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Three Essays on Migration Decision, Migration Destination Choice, and Food Security: Evidence from Chitwan, Nepal

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THREE ESSAYS ON MIGRATION DECISION, MIGRATION DESTINATION CHOICE, AND FOOD SECURITY: EVIDENCE FROM CHITWAN, NEPAL

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This thesis is dedicated to:

My father: Late Mr. Pushpa Raj Regmi

My mother: Mrs. Rina Kumari Regmi

My sisters: Rupa, Ranjana and Ritu

I am so grateful for all of the love, support and encouragement.

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I am very thankful to Elina Adhikari for her unwavering love, support and encouragement for all these years. At this moment of success, I would also like to remember my relatives and friends in Nepal.

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ABSTRACT

This thesis research is based on data obtained from the Nepal Ethno Survey of Family, Migration and Development conducted in 396 farming households in the Eastern part of the Chitwan, Nepal. In a three essay thesis format, I explore the factors affecting migration decision and migration destination choices. I then establish a link between remittance and food security status of the surveyed households.

In the first essay, I use a probit model to identify household decisions to send or not to send migrants, and identify factors affecting the decision process. I include individual, household and social network characteristics in the regression model. Results suggest that migrants who are males, young and non-household head, households which have higher number of adult males, lower number of adult females, lower number of males with secondary education, higher number of females with secondary education and lower land holding size positively affect the decision to migrate.

In the second essay, I use a multinomial logit model to first identify the pertinent variables related to choice among those that do not to migrate, migrate internally and migrate outside of the country. I then follow up this analysis with another multinomial logit model in which I identify variables that are critical for migrants to choose among four major international migration destinations (India, Malaysia, Gulf Countries and other countries). Results indicate that along with individual and family characteristics, the migration networks are crucial factor for the selection of migration destinations.

The third essay explores the impact of remittances on food security status at household, adult and children levels. Results from an ordered probit regression model indicates that higher education level, higher income from agriculture source and adoption of hybrid rice/maize have a positive effect on food security while age of household head and number of conservation technologies adopted have a negative impact on food security. Also, results indicate that

remittance-receiving households are more food secured than those that did not receive remittance. Findings suggest that Nepal should address migration issues as resulting remittance has multiple impacts that reverberate through the economy.

CHAPTER I
INTRODUCTION

Nepal is a small landlocked country situated between China and India (area 147,181 square kilometers) with three primary ecological zones (Terai, Hill and Mountain). The Terai region is the bread basket region of the country, but it is densely populated. The lower part of the Hill region has climatic advantages for growing fruits and vegetables, and the higher part of the Hill to the Mountain regions have environmental suitability for livestock production. However, the lack of infrastructure and proper agricultural commodity promotion has made the Hill and Mountain regions economically less viable. These regions also have a disproportionate number of malnourished people. Lack of economic opportunities in the country has forced many people of the working class to look outside of the country for employment and source of income to sustain their livelihoods.

From an economic viewpoint, Nepal can be characterized as a low income, densely populated, agriculturally dominant economy (IFAD, 2013). A quarter of Nepal's population lives on less than US$1/day, and many Nepali lack the needed human capital and economic environment for income generation within the country (Wagle, 2010). According to CBS (2011), among the total population of 28 million, the total labor force was 21.84 million and agricultural employment was 13.98 million (64 percent of the work force). The growth of agricultural gross domestic product (GDP) had been only 3 percent during the 15 years period (from 1995/96 to 2010/11), in comparison to the growth of population by 2 percent over the same period (CBS, 2011). Therefore, the increase in agricultural GDP is not yet sufficient to lift a large number of people engaged in agriculture out of poverty, reduce malnutrition, and assure food security of the nation (ABD, 2012). Despite the fact that agriculture is vital for the livelihood and economy of the country, food imports grew from $125 million to $373 million over the period from 1995/1996 to 2010/2011 (ADB, 2013). The 2013 United Nations Human Development Report (HDR) has shown that Nepal remains one of the poorest countries in the

world with a Human Development Index (HDI) of 0.463, and is positioned at 157 out of 187 countries (Khalid, 2013). In 2011, about 25 percent of the total population was below the poverty level, which was mainly due to concentration of the poor in the agriculture based rural economy (CBS, 2011; MOF 2012). One of the major impacts of this economic situation is malnutrition, which is evident as 42 percent of children younger than five years old suffered from stunting (CBS, 2011). In the year 2012, the country ranked 60th in the Global Hunger Index[1] (IFPRI, 2012) and the prevalence of overall undernourished among residents of Nepal was 18 percent of the total population (FAO, 2012).

The lack of economic opportunities due to weak performance of the agricultural sector, high-population growth, and unstable political situations has prompted many of the most productive members of rural households to migrate in recent years (ADB, 2013). Both internal and international migrations are common in Nepal (Gurung, 2001; Seddon et al., 1998; Karan & Ishii, 1966; Shrestha, 1990). Nepal has experienced a substantial exodus of working adults to international destinations. According to the Nepal Institute of Developmental Studies (NIDS) (2010), India hosts the largest number of Nepali workers anywhere in the world, but accurate information on the number of migrants to India is not available as these two countries share open borders. However, it was estimated that approximately 1.3 million male and 153,000 female Nepali migrants work in India (NIDS, 2010). Among countries that require a visa/work permit to work, the largest number of Nepalese migrant workers had chosen to migrate/work in Malaysia (361,464) followed by Qatar (351,544), Saudi Arabia (246,448), United Arab Emirates (178,535) and Bahrain (20,303) during the period 2006-2010 (DOFE,

[1] Global Hunger Index (GHI) is calculated each year by International Food Policy and Research Institute (IFPRI). GHI combines three equally weighted indicators viz. undernourishment, child underweight and children mortality in on scale and ranks countries on a 100-point scale where zero is the best (no hunger) and 100 is the worst.

2010). Nepalese migrants working in these countries are the source of a large amount of remittance, officially estimated at over US$5.1 billion in 2012 (IFAD, 2013).

During fiscal year 2013, Nepal's economic growth fell to 3.6 percent because of political uncertainty, shortfalls in public expenditures and low agricultural output. Despite the lower growth rate and instability, the country has abled to fund its trade deficit through the robust remittance inflow (World Bank, 2013). According to CBS (2011), the percentage of households receiving remittances increased from 23.4 percent in 1995/1996 to about 55.8 percent in 2010/2011 and the share of remittances in household income increased from about 26.6 percent to 30.9 percent during the same period. Thus, remittance income has been playing a crucial role for sustaining the livelihood of people residing in the country. The general objective of my thesis is to understand labor migration and to establish a link between remittance and food security. Specifically, I write three essays to:

- Determine the pertinent variables that affect the migration decision
- Understand the remittance economy of Nepal and identify the factors associated with internal and international migration destination choices, and
- Find the impact of remittance on food security.

In the next chapter (Chapter Two), I will present a brief introduction to the survey site, survey design, data collection and descriptive statistics of major variables affecting migration and food security. Then, I will describe all of these above mentioned objectives sequentially in three separate essays (Chapter Three, Chapter Four and Chapter Five). In the last chapter (Chapter Six), I will summarize the relevant conclusions, policy recommendations and limitations of my research work.

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CHAPTER II
SURVEY, DATA, AND DESCRIPTIVE STATISTICS

1. Survey and Data Collection

This thesis study used the household survey data of Nepal Ethno Survey of Family, Migration and Development that was carried out by researchers from Louisiana State University (LSU). Survey respondents were farming households randomly selected from seven village development committees (VDC) of East Chitwan, Nepal (Figure 2.1). Chitwan district is one of the 75 district of Nepal, which is a unique source of both internal and international migration. Chitwan is one of the fairly developed districts of the developing country, Nepal, having 36 Village Development Committees (VDCs) and two municipalities. This survey study was conducted to collect migration related information from 395 households that belong to the seven VDCs of Eastern Chitwan. Land parcels owned by each farmers were obtained from the local VDC tax offices. This information was, then, digitized by the researchers to draw a stratified random sample with strata being the land holding size (small, medium and large) to represent the population of the village development committee. The survey was initially tested among focus groups of farmers located in Kumroj and Pithuwa VDCs. Based on their responses, the final survey questionnaire was developed.

Bachelor and master degree holders in agriculture sciences/agricultural economics from the Institute of Agriculture and Animal Sciences, Tribhuvan University, in Chitwan, Nepal, were hired to conduct face-to-face interviews of farmers. Becausethe interviews were lengthy and rigorous, it took more than two months to complete the survey part of the study. Survey respondents were cooperative; there were no incidences of survey assistants being turned down for an interview. Using a 22-page questionnaire, 396 farmers were interviewed by the LSU team. But, only 395 households information are used in this study because of missing of all the relevant information of a household. Survey questions captured information on the socio-

demographic structure of the household, household production decision-making, agriculture and conservation practices adoption, migration history, remittances and food security status.

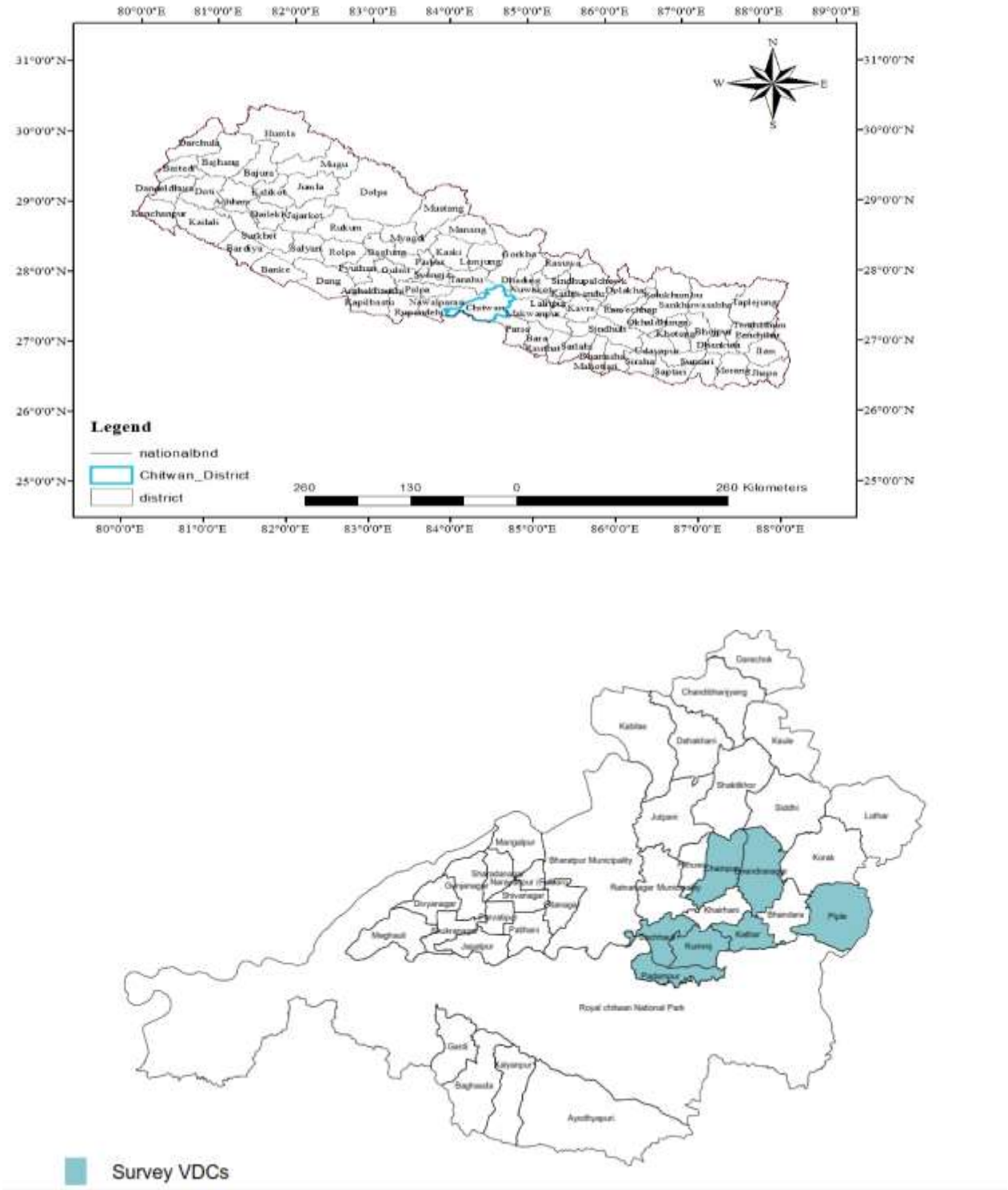

Figure 2.1. Map showing the study area – Chitwan, Nepal

2. Descriptive Statistics

The survey households can be described on the basis of several socioeconomic factors. I would like to mention that because of missing information, the total number of observations for different variables may not be exactly equal to the available figures for the corresponding parts.

The total number of migrants in the study area were 911 individuals from 249 households (Figure 2.2).

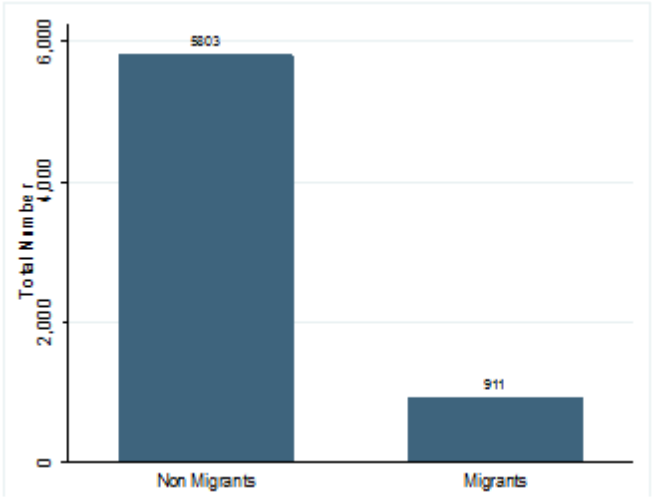

Figure 2.2. Number of non-migrant and migrant in sample households

The total numbers of internal migrants were 158 from 54 households and the total numbers of international migrants were 753 from 216 households (Table 2.1).

Table 2.1. Number of non-migrant, internal migrant and international migrant from sample households

	Freq.	Percent
No migration	5,803	86.4
Internal	158	2.4
International	753	11.2
Total	6,714	100

Among 158 internal migrants, 105 migrants selected Kathmandu as a destination and the remaining 53 selected areas other than Kathmandu as a migration destination. Hence, Kathmandu, the capital city of Nepal,was the major internal migration destination for migrants from Eastern Chitwan. Likewise, among 753 international migrants, 91 went to India, 145 went

to Malaysia, 324 went to Gulf countries (126 in Saudi Arabia, 100 in Qatar and 98 in Dubai) and 193 went to other countries (highest was 45 to the United Kingdom) (Figure 2.3).

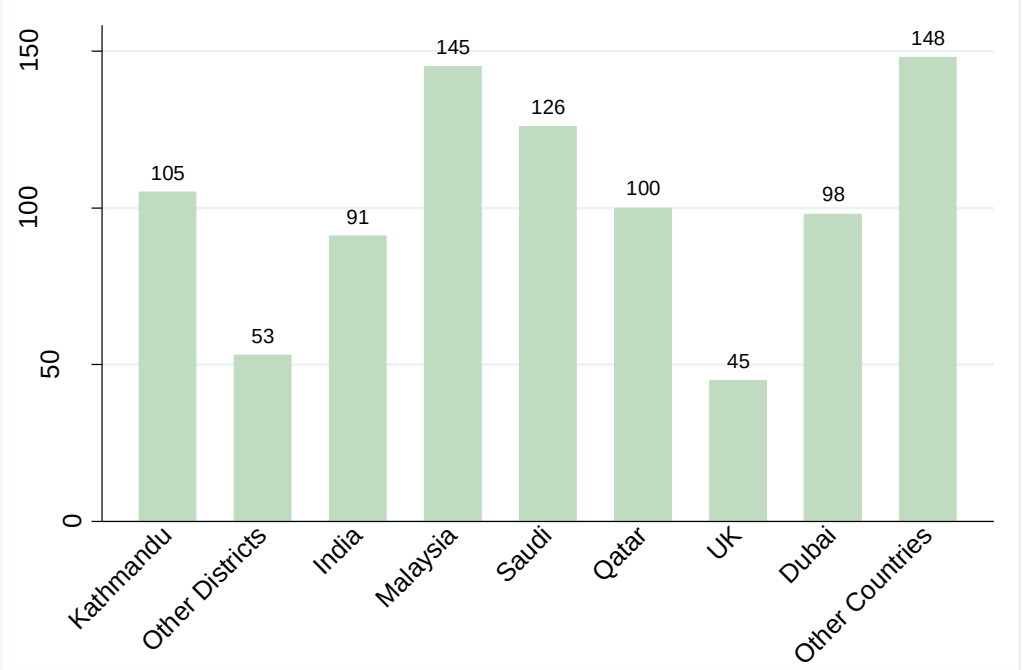

Figure 2.3. Number of migrants in different internal and international destinations from sample households

Among 395 households, 18 were female-headed households and 375 were male-headed households. There is missing information on the gender of the household head for two of the households. Household heads from 86 households were migrated; 72 to an international destination and 14 to an internal destination.

The average school attendance years of the household head was 5.35 years in the sample households and 5.85 years among the migrant households. The average school attendance of household heads among internal migrant households was 7.53, and 5.50 years among international migrant households. Based on gender, 49 were female from 23 households, and 861 were male from 242 households (Figure 2.4). There is missing information on the gender of a migrant.

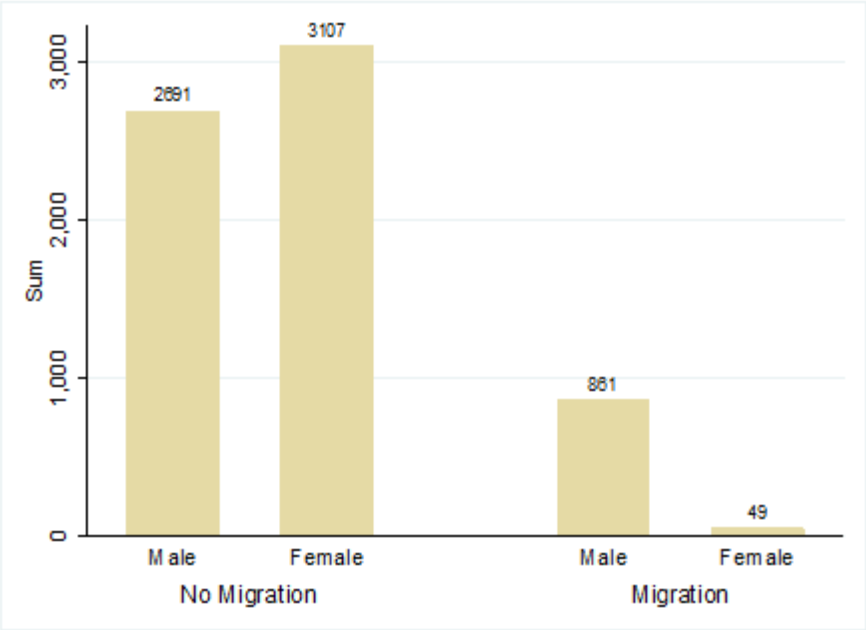

Fig 2.4. Gender and migration decision in the study area

In addition, only two female migrants were reported as internal migrants from two households, while 47 female migrants were reported as international migrants from 21 households. Similarly, 156 males were found as internal migrants from 53 households, and 705 males were found as international migrants from 208 households (Figure 2.5).

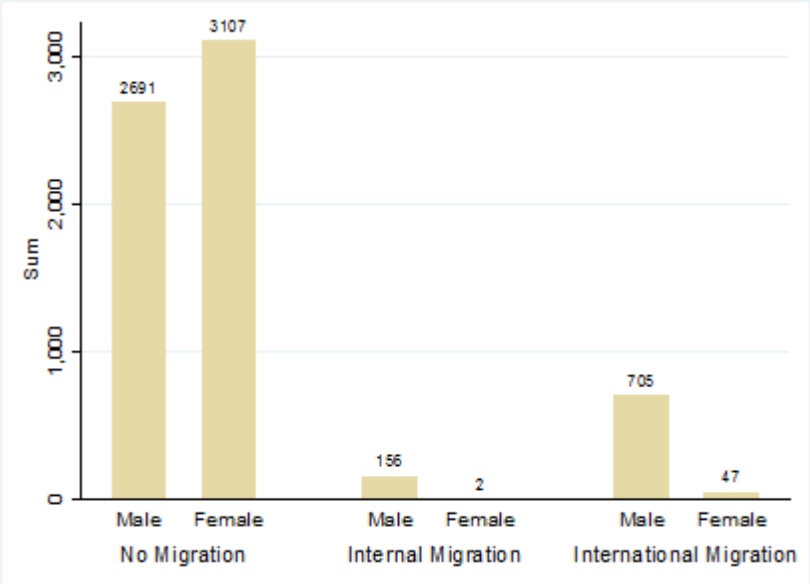

Fig 2.5. Gender and migration destination choices in the study area

The average age of the sample population was 29.40 years; 28.60 years for non-migrants and 34.74 years for migrants (Figure 2.6).

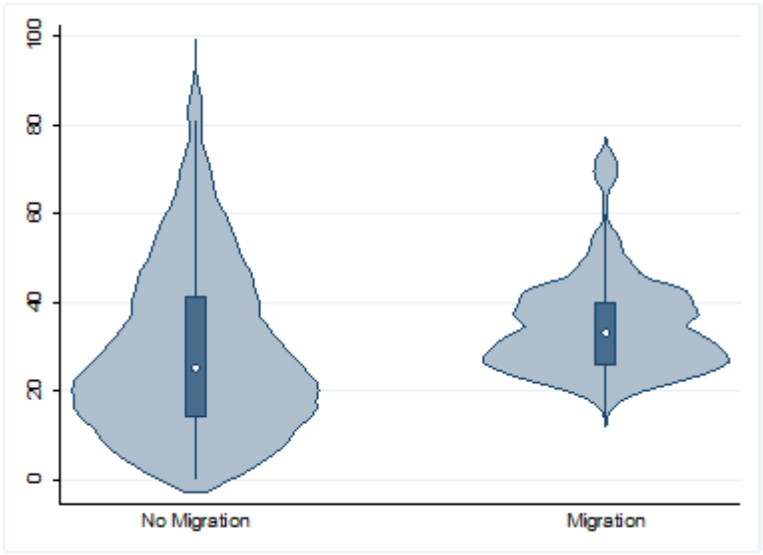

Fig 2.6. Age and migration decision in the study area

The average age was 36.42 years for internal migrants and 34.40 years for international migrants (Figure 2.7). The same figure shows that people below 20 years of age and above 60 years of age are more likely to be non-migrant. Almost all migrants fell within the age range from 20 to 60 years of age. The tendency to migrate internationally after 50 years of age was very low in comparison to internal migration.

