi-square test has been implemented to see percentage differences between the migrants' and non-migrants' family in terms of consumer durables. In this regard, as shown in Table 6.2, the chi-square test for Housing cover (Tin cover), use of solar energy for light, access to private toilet and possession of radio were not statistically significant. However, there is significant percentage difference in terms of having separate kitchen. For this specific variable, having separate kitchen accounts 39.29 % and 16.34% for migrants and non-migrants' household respectively at less than 1 % significant level. This

implies that families with a migrant are in a better position to have separate kitchen for cooking and related activities that could arise due to labour migration income.

Table 6.2: Chi-Square Test for Discrete Variables

Variables		Migrants Family N =112		Non-Family N =257		Chi-square Value	Sig. level
		Number	Percent	Number	Percent		
Housing roof (Tin cover)	Yes	102	91.07	226	87.93	0.7756 ^{NS}	0.378
	No	10	8.93	31	12.06		
Light (Solar)	Yes	38	33.92	66	25.68	2.6215 ^{NS}	0.105
	No	74	66.08	191	74.32		
Separate Kitchen	Yes	44	39.29	42	16.34	22.9723 ^{***}	0.000
	No	68	60.71	215	83.66		
Private toilet	Yes	65	58.04	148	57.59	0.0064 ^{NS}	0.936
	No	47	41.96	109	42.41		
Radio	Yes	22	19.64	50	19.46	0.0017 ^{NS}	0.967
	No		80.36	207	80.54		
		90					

Source: Own Survey Computation, 2019. *** represents significance level at 1 % and NS represents Not-significant



Focused group Discussion at Dembia 5/19/2018, 8:55 am (Koladiba)

6.2 THE IMPACT OF RURAL-RURAL MIGRATION ON OVERALL ASSET

For the establishment of composite asset index on the bases of multiple asset indicators, in the first place it requires to identify the important variables to be included in the analysis. In this regard, the descriptive statistics were executed to examine the density or frequency of the possession for each item and the presence of missing values. However, since these study is carried out with first hand cross-sectional survey, preliminary inspection has been made to circumvent the problems of missing values. At the same time, based on descriptive statistics the suitability of each of the asset indicators were assessed. According to Vyas and Kumaranayake, (2006) any asset indicator that everybody owns and that everybody doesn't possess can't be the true overall asset indicator. The same approaches also employed by

Emorine, *et al.*, (2014:13) to focus on indicators that can have sufficient information. Based on this, from the total 32 composite asset indicators, some variables that virtually all possessed like wall made up of wood and mud (91%) and those very few possessed like animal cart, irrigation generator, weaving equipment and ventilator, sewing machine as well as nobody possessed are bicycle, DVD player, electrical stove, motor bicycle, television and ventilator are excluded from the computation of asset index. Specifically, the exclusion of these variables such as DVD player, electric stove, television, satellite dish is relevant not only because of low possession rather the differences in accessibility also can distort the comparison of households across different districts.

At this point it should be also clear that the variables were re-coded to fit for the analysis of multiple correspondence analysis (MCA) that best works with binary variables. For all continuous variables since we don't have prior standard classification the mean used to categorize higher and lower. These variables were tropical livestock unit, number of bedrooms, number of chairs, number of formal education and land size. Variables that were initially binary were kept the same. While, some variables initially coded as ordinal were recoded as binary on the bases of the quality of the asset that farm households are reported, for instance, the farm household that reported wall material with cement or bricks were coded as one, while for grass or mud type coded as zero.

Table 6.3: Descriptive Statistics for All Asset Indicators

Indicators	Mean (%)
Roof Material	87.01
Wall Material	2.07
Sources of light	23.9
Latrine type	56.10
Water sources	53.25
Number of bed rooms	35.84
Separate kitchen	22.59
Number of chair	50.90
Radio	19.48
Remittance	21.56

Bank account	47.01
Tropical livestock unit	48.31
Family in formal education	37.66
Head literacy status	31.94
Member in religious	51.42
Participation in traditional association	51.43
Member in cooperatives	15.32
Participation Rural youth association	9.09
Land size	43.89
Beehive	8.05
Television	0
Satellite dish	0.25
Mobile phone	26.75
Bicycle	0
DVD player	0
Electric stove	0
Ventilator	0.26
Sewing machine	0
Motor bicycle	0
Animal cart	3.11
Irrigation generator	2.33
Weaving equipment	3.12

Source: Own survey Computation

Before the variables fine-tuned, the first MCA with a total of 24 asset indicators had a result with 39.91 % explanatory power of the first axis. However, once the variables with very low density and the non-FAOC (first axis ordering consistency) property are excluded the explanatory power of the first axis has increased to 51.45 %. In the other word, with the refined one first dimension can tell about 51.45 % of the variability in the overall asset possession. At the same time, to be in line with the principle of monotonicity we multiplied all the coordinates by -1 following (Greenacre, 2007; Greenacre, 2017). Once we make sure that the requirements

are fulfilled, we generated the composite asset index for the refined 20 asset indicators as listed in Table 6.4 below.

Table 6. 4: List of Final Asset Indicators Used for Composite Asset Index Development

Asset indicators	Asset type
1. Roof Material	Physical asset
2. Sources of light	Physical asset
3. Latrine type	Physical Asset
4. Water sources	Human capital
5. Number of bed rooms	Physical asset
6. Separate kitchen	Physical asset
7. Number of chair	Physical capital
8. Radio	Physical capital
9. Remittance	Financial asset
10. Bank account	Financial asset
11. Tropical livestock unit	Financial asset
12. Family in formal education	Human capital
13. Head literacy status	Human Capital
14. Member in religious	Social Capital
15. Participation in traditional association	Social Capital
16. Member in cooperatives	Financial capital
17. Participation Rural youth association	Social capital
18. Land size	Natural capital
19. Beehive	Natural capital
20. Mobile phone	Physical capital

The final index has been standardized and presented as follow in terms of percentage. From the pie chart below (Figure 6.1), the larger share which accounts nearly 80 % of the survey respondents have composite asset index within the range of 0-50%. Only very small proportion of the respondents have an index of higher than 50 % asset index established from the above

list of eligible variables. This figure has clear message that the composite asset ownership in study area is very low in terms of the above mentioned 20 asset indicators.

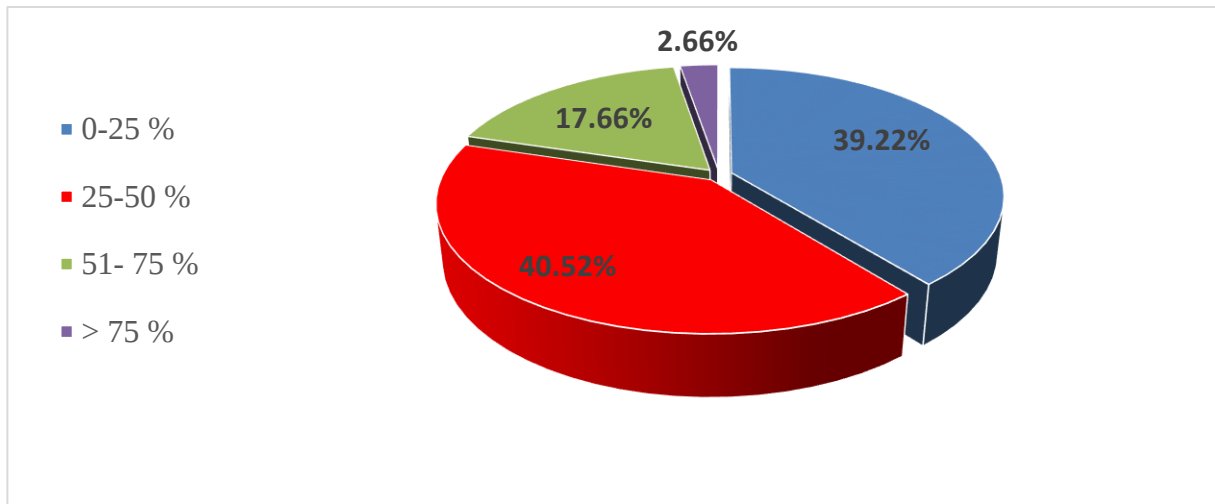


Figure 6.1: Percentage Distribution of the Composite Asset Index Level

To execute the PSM, we followed the same procedure as we have seen the previous pages. To estimate the propensity scores the logit model has been used. Once, the logit model estimated the common support has been checked as shown in the figure below there are good overlaps between the treated and non-treated groups in terms of the observable characteristics that can be good starting point to estimate the impact of migration on composite asset possession.

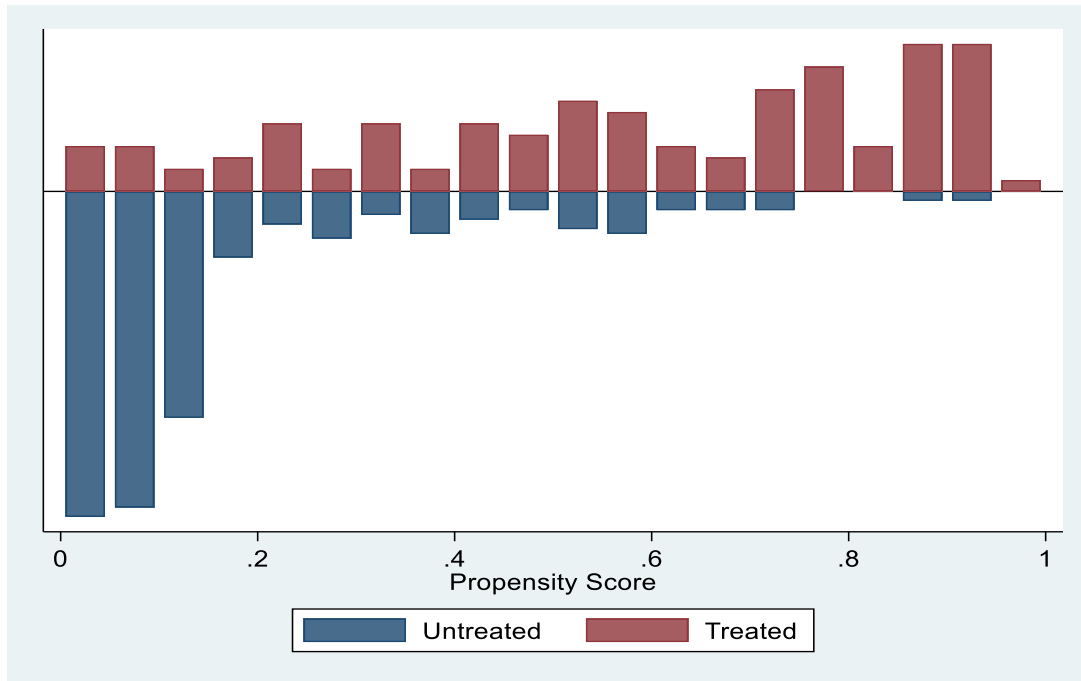


Figure 6.2: Common Support Region between the Migrants' and Non-Migrants

At the same time, ahead of estimating the treatment effect, as we did above the matching quality also tested. Then on the bases of the quality of the matching for the three matching algorithms (Nearest-Neighborhood, Kernel and Radius Methods); the best will be used for interpretation. As shown in Table 6.5 below, the matching quality test both the Kernel and the radius matching algorithms are relatively good estimators compared to the two nearest neighborhood methods. This is mainly due the fact that the two matching techniques (Kernel (0.03) and radius (0.02)) have showed consistent decline of the values of Pseudo R², LR X², p-value, and the mean standardized bias reduction. For instance for kernel (0.03) the standardized mean bias reduction is from 47.0 to 5.4 and for radius (0.02) from 47.0 to 4.2 after matching. Thus, our treatment effect estimation results entirely has depended on the two matching algorithms.

Table 6.5: Matching Quality Test: Balancing Property

Test for	Before	After matching (algorithms)				
	matching	1- Nearest- neighborhood	5-Nearest- neighborhood	Kernel ^a	Kernel ^b	Radius
Pseudo R2	0.355	0.067	0.020	0.009	0.027	0.006
LR X^2	160.86	18.69	5.66	2.09	7.16	1.38
p-value	0.000	0.067	0.895	0.998	0.786	1.000
Mean	47.0	18.1	8.2	5.4	12.5	4.2
standardized bias						
Median bias	33.4	18.6	8.0	4.1	12.3	3.4

Source: Own Survey Computation. NB: Nearest neighbors, Kernel and Radius (caliper =0.02) were estimated based on psmatch2 stata command. a and b are the kernel with bandwidth=0.03 and 0.06 respectively.

Based the above matching quality test we will interpret the results of two matching methods. As shown in Table 6.6 both for Kernel (0.03) and Radius (0.02) method, the average treatment effect on treated is positive and statistically significant at 10 % significance level. On average the effect of labour migration on the composite asset index on migrants' family is about 8 %. Similarly the result from the radius (0.02) is about 8.5 %. While, the average treatment effect on the untreated (non-migrants) is also positive and statistically significant for the two selected matching methods. For both Kernel (0.03) and Radius (0.02) the average effect of labour migration for non-migrants will be 1.4 % and 2.4 % increment on the composite asset index respectively.

From this result we found that labour migration in the study area on average has been found to have positive and statistically significant impact on the overall asset possession of both migrants' family and non-migrants had they migrated. From the Table difference of treatment effect between the migrants and non-migrants can be linked with the heterogeneities in the sample or the inherent characteristics of the two groups (Akroush *et al.*, 2015).

Table 6. 6: Average Treatment Effect Based on PSM

Matching algorithm	Migrants' Household	Non- Migrants Household	ATT	ATU	Std. err	P-value
1-Nearest- neighborhood	.3714	.339	.0321	.0150	.05078	0.497 ^{NS}
5-Nearest- neighborhood	.3714	.324	.0468	.0127	.03507	0.233 ^{NS}
Kernel^a	.3744	.2948	.07959	.0137	.04066	0.050 [*]
Kernel^b	.37576	.3206	.05515	.01096	.03912	0.159 ^{NS}
Radius	.37139	.28614	.08525	.02444	.04392	0.052 [*]

Source: Own Survey Computation. NB: Nearest neighbors, Kernel and Radius (caliper =0.02) were estimated based on psmatch2 stata command. a and b are the kernel with bandwidth=0.03 and 0.06 respectively. The standard errors are estimated using bootstrap with 100 replications

In connection to this, different studies have been reviewed with regard to the asset implication of migration in different countries including Ethiopia. For instance the study by Anupama, *et al.*, (2016) in India has showed positive effect of seasonal labour migration on asset possession that can be explained in terms of agricultural land, livestock, and housing and consumer durables too. Similarly in Nepal, seasonal migration has been found to have positive change in almost in financial, social, physical, natural and human assets based on simple descriptive analysis for whether livelihood has improved or declined. (Sapkota, 2018). While the study in Ethiopia by Woldie, *et al.*, (2010) also have found the same result in which seasonal labour migration found to be a means to capitalize on asset possession of the household through the construction of corrugated iron houses, buying oxen and other consumer goods. There are also studies that further substantiate the significant positive impact of short term migration on improving livelihood assets in North Western part of Ethiopia (Atsede, 2018). This study additionally stressed on how short term migrants can influence the contribution of remittance income on investment in new business and viewed it as avenue for sustainable livelihood improvement (Ibid).

Almost the majority of previous studies reviewed has witnessed the positive effect of labour migration and agreement with this study despite the fact that those studies doesn't take in to consideration the endogeneity and sample selection problems in their assessment. Thus, in this study we can say that labour migration to the low land cash producing area has positive implication on the livelihood improvements family. However, the conclusion should be cautiously interpreted for the result of the PSM as mainly infer based on observable characteristics for the two groups.

CHAPTER SEVEN

7. CONCLUSIONS, THE WAY FORWARD AND AREAS FOR FURTHER STUDY

In this sub-section, firstly, brief summary of the results of all chapters were presented. Then on the bases of the finding the conclusions drawn are followed and the respective recommendations are also presented.

7.1 SUMMARY AND CONCLUSIONS

To transform the agriculture sector; it demands to invest on smallholder producers so that they can integrate in both input and output market. The government of Ethiopia has prioritized smallholder commercialization as a basis to transform agriculture and the overall economy of the country under its Growth and Transformation Plan (GTP I and II). However, in developing countries like Ethiopia, where low level of credit facilities and poor institutional arrangements are installed, adoption of productive agricultural technologies and input utilization is meager. Thus, among the various alternative livelihood diversification strategies for poor farmers; migration is the one which helps to bridge the financial gap and input requirements of the rural farmers and ‘asset accumulation’ and there is wider recognition for labour and migration as complimentary path-ways out of rural poverty.

In this study, there was an argument that labour migration is one of the livelihood strategy for rural farm households, however, had been limited in many studies only to rural to urban migration and the international migration. Studies are ample concerning migration and development, notably in international migration and rural-urban migration. However, the emphasis for rural-rural migration has been given very low attention in the development discourses in the context of poor countries. At the same time, previous studies fail to recognize the need to see the synergies existed within the agricultural economy itself given its heterogeneous agro-ecological and diverse production potential and thus, rural–rural migration remained ignored; thereby rural to rural migration has been seen buried in migration studies. On the top of that, there are still studies that pointed for the need to delve deeper on the impact of migration on agricultural and rural development. Despite these facts, no or limited rigorous

studies have been conducted linking the two agricultural activities of the smallholder production and the large scale commercial agriculture; notably, its implication on agricultural production, smallholder commercialization and welfare effect. In this study also, there is a recognition for the dynamic effects of labour migration that questions the development general conclusions. Thus, conducting site specific research has been seen relevant to come up with location specific research outputs and to generate site specific implication of migration.

The study have been conducted in North-Western part of Ethiopia, in North Gondar zone representing three agro-ecological zones. From these three Districts a total of 385 samples have been taken for the entire quantitative analysis. At the same time, three focused group discussions, Key Informant Interviews and observations have been conducted to substantiate the results of the quantitative outputs.

Different methods of analysis were employed for different objectives. Mainly models that control of sample selection and endogeneity problem such as Endogenous Switching Regression Model and Propensity Score Matching were employed. On the other hand the Seemingly Unrelated Regression model (SUR) was employed to see the interdependence between crop production and crop output commercialization.

Coming to the juice of the study, firstly, as presented in chapter four rural to rural migration and its peculiar features have been characterized. From the study we came to understand that rural-rural migration which is operationalized as having at least one family member migrant to other rural areas for the purpose of labour work or farming accounted 29 % of the total surveyed households. It is also recognized that the migration is predominantly underway by male labour workers and farmers. Moreover, in this research the flow of labour migration status found to have slight variations from district to district inferring location specific nature of the migration decision. In this case, Wogera and West-Belesa Districts found to be the areas where labour migration accounts 34.36 % and 27.52 % respectively. Thus, the former is even higher than the average rate of the study area. The main labour hosting activities in the destination area that accommodates the larger labour share are weeding and sesame harvest. However, there are also land clearing, plowing and livestock keeping that follows the above mentioned employment options. The study also examined the income amount to be generated from each of labour employment options. As per the respondents the prime motive to migrate in the study area is

due higher income opportunities which is higher than the origin. For instance, weeding alone can earn the labour migrants on average 1320 birr per hectare. However, to the maximum the migrant also can earn 2000 birr per hectare. Similarly, for sesame harvest, the casual labour worker can earn on average 82 birr per hilla (400 handful sesame cut), but also could go up to 150 birr per hilla.

The motives behind rural-rural migration from the viewpoints of socioeconomic and other related factors were also investigated employing binary logit model. The result indicated that having larger active labour in the family, positive perception of higher income of the destination, social network and being a female household head are the major factors that determine migration decision at household level positively. Only, one variable that is participation in social affairs found to affect migration negatively. Moreover, study also identified the major challenges from the labour workers, farmers and investors side from different views.

Secondly, the fifth chapter of this study was entirely focused on the interplay between labour migration, crop production and commercialization. In connection to this, for impact evaluation, appropriate econometrics models such as Endogenous Switching Regression Model (ESRM) and Propensity Score Matching Models (PSM) were executive for these objectives. Based on the result of the ESRM we found that families with labour migrants have improved crop productivity by an equivalent of 2.35 Quintal of Teff (or 4787.77 Birr) due to the fact that migration income have positively affected input requirements of the farm households. On contrary the same model revealed that sending families would have negative impact, if the non-migrants send family members. However, from this study, the impact of migration on efficiency has been found statistically insignificant for migrants' family. Under the same chapter, this study found the positive impact of labour migration on crop output commercialization which is also further strengthened through seemingly unrelated regression model to see the interdependence between production and commercialization. The last chapter also articulated the impact of labour migration and asset possession. The Propensity Score Matching Model found positive impact of migration on asset endowment. On the bases of the above major findings the following conclusions were drawn.

- This study first and foremost came to understand that in the discourses of migration studies, much has been stressed on the international migration. Though there are attempts in domestic migration, virtually all studies skewed towards the rural to urban migration which ignored the important phenomenon of rural to rural migration in areas where agricultural productivities are highly heterogeneous.
- Consequently, this study came to recognize that rural to rural labour migration is the dominant livelihood strategy for the highland farming households that supplements the origin agricultural production. In relation to this, such type of labour migration found to host large number of labour with attractive income that is better than the origin labour income. At the same time, there are also guest based labour works in Sudan large scale farming areas following its proximity to the labour workers.
- Secondly, in this study we can conclude that migration is not a random phenomenon, rather it is based on costs and benefit analysis conducted at household level. Thus, the study supports the theoretical arguments of the New Economics of Labour Migration (NELM) in which migration decision is done at household level weighting what can be attained to the household and what losses can be accrued to the family. Sometimes such type of migration also viewed as labour division among the household to collaborate and improve livelihood (Tacoli, 2011) and thus regarded as a family strategy than individual decision (Azam and Gubert, 2006; King, 2012). On the top of that, though the combination of both pull and push factors are acknowledged as driving force behind migration. However, the pull factor has been found to be the powerful drive due to higher labour income, opportunity to access land in terms of sharecropping and land renting, as well as the guest based seasonal labour employment option in Sudan large scale farming areas too.
- The synergy of the of the two rural economies, the one that has huge labour and the other which has the capacity of accommodating huge labour with lucrative cash income found to have positive impact on agricultural productivity in terms of using improved inputs (such as high yielding seed varieties and fertilizer). The study also concludes that migration can be one of the strategy to solve the financial constraints through either direct remittance or

through means of collateral for money borrowing. This study also concluded that labour migration have no significant impact on the technical efficiency of the migrant families. However, non-migrant families had they send a family member can take advantage of improving technical efficiency through reducing the congested labour in their small farm size.

- Currently, there are wider applauds for smallholder crop output commercialization as an avenue to shift the livelihood of the poor and transform the rural economy. The Ethiopian government has given priority for smallholder commercialization under its broader development plans and strategies to improve the crop output participation of the farm households. Much efforts have been done so far in terms of improved varieties dissemination, the use of fertilizer and credit facilities. However, still, income improvement and financial constraints are the main bottlenecks that constrained the use of agricultural productivity enhancing technologies and thereby the tendency of commercialization. In this study, labour migration as strategy of income diversification has been proved to circumvent the financial constraint and improve the farmers' tendency towards crop output commercialization. On the top of that, the study also confirmed that what happed on crop production has strong interdependence with crop output commercialization. Thus, the impact of labour migration can transcend from production improvement to positively pushing farmers tendency towards commercialization of crop production.
- Despite these facts, however, the existing level of crop output commercialization in the study area is very low. Multiple factors such as farm and household characteristics that are manifested in terms of low level of education and small land size; cost of market access due to long distance by foot travel and higher price of transportation, and low level marketing information. Recently, the study also recognized the state of security has put much burden on the mobility of agricultural crops from one location to the other.
- The migration of family labour for the purpose of labour work or farming has been found to have positive impact of the multi-dimension asset indicators that generically explained in terms of human, social, physical, financial and natural capital. Methodologically, the

study came to understand that descriptive analysis alone couldn't meticulously examine the impact on asset unless tools that control self-selection and endogeneity problem are employed.

- Lastly, probably the most important conclusion in this study is, this: This study brings an alternative option for agricultural and rural development improvements through the synergy of the heterogeneous rural economics via rural to rural migration in areas where opportunities are higher like the current studies, apart from the dominantly rural to urban migration. Thus, the former type of migration can be one means of livelihood improvement in countries where urban economy is proliferated with huge unemployment, lack of job opportunities and non-existence of job for rural labour skill.