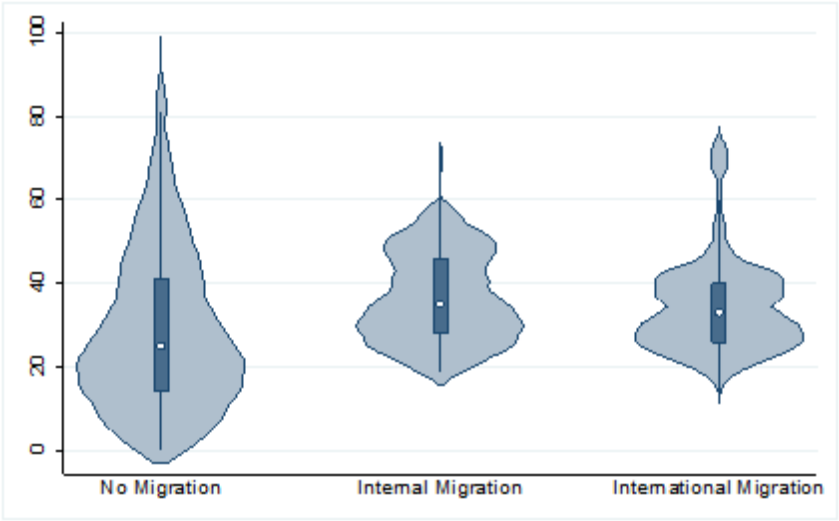

Fig 2.7. Age and migration destination choices in the study area

There were a total of 244 unmarried migrants from 63 households, and 615 were married migrants from 200 households (Figure 2.8). There is missing information on the marital status of 52 migrants from 9 households.

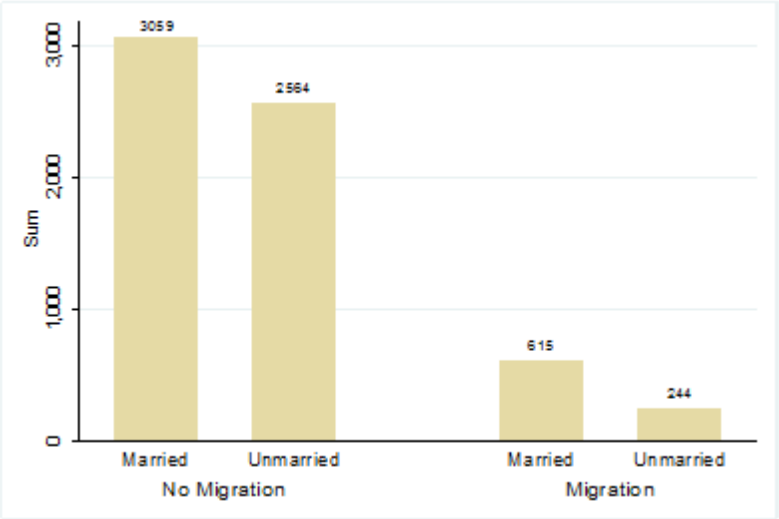

Fig 2.8. Marital status and migration decision in the study area

Among married migrants, 104 were internal migrants from 39 households, and 511 were international migrants from 174 households. Similarly, among unmarried migrants, 30 migrants from 13 households were internal migrants, and 214 migrants from 53 households were international migrants (Figure 2.9).

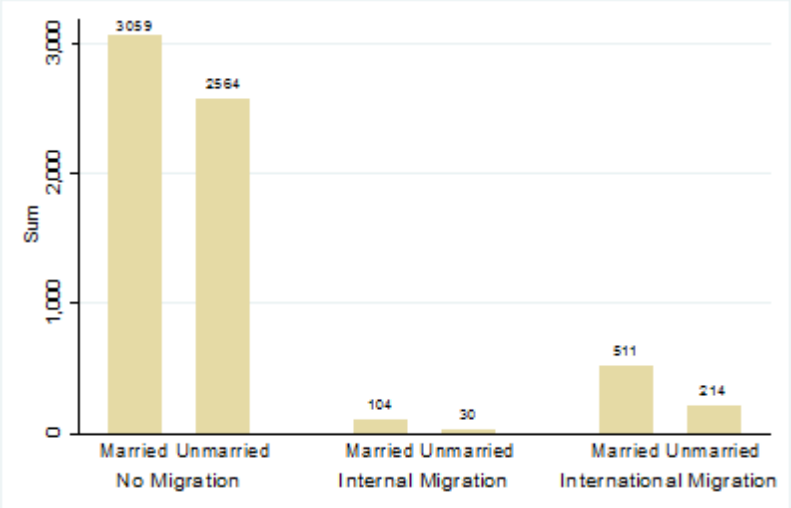

Fig 2.9. Marital status and migration destination choices in the study area

Average schooling of the total sample population was 8.48 years; non-migrants had 8.07 years, and migrants had 10.61 years (Figure 2.10).

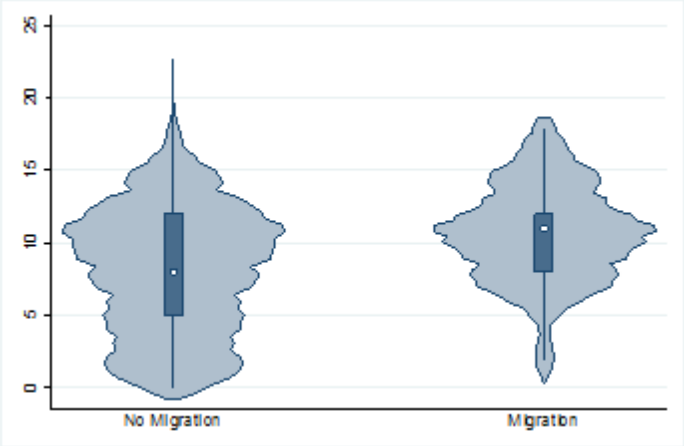

Fig 2.10.Years of schooling and migration decision in the study area

The average schooling years attended by internal migrants was 12.44 years, and the average schooling years attended by international migrants was 10.21 years (Figure 2.11). The same figure suggests that people who had education below an elementary level education (five years of schooling) chosed not to migrate. The majority of international migrants had an education level between primary and higher secondary (12 years of education). Similarly, most of the internal migrants had secondary education.

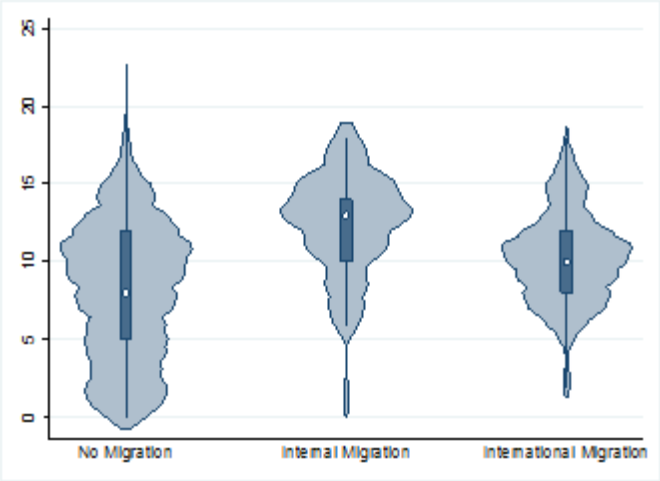

Fig 2.11.Years of schooling and migration destination choices in the study area

The average number of males above 15 years was found to be 2.62 among the sample households. Those households sending at least one migrant had 2.67 average adult males in the household, whereas those not sending any migrants had slightly fewer average adult males (2.61 males). Likewise, the average number of females above 15 years was found in 2.59

among the sample households; it was 2.64 among the migrant's households, and 2.58 among the households with no migrants (Figure 2.12).

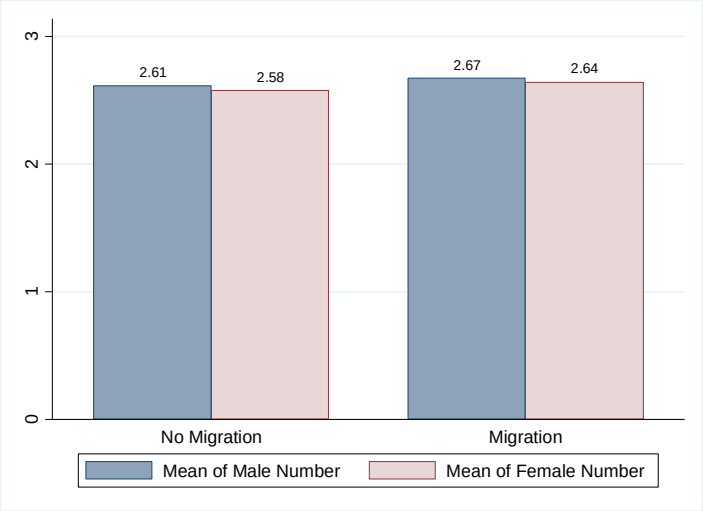

Fig 2.12. Number of adults (male and female) above 15 years of age and migration decision in the study area

The average number of males above 15 years for internal migrant's households was 3.01, and it was 2.60 for the international migrant's households. Similarly, the average number of females above 15 years for internal migrants household was 2.52, and 2.67 among the international migrant's households (Figure 2.13).

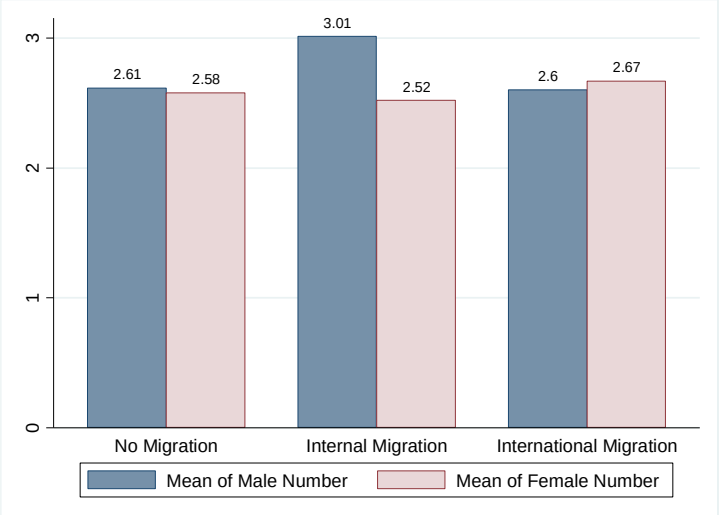

Fig 2.13. Number of adults (male and female) above 15 years of age and migration destination choices study area

The mean dependency ratio in the study area was 25.60. I used the following formula to calculate the dependency ratio:

$$Total\ Dependency\ Ratio = \frac{Number\ of\ people\ (age\ 0\ to\ 14\ years\ and\ 65\ and\ over)}{Number\ of\ people\ aged\ 15\ to\ 64} \times 100$$

The average number of males with secondary education in the sample households was 1.84; 1.82 among households with no migrants; and 2 for migrant's households. In the case of females, the average number of females with secondary education in the sample households was 1.52; 1.49 among households with no migrants; and 1.71 among migrant's households (Figure 2.14).

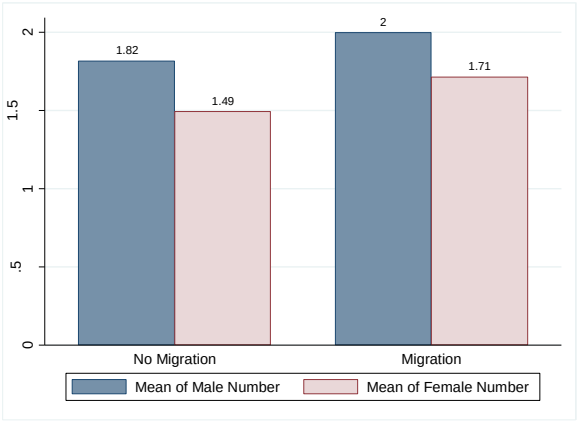

Fig 2.14. Number of adults (male and female) with secondary education and migration decision in the study area

The average number of males with secondary education was 2.54 for internal migrant's households, and 1.88 for international migrant's households. Likewise, 1.78 was the average females with secondary level education for internal migrant's households, and 1.70 for international migrant households (Figure 2.15).

The average land holding size of the total households in the sample was 11.56 kattha (where 30 kattha = 1 ha). The size of households without migrants was 11.5 kattha, and 11.80 kattha for the households having at least one migrant (Figure 2.16).

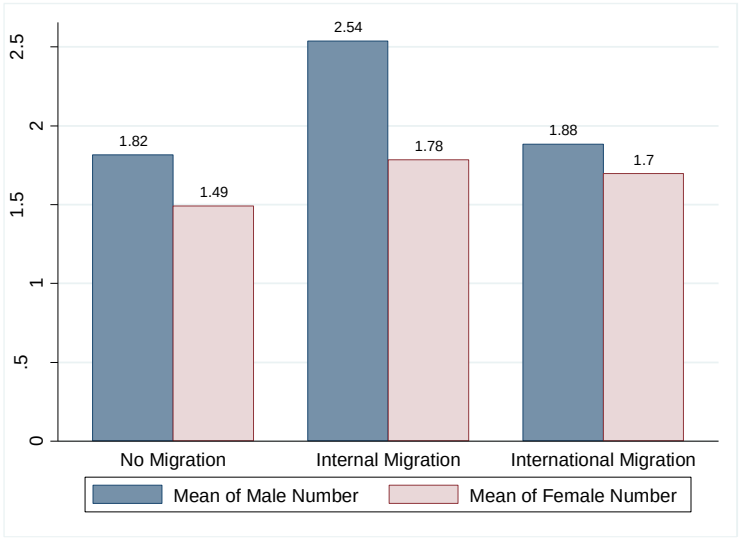

Fig 2.15. Number of adults (male and female) with secondary education by migration destination choice

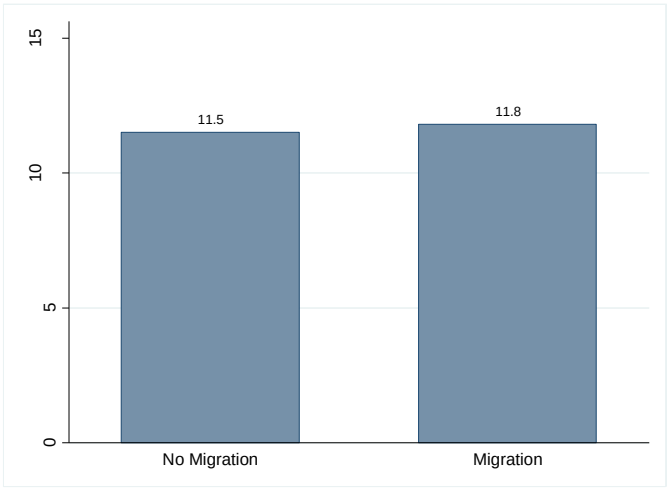

Fig 2.16. Land area and migration decision in the study area

The average land size was 10.5 kattha for the households having at least one internal migrant and 12.1 kattha for the households having at least one international migrant (Figure 2.17). The average number of conservation technologies adopted by the farmers in the study area was 6.2. Table 2.2 represents the conservation practices considered in the study area and the numbers of farmers adopting each.

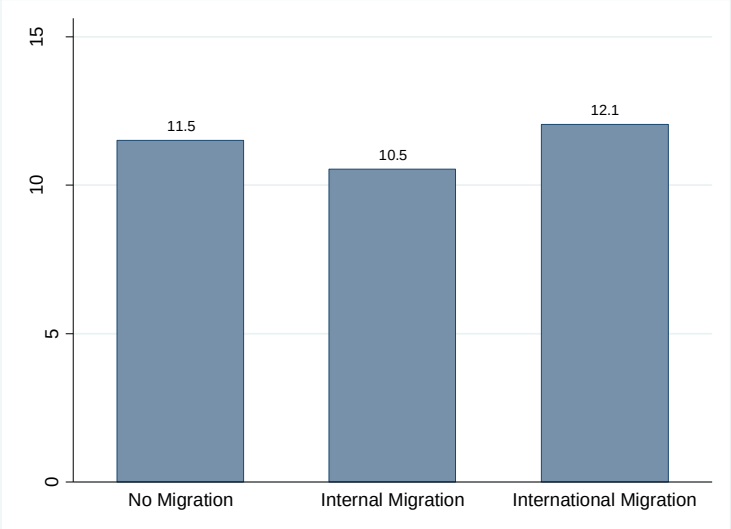

Fig 2.17. Land area and migration destination choices in the study area

In the study area, rice is the staple food and the major crops produced are corn and rice. Based on the available information, only 18 households adopted hybrid corn or rice variety in 2012, while the remaining 377 households used either the local or improved varieties of maize and rice.

Animal unit equivalents per household are calculated based on the formula provided by the Minnesota Department of Agriculture (MDA, 2013). Some animals did not have an equivalent animal unit, so I used the value of the most appropriate equivalent. Based on the MDA definition, the animal unit is 1.0 for a cow, horse or ox (an ox is worth the same as a mature cow under 1,000 pounds with an animal unit of 1.0), 0.7 for a buffalo, 0.1 for a goat (a goat is worth the same as a sheep or a lamb with an animal unit of 0.1), 0.3 for a pig (the animal unit for a pig between 55 and 300 pounds is 0.3), 0.033 for a chicken, 0.01 for a duck and 0.003 for a pigeon (a pigeon is worth the same as a chicken under five pounds with an animal unit of 0.003).

The average number of animal units in the sample households was 5.12; it was 5.31 for households without migrants, and it was 3.96 for households with at least one migrant (Figure 2.18).

Table 2.2. Conservation practices considered in the study and number of farmers adopting to these practices

Soil and water conservation methods	Number of farmers
1.Placing plant rows and tillage lines at a right angle to the normal flow of surface run-off	47
2. Pit dug to protect and retain soil and water out flows	23
3. Alternate planting of different crops in strips	65
4. Planting trees and shrubs around the farmland to control wind erosion	123
5.Grass strips alternating with crop strips on the same plot to check erosion, e.g. using vetiver grass	44
6. Using the straw to cover the plot after land preparation	184
7. Furrow-irrigated raised bed	223
8. No-tillage	14
9. Reduced-tillage	8
10. Minimum-tillage	11
11. Keeping the soil covered with growing plants	48
12. Using tied ridges	3
13. Terrace farming	15
14. Using a combination of different crops	237
15. Alternating periods of cropping and fallowing	99
16. Crop rotation	346
17. Avoidance of overgrazing	156
18. Establishment of permanent water ways	69
19. Use of water-harvesting techniques such as digging pits	22
20. Farmer-managed irrigation system	184
21. Rainwater harvesting system	34
22. Drip irrigation system	1
23. Wastewater reuse for agriculture	124
24. Plastic mulching in vegetable plots	18
25. Building dams	7

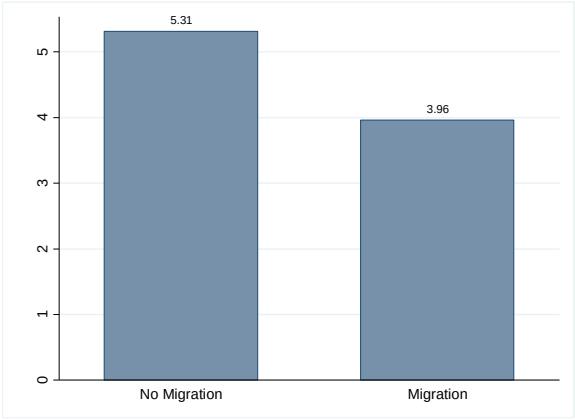

Fig 2.18. Animal units and migration decision in the study area

The average animal units among all the household having at least one internal migrant was 3.43, whereas it was 4.084 for households having at least one international migrant (Figure 2.19).

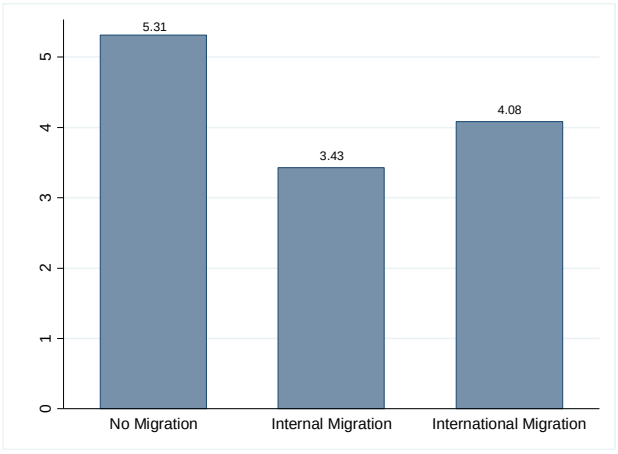

Fig 2.19. Animal units and the migration destination choice in the study area

The wealth index is constructed as a proxy measure for the household's living standard. The wealth index is calculated based on the availability and access to different facilities (e.g., electricity, water, toilet facility, roof materials) in the households (Montgomery et al., 2000; Mora & Taylor 2006; McKenzie and Rapoport, 2007). The wealth index is based on asset ownership indicators derived using weights that can be obtained through principal component analysis (PCA) (Filmer & Pritchett, 2001; McKenzie and Rapoport, 2007; Smits & Steendijk, 2013; Vyas and Kumaranayake, 2006). The wealth index of a household i can be defined as:

$$W_i = \sum_k \alpha_k \left(\frac{x_{ik} - \bar{x}_k}{\sigma_k} \right) \qquad (1.12)$$

Here, x_{ik} is the value of asset k for household i, $\bar{x}_k$ is the sample mean, σ_k is the sample standard deviation and α_k represents the weight for each variable x_{ik} for the first principal component that is calculated using PCA.

Details about weights for the assets can be obtained from McKenzie (2005). Here, the wealth index can take positive or negative values. As indicated by Mora & Taylor (2006), a positive value of a wealth index represents that the household's wealth is above the sample wealth average, and a negative value represents that it is below the sample wealth average.

Based on previous literature (McKenzie, 2005; McKenzie and Rapoport, 2007; Vyas and Kumaranayake, 2006), in order to calculate the wealth index using STATA, I first create all the variables of interest in the form of a dichotomous value (1 = Yes and 0 = No) (Table 2.3). Then, weights for each assets are generated through PCA using STATA as described in O'Donnell & Wagstaff (2008) and Torres-Reyna (2012). Table 2.4 summarizes the principal components correlation for 25 components and Figure 2.20 presents the scree plot of Eigen values. Table 2.5 summarizes the first four principal components for all the variables, which contain more than 85 percent of the variance (STATA, 2013). After that, I predict the value of the wealth index for each households. The summary of wealth indices for the surveyed households is presented in Table 2.6. The average wealth index among the sample households was nearly equal to zero (i.e. 0.00026) but was -0.021 among households with no migrants, and 0.132 among the households with at least one migrant member (Figure 2.21). The average wealth index was -0.216 for the households having at least one internal migrant and 0.205 for households having at least one international migrant.