7.2 THE WAY FORWARD

As a way forward, this study points the need to examine the synergies that existed within the rural economy itself and also rethink the implication of rural-rural migration how it reinforces each other for the success of rural development. For its success, it should be accompanied by better media exposure and labour sensitization activities that could give direction on where and when to go for labour work to create win-win synergies between the sending and the hosting areas at micro-level. At the same time, such type of labour migration for work and farming activity has to be regulated to maintain fair prices for the cost of transportation during the pick time of the season. It is also important both the government body and private investors to jointly facilitate the transportation during the pick times of labour demand in the destination.

These days the social and labour affairs are established at district level. Therefore, though this structure is the recent establishment; it can play an important role through mediating the two parties (the labour workers and the investors) in the low land through formal agreements so that win-win situations can be established. This can have double benefits in one hand improving the productivity of the commercial agriculture and on the other hand creating decent work for labour workers.

Moreover, this office in collaboration with regional and national bodies should play the central role to exploit the labour demand opportunities that existed in Sudan large scale farming through well-managed and formally established institutions.

Labour migration has been found to be one of the strategy through which low level of income is augmented and therefore, this demographic phenomenon (rural-rural migration) should be mainstreamed into development policies, strategies and plans at various levels. For this effect, clear policy direction should be put in place so that appropriate interventions at various level can be install to exploit the synergies of diversified potentials of the rural economy.

At the same time, to further strengthen the contribution of labour migration on crop production and crop output commercialization important enabling activities of both the production and marketing access constraints has to be improved. Notably, the marketing information through marketing extension, improvements in infrastructure, improving the productivity of land, and maintaining peace and order both at national, regional and local level should stressed by the concerned bodies at all level.

Academicicians, policy makers and practitioners at different level should view that migration has heterogeneous impact for different setting. This study, suggested that in situations where rural-urban migration is less productive, the rural-rural migration can be effective. Thus, it is important to re-consider urban biased approaches of viewing rural to urban migration as means of rural transformation and to rethink the ways how the interaction within rural economy can bring synergetic effects on both sides.

Finally, this study also recommends better data management and repository of the different patterns of migration, notably seasonal labour migration for different purpose which in one or the other way have very relevant contribution for further study and development implication.

7.3 AREAS FOR FURTHER STUDY

This study primarily had its focus on the rural to rural migration and its implication on the origin household. Since migration has multi-faced characteristics; studying the origin side alone couldn't preview the whole faces of migration. Therefore this study has crystalized the following research areas for further investigation:

- Firstly, as mentioned earlier, what happed to the destination in terms of different characteristics should be investigated to have balanced view of rural-rural migration. In similar vein, apart from taking migration and its impact at household level, other studies have the room to study on individual migrants who are landless.
- Secondly, from methodological perspective, this study mainly employed cross-sectional survey. However, such kind of studies can be further improved through panel data. In connection to this efforts should be made to document longitudinal data on internal migration, notably rural to rural migration.
- Thirdly, this study was conducted in North-Western part of Ethiopia. In recognition to the positive impact of this location specific study; we encourage studies to be conducted with similar characteristics of migration in the other parts of the country so that the full picture of rural to rural migration can be comprehended.

8. REFERENCES

- Abafita, J., Atkinson, J. and Kim, C. (2016). Smallholder Commercialization in Ethiopia: Market Orientation and Participation. *International Food Research Journal* 23(4): 1797-1807
- Abebe Shimeles (2010). Migration Patterns, Trends and Policy Issues in Africa. Working Papers Series N° 119, African Development Bank, Tunis, Tunisia.
- Ackah Charles and Medvedev Denis (2010). Internal Migration in Ghana: Determinants and Welfare Impacts. Paper prepared as a background paper for the 2010 World Bank Ghana Poverty Assessment.
- Agwu, N.M. Anyanwu C.I. and Mendie E.I. (2013). Socio-Economic Determinants of Commercialization among Smallholder Farmers in Abia State, Nigeria. Paper presented at the 4th International Conference of the African Association of Agricultural Economists, September 22-25, 2013, Hammamet, Tunisia.
- Ahmed Al-Feel, Abdul Razig (2009). Economic efficiency of wheat production in Gezira scheme, Sudan. *Journal of the Saudi Society of Agricultural Sciences*, 11, 1–5
- Ahmed, B., Haji, J., & Geta, E. (2013). Analysis of farm households' technical efficiency in production of smallholder farmers: The case of Girawa district, Ethiopia. *American-Eurasian Journal of Agricultural & Environmental Sciences*, 13(12), 1615-1621.
- Ajay S Singh and Micah B Masuku (2014). Sampling techniques & determination of sample size in applied statistics research: An overview. *International Journal of Economics, Commerce and Management*, Vol. II, Issue 11, 1-22
- Akroush Samia, Yigezu A. and Abed Omar (2015). Profitability Analysis of Zero Tillage among Smallholder Farm Households in the Karak Region of Jordan. Working Paper 29

- Alene, A. and Manyong, V.M. (2007). The effect of education on agricultural productivity under traditional and improved technology in northern Nigeria: an endogenous switching regression analysis. *Empirical Economics* 32: 141-159.
- Andersson Lisa (2014). Migration, remittances and household welfare in Ethiopia. UNU-MERIT Working Papers, #2014-004
- ANRSCO (Amhara National Regional State Communication Office) (2014). 2013 Yearly Information Book (Amharic version report). Prepared by Amhara National Regional State office of Communication Agency.
- Anupama GV, Deb U, Bantilan C and Vajjha H. (2016). Seasonal Migration and Moving Out Of Poverty in Rural India: Insights from Statistical Analysis. *Asian Journal of Agriculture and Development*.13 (2): 35-53.
- Arkebe Oqubay (2018).The Structure and Performance of the Ethiopian Manufacturing Sector Working Paper Series, Number 299, African Development Bank Group. <https://www.tralac.org/images/docs/13204/the-structure-and-performance-of-the-ethiopian-manufacturing-sector-afdb-wps-299-june-2018.pdf>
- Asfaw Negesse Senbeta (2018). Review on Determinants and Impacts of Smallholder Agricultural Commercialization in Ethiopia. *International Journal of Agriculture & Agribusiness*, Volume1, Issue 1, page 124-132.
- Asfaw Solomon., Shiferaw Bekele., Simtowe Franklin, and Gebretsadik H. (2011). Agricultural technology adoption, seed access constraints and commercialization in Ethiopia. *Journal of Development and Agricultural Economics* Vol. 3(9), pp. 436-447.
- Asfaw Solomon Shiferaw Bekele Simtowe Franklin and Lipper Leslie (2012). Impact of modern agricultural technologies on smallholder welfare: Evidence from Tanzania and Ethiopia. *Food Policy*, 37, 283–295
- Asfaw Solomon, Lipper Leslie, Dalton Timothy and Audi Patrick (2012). Market participation, on-farm crop diversity and household welfare: micro evidence from Kenya.

Environment and Development Economics, Vol. 17, Special Issue 05, pp 579- 601
DOI: 10.1017/S1355770X12000277.

Asfaw, Solomon., Shiferaw Bekele., and Simtowe Franklin . (2010). Does technology adoption promote commercialization? Evidence from chickpea technologies in Ethiopia. In CSAE 2010 Conference on Economic Development in Africa, University of Oxford, UK, pp. 21-23.

Asselin, L. M. and Tuan Anh (2008). “Multidimensional Poverty and Multiple Correspondence Analysis,” in N. Kakwani and J. Silber (eds), Quantitative Approaches to Multidimensional Poverty, Palgrave Macmillan, London.

Astede Desta (2018). Uncertain Migration Impacts on Sending Households in Rural Areas in North Western Ethiopia. Ethiopian Journal of Development Research, Vol.40, No. 1.

Atsedeste Desta and Penker Marianne (2016). Determinants of rural out-migration in Ethiopia: Who stays and who goes? Demographic Research, Volume 35, Article 34, pp. 1011-1044.

Atsedeste Desta, Penker Marianne and Wurzinger Maria (2016). Population change in rural Northwest Ethiopia: A trans-disciplinary mixed methods approach. Submitted in partial fulfilment of the requirements for the degree Doctor of Social and Economic Sciences, University of Natural Resources and Life Science, Vienna.

Aynalem Adugna (2014). Amhara: Demography and Health, July, 2014.

Azam Jean-Paul, and Gubert Flore (2006). Migrants’ Remittances and the Household in Africa: A Review of Evidence. JOURNAL OF African Economies, Volume 15, Aerc Supplement 2, PP. 426–462. doi:10.1093/jae/ejl030

Babatunde, R.O. (2015). On-Farm and Off-Farm Works: Complement or Substitute? Evidence from Nigeria. Working Paper No. 2015/02

Babbie, Earl (2007). The Practice of Social Research. USA: Thomson, Wadsworth.

- Bäckman Stefan, Zahidul Islam and Sumelius John (2011). Determinants of Technical Efficiency of Rice Farms in North-Central And North-Western Regions In Bangladesh. *The Journal of Developing Areas*, Vol. 45 (Fall 2011), pp. 73-94
- Bakewell O., de Haas H., and Kubal, A. (2011). Migration systems, pioneers and the role of agency. International Migration institute (IMI) Working Papers 48, November 2011
- Bamlaku A. Alemu, Nuppenau and Boland (2008). Technical Efficiency of Farming Systems across Agro-ecological Zones in Ethiopia: An Application of Stochastic Frontier Analysis. Unpublished PhD thesis, Justus-Liebig University of Giessen, Germany
- Battese GE (1992). Frontier production functions and technical efficiency: A survey of empirical applications in agricultural economics. *Agricultural Economics* 7:185-208
- Berhanu Gebremedhin and Moti Jaleta, (2012). Market Orientation and Market Participation of Smallholders in Ethiopia: Implications for Commercial Transformation. Paper presented at the International Association of Agricultural Economists (IAAE) Triennial Conference, Foz do Iguaçu, Brazil, 18-24 August, 2012.
- Berhanu Gebremedhin, Moti Jaleta, (2010). Commercialization of smallholders: Does market orientation translate into market participation? Improving Productivity and Market Success (IPMS) of Ethiopian farmers project Working Paper 22. Nairobi, Kenya, ILRI.
- Bernard H. Russell, (2006). *Research Methods Anthropology: Qualitative and Quantitative Approaches*. Fourth Edition, United States of America, Rowman & Littlefield Publishers.
- Bertoli Simone and Marchetta Francesca, (2014). Migration, Remittances and Poverty In Ecuador. *Etudes Et Documents* N° 07, March 2014.
- Blumenstock Chi & Tan. (2018). Migration and the Value of Social Networks. 1-83. Retrieved November 23, 2018, from http://www.jblumenstock.com/files/papers/migration_networks.pdf
- Booyesen Frikkie, Van Der Berg Servaas, Burger Ronelle, Von Maltitz, and Du Rand, (2008). Using an Asset Index to Assess Trends in Poverty in Seven Sub-Saharan African

- Countries. *World Development* Vol. 36, No. 6, pp. 1113–1130. doi:10.1016/j.worlddev.2007.10.008
- Caliendo Marco, (2018). Program Evaluation for IZA/DFID. Material prepared for the short term training by Institute of Labour Economics. Addis Ababa, Ethiopia.
- Campbell Eugene, (2010). The Role of Remittances in Botswana: Does Internal Migration Really Reward Sending Families? *Popul. Space Place* 16, 151–164. DOI: 10.1002/psp.538.
- Canuel M, Abdous B, Be' langer D, Gosselin P, (2014). Development of Composite Indices to Measure the Adoption of Pro-Environmental Behaviours across Canadian Provinces. *PLoS ONE* 9(7): e101569. doi:10.1371/journal.pone.0101569.
- Caroline Krefis, Georg Schwarz, Nkrumah Bernard, Acquah Samuel, Loag Wibke, Sarpong Nimako, Adu-Sarkodie Yaw, Ranft Ulrich, and May Jürgen, (2010). Principal component analysis of socioeconomic factors and their association with malaria in children from the Ashanti Region, Ghana. *Malaria Journal*, 9:201
- Caroline, Georg, Nkrumah, Acquah, Loag, Sarpong, Adu-Sarkodie, Ranft, May, (2010). Principal component analysis of socioeconomic factors and their association with malaria in children from the Ashanti Region, Ghana. *Malaria Journal* 2010, 9:201.
- Carr David, (2009). Rural migration: The driving force behind tropical deforestation on the settlement frontier. *Progress in human geography*, 33(3), 355.
- Carter, B. & Rohwerder, B. (2016). Rapid fragility and migration assessment for Ethiopia (Rapid Literature Review). Birmingham, UK: GSDRC, University of Birmingham.
- Central Gondar Bureau of Social and Labour Affairs (CBoSLA), (2019). Annual reports on the large scale agricultural investment status in Central Gondar Zone.
- Central Statistical Agency (CSA). (2013). Population projection of Ethiopia for all regions at District level from 2014-2017. Addis Ababa: Author.

- Chambers, R., Conway, GR., (1991). Sustainable rural livelihoods: Practical concepts for the 21st century. Brighton: Institute for Development Studies, (IDS Discussion paper #296)
- Chen Ching-Fu, (2007). Applying the stochastic frontier approach to measure hotel managerial efficiency in Taiwan. *Tourism Management* 28 (2007) 696–702
- Chirwa, E. W., (2007). Sources of technical efficiency among smallholder maize farmers in Southern Malawi. AERC research paper 172. African Economic Research Consortium, 2007, Nairobi, Kenya.
- Coelli, T., Prasada Rao, D.S., O'Donnell, C.J. and Battese, G.E. (2005). *An Introduction to Efficiency and Productivity Analysis*. Second edition, Springer science, New York, USA.
- Córdova Abby, (2008). Methodological Note: Measuring Relative Wealth using Household Asset Indicators. *Americas Barometer Insights*: 2008 (No.6).
- Creswell John W., (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. (3rd ed.). USA: SAGE
- Creswell John W., (2014). *Research design: Qualitative, Quantitative, and Mixed Methods Approach*. (4th ed.). USA: SAGE
- CSA, (2014). The Federal Democratic Republic of Ethiopia, Analytical Report on the 2013 National Labour Force Survey, Statistical Bulletin Abstract, Addis Ababa, Ethiopia.
- D. I. Michael (Eds.), *Handbook of econometrics* (pp. 1633–1682). North-Holland: Elsevier.
- Dagne Mojo, Fischer Christian, and Terefe Degefa, (2017). The determinants and economic impacts of membership in coffee cooperatives: recent evidence from rural Ethiopia. *Journal of Rural Studies* 50 (2017) 84-94. doi.org/10.1016/j.jrurstud.2016.12.010
- Daniel Tsegai and Bao Le, (2010). District-level Spatial Analysis of Migration Flows in Ghana: Determinants and Implications for Policy. Center for Development Research, Bonn, December 2010, pp. 18
- Dawson Catherine, (2009). *Introduction to research Methods: A practical guide for everyone undertaking research project*. Fourth edition, United Kingdom; howtobooks.

- De Brauw Alan and Harigaya Tomoko, (2007). Seasonal Migration and Improving Living Standards In Vietnam. *Amer. J. Agr. Econ.* 89(2) (May 2007): 430–447. DOI: 10.1111/j.1467-8276.2006.00989.x
- de Brauw Alan, (2014). Migration, Youth, and Agricultural Productivity in Ethiopia.
- De Brauw, A. (2010). Seasonal Migration and Agricultural Production in Vietnam. *Journal of Development Studies*, 46, 114-139. doi:10.1080/00220380903197986
- de Brauw, Mueller V. and Woldehanna, T. (2013) ‘Does Internal Migration Improve Overall Well-Being in Ethiopia?’ Ethiopia Strategy Support Program II Working Paper 55, Washington, DC and Addis Ababa: International Food Policy Research Institute (IFPRI) and Ethiopian Development Research Institute (EDRI). Retrieved online at <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.352.6060&rep=rep1&type=pdf>
- De Haas, (2007). Migration and Development: A Theoretical Perspective. Paper presented at the conference on ‘Transnationalisation and Development(s): Towards a North-South Perspective’, Center for Interdisciplinary Research, Bielefeld, Germany, May 31 - June 01, 2007 (COMCAD, Working Papers – Center on Migration, Citizenship and Development; 29).
- De Haas, H. (2010). Migration and development: A theoretical perspective. *International Migration Review*, 44, 227–264.
- Degye Goshu, Belay Kassa and Mengistu Ketema, (2013). Is food security enhanced by agricultural technologies in rural Ethiopia? *African Journal of Agricultural and Resource Economics* Volume 8 Number 1, pp. 58 - 68
- Deotti L., and Estruch E., (2016). Addressing rural youth migration at its root causes: A conceptual framework. Knowledge materials, Food and Agriculture Organization of the United Nations (FAO), Social Policies and Rural Institutions Division, Rome.
- Deshingkar Priya and Grimm Sven, (2005). Internal Migration and Development: A Global Perspective. Overseas Development Institute, February 2005.

- Deshingkar Priya, (2006). Internal Migration, Poverty and Development in Asia. Session 3: Realizing the Potential for Poverty Reduction Parallel Group 3A: Topic Paper 2.
- Deshingkar, P., & Start, D, (2003). Seasonal migration for livelihoods in India: Coping, accumulation and exclusion', ODI Working Papers 220. London: Overseas Development Institute.
- Dessaiegn Rahmeto, (2009). The peasant and the state: Studies in Agrarian Change in Ethiopia 1950s-2000s. Addis Ababa University Press.
- Dey Sagarika, (2014). Impact of remittances on poverty at origin: a study on rural households in India using Covariate Balancing Propensity Score Matching. Migration and Development, DOI: 10.1080/21632324.2014.979022.
- Di Falco, S., Veronesi, M., Yesuf, M., (2011). Does adaptation to climate change provide food security? A micro-perspective from Ethiopia. American Journal of Agricultural Economics 93 (3), 829–846.
- Diana MohdIdris, Siwar Chamhuri, Abdul Talib, (2014). Determinants of technical efficiency among cash-crop producers: Evidence from East Malaysia. IOSR Journal of Humanities and Social Science (IOSR-JHSS) Volume 19, Issue 6, Ver. V (Jun. 2014), PP 64-69
- Dodd Warren, Humphries Sally, Patel Kirit, Majowicz Shannon & Dewey Cate, (2016). Determinants of temporary labour migration in southern India, Asian Population Studies, 12:3, 294-311, DOI: 10.1080/17441730.2016.1207929.
- Dodd Warren, Humphries Sally, Patel Kirit, Majowicz Shannon and Dewey Cate, (2016). Determinants of temporary labour migration in southern India, Asian Population Studies, 12:3, 294-311, DOI: 10.1080/17441730.2016.1207929
- Dorosh, P., Alemu, G., De Brau, A., Malek, M., Mueller, V., Schmidt, E., Tafere, K., and Thurlow, J., (2011). The rural-urban transformation in Ethiopia, Ethiopia Strategy Support Programii-Ethiopia Development Research Institute Report. International Food Policy Research Institute.

- Ebihart Msigwa AND Ezekiel Mbongo, (2013). Determinants of Internal Migration in Tanzania. *Journal of Economics and Sustainable Development*, Vol.4, No.9, 2013
- Ekpenyong S. Alfred, Daniel Egerson (2015). Rural-Rural Migration in Bayelsa State, Nigeria: A Case Study of Rural-Rural Migrants along Tombia-Amassoma Expressway. *International Journal of Scientific and Research Publications*, Volume 5, Issue 2.
- Ellis Frank and Freeman H. Ade (2005). *Rural Livelihoods and Poverty Reduction Policies*. London and New York, Routledge.
- Ellis Frank, (1999). Rural livelihood diversity in developing countries: evidence and policy implications. *Natural Resource Perspectives* No. 40. London, UK, Overseas Development Institute.
- Emorine Marine, Hai Anh, Lamballe Yoann, and Oudin Xavier, (2014). Using an Asset Index to analyse Governance in Vietnam. Working Paper No. 27. Retrieved at https://basepub.dauphine.fr/bitstream/handle/123456789/17847/NOPOOR%20WP%2038_N%C2%B027_Using%20an%20Asset%20Index%20to%20analyse%20Governance%20in%20Vietnam.pdf?sequence=2&isAllowed=y
- Ephraim Chirwa and Miriam Matita, (2012). Factors influencing smallholder commercial farming in Malawi: The case of NASFAM Commercialization initiatives. (Eds) Beatrice Ouma and Elaine Mercer. *Future-agricultures*, policy brief 051.
- Ezzrari Abdeljaouad and Verme Paolo, (2012). A Multiple Correspondence Analysis Approach to the Measurement of Multidimensional Poverty in Morocco, 2001-2007. *Policy Research Working Paper* 6087.
- FAO, (2017). Evidence on internal and international migration patterns in selected African countries, Food and Agriculture organization, Knowledge Material.
- FAO, IFAD, IOM, and WFP, (2018). *The Linkages between Migration, Agriculture, Food Security and Rural Development*. Rome. 80pp. (<http://www.fao.org/3/CA0922EN/CA0922EN.pdf>). Licence: CC BY-NC-SA 3.0 IGO.

- Farrell, M.J., (1957). The Measurement of Productive Efficiency. J. Royal Statistical Society, Series A., 120: 253–290.
- Filmer, D. & Pritchett, L.H. (1994). Estimating Wealth Effects without Expenditure Data – or Tears: With An Application to Educational Enrollments in States of India. World Bank Policy Research Working Paper. Washington, D.C.
- Filmer, D.Pritchett, (2001). Estimating wealth effects without expenditure data or tear: An application to educational enrollments in states of India. *Demography*38:115-132.
- Fransen Sonja and Kuschminder Katie, (2009). Migration in Ethiopia: History, Current Trends and Future Prospects, Paper Series: Migration and Development Country Profile, Maastricht Graduate School of Governance
- Gálvez-Soriano Oscar de J. and Benitez-Blacio Paulina, (2010). How to Measure the Multidimensional Inequality with Household Surveys: The Mexican Case. *Revista Mexicana de Economía y Finanzas*, Vol. 13 No.2, (2018), pp. 175-193.
- Garip, Filiz, (2014). The Impact of Migration and Remittances on Wealth Accumulation and Distribution in Rural Thailand. *Demography* 51 (2) (April): 673–698.
- Gebrehiwot Weldegebrail and Fekadu Beyene, (2012). Causes and consequences of out-migration on rural households' livelihood in Gulomekeda district, Tigray, Ethiopia. *Agricultural Research and Reviews* Vol. 1(1), pp. 26 – 33.
- Gebreslassie Hailu, Kebede Manjure and Kiros-Meles Aymut, (2015). Crop commercialization and smallholder farmers' livelihood in Tigray region, Ethiopia. *Journal of Development and Agricultural Economics*, Vol. 7(9), pp. 314-322, September,2015. DOI: 10.5897/JDAE2015.0649.
- Getachew Magnar and Bamlak Alamirew, (2014). Analysis of Technical Efficiency of Smallholder Maize Growing Farmers of Horo Guduru Wollega Zone, Ethiopia: A Stochastic Frontier Approach. *Sci. Technol. Arts Res. J.*, 3(3): 204-212

- Getahun Gemechu Abebe, (2014). Off-Farm Income and Technical Efficiency of Smallholder Farmers in Ethiopia: - A Stochastic Frontier Analysis. Master thesis, department of economics. Swedish University of Agricultural Science.
- Getnet Alemu Zewdu and Mehrab Malek, (2010). Implications of Land Policies for Rural-urban Linkages and Rural Transformation in Ethiopia. Ethiopia Strategy Support Program (ESSP) ESSP II Working Paper No. 15
- GIZ, (2018). Better Migration Management Horn of Africa. Newsletter March - September 2018, Germany.
- Gorard, S. (2004). Quantitative Methods in Social Sciences: The Role of Numbers Made Easy. King's Lynn, Norfolk, Great Britain.
- Govere, J., Jayne, T. S. and Nyoro, J., (1999). Smallholder Commercialization, Interlinked Markets and Food Crop Productivity: Cross-Country Evidence in Eastern and Southern Africa, paper is published by the Department of Agricultural Economics and the Department of Economics, *Michigan State University* (MSU).
- Greenacre, M., (2007). Correspondence Analysis in Practice (2nd ed.). Chapman and Hall/CRC, Interdisciplinary Statistics Series, London.
- Grix Jonathan (2002). Introducing Students to the Generic terminology of Social Research. *POLITICS*: 2002 VOL 22(3), 175–186
- Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105-117). Thousand Oaks, CA: Sage
- Guba, E.G. (1990). The alternative paradigm dialogue. In E.G. Guba (Ed.), *The paradigm dialogue* (pp. 17-27). Newbury Park: Sage Publications.
- Gujarati, D. N. (2004). Basic Econometrics. (Fourth edition ed.). New York: McGraw- Hill Book Company.
- Gyasi E.A and Ayivor J.S, (1992). Rural-Rural Migration in Ghana: The Case of Likpe Seasonal Migrant Rice Farmers. *Malaysian Journal of Tropical Geography*, 23(1), pp. 13-21