Table 2.3. Descriptive statistics of variables that used in wealth index construction

Variables	Variable Label	Obs	Mean	Std. Dev.	Min	Max
bicycle	Household holding bicycle=1 else =0	6715	0.033	0.179	0	1
motorcycle	Household holding motorcycle=1 else =0	6715	0.277	0.447	0	1
tractor	Household holding tractor=1 else =0	6715	0.034	0.182	0	1
construction	High quality materials of construction=1 else =0	6715	0.388	0.487	0	1
floor	High quality materials of floor=1 else =0	6715	0.144	0.351	0	1
rooms	Number of rooms in the house	6555	4.124	2.250	1	20
toilet	Indoor toilet access=1 else =0	6715	0.271	0.445	0	1
water	Utilization of water service in house=1 else=0	6715	0.053	0.225	0	1
electricty	Utilization of electricity service in house=1 else=0	6715	0.057	0.232	0	1
sewer	Utilization of sewer service in house=1 else=0	6715	0.007	0.081	0	1
garbage	Utilization of garbage disposal service in house=1 else=0	6715	0.006	0.079	0	1
stove	Utilization of stove service in house=1 else=0	6715	0.010	0.099	0	1
refrigerator	Utilization of refrigerator service in house=1 else=0	6715	0.015	0.123	0	1
washmach	Utilization of washing machine service in house=1 else=0	6715	0.001	0.024	0	1
sewach	Utilization of sewing machine service in house=1 else=0	6715	0.002	0.046	0	1
radio	Utilization of radio service in house=1 else=0	6715	0.024	0.154	0	1
Tv	Utilization of television service in house=1 else=0	6715	0.049	0.216	0	1
dvd	Utilization of dvd service in house=1 else=0	6715	0.021	0.144	0	1
cable	Utilization of cable service in house=1 else=0	6715	0.039	0.193	0	1
stereo	Utilization of stereo service in house=1 else=0	6715	0.006	0.075	0	1
telephone	Utilization of telephone service in house=1 else=0	6715	0.008	0.089	0	1
cellularph~e	Utilization of cellular phone service in house=1 else=0	6715	0.055	0.229	0	1
computer	Utilization of computer service in house=1 else=0	6715	0.011	0.102	0	1
internet	Utilization of internet service in house=1 else=0	6715	0.005	0.072	0	1
land	Total land area greater than 6 Acre(72 Katha)=1 else=0	6715	0.010	0.100	0	1

Table 2.4. Principal components/correlation

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.502	1.321	0.100	0.100
Comp2	1.181	0.092	0.047	0.147
Comp3	1.089	0.015	0.044	0.191
Comp4	1.074	0.014	0.043	0.234
Comp5	1.060	0.003	0.042	0.276
Comp6	1.057	0.006	0.042	0.319
Comp7	1.052	0.011	0.042	0.361
Comp8	1.040	0.012	0.042	0.402
Comp9	1.028	0.007	0.041	0.443
Comp10	1.021	0.008	0.041	0.484
Comp11	1.014	0.001	0.041	0.525
Comp12	1.013	0.003	0.041	0.565
Comp13	1.010	0.001	0.040	0.606
Comp14	1.008	0.003	0.040	0.646
Comp15	1.006	0.001	0.040	0.686
Comp16	1.005	0.004	0.040	0.726
Comp17	1.001	0.024	0.040	0.766
Comp18	0.977	0.012	0.039	0.805
Comp19	0.965	0.055	0.039	0.844
Comp20	0.910	0.152	0.036	0.880
Comp21	0.758	0.067	0.030	0.911
Comp22	0.691	0.064	0.028	0.938
Comp23	0.626	0.074	0.025	0.963
Comp24	0.553	0.191	0.022	0.986
Comp25	0.362	.	0.015	1.000

Number of obs. = 6555
Number of comp. = 25
Trace = 25
Rho = 1.0000
Rotation: (unrotated = principal)

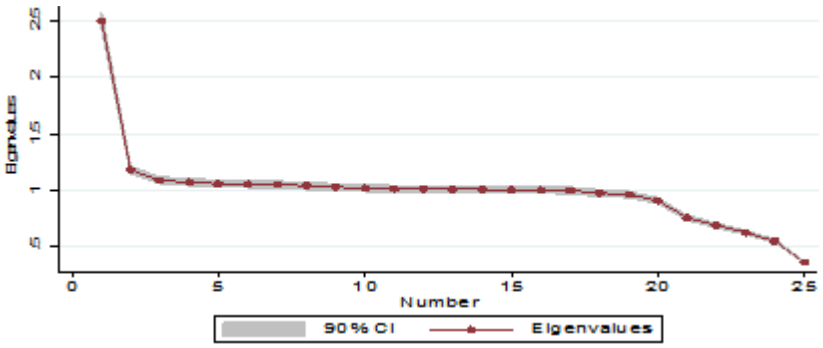

Fig 2.20. Scree plot of eigenvalues after a principle component analysis

Table 2.5. Principal components (eigenvectors)

Variables	Comp1	Comp2	Comp3	Comp4
Bicycle	-0.038	0.199	0.577	-0.392
Motorcycle	0.310	-0.415	-0.221	-0.111
Tractor	-0.013	0.437	0.025	0.445
Construction	0.502	0.231	-0.057	-0.040
Floor	0.389	0.120	-0.149	-0.075
Rooms	0.451	-0.147	0.152	0.048
Toilet	0.474	0.283	0.007	-0.074
Water	-0.007	-0.033	-0.001	-0.130
electricity	-0.011	0.027	0.079	-0.067
Sewer	0.017	-0.232	0.084	-0.212
Garbage	0.031	-0.178	0.078	-0.251
Stove	0.017	0.265	0.147	0.059
Refrigerator	0.090	0.073	-0.003	-0.089
Washmach	0.066	-0.156	0.250	0.243
Sewach	0.020	0.123	0.174	-0.159
Radio	0.024	0.064	-0.073	0.268
Tv	0.022	0.010	-0.197	0.073
Dvd	0.049	-0.098	-0.196	-0.186
Cable	0.035	-0.023	-0.296	0.112
Stereo	0.063	0.000	0.194	-0.105
Telephone	0.080	0.049	0.159	-0.015
cellularph~e	-0.013	0.037	0.098	0.092
Computer	0.089	-0.026	0.043	0.147
Internet	0.088	-0.115	0.254	0.310
Land	0.159	-0.440	0.355	0.367

Table 2.6. Descriptive statistics of wealth index

Variable	Variable Label	Obs	Mean	Std. Dev.	Min	Max
wealth_index	Scores for component 1	6555	0.000	1.582	-1.814	9.063

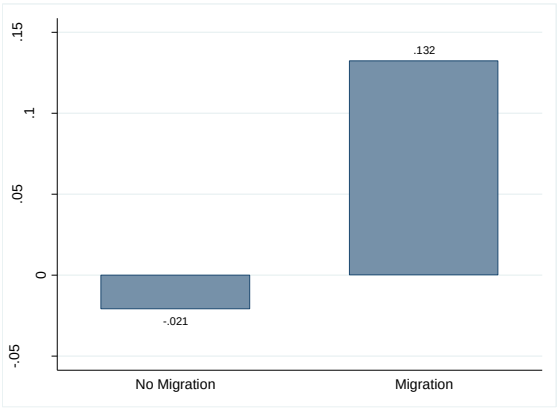

Fig 2.21. Wealth index and migration decision in the study area

In this study, the number of migrants from household head extended families in the internal destinations is termed as "household head extended internal migrants network." In the international destinations, the term is"household head extended international migrants network". The average number of household head extended internal migrants network was 9.39 in the sample households. This number was 9.31 among households having no migrants and 9.51 among the households having at least one migrant. Similarly, the average number of household head extended international migrants was 5.51 among all households, 5.48 among the households having no migrants and 5.77 among the migrant's households. (Figure 2.22).

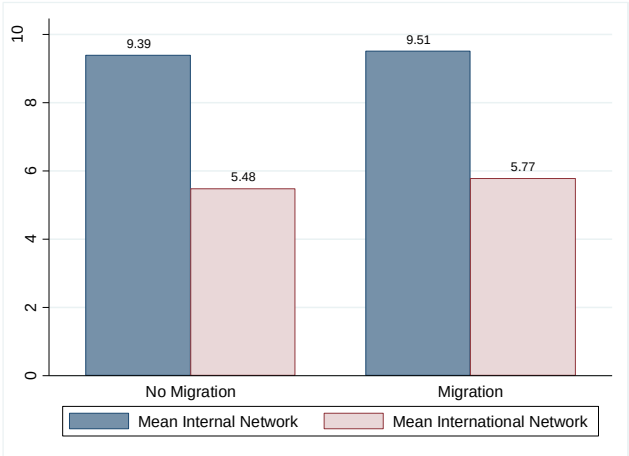

Fig 2.22. Migration network and migration decision in the study area

The average number of household head extended internal migrants network was 9.41 among internal migrant's households, and 9.53 among international migrant's households. Correspondingly, the average number of household head extended international migrants

network was 7.38 among internal migrant's households and 5.44 among international migrant's households (Figure 2.23).

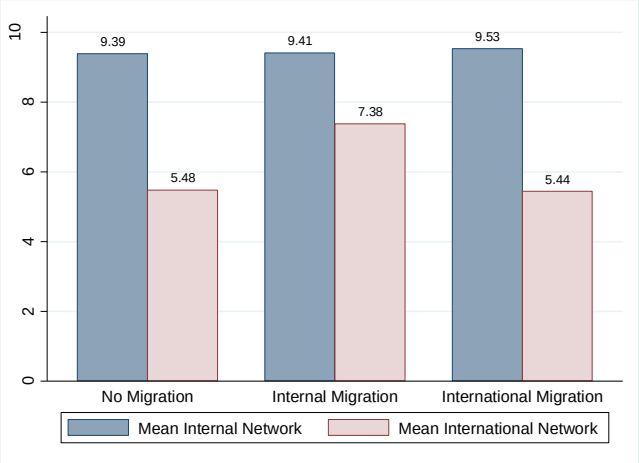

Fig 2.23. Migration network and migration destination choices in the study area

Figure 2.24 shows that international remittance income was almost 60 percent of the total household income in the sample households. Among international remittance receiving households, the average annual remittance was NRs. 37,621 (where, NRs.1=$0.01003 on Jan. 7, 2013).

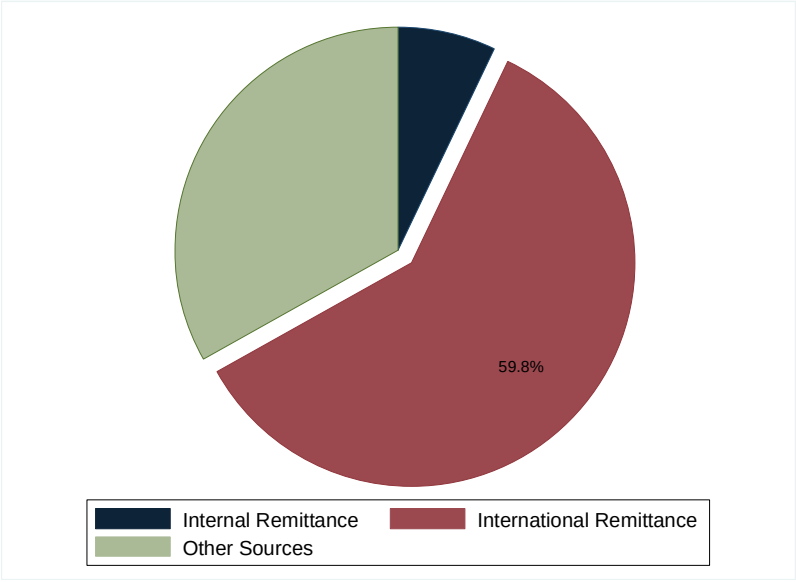

Fig 2.24. Major income sources in the study area

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CHAPTER III
TO MIGRATE OR NOT TO MIGRATE: DECISIONS OF NEPALESE ADULTS

1. Introduction

Migration refers to the movements of a person or group of people from one place to another place, which is generally understood as a permanent or semi-permanent change of residence (Lee, 1966). Migrants selectively choose to move across an international border or within a domestic boundary. Migration is an important issue in many countries around the world. Benefits and drawbacks of migration can be described in terms of "brain drain," "brain gain," "flow of remittances," and "flow of skill." Migration is a concern of both source and sink countries.

Sjaastad (1962) mentioned that the individual migration decision is grounded on the cost-benefit of migration subject to returns on an individual's human capital. The model of migration was rooted on the individual rational choice theory and migration decisions were assumed to rely on several push and pull factors. Rational choice theory, and pull and push factors were included in the classic papers by Sjasstad (1962) and Todaro (1969). During that time, the presumed push factors were socio-economic disadvantages within the individual, the household or location of origin. The pull factors were comparative socio-economic advantages in the migration destination. Lee (1966) also added that in addition to those push and pull factors in the place of origin and destination, other obstacles or restrictions such as cost of migration, distance of migration, cultural and language obstacles, and political barriers should be considered while modeling the migration. Therefore, the neoclassical economic theory of migration was based on the principle of utility maximization, rational choice, factor-price differentials between regions/countries and labor mobility (King, 2012).

After the neoclassical economic theory, transformation of migration theory occurred resulting in the New Economics of Labor Migration (NELM) which is the current accepted theory on migration. NELM combines the neoclassical individual decision making theory with

family decision making for migration (Stark and Taylor, 1991; Lucas and Stark, 1985; Stark and Bloom, 1985; Taylor, 1999). NELM focuses on two major aspects (King, 2012). First, migration decisions are joint decisions taken by household members. Second, a rational-choice decision is not only about differentials in wage and income as described in neoclassical push-pull theory, but also about income diversification and risk aversion. Hence, families allocate their members to different tasks and positions giving careful consideration to the risk-return tradeoff on the overall family economy. In addition to family decisions, migration networks are important while theorizing the migration decision because migration doesn't follow a unidirectional pattern as described by the neoclassical push-pull movement, rather it connects individual and socio-structural reasons for migration (Massey, 1990; Massey et al., 1993; Faist, 1997). NELM is also not above criticism. The main criticism of NELM is that it is only limited to the supply side of labor (Arango, 2004). Arango (2004) also mentioned that the NELM theory can be successfully applied in rural settings in Botswana and Mexico. This research study also applies the NELM theory to understand migration patterns in rural Nepal.

Nepal has a long (more than 200 years) history of international labor migration. During the early 19th century, the first Nepalese men migrated to Lahor, Pakistan, to join the army of the Sikh ruler Ranjit Singh, and this trend of migration as an army has been given the name "Lahure" (Thieme and Wyss, 2005). During the Anglo-Nepal war of 1814 to 1816, Nepali soldiers fought against the British-Indian army. The British-Indian rulers were impressed by the bravery of Nepali soldiers. As a result, the British ruler hired three Gurkha regiments into their army after 1816 treaty (Seddon et al., 2001). Today, Gurkhas are an important part of both the Indian and British armies. Joining these armies is still an attractive outlet for employment and remittance for Nepalese youths. Because of the proximity and no visa requirements, many Nepalese laborers have been migrating to India to join in the army and to work in agriculture, construction and the coal industry (Hoffmann, 2001). Before 1990, it was hard to get the

necessary travel documents and passports for an ordinary Nepalese citizen because of the autocratic regime. However, following the major political changes in 1990, it became easy to get passports and travel documents to move internationally. The Maoist insurgency, from February 1996 to May 2006, forced many rural people to migrate both internally and internationally (Bohra-Mishra & Massey, 2011).

Migration provides remittance and is helping to secure a better livelihood for many people living in the rural areas of Nepal (Thieme and Müller-Böker, 2004). However, there is still a lack of sufficient empirical evidence related to the driving forces behind internal and international migration. In this study, I identify the effects of push factors (individual and family factors) along with social networks on the migration decision.

2. Conceptual Framework for Migration Decision

According to human capital theory, migration of workers is a type of human capital investment, and anindividual's decision to migrate is a function of the migrant's present value of lifetime net benefits resulting from migration (Becker, 1962; Sjasstad, 1962). The role of unemployment in migration was introduced by Todaro (1969), and Harris & Todaro (1983). According to Bojras (2000), the net gain (NG) to migration is given by:

$$NG = \sum_{k=t}^{T} \frac{w_{jk} - w_{ik}}{(1+r)^{k-t}} - M \qquad (3.1)$$

Here, the worker, who is *t* years old, is currently employed at region *i* and is considering to migrate to place *j*. The *t* year old worker earns w_{it} at the current place and s/he would earn w_{jt} if s/he migrated from region *i* to region *j*. In this context, *r* is the discount rate, *T* is the age of retirement and *M* is the total cost of migration. The total cost includes transportation expenditures as well as the "psychic cost" (Bojras, 2000). The individual will migrate if NG > 0, i.e.

$$NG = \left\{ \sum_{k=t}^{T} \frac{w_{jk} - w_{ik}}{(1+r)^{-k+t}} - M \right\} > 0 \quad (3.2)$$

Hence, economic opportunities in the destination will increase the likelihood of migration while it will be reduced if the economic opportunities in the current location increase. Similarly, the higher cost of migration reduces the likelihood of migration $\left(\frac{\partial NG}{\partial M} < 0\right)$; therefore, the migrant's goal is to maximize the present value of lifetime net economic benefits from migration (Bojras, 2000; Nakosteen & Zimmer, 1980; Polachek & Horvath, 1977).

3. Econometric Model for Migration Decision

Migration decisions generally are modeled under the random utility framework (Ben-Akiva & Lerman, 1985; Pellegrini et al., 2002; Fafchamps & Shilpi, 2013). I have used a probit model for the migration decision based on Cameron & Trivedi (2005), Wooldridge (2000), Wooldridge (2010), Train (2009), and Gould et al. (2006). In this study, y_{ij} is a dummy variable, defined as:

$$y_{ij} = \begin{cases} 0 \; if \;\; household \; j \; has \; not \; sent \; a \; family \; member \; i \; for \; migration \\ 1 \; if \;\; household \; j \; has \;\; sent \; a \; family \; member \; i \; for \; migration \end{cases}$$

Now, I am interested in estimating this binary outcome model that can be expressed as:

$$Pr(y_{ij} = 1 | \, x_{ij})$$

Let U_{ij}^{m} be the utility derived from the migration of any individual i from household j and U_{ij}^{n} be the utility for non-migration of any individual i from the household j.

In the case of migrants:

$$U_{ij}^{m}(x_{ij}) = \alpha_0^m + \alpha_{ij}^m x_{ij} + \mu_{ij}^m \quad (3.3)$$

In case of non-migrants:

$$U_{ij}^{n}(x_{ij}) = \alpha_0^n + \alpha_{ij}^n x_{ij} + \mu_{ij}^n \quad (3.4)$$

Let's denote,

$\beta_0 = \alpha_0^m - \alpha_0^n$, $\beta_{ij} = \alpha_{ij}^m - \alpha_{ij}^n$ and $\varepsilon_{ij} = \mu_{ij}^m - \mu_{ij}^n$

Now, I have a model for having migration experiences as:

$$\beta_0 + \beta_{ij}x_{ij} + \varepsilon_{ij} \geq 0 \quad (3.5)$$

Now, I can define a latent variable y^* as:

$$y^*(x_{ij}; \beta_0, \beta_{ij}) \equiv \beta_0 + \beta_{ij}x_{ij} + \varepsilon_{ij} \quad (3.6)$$

I can express this latent variable as determining our outcome variable "y_{ij}", as defined below:

$$y_{ij} = \begin{cases} 0 \; if \; y^* \leq 0 \\ 1 \; if \; y^* > 0 \end{cases}$$

In order to estimate the probability of migration, I need to make a distributional assumption. Here, ε_{ij} is i.i.d with standard normal distribution, independent of x_{ij}

$$\varepsilon_{ij}|x_{ij} \sim N(0,1).$$

The probability density function of a standard normal is:

$$\emptyset(\mathrm{x}) = \frac{1}{\sqrt{2\pi}} . \exp(-\frac{x^2}{2}) \quad (3.7)$$

Similarly, the cumulative density function is:

$$\Phi(\mathrm{x}) = \int_{-\infty}^{x} \emptyset(\mathrm{z})\, dz \quad (3.8)$$

Now, the conditional probability of migraiton decision is given by:

$$\begin{aligned} \Pr(y_{ij} = 1|\, x_{ij}\,; \beta_0, \beta_{ij}) &= \Pr(\beta_0 + \beta_{ij}x_{ij} + \varepsilon_{ij} \geq 0 | x_{ij}) \\ &= \Pr(-\varepsilon_{ij} \leq \beta_0 + \beta_{ij}x_{ij}) \\ &= \Pr(\varepsilon_{ij} \leq \beta_0 + \beta_{ij}x_{ij}) \\ &= \Phi(\beta_0 + \beta_{ij}x_{ij}) \end{aligned} \quad (3.9)$$

Also,

$$\Pr(y_{ij} = 0|\, x_{ij}\,; \beta_0, \beta_{ij}) = 1 - \Phi(\beta_0 + \beta_{ij}x_{ij}) \quad (3.10)$$

Here, $\Phi(.)$ is the standard normal cumulative distribution function, x_{ij} is the vector of control variables and β_{ij} is the vector of parameters to be estimated. In the case of a probit

model, the method of estimation of vectors of parameters is "maximum likelihood", which can be described as:

$$L_i(\beta_0, \beta_{ij}\,; y_{ij}(x_{ij}) = \Pr(y_{ij} = 1|\, x_{ij}\,; \beta_0, \beta_{ij})^{y_{ij}}\ .\ \Pr(y_i = 1|\, x_{ij}\,; \beta_0, \beta_{ij})^{1-y_{ij}}$$

$$= \Phi(\beta_0 + \beta_{ij}x_{ij})^{y_{ij}}\ .\left[1 - \Phi(\beta_0 + \beta_{ij}x_{ij})\right]^{1-y_{ij}} \quad (3.11)$$

The full maximum likelihood estimates of parameters with the homoscedasticity assumption obtained by maximizing the log-likelihood function can be given as:

$$l_i(\beta_0, \beta_{ij}\,; y_{ij}|\, x_{ij}) = y_{ij}\ .\ln \Phi(\beta_0 + \beta_{ij}x_{ij}) + \left(1 - y_{ij}\right)\left[1 - \ln \Phi\left(\beta_0 + \beta_{ij}x_{ij}\right)\right] \quad (3.12)$$

Now for a sample of N individuals from the j^{th} household, it can be represented as:

$$l_i(\beta_0, \beta_{ij}\,; y|x) = \sum_{i=1}^{N}\{y_{ij}\ .\ln \Phi(\beta_0 + \beta_{ij}x_{ij}) + \left(1 - y_{ij}\right)\left[1 - \ln \Phi(\beta_0 + \beta_{ij}x_{ij})\right]\} \quad (3.13)$$

The procedures for estimating a probit model using STATA are given in Gould et al. (2006).

4. Descriptive Statistics

The dependent variable used for estimating the migration probability equation is a dummy variable (1 = an individual from a household has migrated; 0 = otherwise). Summary statistics of variables used in the regression model are presented in Table 3.1. I have used individual characteristics, household characteristics and social networks variables in this study. Though it is assumed that community characteristics are very important for migration, in our situation, the community characteristics of all the study sites are similar. The location, weather, and availability of different resources of development are almost exactly the same because all observations came from a small area within Eastern Chitwan. In addition to household and individual characteristics, I have included the social network characteristics to control for and understand the effects of networking on migration decision. Hence, all of the explanatory variables belong to three different categories; individual, household and social network.

Table 3.1. Descriptive statistics of independent variables

Variables	Variable label	Obs	Mean	Std. Dev.	Min	Max
Individual characteristics						
house_head	Are you household head? (1=yes, 0= no)	6714	0.176	0.381	0.000	1.000
all_gender	What is your gender? (1=male, 0=female)	6708	0.530	0.499	0.000	1.000
age	Age of the individual (number of years)	6663	29.405	17.903	0.120	96.000
agesq	Age squared of the individual	6663	1185.150	1342.350	0.014	9216.000
all_marital	Are you married? (1=yes, 0= no)	6482	0.567	0.496	0.000	1.000
school_year	How many years of education? (number)	5488	8.481	4.275	0.000	22.000
Household characteristics						
male_num	What is the number of males above 15 years of age? (number)	395	2.615	1.385	0.000	9.000
female_num	What is the number of females above 15 years of age? (number)	395	2.575	1.497	0.000	9.000
male_educ	What is the number of males in family with secondary education? (number)	395	1.838	1.196	0.000	7.000
female_educ	What is the number of females in family with secondary education? (number)	395	1.511	1.311	0.000	8.000
hh_educ	What is the number of schooling years of household head? (number)	395	5.365	5.045	0.000	22.000
land_area	Land area (number in kattha)	381	11.575	15.217	0.100	112.000
anim_unit	Household's animal unit (number)	348	5.132	13.045	0.000	111.700
wealth_indx	Wealth index (number)	386	0.000	1.570	-1.811	7.329
wealth_ind~q	Wealth index squared	386	6555.000	2.463	3.616	0.000
S*ocial network characteristics*						
in_network	How many internal migrants are there from the household head's extended family? (number)	2938	9.403	5.346	0.000	34.000
out_network	How many international migrants are there from the household head's extended family? (number)	2444	5.515	2.682	0.000	10.000

In the following section, I describe the rationale behind the selection of these variables and their expected signs in the migration decision.