- Haberfeld Y, Menaria R. K., Sahoo B. B. & Vyas R. N, (1999). Seasonal migration of rural labor in India. *Population Research and Policy Review* 18: 473–489.
- Hagos Weldegebriel, (2014). The Determinants of Technical Efficiency of Farmers in Teff, Maize and Sorghum Production: Empirical Evidence from Central Zone of Tigray Region. *Ethiopian Journal of Economics* Vol. XXIII No 2.
- Hancock B., Windridge K., and Ockleford E., (2009). *An Introduction to Qualitative Research. The NIHR RDS EM / YH.*
- Harris, J. R., and Todaro, M., (1970). Migration, unemployment, and development: A two-sector analysis. *American Economic Review* 60: 126-142.
- Harttgen Kenneth & Klasen Stephan (2011). A Human Development Index by Internal Migrational Status, *Journal of Human Development and Capabilities: A Multi-Disciplinary Journal for People-Centered Development*, 12:3, 393-424
- Hausman, J.A., (1978). Specification tests in econometrics. *Econometrica* 46: 1251-1272.
- Heckman, J. J., (1979). Sample Selection Bias as a Specification Error. *Econometrica*, Vol. 47, No. 1 (Jan., 1979), pp. 153-161
- Ibrahim A., Yakubu A., and Alhaji A. (2014). Impact of Youth rural-urban Migration on household economy and crop production: A case study of Sokoto Metropolitan, Sokoto State, North-Western Nigeria. *Journal of Agricultural Extension and Rural Development*, Vol. 6(4), pp. 122-131, DOI: 10.5897/JAERD2013.0547
- Imran Muhammad, Bakhsh Khuda, and Hassan Sarfaraz, (2016). Rural to urban migration and crop productivity: evidence from Pakistani Punjab. *AKDENİZ ÜNİVERSİTESİ ZİRAAT FAKÜLTESİ DERGİSİ*, 29(1): 17-19.
- International Fund for Agricultural Development (IFAD), (2013). *Smallholders, Food Security, and the Environment*. Retrieved from http://www.ifad.org/climate/resources/smallholders_report.pdf (accessed 03 Aug 2016).

- International Organization for Migration (IOM), (2011). Glossary on Migration. 2nd edition, No. 25 International Migration Law. Retrieved online at <http://www.epim.info/wp-content/uploads/2011/01/iom.pdf>
- International Organization for Migration (IOM), (2015). World Migration Report 2015: Migrants and Cities: New Partnerships to Manage Mobility.
- Ito, C. (2011). The Role of Labor Migration to Neighboring Small Towns in Rural Livelihoods: A Case Study in Southern Province, Zambia. *African Studies Quarterly*, 12(1), 46-73.
- Jane Kabubo-Mariara Richard M. Mulwa and Salvatore Di Falco. (2017). Adaptation to Climate and Variability and Its implication for household food nutrition in Kenya. *Environment for Development*, 1-29. Retrieved November 27, 2018, from http://www.efdinitiative.org/sites/default/files/publications/efd_dp_17-05.pdf
- Jarzębowski Sebastian, (2013). Parametric and Non-Parametric Efficiency Measurement – The Comparison of Results. *Quantitative Methods in Economics* Vol. XIV, No. 1, 2013, pp. 170 – 179.
- Jayne Thomas, Kwame Yeboah And Henry Carla, (2017). The future of work in African agriculture: Trends and drivers of change. Research Department Working Paper No. 25, ILO
- Jayne, T.S. Haggblade Steven, Minot Nicholas, and Rashid Shahid, (2011). Agricultural Commercialization, Rural Transformation and Poverty Reduction: What have We Learned about How to Achieve This? Synthesis report prepared for the African Agricultural Markets Programme Policy Symposium, Alliance for Commodity Trade in Eastern and Southern Africa April 20-22, 2011, Kigali, Rwanda.
- Jimenez-Soto and Brown P. C., (2012). Assessing the Poverty Impacts of Migrants' Remittances Using Propensity Score Matching: The Case of Tonga. *The Economic Record*, Vol. 88, No. 282, September, 2012, 425–439

- Justus Ochieng, Knerr Beatrice, Owuor George & Ouma Emily, (2016). Migration and agricultural intensification at origin: evidence from farm households in Central Africa. *Migration and Development*, DOI: 10.1080/21632324.2015.1123837
- Justus Ochieng, Knerr Beatrice, Owuor George and Ouma Emily (2015). Agricultural commercialization and household food security: The case of smallholders in Great Lakes Region of Central Africa. International Conference of Agricultural Economists, Milan, Italy.
- Kabiti H.M., Raidimi N.E., Pfumayaramba T.K., and Chauke P.K., (2016). Determinants of Agricultural Commercialization among Smallholder Farmers in Munyati Resettlement Area, Chikomba District, Zimbabwe. *J Hum Ecol*, 53(1): 10-19
- Kainth, G. S. (2010). Push and pull factors of migration: A case study of brick kiln migrant workers in Punjab. Guru Arjan Dev Institute of Development Studies. Retrieved at https://www.researchgate.net/publication/239809734_Push_and_Pull_Factors_of_Migration_A_Case_Study_of_Brick_Kiln_Migrant_Workers_in_Punjab/citations
- Kaninda Tshikala Sam and Greg Fonsah Esendugue, (2014). Assessing the impact of migration and remittances on technology adoption in rural Senegal. Selected Paper prepared for presentation at the Southern Agricultural Economics Association Annual Meeting, Dallas, TX, February 1-4, 2014
- Kanta Nayak, (2014). Unemployment in Ethiopia: A Call for an Action. *International Journal of Management and Social Sciences Research*, Volume 3, No. 4.
- Keshri, K., & Bhagat, R. B, (2011). Temporary and seasonal migration in India. *Genus*, 66(3), 25-45.
- Khandker S. R., H. A. Samad and Koolwal G. B., (2009). *Handbook on Impact Evaluation: Quantitative Methods and Practices*, The World Bank.
- Kibrom Adino Haimanot Atinkut Sisay Yehuala Tigist Petros, (2015). The Determinant Factors for Internal Migration in Rural Areas of North Gondar: The Case of Dabat District.

Radix International Journal of Research in Social Science, Volume 4, Issue 8 (August, 2015)

- King Russell, (2012). Theories and Typologies of Migration: An Overview and a Primer. Willy Brandt Series of Working Papers in International Migration and Ethnic Relations 3/12. Malmö Institute for Studies of Migration, Diversity and Welfare (MIM).
- Kirsten Johann, Mapila Mariam Okello Julius, Sourovi De, (2012). Managing Agricultural Commercialization for Inclusive Growth in Sub-Saharan Africa. Supporting Policy Research to Inform Agricultural Policy in Sub-Saharan Africa and South Asia.
- Kolenikov Stanislav and Angeles Gustavo (2009). Socioeconomic Status Measurement With Discrete Proxy Variables: Is Principal Component Analysis A Reliable Answer? Review of Income and Wealth Series 55, Number 1, March 2009
- Korra, V., (2010). Nature and Characteristics of Seasonal Labour Migration: a case study in Mahabubnagar district of Andhra Pradesh. Working paper 433. Retrieved from <https://core.ac.uk/download/pdf/19918871.pdf> .
- Kothari C.R., (2004). Research Methodology: Methods and Techniques. (3rd ed). New Delhi: New age International publisher.
- Kumbhakar and Wang, (2015). Estimation of Technical Inefficiency in Production Frontier Models Using Cross-Sectional Data. In Ray, Kumbhakar and Dua (2015), Benchmarking for Performance Evaluation A Production Frontier Approach, Springer India. DOI:10.1007/978-81-322- 2253-8
- Kurekova Lucia, (2011). Theories of migration: Conceptual review and empirical testing in the context of the EU East -West flows. Paper prepared for Interdisciplinary conference on Migration. Economic Change, Social Challenge. April 6-9, 2011, University College London.
- Larry E., Asiamah, M., Nimoh, F., (2011). Estimation of farm level technical efficiency in small scale maize production in the Mfantseman Municipality in the Central Region of Ghana: A stochastic frontier approach. Journal of Development and Agricultural Economics Vol. 3(14), pp. 645-654.

Lee Everett, (1966). A Theory of Migration. *Demography*, Vol. 3, No. 1. (1966), pp. 47-57.

Lerman Z., (2004). Policies and institutions for commercialization of subsistence farms in Transition countries. *Journal of Asian Economics* 15:461–479.

Leykun Birhanu Demeke and Jemma Haji, (2014). Econometric analysis of factors affecting market participation of smallholder farming in Central Ethiopia. *Journal of Agricultural Economics, Extension and Rural Development: ISSN-2360-798X: Vol. 2(6): pp 094-104.*

Linger Ayele and Terefe Degefa, (2018). Temporary Rural-rural Migration, Vulnerability of Migrants at the Destination and Its Outcomes on Migrant Households: Evidence from Temporary Migrant Sending Households in Quarit District, Northwestern Ethiopia. Unpublished PhD Dissertation, College of Development Studies, Addis Ababa University, Ethiopia.

Lokshin M, and Sajaia Z, (2004). Maximum likelihood estimation of endogenous switching regression models. *Stata J* 4(3):282–289.

Long, J. and Freese, J. (2006). *Regression Model for Categorical Variables Using Stata* (2nd ed.), College Station, TX: Stata Press.

Lucas R., (2007). Migration and rural development. *electronic Journal of Agricultural and Development Economics*, Vol. 4, No. 1, 2007, pp. 99-122.

Lucas, R. 1997. Internal Migration in Developing Countries. In M. Rozenweig and O. Stark (eds.) *The Handbook of Population and Family Economics*. Amsterdam: Elsevier, pp. 721–798.

Lucas, R. E., (2015). Internal migration in developing economies: An overview. KNOMAD Working Paper 6, global knowledge partnership on migration and development. Washington, DC.: World Bank.

- Maddala, G. S., (1983). Limited-dependent and qualitative variables in econometrics. Cambridge: Cambridge University Press.
- Maddala, G. S., (1986). Disequilibrium, self-selection, and switching models. In Z. Griliches, & Magnani Robert, (1997). Sampling Guide. Food and Nutrition Technical Assistance
- Maharjan Amina, Bauer Siegfried and Knerr Beatrice, (2013). Migration for Labour and Its Impact in Farm Production in Nepal. Working paper IV, Centre for the Study of Labour and Mobility.
- Martey, Al-Hassan and Kuwornu, (2012). Commercialization of Smallholder Agriculture in Ghana: A Tobit regression analysis. African Journal of Agricultural Research Vol. 7(14), pp. 2131-2141, 12 April, 2012 Available online at <http://www.academicjournals.org/AJAR> DOI: 10.5897/AJAR11.1743.
- Massey D., Arango J., Hugo G., Kouaouci A., Pellegrino A. and Taylor E., (1993). Theories of International Migration: A Review and Appraisal. Population and Development Review, Vol. 19, No. 3), pp. 431-466
- McKenzie David and Rapoport Hillel, (2007). Network effects and the dynamics of migration and inequality: Theory and evidence from Mexico. *Journal of Development Economics*, 84, issue 1, p. 1-24.
- Mochebelele Motsamai and Winter-Nelson, (2000). Migrant Labor and Farm Technical Efficiency in Lesotho. World Development Vol. 28, No. 1, pp. 143-153.
- Moepeng Pelotshweu and Tisdell Clem, (2008). The Socio-Economic Situation of Female Heads and Poor Heads of Households in Rural Botswana: A Village Case Study. Working Paper No. 48 series on Social Economics, Policy and Development, University of Queensland. <https://ageconsearch.umn.edu/bitstream/123544/2/WP%2048.pdf>
- MoFED (Ministry of Finance and Economic Development), (2010). Federal Democratic Republic of Ethiopia: Growth and Transformation Plan (2010/11-2014/15).