4.1.Individual characteristics

I have included individual characteristics as explanatory variables. According to Stark & Taylor (1991), migrants tend to not be heads of households mainly because of the administrative responsibilities of household heads on the family farm and other village level obligations. In addition, they mentioned that household heads are more unlikely to choose international migration but are no less likely to be internal migrants than those who are not heads of households. To control for this effect, I have included a dummy variable named "house_head" that takes a value 1 if an individual is a household head and 0 otherwise.

Migration is gender oriented in developing economies (Lee, 1985). Nepal is a patriarchal society; therefore, males are more likely to migrate than females (Bhandari, 2004). In this study the variable called "all_gender" takes the value 1 if male and 0 if female.

Age is nonlinearly related to migration (Shryock, 1964; Shaw, 1975; Kennan & Walker, 2011; Chi and Voss, 2004). Younger individuals are more likely to move than the older individuals because younger individuals can earn more money and for a longer duration of time than older individuals (Kennan & Walker, 2011). In this study the variable named "age" represents the age of the individual and because of expected strong nonlinear relationship, I have also included the square of age as an explanatory variable.

Marital status of an individual is also a key variable to explain the migration decision (Shryock 1964, Shaw, 1975; Mincer, 1977; Hare, 1999; Zhao, 1999; Zhu, 2002). Married people are less likely to migrate than non-married people (Mincer, 1977; Hare, 1999; Zhao, 1999; Zhu, 2002). I have included a dummy variable named "all_marital', which is denoted by 1 if the individual is married and 0 otherwise.

Migration of an individual is more likely with increased education (Mincer, 1974; Mincer, 1977; Da Vanzo, 1981) because education is an investment that increases worker's productivity and provides an opportunity for the worker to earn more (Becker, 1993). In addition, education makes people aware of new opportunities (Shaw, 1975) and they tend to migrate more in order to find jobs that match their skill levels (De Haan, 1999; Marre 2009). The "school_year" variable included in the regression model is the number of years that an individual attended school.

4.2.Household characteristics

Higher numbers of adults in the family is expected to increase the chance of migration to internal and international locations (Mincer, 1977; Findley 1987). Given the fact that Nepal is a patriarchal society, males are more likely to get better education and migrate compared to females. In this study, "male_num" represents the number of males in the household above 15 years of age and "female_num" indicates the number of females in the household above 15 years of age.

An increase in the number of household members with secondary education is likely to result in more migration (Mincer, 1974; Mincer, 1977; Da Vanzo, 1981); however the result is expected to be different with respect to the gender of educated family members. In the regression model, I have mentioned "male_educ" for total number of males with secondary education in the household and "female_educ" for total number females with secondary education in the household.

Landholding is also an important characteristic to determine the migration decision of a household member (Lee, 1985; Stark & Taylor, 1991; Mora & Taylor, 2006). Bilsborrow (1981) mentioned that a household with large amounts of landholding tends to have higher income and encourage its members for out-migration; however, according to Mora & Taylor (2006), as the value of family landholding increases, the probability of migration decreases. I

have included the variable named “land_area” in the regression model which represents total landholding size of the household in the study area. The total land area is measured in kattha. The quality of land is almost similar in all the study VDCs; therefore, the value of land is mainly determined by the quantity of land holdings, not by the quality of land among the survey households.

Previous research in the field of migration has included livestock number or livestock index as an explanatory variable (Winters et al., 2001; Mora and Taylor 2006). I have developed an index variable called “animal_unit” in order to indicate the animal unit equivalents of the household.

As a proxy for the measure of living standard and also to test the hypothesis relating to living standard on migration decision and destination choices, I have constructed and used a welfare index named “wealth_indx” in the regression model. Wealth index reflects how an individual can handle the fixed cost and perceived risk associated with migration. Following the findings of Cerruti and Massey (2001) and Mora and Taylor (2006), I have hypothesized that wealth index impacts the migration decision positively.

4.3.Social network characteristics

Based on the social network theory (Granovetter, 1973), several researchers in the field of migration have described the importance of the migration network on the migration decision of an individual (Boyd, 1989; Espinosa & Masse,1997; Massey et al., 1994; Davis & Winters, 2001; Munshi, 2001; Mora & Taylor, 2006). Mora & Taylor (2006) have shown that migration network is important to describe the international migration decision from Mexican villages to the United States. Migration network not only lowers the cost of migration through direct assistance (Boyd, 1989) but also provides support to gain benefits and to reduce uncertainties in the destinations (Massey et al., 1994; Munshi, 2001). Therefore, these networks are expected to affect the individual and family decision on migration positively. In this study, I have

developed two variables to control the effects of social network characteristics. The first variable named "in_network" represents the number of internal migrants from the household head's extended families. Similarly, the second variable "out_network" represents the number of international migrants from the household head's extended families.

5. Results

Results suggest that individual characteristics such as household head, gender and age are important for explaining the migration decision from Nepal. Similarly, the number of adults (male and female), number of household members with secondary education, total land area, and wealth index are important household level variables that shape migration decisions in the context of East Chitwan, Nepal. Though I expected a significant contribution of social networks on the migration decision, results didn't support that hypothesis. Table 3.2 presents coefficients and marginal effects associated with individual, household, and social network level variables.

Results based on individual characteristics indicate that household heads are less likely to participate in migration. Holding all else constant, the probability of migration of a household head is 7.7 percent lower than the migration of another member of the household. Similarly, all else being status quo, the probability of migration of a male individual from a family is 30.1 percent higher than migration of a female individual. As hypothesized, age of an individual has followed a quadratic pattern. Results suggest that with the increase of age, the likelihood of migration increases up to certain age years and then it starts to decline ceteris paribus. Figure 3.1 presents the average marginal effects of age on probability of migration.

The regression estimate indicate that households with higher numbers of adult males above working age (15 years) are more likely to participate in migration; however, the impact on migration is opposite for the households with higher number of females above working age.

Table 3.2. Binary probit regression results for migration decision (base outcome: no-migration)

Variables	Coeff.	ME
Individual Characteristics		
house_head	-0.540**	-0.077**
	(0.211)	(0.030)
all_gender	2.126***	0.301***
	(0.167)	(0.020)
Age	0.220***	0.031***
	(0.027)	(0.004)
Agesq	-0.003***	-0.000***
	(0.000)	(0.000)
all_marital	0.151	0.021
	(0.171)	(0.024)
school_year	0.013	0.002
	(0.017)	(0.002)
Household Characteristics		
male_num	0.228**	0.032**
	(0.089)	(0.013)
female_num	-0.127*	-0.018*
	(0.072)	(0.010)
male_educ	-0.396***	-0.056***
	(0.086)	(0.012)
female_educ	0.377***	0.053***
	(0.071)	(0.010)
hh_educ	0.012	0.002
	(0.014)	(0.002)
land_area	-0.015***	-0.002***
	(0.005)	(0.001)
anim_unit	-0.007	-0.001
	(0.006)	(0.001)
wealth_indx	0.162***	0.023***
	(0.051)	(0.007)
wealth_indxsq	-0.021	-0.003
	(0.019)	(0.003)
Social Network Characteristics		
in_network	0.005	0.001
	(0.009)	(0.001)
out_network	-0.003	-0.000
	(0.020)	(0.003)
Constant	-6.334***	
	(0.490)	
N	1688	
pseudo R^2	0.409	

Note: Coeff. Stands for coefficients, ME stands for marginal effects. Standard errors in the parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

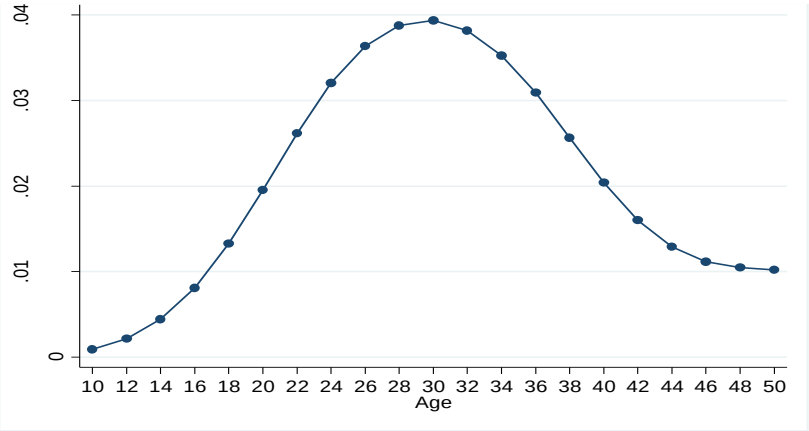

Figure 3.1. Average marginal effects of age

The probability of household participation in migration increases by 3.2 percent with an additional working age male in the household, whereas it decreases by 1.8 percent with an additional working age female in the household. The variable education level was significant, in that it indicates an additional male household member with a secondary education, the probability of migration decreases by 5.6 percent. However, the addition of one more female household member with secondary education, the probability of migration increases by 5.3 percent. With an additional kattha of land holding decreases the probability of migration by 0.2 percent, ceteris paribus. As expected, a higher wealth index (proxy for living standard) increases the likelihood of migration. Holding all else being constant, an additional point in wealth index increases the probability of migration up to certain wealth index value. Figure 3.2 presents the average marginal effects of wealth index on migration decision.

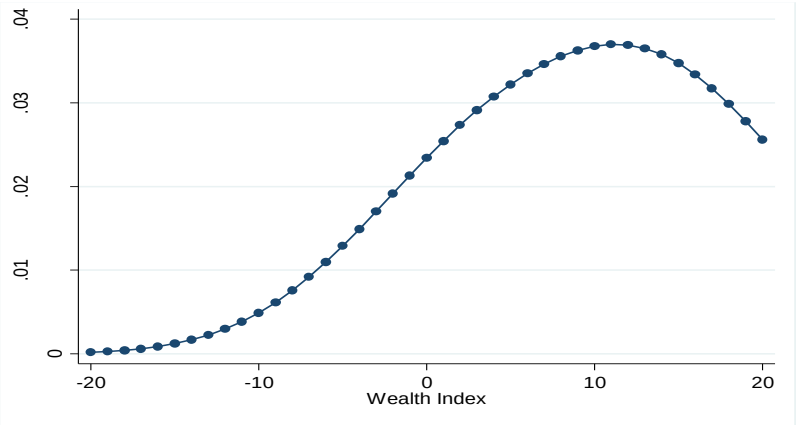

Figure 3.2. Average marginal effects of wealth index

6. Conclusions

I have estimated the role of individual, household and social network characteristics on the migration decision. The findings suggest that migration decision in East Chitwan, Nepal can be explained by household and individual level characteristics.

In the case of individual characteristics, variables such as household head, gender, and age show significant effects on migration decision. Probit estimates show that household heads are less likely to migrate. This is consistent with the findings of Stark & Taylor (1991) which explains that migrants tend not to be heads of households mainly because of the administrative responsibilities of household heads on the family farm and other village level obligations. Furthermore, males are more likely to move than females because Nepal in general is a patriarchal society (Bhandari, 2004).

Similarly, the household level characteristics such as the number of males above 15 years of age, number of adults (male and female) with secondary education, total land area, and wealth index of the households significantly explains the migration decision. The econometric estimation indicates that with the increase of male numbers above 15 years of age in the household significantly increase the probability of migration. This finding is also consistent with Mincer (1977) and Findley (1987), except they mentioned it holds for total adult members of the household (not only male). However, as shown in the results, it is only the number of adult males and not the adult females, which can significantly explains migration decisions of the household in the patriarchal society of Nepal. Education makes individuals aware of new opportunities (Shaw 1975) and they tend to migrate more in order to find jobs that match their skill levels (de Haan, 1999; Marre, 2009). The increase in the number of females in the household with secondary education results in migration, whereas, the opposite holds for the number of male members with secondary education. This is expected, because females can explore opportunities beyond the kitchen with the higher education. However, for

males, who are basically the low wage workers in major international destinations from the study area, require below secondary level of education. The estimate for land holding size (which is the major determinant of land value in the study site) indicates that it has a negative effect on the migration decision, which is consistent with the findings of Mora & Taylor (2006). I have hypothesized that wealth has a curvilinear relationship with the migration decision; however, the estimates suggest that families with a low living standard tend to move with the increase of wealth of the household.

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CHAPTER IV
REMITTANCE ECONOMY OF NEPAL AND MIGRATION DESTINATION CHOICES

1. Introduction

Migration within and outside of one's country of birth is a worldwide phenomenon. Many scholars in the field of migration research are convinced with the statement that this is the "Age of Migration" (Castles et al., 2005; Brettell & Hollifield, 2013). Different types of human migration have been described in pervious migration literature such as "internal vs. international migration," "temporary vs. permanent migration," and "regular vs. irregular migration." Several push factors motivate people to leave their place of origin and different pull factors attract migrants to new destinations. Migration has many effects on the economic situation of both migrants sending and the migrant receiving countries.

Remittance is the money earned and transferred by the non-national workers back to their country of origin. It is one of the significant sources of capital in many low income countries (Adams et al., 2005). The World Bank (2013) has estimated that the remittance receipt in developing countries is expected to reach $414 billion during 2013. The officially recorded top remittance receiving countries in 2013 were India ($71 billion), China ($60 billion), the Philippines ($26 billion), Mexico ($22 billion), Nigeria ($21 billion), and Egypt ($20 billion). Based on the same report, as a percentage of GDP, the top recipients of remittance in 2012 were Tajikistan (48 percent), Kyrgyz Republic (31 percent), Nepal (25 percent), Lesotho (25 percent) and Moldova (24 percent).

According to a CBS (2011) report, remittances in Nepal increased by about five-and-a-half fold in the 15 years period; from about NRs. 46billion in 2003/04 to NRs. 259 billion in 2010/11 in nominal terms. Based on the same report, the share of internal remittances on total remittances decreased from 44.7 percent in 1995/96 to about 19.6 percent in 2010/11. Conversely, the share of international remittances on total amount of remittances increased

from 22.4 percent in 1995/96 to 69 percent in 2010/11 from other countries except India. During the 15 years (1995/96 – 2010/11), the total value of remittances received from India decreased by about 22 percent and total amount of remittances received from other countries increased by 47 percent (Table 4.1). Even if India hosted the largest number of Nepali migrants, the total remittances share from India was only 11.3 percent in the year 2011 (CBS, 2011). This share amount is below the total share of remittances coming from Saudi Arabia, which was 16.0 percent (CBS, 2011). Among the major destination countries, the mean amount of remittances from India (NRs. 29,499) was the lowest (Table 4.2). The large number of migrants in India is contributed by the fact that migrants require very little skill and they do not need a visa to go to India. Additionally, the seasonal migrants travel to India to participate in several agricultural activities; for example, harvesting of fruits and vegetables (Seddon et al., 2002).

Table 4.1. Summary statistics of remittances and transfers

	Nepal living standards survey		
Description	1995/96	2003/04	2010/11
Percent of all households receiving remittances	23.4	31.9	55.8
Nominal average amount of remittance per recipient household (NRs.)	15,160	34,698	80,436
Share of total amount of remittances received by household			
From within Nepal	44.7	23.5	19.6
From India	32.9	23.2	11.3
From other countries	22.4	53.3	69.1
Share of remittances in total household income among recipients	26.6	35.4	30.9
Nominal per capita remittance received for all Nepal (NRs.)	625	2,100	9,245
Nominal total amount of remittance received (million NRs.)	12,957.8	46,365.5	259,088.5

Source: CBS/ Nepal Living Standards Survey (NLSS) 2010/11
Note: NRs.1=$0.01003 on Jan. 7, 2013

According to the World Bank (2013), Nepal's trade deficit has reached 27.1 percent of GDP during fiscal year 2013, a record low (down from 24.3 percent the year before) and remittances went up by 20.9 percent during the same year. As a result, officially recorded private transfers amounted to over 25.5 percent of GDP in fiscal year 2013. Although there was

no notable progress in the production and promotion of exportable goods except limited traditional items, the surplus of current account balance in the last decade was mainly due to the improvement in remittance income (MOF, 2012). Hence, remittance income has been a significant portion of the national economy in Nepal.

During that year, a total of 146,938 migrant workers left for Malaysia, which is the highest number of migrant workers going to any country anywhere in the world from Nepal (Table 4.3) , and it was followed by Saudi Arabia (46,047), Qatar (26,993), United Arab Emirates (21,346), Bahrain (16,673) and Lebanon (1,623) in the year 2010 (DOFE, 2010). After Malaysia, the second largest concentration of Nepalese migrant workers in East Asia went to South Korea, where 3,221 Nepalese migrants were working under a significantly reformed and emerging Employment Permit System (EPS) in the year 2010 (NIDS, 2010). Several countries in the Gulf hosted the largest concentration of Nepalese workers due to the construction boom in these countries (NIDS, 2010).

Table 4.2. Size and share of remittances received by source per year in 2010/11

Source of Remittance	Mean amount of remittance received (NRs.)	Total amount of remittance received (NRs.)	Share of remittance amount received (Percent)
Internal Source			
Urban Nepal	25,454	25,713,539,244	9.9
Rural Nepal	12,127	25,172,505,886	9.7
External Source			
India	29,499	29,197,865,119	11.3
Malaysia	93,474	21,776,508,833	8.4
Saudi Arabia	108,561	25,770,996,309	9.9
Qatar	115,794	41,327,887,124	16.0
United Kingdom	164,842	7,719,576,662	3.0
Other	224,609	82,362,803,100	31.8
Other			
Donor	16,547	46,795,183	0.0
Nepal	58,335	259,088,477,460	100.0

Source: CBS/Nepal Living Standard Survey (NLSS) 2010/11

Table 4.3. Migrant workers by destination

No.	Country	Male	Female	Total
1	Afghanistan	472	0	472
2	Algeria	35	0	35
3	Bahrain	16554	119	16673
4	Hong Kong	86	32	118
5	Israel	65	0	65
6	Japan	16	6	22
7	Jordan	249	0	249
8	Kuwait	3916	8	3924
9	Lebanon	756	867	1623
10	Libya	1185	0	1185
11	Macau	39	0	39
12	Malaysia	145942	996	146938
13	Maldives	45	0	45
14	Mauritius	33	0	33
15	Oman	1276	2	1278
16	Pakistan	145	0	145
17	Poland	27	31	58
18	Qatar	26964	29	26993
19	Russia	8	0	8
20	Saudi Arabia	46040	7	46047
21	Seychelles	28	0	28
22	United Arab	20936	410	21346
23	United States	22	0	22
24	South Korea	2118	0	2118

Source: DOFE (2010) and NIDS (2010)

In total migration, the share of within country migration and migration to India has decreased from the past few years, but an increasing number of Nepalese has gone to the Gulf and East Asian countries. This is because migrants can earn considerably more in Gulf and East Asian countries than in India or within Nepal (CBS, 2005). Although there is availability of summary statistics on the number of migrants, there is very little known about the factors affecting choices of internal and international destinations for Nepalese migrants. To fill this void in the literature, I have used survey information collected from the Chitwan district of Nepal to understand different facets of migration. Here, I identify the relationship of different explanatory variables on internal and international migration destination choices.

2. Conceptual Framework for Migration Destination Choices

Migration destination choices are grounded in the random utility theory model such that a family member from a household is observed to select the destination yielding maximum utility among all other alternatives in the choice set (Mora and Taylor, 2006; Ben-Akiva & Lerman, 1985; Pellegrini et al., 2002; Fafchamps & Shilpi, 2013). Following Pellegrini et al. (2002), U_{ijn} is the utility derived by an individual n located at origin i from selecting alternative destination j. Additionally, U_{ijn} is the sum of two components V_{ijn} (the systematic or observable utility) and ε_{ijn} (a random error), i.e.

$$U_{ijn} = V_{ijn} + \varepsilon_{ijn} \quad (4.1)$$

In terms of probability, a person n at an origin i choosing an alternative j is equal to the probability that the utility of j i.e. U_{ijn}, which is greater than the utilities of all other alternatives in choice set C_{in} i.e.

$$P_{in}(j|C_{in}) = \Pr(U_{ijn} > U_{ikn}) \ \forall\, k \in C_{in}\ j \neq k \quad (4.2)$$

Using the above two equations:

$$P_{in}(j|C_{in}) = \Pr(V_{ijn} + \varepsilon_{ijn} > V_{ikn} + \varepsilon_{ikn}) \ \forall\, k \in C_{in}\ j \neq k \quad (4.3)$$

Alternatively,

$$P_{in}(j|C_{in}) = \Pr(\varepsilon_{ikn} < V_{ijn} - V_{ikn} + \varepsilon_{ijn}) \ \forall\, k \in C_{in}\ j \neq k \quad (4.4)$$

Error distribution dictates the choice of an appropriate econometric model.

2.1. Conceptual framework for major international destination choices

The basic economic principle underlying the international migration destination choices is the same as described for the "migration destination choice". An individual i ($i = 1,2,3,\ldots\ldots\ldots,n$) from j household can be observed as an international migrant from a source country s to foreign destination country d if

$$\gamma_{ij} = w_{d,ij} - w_{s,ij} - z_{ij} - c > 0. \quad (4.5)$$

Here, $w_{d,ij}$ is earnings of an individual in a foreign country, $w_{s,ij}$ is earnings of the individual in his or her home country, z_{ij} is a hardship factor, and c is the direct cost of migration. An individual i is more likely to migrate with a higher wage in the destination country, a lower home wage, lower hardship, and a lower fixed cost of migration. Hatton & Williamson (2002) provides the details on fundamental drivers related to world migration.

3. Econometric Model for Migration Destination Choices

I estimate two different migration destination models. In the first case, I model three choice decisions: no migration, internal destination choice and international destination choice. In the second model, given the international destination choice, I identify the variables affecting the decision to migrate to one of the four common international destinations: India, Malaysia, Gulf Countries and Other countries. In both of these cases, since the dependent variable is discrete with three and four categories respectively, I use a multinomial logit model. I develop an econometric model for migration destination following the concept's provided in Cameron & Trivedi (2005), Wooldridge (2000), Wooldridge (2010), Lewis (1954), McFadden (1974), McFadden (2001) and Gould et al. (2006) . In the first situation, there is either no migration or two destination choices (Internal migration or international migration). Let's write these three choices as $k = \{1,2,3\}$. Therefore, for individual i from household j, the three possible choices $y_{ij} = k$ can be represented as:

$$y_{ij} = \begin{cases} 1\ if\ \ household\ has\ not\ sent\ a\ family\ member\ \ for\ migration \\ 2\ if\ household\ has\ sent\ a\ family\ member\ towards\ an\ internal\ \ destination \\ 3\ if\ \ household\ has\ sent\ a\ family\ member\ towards\ an\ international\ \ destination \end{cases}$$

Now the i^{th} individual's utility from j^{th} household for choosing k^{th} destination is determined by an additive random utility model that is given by:

$$U_{ijk}\left(x_{ij}\right) = \propto_0^{(k)} + \propto_{ij}^{(k)} x_{ij} + \varepsilon_{ijk} \qquad (4.6)$$

As, such there are three possible choices i.e. $k = \{1,2,3\}$, following three utilities can be obtained by the individual based on the type of choice;

For choosing not to migrate:

$$U_{ij1}\left(x_{ij}\right) = \propto_0^{(1)} + \propto_{ij}^{(1)} x_{ij} + \varepsilon_{ij1} \tag{4.7}$$

For choosing internal destination:

$$U_{ij2}\left(x_{ij}\right) = \propto_0^{(2)} + \propto_{ij}^{(2)} x_{ij} + \varepsilon_{ij2} \tag{4.8}$$

For choosing international destination:

$$U_{ij3}\left(x_{ij}\right) = \propto_0^{(3)} + \propto_{ij}^{(3)} x_{ij} + \varepsilon_{ij3} \tag{4.9}$$

These three utility functions determine the destination choice for optimizing the welfare of an agent. Now the conditional probability of the i^{th} individual choosing $y_{ij} = k$ out of K destination choices is given by:

$$\Pr(y_{ij} = k \mid x_{ij}) = Pr\left[U^{(k)}(x_{ij}) > \max_{k \neq j}\left(U^{(l)}(x_{ij})\right) | x_{ij}\right]$$

$$= Pr\left[\propto_0^{(k)} + \propto_{ij}^{(k)} x_{ij} + \varepsilon_{ijk} > \max_{l \neq k} (\propto_0^{(l)} + \propto_{ij}^{(l)} x_{ij} + \varepsilon_{ijl}) | x_{ij}\right] \tag{4.10}$$

I need to make a distributional assumption in order to estimate the above equation. In case of multinomial logit, ε_{ijk} is i.i.d with a type I extreme value distribution, independent of x_{ij};

$$\Pr(\varepsilon_{ij} < z \mid x_{ij}) = \Pr(\varepsilon_{ij} < z) = \exp(-\exp(-z)) \tag{4.11}$$

The above equation defines the cumulative density function of $F(z)$; this implies a probability density function as:

$$f(z) = \frac{d}{dz}\exp(-\exp(-z)) = \exp(-z) \cdot \exp(-\exp(-z))$$

$$= \exp(-z) \cdot F(z) \tag{4.12}$$

Therefore,

$$\Pr(y_{ij} = k \mid x_{ij}) = \frac{\exp(\propto_0^{(k)} + \propto_i^{(k)} x_{ij})}{\sum_l \exp(\exp \propto_0^{(l)} + \propto_{ij}^{(l)} x_{ij})} \tag{4.13}$$

Hence, the probability of choosing not to migrate is given by:

$$\Pr(y_{ij} = 1 \mid x_{ij})$$

$$= \frac{\exp(\propto_0^{(1)} + \propto_{ij}^{(1)} x_{ij})}{\exp(\propto_0^{(1)} + \propto_{ij}^{(1)} x_{ij}) + \exp(\propto_0^{(2)} + \propto_{ij}^{(2)} x_{ij}) + \exp(\propto_0^{(3)} + \propto_{ij}^{(3)} x_{ij})} \tag{4.14}$$

The probability of choosing internal migration destination is given by:

$$\Pr(y_{ij} = 2 \mid x_{ij})$$

$$= \frac{\exp(\propto_0^{(2)} + \propto_{ij}^{(2)} x_{ij})}{\exp(\propto_0^{(1)} + \propto_{ij}^{(1)} x_{ij}) + \exp(\propto_0^{(2)} + \propto_{ij}^{(2)} x_{ij}) + \exp(\propto_0^{(3)} + \propto_{ij}^{(3)} x_{ij})} \tag{4.15}$$

The probability of choosing international migration destination is given by:

$$\Pr(y_{ij} = 3 \mid x_{ij})$$

$$= \frac{\exp(\propto_0^{(3)} + \propto_{ij}^{(3)} x_{ij})}{\exp(\propto_0^{(1)} + \propto_{ij}^{(1)} x_{ij}) + \exp(\propto_0^{(2)} + \propto_{ij}^{(2)} x_{ij}) + \exp(\propto_0^{(3)} + \propto_{ij}^{(3)} x_{ij})} \tag{4.16}$$

In this multinomial logit estimation model, I use "not to migrate" as a reference or base category; therefore, I can re-define the coefficient estimates as:

$$\beta_0^{(2)} = \alpha_0^{(2)} - \alpha_0^{(1)} \tag{4.17}$$

$$\beta_{ij}^{(2)} = \alpha_{ij}^{(2)} - \alpha_{ij}^{(1)} \tag{4.18}$$

$$\beta_0^{(3)} = \alpha_0^{(3)} - \alpha_0^{(1)} \tag{4.19}$$

$$\beta_{ij}^{(3)} = \alpha_{ij}^{(3)} - \alpha_{ij}^{(1)} \tag{4.20}$$

Plugging these values into the above equations and with the multiplication of numerator and denominator of each conditional probability by $\exp(-\alpha_0^{(1)} - \alpha_{ij}^{(1)} x_{ij})$, we can obtain equations shown here.

The probability of choosing not to migrate is given by:

$$\Pr(y_{ij} = 1 \mid x_{ij}) = \frac{1}{1 + \exp(\beta_0^{(2)} + \beta_{ij}^{(2)} x_{ij}) + \exp(\beta_0^{(3)} + \beta_{ij}^{(3)} x_{ij})} \quad (4.21)$$

The probability of choosing an internal migration destination is given by:

$$\Pr(y_{ij} = 2 \mid x_{ij}) = \frac{\exp(\beta_0^{(2)} + \beta_{ij}^{(2)} x_{ij})}{1 + \exp(\beta_0^{(2)} + \beta_{ij}^{(2)} x_{ij}) + \exp(\beta_0^{(3)} + \beta_{ij}^{(3)} x_{ij})} \quad (4.22)$$

The probability of choosing an international migration destination is given by:

$$\Pr(y_{ij} = 3 \mid x_{ij}) = \frac{\exp(\beta_0^{(3)} + \beta_{ij}^{(3)} x_{ij})}{1 + \exp(\beta_0^{(2)} + \beta_{ij}^{(2)} x_{ij}) + \exp(\beta_0^{(3)} + \beta_{ij}^{(3)} x_{ij})} \quad (4.23)$$

Now, the full maximum likelihood function for an i^{th} individual can be expressed as:

$$l_i(\beta_0^{(1)}, \beta_{ij}^{(1)}, \beta_0^{(2)}, \beta_{ij}^{(2)}, \beta_0^{(3)}, \beta_{ij}^{(3)} ; y_{ij} \mid x_{ij})$$

$$= 1(y_{ij} = 1).\ln[(y_{ij} = 1 \mid x_{ij})] + 1(y_{ij} = 2).\ln[(y_{ij} = 2 \mid x_{ij})] + 1(y_{ij} = 3).ln\,[(y_{ij} = 3 \mid x_{ij})] \quad (4.24)$$

This above function is the log-likelihood function that defines the multinomial model when an individual has three possible choices.

3.1. Econometric model for major international destination choices

Unlike two migrations destinations (internal and international) as described in earlier paragraphs, here I am going to model four international migration destinations. The major international migration destinations that are used in this model are India, Malaysia, Gulf Countries and Other Countries. The underlying econometrics of a multinomial logit model for the analysis is described in the section 5.1. In brief, following the destination choices concept in the previous paragraph, utility for an individual i from j^{th} household choosing the k^{th} international migration destination can be given as:

$$U_{ijk}\,(x_{ij}) = \propto_0^{(k)} + \propto_{ij}^{(k)} x_{ij} + \varepsilon_{ijk} \quad (4.25)$$

In this scenario, there are four possible discrete international destination choices ($y_{ij} = k$); therefore, the possible choice set is $k = \{1,2,3,4\}$. Based on the underlying theory and

assumptions of a multinomial logit model in the previous section, the reduced regression form in this case with 1 (India) as base category is given as:

$$\ln \frac{(\Pr(d_{ij} = 2,3,4))}{\Pr(d_{ij} = 1)} = \gamma_0 + \gamma_{ij} z_{ij} + \delta_{ij} h_{ij} + \rho_{ij} s_{ij} + \varepsilon_{ij} \quad (4.26)$$

I estimate the reduced form of a multinomial regression model (4.26) , where d_{ij} represents four international destination choices (1= India, 2= Malaysia, 3= Gulf Countries and 4= Other), z_{ij} represents individual level characteristics, h_{ij} represents household level characteristics, s_{ij} represents social network characteristics and ε_{ij} represents the random error term.

4. Descriptive Statistics

The dependent variable used for estimating the within or outside migration destination choice equation has three choices (1= if no migration, 2= if internal destination choice and 3= if international destination choice). Similarly, the dependent variable for the estimation of international migration destination choice equation has four categories (1=if the individual migrated to India, 2= if the individual migrated to Malaysia, 3= if the individual migrated to Gulf Countries and 4= if the individual migrated to other countries than India, Gulf and Malaysia). The control variables for both of these migration destination choice models are exactly the same as I have used for the migration decision model in chapter 3.

5. Results

First, I interpret the marginal effects of the significant explanatory variables related to internal and international migration destinations choices. Then, I describe the variables affecting the major international migration destination choices for Nepalese Migrants.

5.1. Migration destination: internal and international destination choices

Results from the multinomial logit model are presented in Table 4.4, where "no migration" is the base or reference category.

Table 4.4. Multinomial logit model results for internal and international destination choices (base outcome: no-migration)

	Internal destination		International destination		No migration
Variables	Coeff.	ME	Coeff.	ME	ME
Individual characteristics					
house_head	-1.485	-0.017	-1.183***	-0.074***	0.091***
	(1.133)	(0.017)	(0.418)	(0.028)	(0.030)
all_gender	17.47	0.247	4.28***	0.208	-0.455
	(727.75)	(11.189)	(0.394)	(3.694)	(7.495)
age	0.363**	0.003	0.483***	0.032***	-0.035***
	(0.184)	(0.003)	(0.059)	(0.004)	(0.004)
agesq	-0.003	-0.000	-0.007***	-0.000***	0.000***
	(0.002)	(0.000)	(0.001)	(0.000)	(0.000)
all_marital	1.805*	0.028*	0.049	-0.006	-0.022
	(0.965)	(0.015)	(0.315)	(0.022)	(0.023)
school_year	0.532***	0.009***	-0.079**	-0.008**	-0.000
	(0.115)	(0.002)	(0.034)	(0.002)	(0.002)
Household characteristics					
male_num	1.309***	0.019***	0.195	0.007	-0.026**
	(0.473)	(0.007)	(0.175)	(0.012)	(0.012)
female_num	-0.727**	-0.011**	-0.126	-0.005	0.016
	(0.370)	(0.006)	(0.140)	(0.010)	(0.010)
male_educ	-0.965**	-0.012**	-0.486***	-0.029**	0.041***
	(0.450)	(0.007)	(0.167)	(0.011)	(0.012)
female_educ	0.963***	0.012***	0.504***	0.030***	-0.042***
	(0.344)	(0.005)	(0.140)	(0.009)	(0.010)
hh_educ	0.092	0.002	-0.020	-0.002	0.000
	(0.064)	(0.001)	(0.027)	(0.002)	(0.002)
land_area	-0.073***	-0.001***	-0.031***	-0.002***	0.003***
	(0.023)	(0.000)	(0.009)	(0.001)	(0.001)
anim_unit	-0.340	-0.005	-0.005	0.001	0.004
	(0.219)	(0.003)	(0.010)	(0.001)	(0.002)
wealth_indx	-0.163	-0.004	0.339***	0.024***	-0.020***
	(0.274)	(0.004)	(0.100)	(0.003)	(0.007)
wealth_indxsq	-0.121	-0.002	-0.013	-0.000	0.002
	(0.112)	(0.002)	(0.039)	(0.003)	(0.003)
Social network characteristics					
in_network	0.075*	0.001*	0.009	0.000	-0.001
	(0.039)	(0.001)	(0.017)	(0.001)	(0.001)
out_network	0.371***	0.006***	-0.045	-0.005*	-0.001
	(0.118)	(0.002)	(0.040)	(0.003)	(0.003)
_cons	-38.58		-11.273		
	(727.7625		(1.027)		
N	1688				
pseudo R^2	0.460				

Note: Coeff. Stands for coefficients, ME stands for marginal effects. Standard errors in the parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

For household heads, the probability of international migration decreases by 7.4 percent and probability of no migration increases by 9.1 percent. Findings suggest that the probability of migration towards international destination increases up to certain age year of the individual and then it starts to decrease; however, there is opposite impact of individual's age year on no migration. For married individual, the probability of migration towards internal destination decreases by 2.8 percent. An additional year of schooling for an individual increases the probability of internal migration by 0.9 percent and decreases the probability of international migration by 0.8 percent.

In case of household characteristics, with an additional male member above 15 years of age increases the migration within the country by 1.9 percent and decreases the probability of no migration by 2.6 percent. However, with an additional female above 15 years of age, the probability of internal migration decreases by 1.1 percent. Similarly, an additional male with secondary education in the household decreases the probability of with in country migration by 1.2 percent, decreases the probability of outside country migration by 2.9 percent and increases the probability of no migration by 4.1 percent. Contrary to this, with the increase of one more number of female with secondary education in the household, the probability of internal migration increases by 1.2 percent, the probability of international migration increases by 3.0 percent and the probability of no migration decreases by 4.2 percent. For an additional kattha of land holding, the probability of internal migration decreases by 0.1 percent, the probability of international migration decreases by 0.2 percent and the probability of no migration increases by 0.3 percent. With an additional point in wealth index, the probability of international migration increases up to certain wealth index value and the probability of no migration decreases up to certain wealth index value. The probability of internal migration increases by 0.1 percent with an additional internal migrant from the household head's extended families. An additional international migrant from household head's extended

families increases the probability of internal migration increases by 0.6 percent and decreases the probability of international migration decreases by 0.5 percent.

5.2. International migration destination choices: Malaysia, Gulf, other

Results for the international migration destination choices are presented in Table 4.5, where "India" is the base or reference category. Here, the "other" category doesn't represent any specific country or geography characteristics because it includes all other destination countries except Malaysia, the Gulf countries and India. Therefore, in this section the interpretations of multinomial logit marginal effects are mainly on the choices of India, Malaysia and the Gulf countries.

For household head, the probability of migration towards the Gulf countries increases by 26.2 percent. The probability of migration towards Malaysia increases up to certain age year of the individual and then it decreases. For married individual, the probability of migration towards Malaysia reduces by 17.9 percent, the probability of migration towards Gulf countries increases by 37.5 percent and the probability of migration towards India decreases by 23.8 percent.

In cases of household characteristics, the probability of migration towards the Gulf countries increases by 13.9 percent with an additional male member above 15 years of age in the household. For an additional female member above 15 years of age in the household, the probability of migration to migration to Malaysia increases by 7.7 percent. For an additional female member in the household with secondary education, the probability of migration to India increases by 11.3 percent. If education of household head increases by one more year then the probability of migration towards Malaysia increases by 2.2 percent and the probability of migration towards India decreases by 4.2 percent. An additional kattha of land area decreases the probability of migration towards India by 1.3 percent.

Table 4.5. Multinomial logit model results for international destination choices (base outcome: India)

	Malaysia		Gulf		other		India
Variables	Coeff.	ME	Coeff.	ME	Coeff.	ME	ME
Individual characteristics							
house_head	-2.637 (3.269)	0.035 (0.101)	-2.492 (2.925)	0.262* (0.147)	-12.028*** (3.499)	-0.501*** (0.112)	0.204 (0.126)
all_gender	8.91 (1697.82)	0.670 (94.021)	-3.869* (2.312)	-0.616 (66.508)	-3.699 (2.655)	-0.115 (11.730)	0.060 (15.783)
age	1.601** (0.707)	0.076** (0.030)	0.309 (0.500)	-0.035 (0.036)	0.122 (0.436)	-0.016 (0.020)	-0.025 (0.021)
agesq	-0.024** (0.010)	-0.001** (0.000)	-0.008 (0.007)	0.000 (0.001)	-0.002 (0.005)	0.000 (0.000)	0.000 (0.000)
all_marital	1.771 (1.984)	-0.179*** (0.058)	6.143*** (1.718)	0.375*** (0.083)	5.279** (2.303)	0.043 (0.080)	-0.238*** (0.065)
school_year	-0.300 (0.226)	-0.007 (0.009)	-0.186 (0.176)	0.007 (0.011)	-0.402** (0.205)	-0.012 (0.007)	0.012 (0.008)
Household characteristics							
male_num	0.923 (0.943)	0.040 (0.034)	0.782 (0.800)	0.139*** (0.041)	-2.792*** (1.074)	-0.174*** (0.033)	-0.005 (0.033)
female_num	2.344** (0.992)	0.077** (0.031)	1.152 (0.927)	-0.011 (0.045)	1.072 (1.056)	-0.002 (0.031)	-0.064 (0.041)
male_educ	-0.801 (0.876)	-0.006 (0.030)	-1.265* (0.714)	-0.151 (0.038)	1.564 (0.977)	0.128*** (0.034)	0.029 (0.030)
female_educ	-3.293*** (1.121)	-0.077*** (0.034)	-2.417** (1.001)	-0.066 (0.047)	-1.500 (1.039)	0.030 (0.030)	0.113*** (0.041)
hh_educ	1.095*** (0.350)	0.022*** (0.009)	0.835*** (0.323)	0.013 (0.012)	0.860** (0.344)	0.007 (0.007)	-0.042*** (0.014)
LandArea	0.203 (0.132)	-0.002 (0.003)	0.269** (0.125)	0.006 (0.004)	0.397*** (0.127)	0.009*** (0.002)	-0.013** (0.005)

(Table 4.5. continued)

	Malaysia		Gulf		other		India
Variables	Coeff.	ME	Coeff.	ME	Coeff.	ME	ME
AnimUnit	-0.019	-0.005	0.072	0.003	0.147**	0.005**	-0.003
	(0.133)	(0.006)	(0.078)	(0.006)	(0.074)	(0.002)	(0.004)
wealth_indx	0.496	-0.008	1.089	0.127***	-1.043	-0.093***	-0.026
	(0.793)	(0.024)	(0.704)	(0.033)	(0.775)	(0.023)	(0.030)
wealth_indxsq	-1.282**	-0.040	-0.795**	-0.31	0.005	0.036***	0.034*
	(0.644)	(0.029)	(0.401)	(0.026)	(0.404)	(0.011)	(0.018)
Social network characteristics							
in_network	0.334***	0.007***	0.274**	0.011**	0.113	-0.006*	-0.012**
	(0.125)	(0.004)	(0.111)	(0.005)	(0.119)	(0.003)	(0.005)
out_network	-0.413	-0.015*	-0.128	0.017	-0.391	-0.012	0.011
	(0.272)	(0.009)	(0.244)	(0.013)	(0.256)	(0.008)	(0.011)
_cons	-36.87		-0.574		2.498		
	(1697.86)		(8.977)		(9.890)		
N	208						
pseudo R^2	0.619						

Note: Coeff. Stands for coefficients, ME stands for marginal effects. Standard errors in the parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

For an additional unit in wealth index, the probability of migration towards the Gulf countries decreases after certain wealth index value while the probability of migration towards India increases after certain wealth index value.

Likewise, with an additional member in the internal migrant network, the probability of migration towards Malaysia increases by 0.7 percent, the probability of migration towards the Gulf countries increases by 1.1 percent, and the probability of migration towards India decreases by 1.2 percent. An additional member in the international migrant network decreases the probability of migration towards Malaysia by 1.5 percent.

6. Conclusions

I have estimated the role of individual level characteristics, household level characteristics and social network characteristics on the internal and international migration destination choices of Nepalese laborers. In addition, the key variables that determine the choices among popular international migration destinations are also identified. The findings suggest that both internal and international migration destination choices in the study area are explained by several individual, household and social network characteristics. Empirical evidence on the selection between internal and international destination choices of Nepalese migrants is one of the very few research that were conducted in Nepal while the econometric evidence on the choices among popular international destinations for Nepalese labor migration might be the first literature based on my knowledge.

The multinomial logit estimate suggests that household heads are less likely to migrate internationally. This finding is consistent with the explanation of Stark & Taylor (1991), who indicated that household heads are unlikely to choose international migration but are no less likely to be internal migrants than those who are not heads of households. I also find that household heads are more likely to select the Gulf countries if they choose to migrate internationally. Similarly, younger people are more likely to migrate internationally. This may

be due to the higher return for younger people than for older (Kennan & Walker 2011); because, older individual have short future time horizon to spread the fixed cost of migration than younger (Richter & Taylor 2007). Also, younger people are more likely to migrate Malaysia than older people which may be because Malaysia require higher fixed cost than other major international destinations (India and the Gulf countries) from the study area. Married people are more likely to migrate internally that may be because married people prefer to visit their family frequently, which is more costly with international migration. However, if married people choose to migrate internationally then they are more likely migrate the Gulf countries and less likely to migrate Malaysia and India. This may be because of higher average wage in the Gulf countries in comparison to Malaysia and India. Number of school years of the individual is positively related with internal migration, but it is negatively related with international migration. This is consistent with the findings of Mora and Taylor (2006) which mentioned that internal migration is more attractive for those with higher education but the international service jobs that needs low skilled labor is less likely to be selected by those who have more years of education. As all these three major destinations (India, Gulf countries and Malaysia) require low skilled labor so they are less likely to be selected by individuals with higher level of education. It is a result likely in the study area and Nepal in general since jobs within the country having reasonable wage is generally available only after the certain fixed amount of schooling (Bachelor level). Hence, below that schooling year, low education requiring and low skill requiring international migration destinations are attractive for the labor force from rural areas.

Higher numbers of males above 15 years of age in the households are likely to increase the choice of internal migration and also the migration towards the Gulf countries. The higher number of adult females in the households (above 15 years of age) are likely to increase the choice of internal migration and also the migration towards Malaysia. This may be because in

the Gulf countries the demand for Male workers is higher than female workers due to the type of job and also the nature of risk associated with the job. Similarly, the higher numbers of male members with secondary education in the households are likely to reduce the selection of both internal and international migration. However, the effect is opposite for the higher numbers of female members in the household. This may be because migration selects positively on female schooling year but not male schooling year (Richter & Taylor, 2007). Additionally, Kanaiunpuni (2000) also mentioned that schooling has relatively larger effect on the productivity of female migrants. Moreover, Hondagneu-Sotelo (1994) indicated that women with higher education consider moving beyond the social norms and unemployment situation from the place of origin to get new employment opportunity. If a females choose to migrate internationally from the study area, then, they are more likely to migrate India and less likely to migrate Malaysia. Results suggest that households with educated household head are less likely to select India as an international migration destination. Households with higher land holding area are less likely to select internal migration destination, international migration destination and migration towards India. This may be because land and home ownership decreases probability of migration (Cerruti & Massey, 2001).

As expected, higher wealth index value is likely to reduce no migration up to certain wealth index value. This is consistent with findings of Cerruti & Massey (2001) and Mora & Taylor (2006), where they mentioned that increase in the value of wealth indicator is likely to increase the propensity to migration. But, result indicat that the migration towards the Gulf countries increases with increase in wealth value up to certain level. This may be because wealth not only supports for fixed cost of migration but also helps to reduce perceived risk that might occur due to the decision to migrate. But, due to non-linear wealth effect, after certain wealth level, the selection of Malaysia and the Gulf countries as international destination decreases.

Findings suggest that both internal and international migrants' networks from household head's extended families are likely to increase selection of internal migration destination. However, the higher number of international migrants from the household head's extended families are likely to decrease the migration towards international destination and migration towards Malaysia. This may be due to the lower average wage and higher migration cost in the destination country Malaysia.

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CHAPTER V
FOOD SECURITY OF HOUSEHOLDS, ADULTS AND CHILDREN IN NEPAL: THE ROLE OF REMITTANCE

1. Introduction

Ambition to commercialize agriculture has been unsuccessfully put in Nepal's agriculture development plan for a long time. The 20-year Agriculture Prospective Plan (APP) from 1995 to 2015 is mainly focused on two issues: poverty reduction and sustainable agricultural growth. After major political changes in 2006, the first three year interim plan (TYIP 2007/08-2009/10), second three year interim plan (TYIP 2010/11-2012/12) and National Agriculture Sector Development Priority Plan (NASDP 2011- 2015) were launched in which high priority was given for food security. Specifically, the Nepal Agriculture and Food Security Country Investment Plan (CIP) from September 2010 addressed the particular issue related to household food security.