- MoFED (Ministry of Finance and Economic Development), (2011) Ethiopia: building on progress. A Plan for Accelerated and Sustained Development to End Poverty (PASDEP) (2005/06-2009/10) Volume I: Main Text. MoFED, Addis Ababa.
- Möllers Judith and Meyer Wiebke, (2014). The effects of migration on poverty and inequality in rural Kosovo. *IZA Journal of Labor & Development*, 3:16.
- Morgan David L., (2007). Paradigms Lost and Pragmatism Regained Methodological Implications of Combining Qualitative and Quantitative Methods. *Journal of Mixed Methods Research* Volume 1 Number 1, 48-76.
- Morten, M. (2016). Temporary Migration and Endogenous Risk Sharing In Village. National Bureau of Economic Research Working Paper Series. Retrieved November 23, 2018, from <https://www.nber.org/papers/w22159.pdf>
- Mulu Debela Ofolsha and Paul Mansingh, (2015). Determinants of Female-headed Households' Livelihood Diversification Strategies Choice in Ambo District, Ethiopia. *Journal of Extension Education*, Vol. 27 No. 2
- Munshi K., (2003). Networks in the modern economy: Mexican migrants in the U. S. labor market. *Quarterly Journal of Economic*, 549-599
- National Planning Commission (NPC), (2016). Federal Democratic Republic of Ethiopia: Growth and Transformation Plan II (GTP II), 2015/16-2019/20). Volume I: Main text
- Nawrotzki, Raphael J, Lori M Hunter, and Thomas W Dickinson., (2012). Rural livelihoods and access to natural capital: differences between migrants and non-migrants in Madagascar. *Demographic Research* 26, no. 24, pp, 661-700.
- Newbold Bruce, (2010). *Population and Geography: Tools and Issues*. Rowman & Littlefield Publishers, United Kingdom.
- North Gondar zone Labour and social Affairs Department (NLSAD), (2016). Plan for decent work in North Gondar zone in the Agricultural development potential areas for better political, social, and economical performance. (Amharic version). Gondar.

- Nørgaard Asbjørn S., (2008). Political Science: Witchcraft or Craftsmanship? Standards for Good Research. *World Political Science Review*, Volume 4, Issue 1, Article 5.
- North Gondar Finance and Economy Department, (2013). Statistical bulletin final, Unpublished document.
- North Gondar Finance and Economy Department, (2014). Statistical bulletin final, unpublished document.
- Nzima Divane, Duma Vusumzi and Moyo Philani, (2016). Theorizing migration-development interactions: towards an integrated approach. *Migration and Development*, pp, 1-14. DOI: [org/10.1080/21632324.2016.1147897](https://doi.org/10.1080/21632324.2016.1147897).
- Oucho, J. O., and Gould, W., (1993). Migration, urbanization and population distribution. In K. A. Foote, K. K. Hill and L. G. Martin (eds.) *Demographic Change in Sub-Saharan Africa*. Washington, DC: National Academy Press, pp. 256–296.
- Pathirage, C.P., Amaratunga, R.D.G and Haigh, R.P., (2008). The Role of Philosophical Context in the Development of Theory: Towards Methodological Pluralism. *The Built & Human Environment Review*, Volume 1, 2008 Project (FANTA), Washington, D.C.
- Poole Nigel, (2017). *Smallholder Agriculture and Market Participation*. Rugby, UK: Practical Action Publishing, <http://dx.doi.org/10.3362/9781780449401>
- Portes Alejandro (2010). Migration and Social Change: Some Conceptual Reflections. *Journal of Ethnic and Migration Studies*, Vol. 36, No. 10, 2010, pp. 1537-1563
- Qian Wenrong, Wang Dazhe, and Zheng Liyi, (2016). The impact of migration on agricultural restructuring: Evidence from Jiangxi Province in China. *Journal of Rural Studies*, 47, 542-551
- Rahman, and Umar, (2009). Measurement of Technical Efficiency and Its Determinants in Crop Production in Lafia Local Government Area of Nasarawa State, Nigeria. *Journal of Tropical Agriculture, Food, Environment and Extension*, Volume 8 Number 2 May 2009 pp 90 - 96
- Retrieved online at <http://onlinelibrary.wiley.com/doi/10.1002/psp.538/pdf>

- Rios Ana R., Masters William A. and Shively Gerald E., (2008). Linkages between Market Participation and Productivity: Results from a Multi-Country Farm Household Sample. *Paper presented at the American Agricultural Economics Association Annual Meeting, Orlando, FL, July 27-29, 2008.*
- Rosenbaum and Rubin, (1985). Constructing a Control Group Using Multivariate Matched Sampling Methods That Incorporate the Propensity Score. *The American Statistician*, 39:1, 33-38.
- Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41–55.
- Rosenbaum, P. R., & Rubin, D. B. (1984). Reducing bias in observational studies using subclassification on the propensity score. *Journal of the American Statistical Association*, 79, 516–524.
- Salami Adeleke, Kamara B. Abdul and Brixiova Zuzana (2010). Smallholder Agriculture in East Africa: Trends, Constraints and Opportunities. Working Paper No. 105 April 2010; African Development Bank Group.
- Sale Joanna E. M., Lohfeld Lynne H. and Brazil Kevin, (2002). Revisiting the Quantitative-Qualitative Debate: Implications for Mixed-Methods Research. *Quality & Quantity* 36: 43–53, 2002.
- Sapkota Kanhaiya, (2018). Seasonal Labour Migration and Livelihood in The Middle Hill of Nepal: Reflections From Arghakhanchi District. *Research Nepal Journal of Development Studies* (Volume I Issue 1, 2018 May).
- Sauer Johannes, Gorton Matthew and Davidova Sophia, (2010). Migration and Agricultural Efficiency. Selected Paper prepared for presentation at the Agricultural & Applied Economics Association's 2014 AAEA Annual Meeting, Minneapolis, MN, July 27-29, 2010
- SBN. (2015). Annual report 2014 Sesame Business Network Support Programme. Gondar: Sesame Business Network.

- Sesame Business Network (SBN), (2013). Sesame Business Network Ethiopia: Baseline summary of Sesame Business Cluster (SBC): Metema Yohannes – Kokit Retrieved online at http://sbnethiopia.org/wp-content/uploads/2014/04/Metema_Yohannes-Kokit-Cluster-Summary.pdf
- Shiferaw, B., Kassie, M., Jaleta, M., Yirga, C., (2014). Adoption of improved wheat varieties and impacts on household food security in Ethiopia. *Food Pol.* 44, 272-284.
- Sinha B.R.K, (2005). Human Migration: Concepts and Approaches, Földrajzi Értesítő. LIV. évf. 3-4, Füzet, pp 403-414.
- Sisay Kebede, Jema Haji and Degye Goshu, (2016). Agricultural Technology Adoption, Crop Diversification and Efficiency of Maize-Dominated Smallholder Farming System In Jimma Zone, South-Western Ethiopia. Unpublished PhD thesis Haremaya University, Ethiopia.
- Smith, D. and Todd, P. (2005). Does Matching Overcome Lalonde's Critique of Nonexperimental Estimators?, *Journal of Econometrics*, 125, 305–53.
- Stark, O. and Bloom, D.E. (1985). The New Economics of Labour Migration, *American Economic Review*, 75(2): 173-178.
- Stark, O. (1991). *The Migration of Labour*. Oxford: Basil Blackwell.
- Stark, O., Bloom, D. E. (1985). The new economics of labor migration. *American Economic Review*, 75, 173–178.
- Tabak M., Cajueiro O., and Dias V. B., (2014). The Adequacy of Deterministic and Parametric Frontiers to Analyze the Efficiency of Indian Commercial Banks. Working Paper Series, 350, ISSN 1518-3548. Retrieved online at <https://www.bcb.gov.br/pec/wps/ingl/wps350.pdf>
- Tacoli, C. (2011). Not only climate change: mobility, vulnerability and socio-economic transformations in environmentally fragile areas in Bolivia, Senegal and Tanzania (No. 28). IIED.

- Taylor, J. E. (1999). The New Economics of Labor Migration and the role of remittances in the migration process. *International Migration*, Vol. 37, No. 1, pp. 63–88.
- Thomas Robert N. (1971). *Internal Migration in Latin America: An Analysis of Recent Literature*. Conference of Latin Americanist Geographers), Vol. 1, pp. 104-118
Published by: University of Texas Press.
- Tigist Mekonnen (2015). *Agricultural Technology Adoption and Market Participation under Learning Externality: Impact Evaluation on Small-scale Agriculture from Rural Ethiopia*. Working Paper No. 2015/06.
- Todaro Michael (1980). *Internal Migration in Developing Countries: A Survey*. In Richard A. Easterlin (ed), *Population and Economic Change in Developing Countries*. University of Chicago Press, p. 361 – 402.
- United Nations Conference on Trade and Development (UNCTAD) (2015). *The role of smallholder farmers in sustainable commodities production and trade*. TD/B/62/9.
- United Nations Department of Economics and Social Affairs (1970). *Methods of Measuring Internal Migration*, Series A. Population Studies, No.47, New York.
- United Nations Development Program (UNDP) (2018). *Human Development Indices and Indicators: 2018 Statistical Update Briefing note for countries on the 2018 Statistical Update, Ethiopia*
- United Nations Economic Commission for Africa (UNECA) (2017). *Economic Report on Africa 2017: Urbanization and Industrialization for Africa’s Transformation*, United Nations Addis Ababa, Ethiopia.
- Vandecasteele Joachim, Mekdim Dereje, Minten Bart, and Alemayehu Seyoum (2016). *Row planting Teff in Ethiopia: Impact on farm-level profitability and labor allocation*. Ethiopia Strategy Support Program (ESSP) Working Paper- 92.
- Vyass Seema and Lilani Kumaranayake (2006). *Constructing Socioeconomic Status Indexes: How to Use Principal Component Analysis*. *Health Policy and Planning* 21, no. 6 (2006): 459-68.

- Wang Hung-Jen and Schmidt Peter (2002). One-Step and Two-Step Estimation of the Effects of Exogenous Variables on Technical Efficiency Levels. *Journal of Productivity Analysis*, 18, 129–144.
- Welay Tesfay, Zemen Ayalew, Zework Aklilu (2018). Impact of Food Security Package Loan on Food Insecure Households' Income and Asset Creation: The Case of West Belesa District, North Gondar Zone, Ethiopia. *J. Agric. Environ. Sci.* 3(1): 87-110
- Wineman Ayala and Jayne Thomas (2016). Intra-Rural Migration in Tanzania and Pathways of Welfare Change. Selected Paper prepared for presentation at the 2016 Agricultural & Applied Economics Association Annual Meeting, Boston, Massachusetts.
- Woldie Asfaw , Degefa Tolossa & Gete Zeleke (2010) Causes and impacts of seasonal migration on rural livelihoods: Case studies from Amhara Region in Ethiopia, *Norsk Geografisk Tidsskrift - Norwegian Journal of Geography*, 64:1, 58-70.
- Wondmagegn Tirkaso and Sebastian Hess, (2018). Does commercialization drive technical efficiency improvements in Ethiopian subsistence agriculture? *African Journal of Agricultural and Resource Economics* Volume 13 Number 1 pages 44-57
- Wooldridge, J. (2010). *Econometric Analysis of Cross Section and Panel Data*, 2nd edition. MIT Press, London.
- World Bank Group (2016). Why So Idle? Wages and Employment in A Crowded Labor Market, 5th Ethiopia Economic Update, the World Bank, Washington DC.
- World Bank (2007). *Urban Labor Markets in Ethiopia: Challenges and Prospects, Volume II: Background Papers*. Report No. 38665-ET, Poverty Reduction and Economic Management Unit, Africa Region. Washington, DC: World Bank.
- World Bank (2008). *World Development Report 2008: Agriculture for Development*. Washington DC.
- Wouterse, F. (2010). Migration and technical efficiency in cereal production: Evidence from Burkina Faso. *Agric. Econ.* 41, 385–395.

- Yeasmin Sabina and Rahman Khan F. (2012). 'Triangulation' Research Method as the Tool of Social Science Research. BUP JOURNAL, Volume 1, Issue 1, September 2012, ISSN: 2219-4851.
- Zahonogo Pam (2011). Migration and agricultural production in Burkina Faso African Journal of Agricultural Research Vol. 6(7), pp. 1844-1852. DOI: 10.5897/AJAR10.1003.
- Zanker Hagen (2008). Why do people migrate? A review of the theoretical literature. Working Paper MGSOG/2008/WP002, Maastricht Graduate School of Governance.
- Zellner, A. 1962. An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias. Journal of the American Statistical Association 57: 348-368.
- Zhu Y., Wu Z., Peng L. & Sheng L., (2014). Where did all the remittances go? Understanding the impact of remittances on consumption patterns in rural China. Applied Economics, 46:12, 1312-1322, DOI: 10.1080/00036846.2013.872764.