Despite the above mentioned policies and strategies, there has not been significant improvement in the agricultural sector, poverty status and food security status within the country during the last decade. A report by the Asian Development Bank (2013) for the preparation of the Agricultural Development Strategy (ADS) has shown several comparative statistics of the key agricultural indicators for the year 1995/96 and the year 2010/11 (Table 5.1). Based on this report, the growth of agricultural GDP was only 3 percent during the 15 years period (1995/96 - 2010/11) in comparison to the growth of population by 2 percent over the same period. Therefore, the increase in agricultural GDP has been too slow to create strong dynamics for the poverty reduction and structural transformation from subsistence to commercialization (ADB, 2013). Additionally, progress in poverty reduction, increases in income per capita and productivity increase of agricultural labor are not yet sufficient to lift a large number of people engaged in agriculture out of poverty, reduce malnutrition and assure food security of the nation.

Table 5.1. Key indicators related to agricultural sector

Indicator	1995/96	2010/2011
Agricultural GDP	$3.4 billion	$5.2 billion
Productivity of agricultural labor ($/person)	$466/person	$700/person
Agricultural land per household (ha/hh)	1.1	0.7
Percentage of holdings operating less than 0.5 ha	40.1 percent	51.6 percent
Productivity of agricultural land ($/ha)	$1,118/ha	$1,700/ha
Agricultural land use (cereal as percentage of cultivated land)	80 percent	80 percent
Seed turnover	8 percent	8 percent
Employment in agriculture	66 percent	60 percent
Agricultural exports	$32million	$248
Agricultural imports	$157 million	$621
Poverty (2010/11)	42 percent	25 percent
Percentage of households reporting inadequacy of food consumption	50.9 percent	15.7 percent
Stunting of children (less than 5 years)	60 percent	42 percent
Irrigation cover (percent of cultivated area)	39.6 percent	54 percent
Infrastructure (strategic road network km)	SRN = 10,000 km	SRN= 20,000 km
ICT reach	Less than 10 percent connected	46 percent connected

Sources: Asian Development Bank (2013)

This poor performance of the agricultural sector adversely affected the income and consumption of the poorest population (World Bank, 2013). The major burden has fallen on 80 percent of Nepal's people who live in rural areas and depend on subsistence farming for their income. Therefore, the major concerns among the rural households are food insecurity and poor nutrition which is evidenced by the fact that about half of the children younger than five years of age are undernourished (IFAD, 2013). According to CBS (2011), the share of farm income in the total income during the 15 years period (1995/96 – 2010/11) declined from 61 percent to 28 percent while that of non-farm income increased from 22 to 37 percent, and that of other sources including remittances increased from 16 to 35 percent. Furthermore, CBS (2011) mentioned that almost 78.9 percent of the remittances in Nepal are used for daily consumption purposes by the receiving households and a significant amount of remittances (about 7.1 percent) is used to repay loans (Table 5.2).

Table 5.2. Distribution of remittances by primary uses and origin of remittance

Source of remittance	Primary uses								
	Daily consumption	Education	Capital formation	Business	Household property	Savings	Repay loan	other	Total
Internal source									
Urban Nepal	84.5	3.5	2.1	0.4	3.8	0.5	1.4	3.9	100
Rural Nepal	86.6	3.6	1.2	0.3	5.6	0.4	0.5	1.9	100
External source									
India	84.6	2.2	2	0.3	4.2	0.4	4.5	1.9	100
Malaysia	52.1	4.3	4.3	1.2	5	0.9	30	2.2	100
Saudi Arabia	57.6	1.2	4.3	0.5	2.8	0.6	31	2.1	100
Qatar	55.4	5	6.2	0.3	4.3	0.5	25.8	2.5	100
United Kingdom	74.2	0	3.6	2	2	3.2	10.2	4.8	100
Other	59.1	6.3	4.6	1.6	1.9	3.1	19.1	4.3	100
Other									
Donor	41.9	16.1	0	0	0	0	0	41.9	100
Nepal	78.9	3.5	2.4	0.5	4.5	0.6	7.1	2.5	100

Source: CBS/ Nepal Living Standards Survey (NLSS) 2010/11

Recent evidence suggests that remittances, the portion of a migrant's income sent back to the family members left behind, are helping to improve the livelihoods of households in many low-income countries (FAO, 2013; Kiawu & Jones, 2013; Williams et al., 2012; Banga & Sahu, 2010).

There are also concerns that a mass exodus from rural to urban areas resulting in the outflow of resources from the farm sector may exacerbate the growing demand for food (Rozelle et al., 1999). However, most would agree that remittance has the potential to alleviate poverty, increase food security and eventually promote development, especially for the rural poor who are marginalized, under-educated and lack accesses to local resources (Yang, 2011; Frost et al., 2007; Adams et al., 2005; Thieme et al. 2005; Carletto et al., 2011). In case of Nepal, Pyakuryal et al. (2010) argued that remittance has become the sole option to alleviate poverty and improve food security. However, there is a dearth of empirical evidence to validate this statement. In order to understand the relationships between remittance and food security, I analyze data obtained from Chitwan, Nepal. I develop food security indices at household, adult and children levels. I identify the role of remittance and other pertinent variables on the food security status of households (HFS), adults (AFS) and children (CFS) separately using an ordered probit model.

The remainder of this paper is organized as follows. First, I provide the method used in the study, specifically the details related to the formulation of an ordered probit model. After that, I provide measurements of food security and justifications for the explanatory variables used in the study. Next, I provide the results section. Then, the paper concludes with major findings and implications of the study.

2. Econometric Model

I use an ordered probit model to estimate the impact of different socioeconomic variables on the food security status because the levels of food security status[1] are discrete, but ordinal in nature (USDA, 2012). Household Food Security (HFS) is coded 1 for very low household food security, 2 for low household food security, 3 for marginal household food security, and 4 for high household food security. The underlying latent regression model is:

$$HFS_i^* = \boldsymbol{\beta} \boldsymbol{X}_i + \varepsilon_i$$

Where $\boldsymbol{X}_i$ represents a set of K observable household characteristics, $\boldsymbol{\beta}$ is a vector of regression parameters to be estimated for K different characteristics variables, and ε_i is the stochastic disturbance term. The n sample observations are labeled as i =1,…, n. HFS_i is an observed ordered categorical variable for the food security status of households with one or more children, which is assumed to be related, with a latent variable HFS_i^* as follows:

$$\mathrm{HFS}_i = \begin{cases} 1 & \text{if } \mathrm{HFS}_i{}^* \leq \mu_1 \\ 2 & \text{if } \mu_1 < \mathrm{HFS}_i{}^* \leq \mu_2 \\ 3 & \text{if } \mu_2 < \mathrm{HFS}_i{}^* \leq \mu_3 \\ 4 & \text{if } \mu_3 < \mathrm{HFS}_i{}^* \end{cases}$$

Similarly, adult food security (AFS) is coded 1 when a household had very low food security among adults, 2 when a household had low food security among adults, 3 when a household had marginal food security among adults, and 4 when a household had high food security among adults. The underlying latent regression model is:

[1] Four categories of food security status can be characterized as:

1. **High food security***:* Households had no problems, or anxiety about, consistently accessing adequate food.
2. **Marginal food security:** Households had problems at times, or anxiety about, accessing adequate food, but the quality, variety, and quantity of their food intake were not substantially reduced.
3. **Low food security:** Households reduced the quality, variety, and desirability of their diets, but the quantity of food intake and normal eating patterns were not substantially disrupted.
4. **Very low food security:** At times during the year, eating patterns of one or more household members were disrupted and food intake reduced because the household lacked money and other resources for food.

$$AFS_i^* = \boldsymbol{\delta X}_i + \epsilon_i$$

Here, $\boldsymbol{X}$ represents a set of K observable household characteristics, $\boldsymbol{\delta}$ is a vector of regression parameters to be estimated, and ϵ is the error term. AFS_i is an observed ordered categorical variable of adult food security for a household, which is assumed to be related with a latent variable AFS_i^* as follows:

$$\mathrm{AFS}_i = \begin{cases} 1 & \text{if } \mathrm{AFS}_i{}^* \leq \varphi_1 \\ 2 & \text{if } \varphi_1 < \mathrm{AFS}_i{}^* \leq \varphi_2 \\ 3 & \text{if } \varphi_2 < \mathrm{AFS}_i{}^* \leq \varphi_3 \\ 4 & \text{if } \varphi_3 < \mathrm{AFS}_i{}^* \end{cases}$$

Likewise, Children Food Security (CFS)[2] is coded 1 when a household had very low food security among children, 2 when a household had low food security among children, and 3 when a household had marginal or high food security among children. The latent regression model is:

$$CFS_i^* = \boldsymbol{\gamma X}_i + \zeta_i$$

Here, $\boldsymbol{X}$ represents a set of K observable household characteristics, $\boldsymbol{\gamma}$ is a vector of regression parameters to be estimated, and ς is the error term. CFS_i is an observed ordered categorical variable of children's food security for a household, which is assumed to be related with a latent variable CFS_i^* as follows:

$$\mathrm{CFS}_i = \begin{cases} 1 & \text{if } \mathrm{CFS}_i{}^* \leq \omega_1 \\ 2 & \text{if } \omega_1 < \mathrm{CFS}_i{}^* \leq \omega_2 \\ 3 & \text{if } \omega_2 < \mathrm{CFS}_i{}^* \end{cases}$$

In order to interpret the coefficients of an ordered probit regression, I compute the partial changes in the marginal probabilities of an outcome for a given change in each of the dependent variables by taking the first derivative of the log likelihood functions (Logn, 1997). These marginal effects will show the probability of having very low food security, low food security, marginal food security, and high food security.

[2] Children Food Security (CFS) has only three categories as defined in the measurement section of U.S. household food security survey module: three-stage design, with screeners (USDA, 2012).

3. Measurement of Food Security Status

We asked 18 questions (Table 5.3) based on the U.S. household survey format developed by the Economic Research Service (ERS), United States Department of Agriculture (USDA, 2012). The food security measurement of this survey module is appropriate to capture the food security scenario of rural households in any part of the world. These 18 questions are designed in such a way that the responses of "yes", "often", "sometimes", "almost every month" and "some but not every month" are coded as affirmative for food insecurity. Based on the sum of affirmative responses, the food security status is identified for each group. In the case of food security for the entire household (I have used the category for households with one or more children), the raw score (sum of affirmative responses for food insecurity) of 8 to 18 represents "very low food security", 3 to 7 represents "low food security", 1 to 2 represents "marginal food security", and 0 (zero) represents "high food security". Similarly, for food security among adults, the raw score of 6 to 10 represents "very low food security", 3 to 5 represents "low food security", 1 to 2 represents "marginal food security", and 0 (zero) represents "high food security". Unlike the household and adult food security measures, the food security among children has only three categories. Both the high or marginal food security among children are considered as one scale because there is no certainty that all the households that have a raw score of zero have high food security among children (USDA, 2012). In this case, a raw score of 5 to 8 represents "very low food security" among children, 2 to 4 represents "low food security" among children, and 0 to 1 represents "marginal or high food security" among children.

Table 5.3. Questions included in the food security scale

1. “We worried whether our food would run out before we got money to buy more.”
1- Often 2-Sometimes 3-Never 4-N/A

2. “The food that we bought just didn’t last and we didn’t have money to get more.”
1- Often 2-Sometimes 3-Never 4-N/A

3. “We couldn’t afford to eat balanced meals.”
1- Often 2-Sometimes 3-Never 4-N/A

4. “We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food.” 1- Often 2-Sometimes 3-Never 4-N/A

4. “We couldn’t feed our children a balanced meal, because we couldn’t afford that.”
1- Often 2-Sometimes 3-Never 4-N/A

5. “The children were not eating enough because we just couldn’t afford enough food.”
1- Often 2-Sometimes 3-Never 4-N/A

7. Did you or other adults in the household ever cut the size of your meals or skip meals because there wasn’t enough money for food? 1- Yes 2-No 3-N/A

8. (If yes to question 7) What month in which it occurred? (All that apply) a:
1-Baishakh, 2-Jeth, 3-Asar,4-Saun , 5-Bhadau, 6-Asoj, 7-Kattik,8- Mangsir,9- Pus,
10- Magh,11- Fagun,12- Chait

9. Did you or other adults ever eat less than you or they ought because there wasn’t enough money for food? 1- Yes 2-No 3-N/A

10. Were you or other adults ever hungry, but didn’t eat, because there wasn’t enough money for food? 1- Yes 2-No 3-N/A

11. Did you or other adults lose weight because there wasn’t enough money for food?
1- Yes 2-No 3-N/A

12. Did you or other adults in your household ever not eat for a whole day because there wasn’t enough money for food? 1- Yes 2-No 3-N/A

13. (If yes to question 12) What month in which it occurred? (All that apply) a:
1-Baishakh, 2-Jeth, 3-Asar,4-Saun , 5-Bhadau, 6-Asoj, 7-Kattik,8- Mangsir,9- Pus,
10- Magh,11- Fagun,12- Chait

14. Did you ever cut the size of any of the children’s meals because there wasn’t enough money for food? 1- Yes 2-No 3-N/A

15. Were the children ever hungry but you just couldn’t afford more food?
1- Yes 2-No 3-N/A

16. Did any of the children ever skip a meal because there wasn’t enough money for food? 1- Yes 2-No 3-N/A

17. (If yes to question 16) What month in which it occurred? (All that apply) a:
1-Baishakh, 2-Jeth, 3-Asar,4-Saun , 5-Bhadau, 6-Asoj, 7-Kattik,8- Mangsir,9- Pus,
10- Magh, 11- Fagun,12- Chait

18. Did any of the children ever not eat for a whole day because there wasn’t enough money for food? 1- Yes 2-No 3-N/A

I have used household, adult and children food security indices as dependent variables in three separate regression models. Summary statistics are presented in Table 5.4.

Table 5.4. Description of food security types

	Frequency	Percent
Household food security status		
Very low food security	6	1.52
Low food security	34	8.61
Marginal food security	12	3.04
High food security	343	86.84
Total	395	100.00
Adult food security status		
Very low food security	3	0.76
Low food security	35	8.86
Marginal food security	13	3.29
High food security	344	`87.09
Total	395	100.00
Children food security status		
Very low food security	2	0.51
Low food security	36	9.11
Marginal or high food security	357	90.38
Total	395	100.00

I have found that 86.84 percent, 3.04 percent, 8.61 percent, and 1.52 percent of households experienced high food security, marginal food security, low food security, and very low food security, respectively. Among adults, 87.09 percent, 3.29 percent, 8.86 percent, and 0.76 percent have experienced the same respective food security categories. Among children, 90.38 percent, 9.11 percent, and 0.51 percent have experienced marginal or high food security, low food security, and very low food security, respectively. The polychoric correlation matrix (Table 5.5) indicates that adult and children food security are highly correlated, and homogenously represent an overall scenario of household food security[3].

[3] High polychoric coefficients among three groups of food security indices indicate the need to estimate the model using a system of equation approach. However, I do not have unique variables for each food security groups. When explanatory variables are the same among three equations, there is no gain in efficiency by estimating the model in a seemingly unrelated fashion.

Table 5.5. Polychoric correlation matrix

	Household food security	Adult food security	Child food security
Household food security	1.00		
Adult food security	0.99	1.00	
Child food security	0.99	0.99	1.00

4. Description of Explanatory Variables

Several socio-economic indicators affect household, adult and children levels of food security, and the pertinent explanatory variables in this analysis are presented in Table 5.6. These explanatory variables are developed based on previous studies on food security (Garret et al., 1999; Babatunde et al., 2007). Respondents were asked several questions related to the socio-economic makeup of their households, including gender of the household head, which is a dummy variable (1= male and 0=female), age of household head (in years), and the number of household members with secondary education or higher. I have also included the number of conservation agricultural practices adopted by the households, whether or not the household adopted hybrid rice/maize (1= yes and 0= no), and the dependency ratio.

As the variable of interest is remittances, I have included total annual remittances received by the household from foreign countries as an explanatory variable. I have also included the annual income from wages outside the district, the annual income from agriculture/livestock production, landholding size (in katha; where 30 katha = 1 hectare), and the total animal unit equivalents owned by the household. Animal unit equivalents are calculated based on the formula provided by Minnesota Department of Agriculture (MDA, 2013).

Table 5.6. Description of dependent and independent variables

Variables	Variable label	Obs	Mean	Std.	Min	Max
Dependent variables						
HouseFS	Household Food Security Status(1= very low food security; 2=low food security; 3=marginal food security; 4=high food security)	394	3.75	0.67	1.00	4.00
AdultFS	Adult Food Security Status(1=very low food security; 2=low food security; 3=marginal food security; 4=high food security)	394	3.77	0.62	1.00	4.00
ChildFS	Children Food Security Status(1=very low food security; 2=low food security; 3=marginal or high food security)	394	2.90	0.3	1.00	3.00
Independent variables						
GenderHh	Gender of household head (1= male, 0= female)	393	0.95	0.21	0.00	1.00
AgeHh	Age of household head (years)	384	52.78	13.74	22.00	92.00
ConsTech	Soil and water conservation technology (number)	362	6.22	2.93	1.00	20.00
EduSec	Number of household members with education of secondary level or more	394	2.87	2.11	0.00	12.00
DepenRatio	Dependency ratio of household	394	25.60	19.52	0.00	100.00
AnimUnit	Animal unit	350	5.13	13.01	0.00	111.70
HybRiceMaize	Adoption of any hybrid varieties of rice or maize last year (1=yes; 0= no)	396	0.05	0.21	0.00	1.00
WageOutDist	Amount of wage from outside the district/ internal remittance (NRs.10,000)	396	0.184	0.650	0.00	6.00
RemitOutCoun	Amount of annual remittance from outside the country (NRs.10,000)	396	1.549	2.997	0.00	30.000
AgLivInc	Annual cash income from agriculture and livestock (NRs. 10,000)	396	8.57	4.54	0.00	887.00
LandArea	Total land area (kattha)	382	11.63	15.24	0.10	112.00

5. Results

An ordered probit model is used to estimate the impact of the explanatory variables on the household, adult and children's food security status. I have suspected that the number of conservation technologies adopted by the household and adoption of hybrid rice/maize variety would be endogenous to the model. I have used variables indicating the presence of household perceived land degradation (household perceived land degradation is a dummy variable; 1= yes and 0= no), and land productivity (household perceived the land is productive is a dummy variable; 1= yes and 0= no) as instrumental variables for the number of conservation technologies adopted and whether a hybrid rice/maize variety was adopted, respectively. I have estimated regression models for both of the suspected endogenous variables. The first stage regression for the number of conservation technologies adopted is a Poisson model, and the first stage regression for whether the household adopted a hybrid rice/maize variety is a probit model.

I have used an ordered probit for both the second stage regressions. The Durbin-Wu-Hausman endogeneity test has found no endogeneity problem with the variables. Therefore, I have used an order probit regression in order to find the determinants of different types of food security and the effect of remittance on each food security status. Mean predicted probabilities of different types of food security group are presented in Table 5.7.

Table 5.7. Mean predicted probabilities of different types of food security group

	Food Security Status			
Food security type	Very low food security	Low food security	Marginal food security	High food security
Household food security	0.016	0.082	0.040	0.862
Adult food security	0.007	0.087	0.045	0.861
Children food security	0.0028	0.093		Marginal/high food security 0.905

5.1. Household food security

Coefficients and marginal effects from ordered probit model for household food security are presented in Table 5.8. I interpret the marginal coefficients of only significant variables in the text. Overall, the findings are consistent with previous food security literature (Kiawu & Jones, 2013; Banga &Sahu, 2010). The RemitOutCoun shows the impact of country level remittance inflows on household level food security. After controlling for other explanatory variables, an increase in annual remittance in the amount of NRs. 10,000 (approximately $100 @ of NRs.1=$0.01003 on Jan. 7, 2013) significantly increases the probability that households are highly food secure by 2.2 percent. An additional household members having secondary or higher education significantly increases the probability that a household is highly food secure by 2.9 percent. There is a 12.2 percent increase in the probability of a household being high food secure if the income from agriculture and livestock production increases by an additional NRs. 10,000.

The age of the household head negatively impacts the household food security status. For an additional year of age, the probability of household to be highly food secure decreases by 0.3 percent. Interestingly, I find that with an additional soil or water conservation technology adopted, the probability of household to be highly food secure decreases by 1.9 percent. The reason may be that when farmers adopt more conservation practices in a subsistence economy, it may be detrimental to food security. If land is set aside by adopting conservation practices, it reduces the total available land for farming. It may also be that farmers do not have other required inputs (herbicides, pesticides, fertilizers) to make conservation practices effective. The adoption of hybrid rice/maize variety, wages from outside the district (internal remittance), land holding size, gender of household head, household dependency ratio, and animal unit does not explain the household food security status as the coefficients associated with these variables are not significant.

Table 5.8. Coefficients and marginal effects of ordered probit estimation of the household food security status

		Marginal Effects			
Variables	Coefficients	High food security	Marginal food security	Low food security	Very low food security
GenderHh	0.559	0.097	-0.021	-0.059	-0.017
	(0.486)	(0.085)	(0.019)	(0.051)	(0.018)
AgeHh	-0.018**	-0.003**	0.001**	0.002**	0.001**
	(0.007)	(0.001)	(0.000)	(0.001)	(0.000)
ConsTech	-0.109***	-0.019***	0.004***	0.012***	0.003***
	(0.027)	(0.004)	(0.002)	(0.003)	(0.001)
EduSec	0.165***	0.029***	-0.006	-0.017	-0.005
	(0.047)	(0.008)	(0.002)	(0.005)	(0.002)
DepenRatio	0.002	0.000	0.000	0.000	0.000
	(0.006)	(0.001)	(0.000)	(0.001)	(0.000)
AnimUnit	-0.001	0.000	0.000	0.000	0.000
	(0.006)	(0.001)	(0.000)	(0.001)	(0.000)
HybRiceMaize	0.352	0.061	-0.013	-0.037	-0.011
	(0.532)	(0.092)	(0.020)	(0.056)	(0.017)
WageOutDist	0.250	0.043	-0.009	-0.026	-0.008
	(0.217)	(0.038)	(0.009)	(0.023)	(0.007)
RemitOutCoun	0.124**	0.022**	-0.005**	-0.013**	-0.004**
	(0.063)	(0.011)	(0.003)	(0.007)	(0.002)
AgLivInc	0.700***	0.122***	-0.026***	-0.074***	-0.022***
	(0.202)	(0.034)	(0.009)	(0.022)	(0.011)
LandArea	0.007	0.001	0.000	-0.001	0.000
	(0.009)	(0.002)	(0.000)	(0.001)	(0.000)
μ_1	-2.604***				
	(0.803)				
μ_2	-1.503**				
	(0.718)				
μ_3	-1.244*				
	(0.721)				

N = 306, Wald χ^2(d.f.=11) = 47.26, prob > χ^2=0.00
Log pseudolikelihood = -132.01
Pseudo R^2 = 0.18

Note: Standard errors in the parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.2. Adult food security

Coefficients and marginal effects from an ordered probit model for adult food security are presented in Table 5.9. The RemitOutCoun shows the impact of international remittance inflows on adult food security at the household level. After controlling for other relevant explanatory variables, an increase in the annual remittance amount of NRs. 10,000 significantly increases the probability of the adults in the household to be highly food secure by 2.1 percent. The probability of high food security for the adults in the household significantly increases by 2.7 percent with an additional household member having secondary education or more. There is a 10.8 percent increase in the probability of the adults in the household to be highly food secure with an additional NRs. 10,000 increase in the income from agriculture and livestock production. The age of the household head negatively impacts household food security status. For an additional year of age of the household head, the probability of adults in the household to be highly food secure decrease by 0.3 percent. Similarly, with an additional soil/water conservation technology adopted, the probability of adults in the household to be highly food secure decreases by 1.8 percent. Although of the expected signs, the marginal effects are not significant when associated with the adoption of improved variety, wage from the outside of district, landholding size, gender of household head, household dependency ratio, and animal units.

5.3. Children food security

Unlike the previous food security groups, children's food security has only three categories. The determinants of children's food security status, their marginal effects, and standard errors are reported in Table 5.10. Results for most of the variables are consistent with the hypotheses. After controlling for other explanatory variables, I find that an increase in the national remittance inflows in the amount of NRs. 10,000 significantly increases the probability of children in the household to be marginally/highly food secure by 1.5 percent.

Table 5.9. Coefficients and marginal effects of ordered probit estimation of the adult food security status

		Marginal Effects			
Variables	Coefficients	High food security	Marginal food security	Low food security	Very low food security
GenderHh	0.515	0.090	-0.022	-0.060	-0.007
	(0.444)	(0.077)	(0.019)	(0.053)	(0.008)
AgeHh	-0.015**	-0.003**	0.001**	0.002**	0.000**
	(0.007)	(0.001)	(0.000)	(0.001)	(0.000)
ConsTech	-0.105***	-0.018***	0.004***	0.012***	0.002***
	(0.029)	(0.004)	(0.002)	(0.003)	(0.001)
EduSec	0.158***	0.027***	-0.007***	-0.019***	-0.002***
	(0.048)	(0.008)	(0.003)	(0.006)	(0.001)
DepenRatio	0.002	0.000	0.000	0.000	0.000
	(0.006)	(0.001)	(0.000)	(0.001)	(0.000)
AnimUnit	-0.001	0.000	0.000	0.000	0.000
	(0.006)	(0.001)	(0.000)	(0.001)	(0.000)
HybRiceMaize	0.353	0.061	-0.015	-0.041	-0.005
	(0.516)	(0.090)	(0.021)	(0.061)	(0.008)
WageOutDist	0.280	0.049	-0.012	-0.033	-0.004
	(0.230)	(0.040)	(0.010)	(0.027)	(0.004)
RemitOutCoun	0.123**	0.021**	-0.005**	-0.014**	-0.002**
	(0.063)	(0.011)	(0.003)	(0.007)	(0.001)
AgLivInc	0.622***	0.108***	-0.026***	-0.073***	-0.009***
	(0.184)	(0.031)	(0.009)	(0.022)	(0.006)
LandArea	0.009	0.002	0.000	-0.001	0.000
	(0.009)	(0.002)	(0.000)	(0.001)	(0.000)
μ_1	-2.854***				
	(0.792)				
μ_2	-1.402**				
	(0.667)				
μ_3	-1.118*				
	(0.669)				

N = 306, Wald χ^2 (d.f.=11) = 45.51
Prob > χ^2 = 0.00
Log pseudolikelihood = -127.16
Pseudo R^2 = 0.17

Note: Standard errors in the parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5.10. Coefficients and marginal effects of ordered probit estimation of the children food security status

Variables	Coefficients	Marginal Effects		
		Marginal/High food security	Low food security	Very low food security
GenderHh	0.723	0.087	-0.082	-0.005
	(0.478)	(0.057)	(0.054)	(0.005)
AgeHh	-0.025***	-0.003***	0.003***	0.000***
	(0.008)	(0.001)	(0.001)	(0.000)
ConsTech	-0.119***	-0.014***	0.014***	0.001***
	(0.033)	(0.004)	(0.003)	(0.001)
EduSec	0.166***	0.020***	-0.019***	-0.001***
	(0.059)	(0.007)	(0.007)	(0.001)
DepenRatio	0.006	0.001	-0.001	0.000
	(0.007)	(0.001)	(0.001)	(0.000)
AnimUnit	-0.005	-0.001	0.001	0.000
	(0.006)	(0.001)	(0.001)	(0.000)
HybRiceMaize	7.509***	0.536***	-0.507***	-0.029***
	(0.553)	(0.100)	(0.099)	(0.022)
WageOutDist	0.156	0.019	-0.018	-0.001
	(0.231)	(0.028)	(0.027)	(0.002)
RemitOutCoun	0.126*	0.015*	-0.014*	-0.001*
	(0.065)	(0.008)	(0.007)	(0.001)
AgLivInc	1.029***	0.124***	-0.117***	-0.007***
	(0.347)	(0.040)	(0.037)	(0.006)
LandArea	0.012	0.001	-0.001	0.000
	(0.012)	(0.002)	(0.001)	(0.000)
μ_1	-3.547***			
	(0.841)			
μ_2	-1.577**			
	(0.782)			

N = 306, Wald χ^2(d.f.= 11) = 1870.13
Prob > χ^2 = 0.00,
Log pseudolikelihood = -71.22
Pseudo R^2 = 0.27

Note: Standard errors in the parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The probability of children in the household to be marginally/highly food secure increases by 2 percent with an additional household member having secondary education or higher. There is a 12.4 percent increase in the probability of children in the household to be marginally or highly food secure that receives additional income from agriculture and livestock production in the amount of NRs. 10,000.

In contrast to the household and adult food security estimations, I have found a very significant effect of adopting a hybrid rice/ maize variety on child food security. If the household cultivated a hybrid rice/maize variety in the previous year, the probability of children in the household to be marginally/highly food secure increases by 53.6 percent. I find the age of household head to be significantly related with children's food security. An additional year of age of the household head decreases the probability of children in the household to be marginally/highly food secure by 0.3 percent. In the study area, household heads are mainly engaged in temporary construction or seasonal agricultural jobs than permanent jobs. The nature of these jobs is that they depend on physical strength of the worker rather than level of education. So, the working age people with relatively lower age will be more productive from an income generation view point than higher age ones. Similarly, I find that an additional soil/water conservation technology adopted decreases the probability of children in the household to be marginally or highly food secure by 1.4 percent. However, internal remittance, gender of the household head, landholding size, household dependency ratio, and animal units does not explain household food security status.

5.4. Marginal effects of remittance on food security status

Holding all other explanatory variables at their mean value, I have calculated the probability of being food secure for an additional amount of international remittance received

(Table 5.11). In all these three categories, the receipt of international remittance does not explain anything about the population who are in very low food security status.

Table 5.11. Marginal effects of remittance on different food security status

	Marginal Effects
Household food security	
Very low food security	0.003
	(0.002)
Low food security	0.047***
	(0.013)
Marginal food security	0.032***
	(0.010)
High food security	0.918***
	(0.019)
Adult food security	
Very low food security	0.001
	(0.001)
Low food security	0.047***
	(0.013)
Marginal food security	0.035***
	(0.011)
High food security	0.917***
	(0.019)
Children food security	
Very low food security	0.000
	(0.000)
Low food security	0.020***
	(0.010)
Marginal/high food security	0.980***
	(0.010)

Note: Standard errors in the parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

It may be due to the fact that the very low food secure group consume remittance money within a relatively small time frame than other groups as they already lack other sufficient sources of income for food consumption purposes; therefore, they tend to remain food insecure after a certain month within the same year. However, further research is necessary regarding the income remittance spending pattern in very low food secure households to support this statement.

In the case of household food security, the additional international remittance amount of NRs. 10,000 increases the probability to be high food secure by 4.7 percent for low food

secured household, by 3.2 percent for marginal food secured household, and by 91.8 percent for already high food secured household. Similarly, the increase of international remittance by NRs. 10,000 increases the probability of being highly food secured by 4.7 percent for the adults who are low food secured, by 3.5 percent for the adults who are marginally food secured, and by 91.7 percent for the adults who are already highly food secured. Furthermore, an additional international remittance amount of NRs. 10,000 increases the probability of being food secured by 2 percent for the children who are low food secured, and by 98 percent for the children who are already marginally/ highly food secured.

6. Conclusions

Nepal's food insecurities can be blamed on many things: population growth, and agriculturally-based subsistence economy, land fragmentation, limited adoption of improved agricultural technology, higher production cost, lack of agricultural credit facilities, poor development of agricultural markets, conflict, and very low agricultural productivity. A positive thing going for the country seems to be the continuous and growing receipt of remittance since 1990. I have estimated the impact of remittance on the food security of different groups (household, adult, and children) in Chitwan, Nepal. Results indicate that the probability of food security status improvement due to remittance receipt is substantial in the study region. Households with higher proportions of income from agriculture and livestock production are more likely to be food secure among household members. I have found that the adoption of conservation practices have a negative impact on food security, possibly because land is set aside/shifted away for these practices, resulting in a lesser amount of land available for food production.

This is consistent with the findings even from the developed countries where farmers do not adopt best management practices in a large proportion even with government subsidies because of the concerns that they have to divert the land from a productive use to an

environmental use (Gillespie et al., 2007). In addition, it may be due to the fact that farmers are not aware of the appropriateness of these technologies in their own farming situation, and they are adopting those as farming traditions. On the other hand, findings suggest that the promotion of hybrid rice/corn varieties can play a crucial role in the food security of children in Nepal.

Based on the results, I recommend that the Government of Nepal and other related stakeholders pay attention to education and human capital development to overcome the ongoing food security problem in the country. Education provides employment opportunities and a steady income flow to households thereby increasing the purchasing power of households.

Remittance is an important source of household income among migrant families. Household members are able to afford quality education and complete education beyond the secondary level. There is a causal positive link between education and agricultural technology adoption (Feder et al., 1985), so education may help Nepalese farmers to adopt improved agricultural technology, thereby producing sufficient food. Findings from this study suggest that the remittance money is very important to uplift the food security situation of rural people who are currently in the low and marginal food security status. Hence, programs related to effective utilization of remittance income at a household-level can make a positive change in food security in developing economies. In the long-run, remittance income can be used for investments in education and adoption of improved agriculture technology, which will simultaneously help alleviate the food insecurity problems.

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CHAPTER VI
CONCLUSIONS

I have conducted this research in a three essay format to identify the role of the pertinent variables on migration decisions, migration destination choices, and the food security status in East Chitwan, Nepal. I have used survey data collected from 395 random rural households from the study area. The empirical estimates that link migration and food security status are the major contribution of this research. The general background on the migration, remittance, and food security issue mainly in the context of Nepal is described based on extensive literature on the topics. The economics and econometrics behind the migration decision and destination choices are also illustrated. The food security status of the households, adults and children in the study area is obtained and ranked based on the responses to eighteen food security related questions. The empirical results are chapter specific and are described within the same chapters.

Marginal effects coefficients from the probit regression model for the migration decision have indicated that females, household heads, older individuals, households with lower adult males and higher adult females, households with higher numbers of males and lower numbers of females with secondary education, households with larger land holding size and lower wealth status have a negative effect on the family decision of choosing a household member as a migrant.

Marginal effects coefficients from the multinomial logit regression models have indicated that married, educated individuals, households with higher numbers of adult males and lower numbers of adult females, households with lower numbers of males and higher numbers of females with secondary education, lower land holding size, and higher number migrants from household head's extended families positively affect the choice of an internal migration destination for an individual migrant from a household. Additionally, family members other than household heads, younger individuals, individuals with lower schooling years, households with a lower number of males and higher number of females with secondary

education, households with a lower land holding size, higher wealth index and lower number of international migrants from household head extended families positively affect the choice of an international migration destination. Particularly in the case of international destination choices, younger individuals, unmarried individuals, households with higher numbers of adult females and higher numbers of females with secondary education, educated household heads, higher number of migrants in internal destinations from the household head's extended families and lower numbers of migrants in international destinations from the household head's extended families positively affect the choice of Malaysia as an international destination. Likewise, household heads, married individuals, households with higher number of adult males, higher value of wealth index and higher numbers of migrants in internal destinations from the household head's extended families positively affect the choice of Gulf countries as an international destination.

The findings from the ordered probit regression model have indicated that remittance income is likely to improve the household, adult and children food security status. In addition, any development activities which support higher income from the agricultural sector, adoption of improved agricultural technologies, and higher years of education attainment of household members can significantly increase the likelihood of adults and children being food secured in the study area.

In summary, managing migration and resulting remittance receipts should be of high priority for the Nepalese government and policy makers. Migration should not be viewed as the loss of labor or a brain drain but rather it should be viewed as an alternative to foreign direct investment. Therefore, it should be used as productive capital rather than in consumption. Empirical evidence from this study has shown that remittance income has the potential to improve food security status of the remittance receiving households. Implications of the findings from this research should be carefully translated to other parts of the country although

general results may hold across the country. Since I have used the New Economics of Labor Migration theory, migration models in this study address only the supply side of labor issues. Similarly, as remittance is a private capital flow, further research is necessary to support the argument that remittance and other knowledge gained by migrants can have a significant impact to reduce food insecurity and to support overall economic development.

APPENDIX 1
SURVEY QUESTIONNAIRE

Nepal Ethnosurvey of Family, Migration, and Development
2012-2013

Louisiana State University

Date: _____

Name: _____

Address: _____

Longitude/Latitude: _____

Interviewer: _____

For Internal Use:
Final I.D.

Community
Number: _____

Household
Number: _____

Observations: _____

_____

_____

_____

_____

_____

Table A Information about the **household members** who lived in the household for at least 1 day in the last 12 months **and other children** of household head who no longer live in the household. (Record in this order: household head first, then the spouse; then, all the children (**from oldest to youngest**), lastly all other persons who live in the household.)

	Name of Head Name of Spouse Code for Others: Son=S#; Daughter=D#; Grandson=GS#; Granddaughter=GD#; Relative=R#; Other=0#	Gender?	Age?	Place of Birth? City & District	Marital Status? *a*	Spouse # from list "A"	Caste? *b*	During the last 12 months, how many months did they live here? (round up)	If lived in the household, their quality of Health? *c*	Assist in which household activity? (All that apply) *d*
1		M F			Code		Code		Code	Code
2		M F			Code		Code		Code	Code
3		M F			Code		Code		Code	Code
4		M F			Code		Code		Code	Code
5		M F			Code		Code		Code	Code
6		M F			Code		Code		Code	Code
7		M F			Code		Code		Code	Code
8		M F			Code		Code		Code	Code
9		M F			Code		Code		Code	Code
10		M F			Code		Code		Code	Code
11		M F			Code		Code		Code	Code
12		M F			Code		Code		Code	Code
13		M F			Code		Code		Code	Code
14		M F			Code		Code		Code	Code
15		M F			Code		Code		Code	Code
16		M F			Code		Code		Code	Code
17		M F			Code		Code		Code	Code

Who Informed?
(number in "A"):

☐

(a) Marital Status
1-Single
2-Married
3-Consensual Union
4-Widowed
5-Divorced
6-Separated

(b) Caste:
1-Higher Caste
2-Lower Caste
3-Mongolian
4-Tharu

(c) Quality?
1- Very Bad
2- Bad
3-Good
4-Excellent
5-N/A

(d) Household Activities:
1-Childcare
2-Take care of other family members
3-Housework
4-Household expenditure management
5-Home mortgage payment
6-Participation in community meetings
7-Family business
8-Farming
9-Other:_____

Table B Information about the **EDUCATION of household members** who lived in the household for at least 1 day in the last 12 months **and other children** of household head who no longer live in the household. (Follow the same order as in Table A.)

Number in "A"	Name of Head Name of Spouse Code for Others: Son=S#; Daughter=D#; Grandson=GS#; Granddaughter=GD#; Relative=R#; Other=0#	Literate?	Total Years of education Completed?	Level of education Completed? *a*	Enrolled in School?	If enrolled, type of eductional institution? *b*	If enrolled, Average time required to attend school? Including transport time	If enrolled, transport used? *c*	If enrolled, total cost of schooling last year? (Rupee)	What languages can be spoken/ understood? (All that apply) *d*
1		Yes No Unk		Code	Yes No Unk	Code		Code		Code
2		Yes No Unk		Code	Yes No Unk	Code		Code		Code
3		Yes No Unk		Code	Yes No Unk	Code		Code		Code
4		Yes No Unk		Code	Yes No Unk	Code		Code		Code
5		Yes No Unk		Code	Yes No Unk	Code		Code		Code
6		Yes No Unk		Code	Yes No Unk	Code		Code		Code
7		Yes No Unk		Code	Yes No Unk	Code		Code		Code
8		Yes No Unk		Code	Yes No Unk	Code		Code		Code
9		Yes No Unk		Code	Yes No Unk	Code		Code		Code
10		Yes No Unk		Code	Yes No Unk	Code		Code		Code
11		Yes No Unk		Code	Yes No Unk	Code		Code		Code
12		Yes No Unk		Code	Yes No Unk	Code		Code		Code
13		Yes No Unk		Code	Yes No Unk	Code		Code		Code
14		Yes No Unk		Code	Yes No Unk	Code		Code		Code
15		Yes No Unk		Code	Yes No Unk	Code		Code		Code
16		Yes No Unk		Code	Yes No Unk	Code		Code		Code
17		Yes No Unk		Code	Yes No Unk	Code		Code		Code
18		Yes No Unk		Code	Yes No Unk	Code		Code		Code

(a) Level of education completed:
1-Elementary/Primary
2-Lower Secondary
3-Seconday
4-Higher Secondary
5- High school
6- Technical w/o other school
7- Technical school
8- College/University
9- Adult School

(b) Type of Educational Institution:
1-Public
2-Private, non-religious
3-Private, religious
4-Private, boarding school

(c) Transportation
1- Foot (Without Load)
2- Bicycle/Richshaw
3- Motorcycle/Tempo
4- Car/Bus
5- Mixed (Foot/Vehicle)
6- Next to Household

(d) Languages:
1-Nepali
2-Maithilii
3-Bhojpuri
4-Tharu
5-Tamang
6-Newari/Nepal Bhasa
7-Magar
8-Awadhi
9-Bantawa
10-Gurung/Tamu
11-Limbu
12-Bajjika
13-English

Table C Current and past agricultural lands in Nepal (separate by unit of area)

Land #	Total Area of Land?	Total Area Cultivated?	Total Area Rented/ Leased Out?	Unit of Area? *a*	Type of Land? *b*	Distance from residence? (one way)	Tenancy? *c*	Cost of rent/ purchase last year? (Rupee)	Financed? (All that apply) *d*	Year Acquired?	Year Sold?	Number of Workers Used Last Year? Family Members?	Other Workers?
Current Agricultural Land													
1				Code	Code		Code		Code				
2				Code	Code		Code		Code				
3				Code	Code		Code		Code				
4				Code	Code		Code		Code				
5				Code	Code		Code		Code				
Past Agricultural Land													
1				Code	Code		Code		Code				
2				Code	Code		Code		Code				
3				Code	Code		Code		Code				
4				Code	Code		Code		Code				
5				Code	Code		Code		Code				

(a) Unit of Area
1- Bigha
2- Katha
3- Dhur
4- Ropani
5- Ana
6- Paisa

(b) Type of Land
1- Arable
2- Pond
3- Terrace
4- Meadow
5- Woodland/Forrest
6- Wetland
7- Dry
8- Other:_____

(c) Tenancy
1- Owned
2- Rented/Leased
3- Communal
4- Other Tenure

(d) Financed?
1-Savings
2-Loan from a bank
3-Loan from family
4-Loan from friend
5-Inheritance
6-Remittance
7-Other: _____

Table D Land Quality and Management of Current Land (Land # corresponds to the land numbered in

Land #	Land Productivity Good?	Water Quality is Good?	Soil Quality is Good?	Land Degradation Present? *b*	Did you have enough Labor last year?	# of Non-Fruit Trees?	Main Purpose of Non-Fruit Trees *c*	After active involvement, area plan to **sell** (monetary purspose)	After active involvement, area plan to **hand over** to offspring/other	After active involvement, area plan to **other** (Please explain)
1	Yes No Unk	Yes No Unk	Yes No Unk	Code	Yes No Unk		Code			
2	Yes No Unk	Yes No Unk	Yes No Unk	Code	Yes No Unk		Code			
3	Yes No Unk	Yes No Unk	Yes No Unk	Code	Yes No Unk		Code			
4	Yes No Unk	Yes No Unk	Yes No Unk	Code	Yes No Unk		Code			
5	Yes No Unk	Yes No Unk	Yes No Unk	Code	Yes No Unk		Code			

(b) Degradation:
0-None
1-Soil Erosion
2-Chemical
3-Physical

(c) Purpose of trees:
1- Wood/Firewood Production
2- Soil & Water Conservation
3- Herbal Plant Production
4-Other: _____

Table E Current Availability and Usage of Agricultural Infrastructure (Land # corresponds to the land numbered in Table)

Agricultural Infrastructure and Technology	Available in District?	Used last year?	If used last year, Total Cost last year? (Rupee)	If used last year, financed w/ Remittance?	If available, Quality? *b*	If do not use, **Plan** to use in the future?
Mechanized Model Farm Concept	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
One Village One Product (OVOP) System	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Biogas Support Programme (BSP)	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Micro-irrigation Programme	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Exchange of animal/fish programme	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Market	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Electricity Supply	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Transportation Facility	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Fair price shops for Inputs	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Agricultural Loans	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Cold Storage	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Food Processing	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Solar Energy to dehydrate perishable products	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Value Added	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Food Supply Chain	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Agricultural Cooperative	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Agricultural Extension	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Climate/Weather Information	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Agro-chemicals e.g. lime and fertilizer	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Mineral/Chemical Fertilizer	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Pesticide	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Organic Manure	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Improved/Hybrid Seed	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Crop Breeding	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Vegetable Seed Production	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk
Improved Animal Variety	Yes No Unk	Yes No Unk		Yes No Unk	Code	Yes No Unk

(d) Quality?
1- Very Bad
2- Bad
3-Good
4-Excellent
5-N/A

Table F Current Availability and Usage of Agricultural Machinery and Equipment (Land # corresponds to the land numbered in Table)

Agriculture Machinery and Equipment	Available in District?	Know How to Use?	If used, **first** year used?	If stopped, **last** year used?	If used last year, Total Cost last year? (Rupee)	If used last year, financed w/ Remittance?	If available, Quality? *a*	If do not use, **Plan** to use in the future?
Iron Plough	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Power Tiller	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Shallow Tube Well	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Deep Tube Well	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Rower/Dhiki Pump	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Tractor	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Thresher	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Pumping Set/Mortor	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Animal Drawn Cart	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Combined Harvester	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Sprayer	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Biomas gasifier	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Manual seed-cum-fertilizer jab planter	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Pedal Millet Threasher/Pearler	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Coffee Pulpers	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Minimum Till Drill	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Zero Till Drill	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Mini SRR (simple, small, low-cost dryer)	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Low-cost Solar Dryers	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Rice Husks Stove for cooking	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk
Poly-house	Yes No Unk	Yes No Unk				Yes No Unk	Code	Yes No Unk

(a) Quality?
1- Very Bad
2- Bad
3-Good
4-Excellent
5-N/A

Table G Current Availability and Usage of Soil and Water Conservation Methods (Land # corresponds to the land numbered in Table)

Soil and Water Conservation Methods	Know How to Use?	Enough Labor to use?	If used, **first** year used?	If stopped, **last** year used?	If used last year, financed w/ Remittance?	If not used, Why? *a*	If do not use, **Plan** to use in the future?
Placing plant rows and tillage lines at right angle to the normal flow of surface run-off	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Pit dug to protect and retain soil and water out flows	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Alternate planting of different crop in strips	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Planting trees and shrubs around the farmland to control wind erosion	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Grass strips alternating with crop strips on the same plot to check erosion e.g. using vetiver grass	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Using the straw to cover the plot after land preparation	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Furrow-irrigated raised bed	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
No-tillage	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Reduced-tillage	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Minimum-tillage	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Keeping the soil covered with growing plants	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Using tied ridges	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Terrace farming	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Using combination of different crops	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Alternating period of cropping and period of fallowing	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Crop rotation	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Avoidance of overgrazing	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Establishment of permanent water ways	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Use of water-harvesting techniques such as digging pits	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Farmer-managed irrigation system	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Rainwater Harvesting system	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Drip Irrigation system	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Wastewater reuse for agriculture	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Plastic Mulching in Vegetable Plots	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk
Building dams	Yes No Unk	Yes No Unk			Yes No Unk	Code	Yes No Unk