Appendix I: Tables

Appendix IA: Collinearity test for continuous variables using Variance Inflation Factor

Variables	VIF	Tolerance
Land	1.26	0.70
Active labour	1.09	0.91
Tropical Livestock Unit	1.29	0.77
Age of the household head	1.10	0.90

Appendix IB: Pair-wise correlation for continuous variables

	sexhh	migcon~t	mobile	land	c~f	prevrain	credac~s	migrex~n	soilprod	social	migrin~e
sexhh	1.0000										
migcontact	0.0961	1.0000									
mobile	0.2412	0.0734	1.0000								
land certf	-0.0626	0.0800	0.0631	1.0000							
prevrain	0.1294	-0.1815	-0.0853	-0.0822	1.0000						
credacess	0.0030	0.0430	0.0415	-0.0774	-0.1535	1.0000					
migrexperian	0.1475	0.6726	0.0115	0.0755	-0.1067	0.0399	1.0000				
soilprod	0.0451	-0.1267	-0.0145	0.0955	0.4703	0.0035	-0.1323	1.0000			
social	0.0251	0.3197	0.0732	0.1206	-0.3048	0.0785	0.3007	-0.2195	1.0000		
migrincome	0.0046	-0.5017	-0.0846	0.0234	0.1727	-0.1681	-0.4965	0.0983	-0.2775	1.0000	

Appendix IC: Skewness test for Ordinary least square estimations

Residuals			
Percentiles		Smallest	
1%	-1.46671	-1.639616	
5%	-.8189759	-1.569339	
10%	-.6424303	-1.46671	Obs 249
25%	-.2440855	-1.421148	Sum of Wgt. 249
50%	.0309666		Mean -2.30e-09
		Largest	Std. Dev. .4566375
75%	.2850576	.8174917	
90%	.5457914	.9944784	Variance .2085178
95%	.6157523	1.080865	Skewness - .7431652
99%	.9944784	1.148094	Kurtosis 4.223685

Appendix IC: Skewness test for Ordinary least square estimations with P-value

Skewness/Kurtosis tests for Normality					
----- joint -----					
Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	chi2(2)	Prob>chi2
e	249	0.0000	0.0037	28.22	0.0000

Akaike's information criterion and Bayesian information criterion

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
cobb_douglas	249	.	-148.312	8	312.624	340.7636
translog	249	.	-139.0664	15	308.1327	360.8945

Appendix ID: Endogenous Switching Regression output for Technical efficiency

Endogenous switching regression model Number of obs = 243
Wald chi2(10) = 20.40
Log likelihood = 4.5271853 Prob > chi2 = 0.0257

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
te_1						
sexhh	.262616	.1016231	2.58	0.010	.0634383	.4617936
agehh	-.0004466	.0023422	-0.19	0.849	-.0050372	.004144
active	-.0100431	.0180872	-0.56	0.579	-.0454933	.0254071
numplots	.0337021	.024627	1.37	0.171	-.0145659	.08197
land_all	-.0539609	.0376709	-1.43	0.152	-.1277945	.0198728
extservic	-.0274193	.0479544	-0.57	0.567	-.1214081	.0665696
tlu	.0180978	.0130995	1.38	0.167	-.0075767	.0437723
soilprod	-.1009742	.0609652	-1.66	0.098	-.2204638	.0185154
prevrain	.0414224	.0581834	0.71	0.477	-.072615	.1554598
credacess	-.1139083	.0507843	-2.24	0.025	-.2134438	-.0143729
_cons	.4919166	.2059384	2.39	0.017	.0882848	.8955484
te_0						
sexhh	-.1803091	.0445204	-4.05	0.000	-.2675674	-.0930507
agehh	.0001185	.0011072	0.11	0.915	-.0020515	.0022886
active	-.0076324	.0111725	-0.68	0.495	-.02953	.0142653
numplots	.0149982	.0143756	1.04	0.297	-.0131776	.0431739
land_all	.006385	.025296	0.25	0.801	-.0431942	.0559643
extservic	.0176887	.0261753	0.68	0.499	-.0336139	.0689913
tlu	.0135509	.0072554	1.87	0.062	-.0006694	.0277713
soilprod	.0473222	.0281108	1.68	0.092	-.0077739	.1024183
prevrain	-.0139126	.0274347	-0.51	0.612	-.0676836	.0398584
credacess	.0231162	.0294325	0.79	0.432	-.0345705	.0808029
_cons	.6905262	.0690277	10.00	0.000	.5552343	.8258181
ruralmig						
agehh	.0184777	.0096594	1.91	0.056	-.0004544	.0374098
active	.208859	.0805437	2.59	0.010	.0509963	.3667217
land_all	.2413246	.1881276	1.28	0.200	-.1273988	.6100479
extservic	-.2532728	.231319	-1.09	0.274	-.7066497	.2001042
tlu	.1332229	.06276	2.12	0.034	.0102156	.2562301
soilprod	.0019433	.2534982	0.01	0.994	-.4949041	.4987906
prevrain	.0580863	.2464596	0.24	0.814	-.4249656	.5411382
credacess	.2661206	.2474044	1.08	0.282	-.2187831	.7510242
sexhh	-.2024861	.4240951	-0.48	0.633	-1.033697	.6287249
numplots	.0013231	.1172694	0.01	0.991	-.2285207	.2311668
migcontact	1.501066	.222705	6.74	0.000	1.064572	1.93756
_cons	-3.132613	.6476358	-4.84	0.000	-4.401956	-1.86327
/lns1	-1.785194	.0845923	-21.10	0.000	-1.950992	-1.619396
/lns2	-1.880107	.0710872	-26.45	0.000	-2.019435	-1.740778
/r1	-.0249074	.2698839	-0.09	0.926	-.5538701	.5040553
/r2	-.4668973	.3638165	-1.28	0.199	-1.179965	.24617
sigma_1	.1677645	.0141916			.142133	.1980182
sigma_2	.1525739	.0108461			.1327304	.1753839
rho_1	-.0249023	.2697165			-.5034151	.4653004
rho_2	-.435689	.2947551			-.8274404	.2413151
LR test of indep. eqns. : chi2(1) = 125.56 Prob > chi2 = 0.0000						

Appendix IE: Matching quality test results

Table a: Matching quality test for kernel bwidth(0.06)

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.357	160.53	0.000	46.9	33.2	171.3*	1.13	33
Matched	0.028	7.44	0.763	13.2	13.3	39.6*	0.96	33

* if B>25%, R outside [0.5; 2]

Table b: Matching quality test for one nearest neighborhood

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.357	160.53	0.000	46.9	33.2	171.3*	1.13	33
Matched	0.069	18.94	0.062	18.3	21.1	62.9*	1.57	0

* if B>25%, R outside [0.5; 2]

Table c: Matching quality test for Five nearest neighborhood

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.357	160.53	0.000	46.9	33.2	171.3*	1.13	33
Matched	0.023	6.35	0.849	9.1	6.5	36.1*	2.07*	0

* if B>25%, R outside [0.5; 2]

Table d: Quality test for Nearest-Neighborhood-1

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.377	110.41	0.000	51.4	38.7	177.3*	1.50	0
Matched	0.067	11.10	0.435	18.0	15.6	62.7*	1.26	0

* if B>25%, R outside [0.5; 2]

Table e: Quality test for Nearest-Neighborhood-5

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.377	110.41	0.000	51.4	38.7	177.3*	1.50	0
Matched	0.049	8.16	0.699	12.1	7.3	52.0*	0.58	0

* if B>25%, R outside [0.5; 2]

Table f: Quality test for Kernel (0.03)

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.377	110.41	0.000	51.4	38.7	177.3*	1.50	0
Matched	0.059	7.85	0.727	15.7	11.2	57.6*	0.92	0

* if B>25%, R outside [0.5; 2]

Table g: Quality test for Kernel (0.06)

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.377	110.41	0.000	51.4	38.7	177.3*	1.50	0
Matched	0.053	8.56	0.663	14.4	9.1	54.3*	0.54	33

* if B>25%, R outside [0.5; 2]

Table h: Quality test for Radius (0.02)

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.377	110.41	0.000	51.4	38.7	177.3*	1.50	0
Matched	0.065	8.45	0.673	17.2	16.7	60.6*	0.94	0

* if B>25%, R outside [0.5; 2]

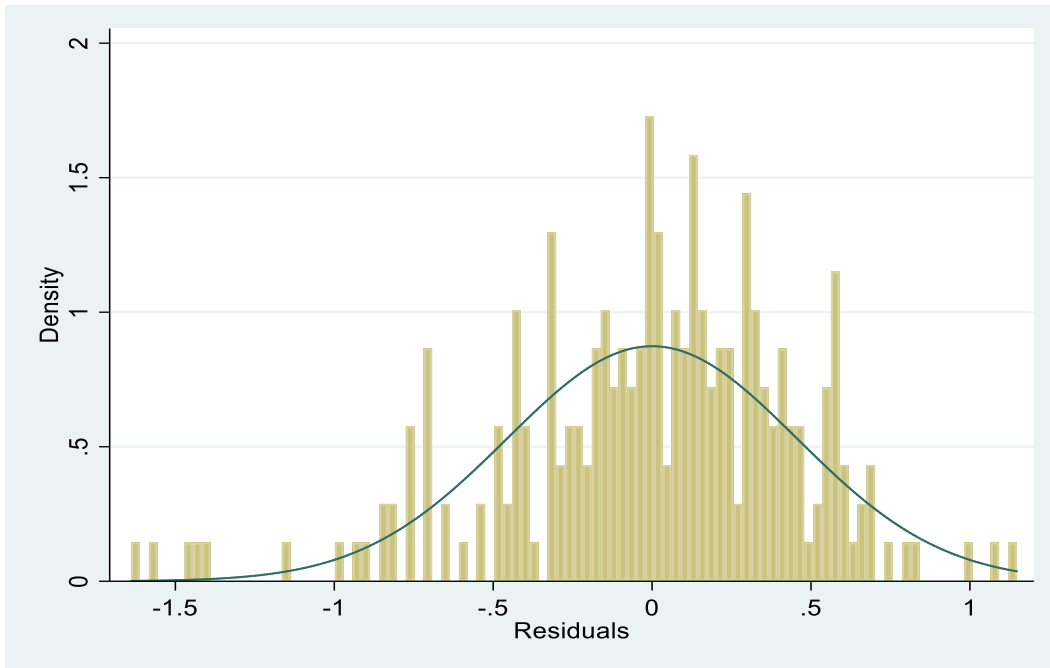
Table i: Quality test for Radius (0.05)

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.377	110.41	0.000	51.4	38.7	177.3*	1.50	0
Matched	0.049	7.70	0.740	13.4	7.6	51.8*	0.62	33

* if B>25%, R outside [0.5; 2]

Appendix II: Figures

Appendix IIA: OLS skewness test for OLS Residuals



Histogram for OLS residuals



Field data collection, Senbet Debir with Development Agents, 3/28/18 9:30 am (Jemal and Abay Left and right side of me respectively)



Enumerator Zenebu Tafere Development agent at Senbet Debit Kebele (orientation for the interview schedule) 01/04/2018 ... 10:30 am



Sesame crop at the time of flowering (Metema)

A3 Research tools:



Addis Ababa University
College of Development Studies
Center for Rural Development

Survey Number

SURVEY QUESTIONNAIRE FOR INTERVIEW SCHEDULE

Dear Respondents!

This survey questionnaire is mainly prepared **ONLY** for academic purpose, in partial fulfillment for the requirement of Degree of Philosophy in Development studies (Rural Development). Thus, we kindly request your genuine information for all the questions to maintain the quality of the research output and its relevance for policy implication. Its' our honor to thank ahead for all your support and collaboration.

Name of the Enumerator: _____ **Signature** _____

Dear enumerators! Please made a careful attempt to encircle all the questions based on the response of the respondents.

0. General Information

Name of the District	Agro-ecology	Name of the Kebele	Name of the Interviewee	Address Phone
0.	1.	2.	3.	4.

Note: For # 2 use 1= Highland 2=Midland 3= lowland

1. Demographic and Socio-economic Characteristics

1. A) Household Characteristics

- 1.1. Sex of the Household head; 1. Male 2. Female
- 1.2. Age of the household head _____ Years old
- 1.3. Farming experience of the head ____ years in farming
- 1.4. Marital Status; 1. Single 2. Married 3. Divorced 4. Widowed 5. Cohabited
- 1.5. Religion of the Household; 1. Orthodox 2. Christian 3. Muslim 3. Others
- 1.6. Educational Status of the Head;
1. Not read and Write 2. Read and write 3. Primary school 4. Secondary school 5. Above

1.7. Number of families attended formal education _____

1.8. Family size (please fill each question carefully!)

Age category	Below 10	10-13	14-65	Above 65	Total
Number of Female					
Number of Male					

1. B) Socio-economic Characteristics

- 1.9. Is agriculture the prime occupation of your family? 1. Yes 2. No
- 1.10. How many parcels of land do your household own? _____
- 1.11. Farm size in hectare ____ own ____rented____ gift ____ others ____ Total
- 1.12. Do you have land certification book? 1. Yes 2. No
- 1.13. Type and Number of Livestock Ownership

List of Animals	Number	List of Animals	Number
1. Cattle		12. beehive	
2. Goat (Adult)		13. heifer	
3. Goat (Young)		14. Calf	
4. Sheep (Adult)		15. Bull	
5. Sheep (Young)		16. Mule	
6. Poultry		17. Chicken	

7. Donkey (Adult)		15.	
8. Donkey (Young)		16.	
9. Ox		17.	
10. Cow		18.	
11. Horse		19.	

1.14 Do you have supplementary income option in your village? 1. Yes 2. No

1.15 If “yes” for the above, list income supplementary options _____

1.16 Do you have personal mobile phone? 1. Yes 2. No

1.17 Do you have radio? 1. Yes 2. No

1.18 How do you perceive income situation with one year ago?

1. Better of 2. Same 3. Worse off

1.19 Did you participated in any social local affairs? 1. Yes 2. No

1.20 If “YES” can you tell us these social affairs _____

2. Agricultural Production, Input Utilization and Commercialization

2.1. Do you have any information on the release of new varieties for your crop production?

1. Yes 2. No

2.2. If “Yes” List the new varieties released for crop production in your district?

2.3. Have you receive extension service or any information from extension works?

1. Yes 2. No

2.4. If YES, in the past 12 months, how many contacts did your household had with an extension officer? _____ Days

2.5. For which of the crop production you have applied new varieties in the 2017/18 cropping season?

Major Crops	Yes	No	Name of the improved varieties	Rate productive effect of the variety 1. Excellent 2. Very good 3. Good 4. Satisfactory 5. Poor
Teff				
Barley				
Wheat				
Malt barely				
Maize				
Milat				
Maize				
Sorghum				
Rice				
Others				
Total				

2.6. Fill the relevant data for all output, input and others questions given below?

Major Crops	Land used (hectare) (A)	Seed/ Kg		Fertilizer/Kg			Lab our (Da ys) 27	Pesticide (price)	Herbicide (price)	Total output (Kg)	Output/ hectare)
		Impr oved	Local	Ure a	DAP	Blended					
Teff											
Barley											
Wheat											
Malt barely											
Maize											
Milat											
Maize											
Sorghum											
Rice											

²⁷ For plowing, sowing, weeding, chemical application, threshing and Harvesting

Others											
Total											

Price of fertilizer per kilogram _____

2.7. How do you evaluate the current price of fertilizer?

1. Very expensive 2. Moderate 2. Cheap

2.8. In your district is there sufficient supply for Improved- seed? 1. Yes 2. No

2.9. In your location is there sufficient supply for chemical inputs (insecticide and pesticides)? 1. Yes 2. No

2.10. Do you implement improved water and soil conservation techniques? 1. Yes 2. No

2.11. If “Yes” can you please tell is that technique

2.12. Farm equipment's/implements?

Items	Amount the household owned	When do you own these assets (month and year)	How much you estimate if you sell
Tractor			
tractor drawn equipment			
Water pump			
Water Sprinkler			
Watering can			
Hoe			
Machete, sickle, mower			
Irrigation pipe			
Chemical sprayer			
Number of oxen rented			
Own number of oxen			
Others specify....? _____ _____			

--	--	--	--

2.13. How do you evaluate the productivity of your soil compared to other farmers in your village? 1. Good 2. Not good

2.14. How do you evaluate the previous year rainfall situation to your crop production?

1. Was favorable 2. Not favorable

2.15 Crop output commercialization (Sold outputs in kilogram and price)

Major Crops	Volume sold (Kg)	Unit price	Total value sold	
Teff				
Barley				
Wheat				
Malt barely				
Maize				
Milat				
Maize				
Sorghum				
Rice				
Other crops 1				
Other crops 2				
Other crops 3				
Other crops 4				
Total				

2.16 How do you evaluate the current market information access?

1. Better of 2. Same 3. Worse off

2.17 How far is the nearest market distance from home by foot_____ hour?_____Minutes

2.18 How many traditional marketing days are there per weak in you district _____Days

2.19 How you grown cash crops additional to food crop in 2009/10 E.C cropping year?

1. Yes 2. No

2.20 Which one best explains your agriculture production orientation

1. Market oriented
2. Based on food
3. Both market and food demand
4. If any other explain _____

3 Migration characterization, Migration Status, Remittance, Effect

3.1 How do you perceive the role of migration in rural livelihood?

1. Very important 2. Important 3. Not important

3.2 Is there a family member who is migrated or returned family within the last 12 months for at least a month in other rural area for the purpose of labour work or any agricultural activity in cash crop producing areas?

1. Yes 2. No

3.3 If “YES” where is the destination _____(Name the district)

3.4 Can you please fill this table regarding migrants characteristics (Skip if your response for # 3.1 is “NO”)

Name of the migrants (you can use symbols)	Age	Sex	When do they migrate ?specify the months

3.5 What are the main reasons for migration of the family member? (More than one is possible)

1. Lack of job opportunity in origin
2. Higher income in the commercial belt
3. Low level of household income
4. Large family size
5. Other reasons _____

3.6 Do you have received remittance from rural Migrants in the last 12 months?

1. Yes 2. No

3.7 If “YES” for the above question; how much of remittance income does your household received for rural migrates only _____ Ethiopian Birr

3.8 List if any kind of gifts other than money:-

3.9 Do you have remittance income other than rural migrants from urban areas? 1. Yes 2. No

3.10 What looks the use of remittance? (Use the following table to rank your)

1. Social ceremonies (Marriage, funeral, “mahiber”	Rank them in order of importance
2. House construction	
3. Health expenditure	
4. Loan repayment	
5. Home consumption	
6. Schooling expenditure	
7. Purchase of improved seeds	
8. Purpose of chemical fertilizer	
9. Purchase of weed chemicals	
10. Farm accessories	
11. Livestock investment (purchase of live animal, improved fodder)	
12. Irrigation facilities	

13. Other expenses	
--------------------	--

3.11 Have you been received loan/ credit from any person or institution in the last 12 months?

1. Yes 2. No

3.12 Is “YES” for the above question, what was the prime purpose of your loan?

1. Agricultural input (list them _____)
2. Finance cost of migration
3. Health expense
4. Specify others _____

3.13 How do your family get information on the labor market and agricultural work in the large scale commercial farming?

1. Personal network
2. Media
3. Rainfall
4. Past experience
5. Other if any _____

3.14 For how long did the migrant stayed away from home

1. One month
2. Two months
3. Three to four
4. For one year
5. More than one year

3.15 Can you please mention other employment options in the other rural areas (such as in Metama, Quara, Shinsa...other cash crop producing destinations)?

3.16 How do you see the transportation situation for labour migrants and farmers?

1. Very improved 2. Improved 3. Not improved

3.17 How do you rate the cost of transportation? 1. Very expensive 2. Expensive 3. Cheap

3.18 Did you face labour shortage when a family member/s migrated for labour work?

1. Yes 2. No

3.19 If “YES” for the above question, what is the prime reason?

1. Because he left at the time of peak works

2. Small size of working labour in the family

3. Because of the above two reasons

4. The migrant is the best labour

5. Explain if any _____

3.20 If you didn't face labour shortage, why?

1. Sufficient family labour

2. Possible to hire local labour

3. Migrants will return at the peak time

4. Explain if any _____

3.21 If returnees came back with any important agricultural experience from the destination areas, please mention them?

3.22 Please mention If there are any problem that family members faced following their migration for labour work or farming? _____

3.23 Did you family have the experience of sending family members for labour work or any agricultural activity in the past?

1. Yes 2. No

3.24 Did your family member have contact with previous migrants in the cash producing areas?

1. Yes 2. No

3.25 How do you evaluate the income situation of the cash producing destinations compared to your past memory?

1. Very improved 2. Improved 3. Reduced 4. No information

4 General livelihood situation in terms of asset indicators

4.1 How do you rate the general living condition of your household/

1. Improved 2. Same 3. Worse off

4.2 Dear respondents encircle the appropriate response based on the table given below?

Asset indicators		Description	Yes (1)	No (2)
Physical assets	Roof material	Grass cover		
		bamboo/wood cover		
		Tine cover		
	Walls material	Grass wall		
		Mud wall		
		Cement wall		
		Number of bedrooms (number)		
		Separate kitchen house		
		Number of chairs		
	Source of light	Kerosene		
		Solar		
		Electricity		
	Latrine type	Open field		
		Common wall		

	Consumer durables	Private wall		
		Television		
		Satellite dish		
		Radio		
		Bicycle		
		DVD player		
		Electric stove		
		Ventilator		
	Water sources	Spring water		
		Wall water		
		Common hand pump		
		Private pipeline		
Financial and productive assets		sewing machine		
		Motor bicycle		
		Remittance		
		Book account		
		Tropical livestock unit		
		Animal cart		
		Member in cooperatives		
		Irrigation generator		
Human capital		Weaving equipment		
		Family with formal education		
Social capital		Religious member		
		Social participation		
		Traditional association		
		Youth associations		
Natural		Land size in hectare		
		Number of honey beehive		

Thank you for your cooperation!

Interview Questions



Dear Respondents! The aim of this interview questionnaire is only for academic purpose for the fulfilment of PhD degree in Rural Development at Addis Ababa University.

1. How do you explain the relevance of rural-rural migration from the view point of migrants?

2. What looks the current demand for labour in the large scale-commercial agriculture?

3. Do you have information where the major wave of migration origin is?

4. Would you please list the major work opportunities for rural labour migrants?

5. Estimated price for each activities

Major activities	Estimated income on average (daily, monthly or contract)
Clearing (land preparation)	
Plough	
Weeding	

Harvesting (sesame harvest)	
Livestock look after (Keeping)	
Cotton harvest	
Sorghum harvest	
Injera baking and cooking	
Farm manager	

6. Anything that you want to explain about the migration income?

7. Anything that you want to say about the migration phenomenon (price, transportation, challenges..etc)?

8. How do you suggest for remittance income to contribute for asset-building?

Thank you for your time!

Guidelines for focused group discussion (FGD)

- i. District and Kebele _____ Date _____
- ii. Welcoming discussants
- iii. Introduction and purpose of the study
 - Rural to rural Migration and its implication on productivity, commercialization and asset possession
- iv. Informing for voice discussion record**
1. Nature of Rural-to rural Migration
 - a. Season of migration
 - b. time of return,
 - c. experience,
 - d. Destination income situation)?
 - e. Who decides? Family or individuals? Is there communication and support for the migration of family member?
2. The benefits of Rural To rural Migration
 - a. Remittance amount,
 - b. Implication on agriculture,
 - c. on loan repayment,
 - d. Purchase of inputs, Labour issues;
 - e. Anyone who have significantly benefited due to migration to the commercial agriculture? In terms of what changes?)
3. Challenges of Rural-rural Migration
 - a. accommodation,
 - b. food and other amenities
 - c. Job searching, health issues?
 - d. Conflict
 - e. Theft
4. Any important concern/story related with rural to rural migration in the districts? (From both positive and negative side)

5. How do you access land crop farming, sharecropping, labour for sesame?
6. Any suggestion to improve the income of migration?
What has to be done by any concerned body?
7. Any point that you want to add with regard to our discussion?