(a) Why not?
1- Cost
2- Lack of Labor
3- Lack of Info.
4-Not Profitable
5- Other:_____

Table H Output/Yield of Crops Last Year (Land # corresponds to the land numbered in Table)

Crops #	Name of Crop?	Type of Crop? *a*	Main Variety? *b*	Land #	Area Cultivated?	Unit of area? *c*	Irrigated?	If irrigated, source? *d*	Cost of Irrigation? (Rupee)	Used No Tillage?	Production Quintal	kg	Used for? *e*
1		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code
2		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code
3		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code
4		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code
5		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code
6		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code
7		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code
8		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code
9		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code
10		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code
11		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code
12		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code
13		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code
14		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code
15		Code	Code			Code	Yes No Unk	Code		Yes No Unk			Code

(a) Type of Crop
1-Traditional Food Crop
2-Vegetable Crop
3-Horticulture
4- Farm Forestry
5-Fishery
5- Floriculture
6- Herbal Plants
7- Other: _____

(b) Variety
1- Local
2- Improved
3- Hybrid

(c) Unit of Area
1- Bigha
2- Katha
3- Dhur
4- Ropani
5- Ana
6- Paisa

(d) Source of Irrigation
1- Tube well, Boring
2- Canal
3- Pond, Well
4- Conti. Flow Canal
5-Other

(e) Used For:
1- Commercial
2- Personal
3- Other:_____

Table I Usage of Animals Last Year (Land # corresponds to the land numbered in Table)

Animals	First Year Acquired?	Improved Variety?	Land #	How Many Total?	How Many Male?	How Many Female?	How Many Milking?	How Many Laying Eggs?	Financed w/ Remittance?
Cows		Yes No Unk							Yes No Unk
Buffallo		Yes No Unk							Yes No Unk
Goats		Yes No Unk							Yes No Unk
Oxen		Yes No Unk							Yes No Unk
Horses		Yes No Unk							Yes No Unk
Pig		Yes No Unk							Yes No Unk
Chicken		Yes No Unk							Yes No Unk
Ducks		Yes No Unk							Yes No Unk
Pigeon		Yes No Unk							Yes No Unk
Other: _____		Yes No Unk							Yes No Unk

Table J Output/Yield of Fruit Trees Last Year (Land # corresponds to the land numbered in Table)

Tree #	Name of Fruit?	Main Variety? *a*	Land #	# of Trees?	Used Fertilizer?	Used Pesticide?	Production? Quintal	kg	Used For? *b*
1		Code			Yes No Unk	Yes No Unk			Code
2		Code			Yes No Unk	Yes No Unk			Code
3		Code			Yes No Unk	Yes No Unk			Code
4		Code			Yes No Unk	Yes No Unk			Code
5		Code			Yes No Unk	Yes No Unk			Code
6		Code			Yes No Unk	Yes No Unk			Code
7		Code			Yes No Unk	Yes No Unk			Code
8		Code			Yes No Unk	Yes No Unk			Code
9		Code			Yes No Unk	Yes No Unk			Code
10		Code			Yes No Unk	Yes No Unk			Code
11		Code			Yes No Unk	Yes No Unk			Code
12		Code			Yes No Unk	Yes No Unk			Code
13		Code			Yes No Unk	Yes No Unk			Code
14		Code			Yes No Unk	Yes No Unk			Code
15		Code			Yes No Unk	Yes No Unk			Code

(a) Variety
1- Local
2- Improved
3- Hybrid

(b) Used For:
1- Commercial
2- Personal
3- Other:_____

Table K Ancillary Agricultural Activity Last Year (Land # corresponds to the land numbered in Table)

Ancillary Agricultural Activity?	Answer	Land # (all that apply)	# of Ponds	Total Area of Pond	Unit of Area *a*	Used Rice Fields for fishery?
Mushroom Farming	Yes No Unk					
Sericulture	Yes No Unk					
Bee-keeping	Yes No Unk					
Fishery	Yes No Unk				Code	Yes No Unk
Other:_____	Yes No Unk					

(a) Unit of Area
1- Bigha
2- Katha
3- Dhur
4- Ropani
5- Ana
6- Paisa

Table L Household Income

Agricultural Income	Answer
Is agricultural income the main source of income?	Yes No Unk
Was your income from agriculture or livestock production sufficient to feed your household last year?	Yes No Unk
Was there surplus agricultural or livestock production to sell at the market?	Yes No Unk
Average **Monthly Income** from agriculture or livestock production? (Rupee)	
Wages/Salary from Within the District	Answer
Average **Monthly Income** from Wages/Salary from **within the district**? (Rupee)	
Purposes of **Wages/Salary from within the district** (All that apply) *a*	Code
Wages/Salary from Outside the District	Answer
Average **Monthly Income** from Wages/Salary from **outside the district**? (Remittance) (Rupee)	
Purposes of **Remittances** (All that apply) *a*	Code
Approximate **percentage** of Remittances used for purpose 3 and 4?	
How is the money **received**? *b*	Code
Do you get the bank rate on remittance money?	Yes No Unk
Wages/Salary from Outside Nepal	Answer
Average **Monthly Income** from Wages/Salary from **outside the district**? (Remittance) (Rupee)	
Purposes of **Remittances** (All that apply) *a*	Code
Approximate **percentage** of Remittances used for purpose 3 and 4?	
How is the money **received**?	Code
Do you get the bank rate on remittance money?	Yes No Unk
Do you know how much it takes to send the money from the destination country to the home country?	Yes No Unk

(b) Received?
1- Hand Carried
2- Hundi
3- Using Banks

Other Sources of Household Income outside of agriculture and off-farm labor:	Answer
Average monthly Income from **Government Assistance** (Rupee)	
Purposes of **Government Assistance** (All that apply) *a*	Code
Average monthly **Assistance from an NGO** (Rupee)	
Purposes of **NGO Assistance** (All that apply) *a*	Code
Average monthly **Pensions** (Rupee)	
Purposes of **Pensions** (All that apply) *a*	Code
Average monthly **Savings** (Rupee)	
Purposes of **Savings** (All that apply) *a*	Code
Average monthly income from **Renting Farming Equipment** (e.g. bullock carts, tractor, pump, etc.) (Rupee)	
Purposes of income from **Renting Farming Equipment** (All that apply) *a*	Code
Average monthly income from **House rent/Land lease** (Rupee)	
Purposes of income from **House rent/Land lease** (All that apply) *a*	Code
Average monthly income from **Trade and other business** (Rupee)	
Purposes of income from **Trade and other business** (All that apply) *a*	Code

(a) Purpose:
1-Food and Maintenance
2-Construction or repair of house
3-Purchase of house or lot
4-Purchase of vehicle
5-Purchase of tools
6-Purchase of livestock
7-Purchase of agricultural inputs
8-Purchase of natural resource conservation inputs
9-Start/expand business
10-Education expenses
11-Health expenses
12-Debt payment
13-Finance a special event
14- Purchase of consumer goods
15-Recreation/entertainment
16-Savings
17-Other:_____

Table M Labor History **within the District** for household members in Table A

Number in "A"	Name of Head Name of Spouse Code for Others: Son=S#; Daughter=D#; Grandson=GS#; Granddaughter=GD#; Relative=R#; Other=0#	Age?	Year Started?	Worked how long?	Permanent Job?	Dist. from residence? (one way)	Transport Used? *a*	Average Cost of Transport per month? (Rupee)	Occupation? *b*	Wages? Quantity (Rupee)	Wages? Unit *c*
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code
					Yes No Unk		Code		Code		Code

(a) Transportation
1- Foot (Without Load)
2- Bicycle/Richshaw
3- Motorcycle/Tempo
4- Car/Bus
5- Mixed (Foot/Vehicle)
6- Next to Household

(b) Occupation Guide
0- Armed Forces
1- Managers
2- Professionals
3- Technicians and associate professions
4- Clerical support
5- Service and sales workers
6- Household chores
7-Craft and related trades worker
8- Plan and machine operator and assemblers
9- Unskilled worker at elementary occupation
10- Agriculture
11- Skilled agricultural, forestry and fishery
12- Other:_____

(c) Wage Unit
1-Hourly
2-Daily
3-Weekly
4-Biweekly
5-Monthly
6-Yearly

Table N Information about each **migratory experience outside the district** for household members in Table A

Number in "A"	Name of Head Name of Spouse Code for Others: Son=S#; Daughter=D#; Grandson=GS#; Granddaughter=GD#; Relative=R#; Other=0#	Place of Destination? City & District	Age?	Year of Arrival?	Worked how long?	Were they Married?	How was trip financed? (All that apply) *a*	Remitted?	Occupation? *b*	Wages Quantity (Rupee)	Unit *c*
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code
						Yes No Unk	Code	Yes No Unk	Code		Code

(a) Financed?
1-Savings
2-Loan from a bank
3-Loan from family
4-Loan from friend
5-Inheritance
6-Remittance
7-Other: _____

(b) Occupation Guide
0- Armed Forces
1- Managers
2- Professionals
3- Technicians and associate professions
4- Clerical support
5- Service and sales workers
6- Household chores
7-Craft and related trades worker
8- Plan and machine operator and assemblers
9- Unskilled worker at elementary occupation
10- Agriculture
11- Skilled agricultural, forestry and fishery
12- Other:_____

(c) Wage Unit
1-Hourly
2-Daily
3-Weekly
4-Biweekly
5-Monthly
6-Yearly

Table O Information about each **migratory experience outside Nepal** for household members in Table A

Number in "A"	Name of Head Name of Spouse Code for Others: Son=S#; Daughter=D#; Grandson=GS#; Granddaughter=GD#; Relative=R#; Other=0#	Place of Destination? State & Country	Legal?	Were they married?	Year of Arrival?	Worked how long?	How was trip financed? (All that apply) *a*	Remitted?	Occupation? *b*	Wages Quantity (Rupee)	Unit *c*
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code
			Yes No Unk	Yes No Unk			Code	Yes No Unk	Code		Code

(a) Financed?
1-Savings
2-Loan from a bank
3-Loan from family
4-Loan from friend
5-Inheritance
6-Remittance
7-Other: _____

(b) Occupation Guide
0- Armed Forces
1- Managers
2- Professionals
3- Technicians and associate professions
4- Clerical support
5- Service and sales workers
7-Craft and related trades worker
8- Plan and machine operator and assemblers
9- Unskilled worker at elementary occupation
10- Agriculture
11- Skilled agricultural, forestry and fishery
12- Other:_____

(c) Wage Unit
1-Hourly
2-Daily
3-Weekly
4-Biweekly
5-Monthly
6-Yearly

Table P Head of Household **family** with migratory experience (includes those born outside Nepal)

Relationship w/ Head	Gender?	Year of 1st trip?	Legal?	Left Nepal?	Total # of trips within?	Total # of trips abroad?	If left Nepal, how any different locations?	Occupation ? (Guide on Previous Page)	Remittted?	Still Alive?	If alive, **Currently** lives away?
Mother			Yes No Unk	Yes No Unk				Code	Yes No Unk	Yes No Unk	Yes No Unk
Father			Yes No Unk	Yes No Unk				Code	Yes No Unk	Yes No Unk	Yes No Unk
Sibling 1	M F		Yes No Unk	Yes No Unk				Code	Yes No Unk	Yes No Unk	Yes No Unk
Sibling 2	M F		Yes No Unk	Yes No Unk				Code	Yes No Unk	Yes No Unk	Yes No Unk
Sibling 3	M F		Yes No Unk	Yes No Unk				Code	Yes No Unk	Yes No Unk	Yes No Unk
Sibling 4	M F		Yes No Unk	Yes No Unk				Code	Yes No Unk	Yes No Unk	Yes No Unk
Sibling 5	M F		Yes No Unk	Yes No Unk				Code	Yes No Unk	Yes No Unk	Yes No Unk
Sibling 6	M F		Yes No Unk	Yes No Unk				Code	Yes No Unk	Yes No Unk	Yes No Unk
Sibling 7	M F		Yes No Unk	Yes No Unk				Code	Yes No Unk	Yes No Unk	Yes No Unk
Sibling 8	M F		Yes No Unk	Yes No Unk				Code	Yes No Unk	Yes No Unk	Yes No Unk
Sibling 9	M F		Yes No Unk	Yes No Unk				Code	Yes No Unk	Yes No Unk	Yes No Unk
Sibling 10	M F		Yes No Unk	Yes No Unk				Code	Yes No Unk	Yes No Unk	Yes No Unk
Sibling 11	M F		Yes No Unk	Yes No Unk				Code	Yes No Unk	Yes No Unk	Yes No Unk
Sibling 12	M F		Yes No Unk	Yes No Unk				Code	Yes No Unk	Yes No Unk	Yes No Unk

Table Q Head of household **extended family and friends** with migratory experience (includes those born outside of Nepal)

Relationship to Head	How many **currently** live **outside the community**?	How many (others) lived **outside the community** before?	How many **currently** live **outside Nepal**?	How many (others) lived **outside Nepal** before?
Uncles				
Cousins				
Nieces/nephews				
Siblings in law (from direct family)				
Children in law				
Parent in law				
Friends				

Table R Information about **head of household migratory experience** or **another migrant** from the household

Number of Person in "A": ☐

On your trips within Nepal and abroad:	Head	Spouse	Migrant in "A"
Help on your first trip:	Use these two columns if the household head is a migrant		Collect only if household head is NOT a migrant
What was the purpose of migrating? *a*	Code	Code	Code
How much was paid to broker? (Rupee)			
If abroad, how long was initial visa for? (months)			
If got a job, how did you get your job? *b*	Code	Code	Code
Lodging from WHOM upon arrival? *c*	Code	Code	Code
Did other FELLOW HOME-COMMUNITY MEMBERS live with you in the same house?	Yes No Unk	Yes No Unk	Yes No Unk
When needed money, who offered HELP? *c*	Code	Code	Code
Information about your last trip			
If got a job, how did you get your job? *b*	Code	Code	Code
If got a job, how long did it take to get your job?			
If got a job, how many hours did you work per week?			
If got a job, which months did you work? *d* (All that apply)	Code	Code	Code
How many times did you communicate with household in home country?			
How many times did you send money to household in home country?			
How much **total money** did you send to household in home country? (Rupee)			
Who in the household usually received the money? (Number from "A")			
Did you have a BANK account in country of work?	Yes No Unk	Yes No Unk	Yes No Unk
Did you have a CREDIT card in country of work?	Yes No Unk	Yes No Unk	Yes No Unk

(a) Purpose of Migration?
1-Education
3-Job opportunity
4-Unemployed
5-Civil conflict/ war
6-Marriage arrangement/Moved to join family
7-Family Problems
8- Poorer living conditions here
9- Do not own enough agricultural land
10-Poor quality of land or depleted soils
11-Other:_____

(b) How was the job obtained?
1-Searched by oneself
2-Recommended by a relative
3-Recommended by a friend
4-Recommened by a fellow home-community member
5-Through an employment agency
6-Contracted
7-Paid a friend/fellow home-community member
8-Other:_____

(c) Who helped?
1-Fellow home-community member
2-Friend
3-Employer
4-Relative
5-Bank
6-Did not need help
7-Other:

(d) Months
1-Baishakh
2-Jeth
3-Asar
4-Saun
5-Bhadau
6-Asoj
7-Kattik
8- Mangsir
9- Pus
10- Magh
11- Fagun
12- Chait

Table S Information about the history of business, companies, or other activities **that require economic investment from the head of household**

Business Number	Type of Business? Description	Code *a*	Year Started?	Year Closed /Sold?	If used last year, Number of Workers? Family Members?	Other Workers?	Located in Nepal?	Distance from residence? (one way)	If purchased over a year ago, Cost of initial purchase? (Rupee)	Cost of set-up/ opening/ expanding last year? (Rupee)	Financed last year? (All that apply) *b*
1		Code					Yes No Unk				Code
2		Code					Yes No Unk				Code
3		Code					Yes No Unk				Code
4		Code					Yes No Unk				Code
5		Code					Yes No Unk				Code

(a) Type of Business:

1-Store
2-Street Vendor
3-Restaurant/Bar
4-Workshop
5-Factory
6-Middleman
7-Personal service
8-Professional/Technical services
9-Other services
10-Agriculture
11-Cattle Raising
12-Other

(b) Financed?

1-Savings
2-Loan from a bank
3-Loan from family
4-Loan from friend
5-Inheritance
6-Remittance
7-Other:

Table T Household Vehicle Holdings

Vehicle #	Type of Vehicle? *a*	Year Acquired?	Year Sold?	Purchased in Nepal?	Used for? *b*	If purchased over a year ago, Cost of initial purchase of vehicle? (Rupee)	Total cost of vehicle purchase/ maintenance last year? (Rupee)	Financed? (All that apply) *c*	Quality of Vehicle? *d*
1	Code			Yes No Unk	Code			Code	Code
2	Code			Yes No Unk	Code			Code	Code
3	Code			Yes No Unk	Code			Code	Code
4	Code			Yes No Unk	Code			Code	Code
5	Code			Yes No Unk	Code			Code	Code

(a) Type of Vehicle

1-Auto
2-Pick-up/Van/Truck
3-Bus
4-Tractor
5-Taxi
6-Motorcycle
7-Other:

(b) Used For:

1- Commercial
2-Personal
3-Other: _____

(c) Financed?

1-Savings
2-Loan from a bank
3-Loan from family
4-Loan from friend
5-Inheritance
6-Remittance
7-Other:

(d) Quality?

1- Very Bad
2- Bad
3-Good
4-Excellent

Table U Information about the **house living in and other properties** owned by household head and spouse

Property Number	Type of Property? *a*	Material of Const.?	Type of Floor? *c*	Number of Rooms?	Toilet Access? *d*	Tenancy? *e*	Year Acquired?	Year Sold?	Located in Nepal?	Distance from residence?	Financed? *f*	Quality of Prop.? *g*
1	1	Code	Code		Code	Code			Yes No Unk		Code	Code
2	Code	Code	Code		Code	Code			Yes No Unk		Code	Code
3	Code	Code	Code		Code	Code			Yes No Unk		Code	Code
4	Code	Code	Code		Code	Code			Yes No Unk		Code	Code
5	Code	Code	Code		Code	Code			Yes No Unk		Code	Code
6	Code	Code	Code		Code	Code			Yes No Unk		Code	Code

(a) Type of Property
1-House of residence
2-House owned
3-Lot owned
4-Business place
5-Apartment building
6-Apartment owned

(b) Material of Construction
1-Wood and tile roof
2-Wood and thatched roof
3-Brick and tile roof
4-Brick and cement roof

(c) Type of floor
1-Dirt
2-Wood
3-Cement
4-Finished
(Tile/Carpet/etc…)

(d) Toilet Access:
1-Outhouse w/ sewer
2-Outhouse w/o sewer
3-Indoor toilet
4-Other:
_____

(e) Tenancy
1-Borrowed
2-Rent
3-Own
4-Owned by other relative
5-Without papers
6-Other:_____

(f) Financed?
1-Savings
2-Loan from a bank
3-Loan from family
4-Loan from friend
5-Inheritance
6-Remittance
7-Other:_____

Table V Services Available and Utilized in the House of Residence

Service	Available?	Used last year?	Year Acquired?	Year Sold/or if Service Stopped, Last Year Used?	Purchased in Nepal?	Cost of Good? Rupee	Financed w/ Remittance?	Quality? *g*
Water	Yes No Unk	Yes No Unk					Yes No Unk	Code
Electricity	Yes No Unk	Yes No Unk					Yes No Unk	Code
Sewer	Yes No Unk	Yes No Unk					Yes No Unk	Code
Garbage Disposal	Yes No Unk	Yes No Unk					Yes No Unk	Code
Stove	Yes No Unk	Yes No Unk			Yes No Unk		Yes No Unk	Code
Refrigerator	Yes No Unk	Yes No Unk			Yes No Unk		Yes No Unk	Code
Washing Machince	Yes No Unk	Yes No Unk			Yes No Unk		Yes No Unk	Code
Sewing Machine	Yes No Unk	Yes No Unk			Yes No Unk		Yes No Unk	Code
Radio	Yes No Unk	Yes No Unk			Yes No Unk		Yes No Unk	Code
TV	Yes No Unk	Yes No Unk			Yes No Unk		Yes No Unk	Code
DVD	Yes No Unk	Yes No Unk			Yes No Unk		Yes No Unk	Code
Cable or Satellite	Yes No Unk	Yes No Unk			Yes No Unk		Yes No Unk	Code
Stereo/CD player	Yes No Unk	Yes No Unk			Yes No Unk		Yes No Unk	Code
Telephone	Yes No Unk	Yes No Unk			Yes No Unk		Yes No Unk	Code
Cellular Phone	Yes No Unk	Yes No Unk			Yes No Unk		Yes No Unk	Code
Computer	Yes No Unk	Yes No Unk			Yes No Unk		Yes No Unk	Code
Internet Service	Yes No Unk	Yes No Unk					Yes No Unk	Code

(g) Quality?
1- Very Bad
2- Bad
3-Good
4-Excellent
5-N/A

Table W Household Access to Outside Resources and Services

Resource & Service	Available in the District?	Used last year?	If used, Dist. from residence? (one way)	If used, Average time required to access? Including transport time	If used, Transport Used? *a*	If used, Cost of Transport there and back? (Rupee)	If used, Quality? *b*
Nutrition Information	Yes No Unk	Yes No Unk			Code		Code
Private Primary School	Yes No Unk	Yes No Unk			Code		Code
Private Secondary School	Yes No Unk	Yes No Unk			Code		Code
Private High School	Yes No Unk	Yes No Unk			Code		Code
Private Technical School	Yes No Unk	Yes No Unk			Code		Code
Private College/University	Yes No Unk	Yes No Unk			Code		Code
Boarding School_Primary	Yes No Unk	Yes No Unk			Code		Code
Boarding School_Seconday	Yes No Unk	Yes No Unk			Code		Code
Boarding School_High	Yes No Unk	Yes No Unk			Code		Code
Solar Energy for cooking and boiling water	Yes No Unk	Yes No Unk			Code		Code
Solar Energy for heating and electrification	Yes No Unk	Yes No Unk			Code		Code
Solar Energy for linking up communication facilities	Yes No Unk	Yes No Unk			Code		Code
Bank	Yes No Unk	Yes No Unk			Code		Code
Other Credit Services	Yes No Unk	Yes No Unk			Code		Code
Healthcare	Yes No Unk	Yes No Unk			Code		Code
Postal Service	Yes No Unk	Yes No Unk			Code		Code
Police Station	Yes No Unk	Yes No Unk			Code		Code
Public Transportation	Yes No Unk	Yes No Unk			Code		Code
Public Library	Yes No Unk	Yes No Unk			Code		Code
Computer	Yes No Unk	Yes No Unk			Code		Code
Internet Service	Yes No Unk	Yes No Unk			Code		Code
Government Office	Yes No Unk	Yes No Unk			Code		Code
Government Assistance	Yes No Unk	Yes No Unk			Code		Code
NGO Office	Yes No Unk	Yes No Unk			Code		Code
NGO Assistance	Yes No Unk	Yes No Unk			Code		Code

(a) Transportation
1- Foot (Without Load)
2- Bicycle/Richshaw
3- Motorcycle/Tempo
4- Car/Bus
5- Mixed (Foot/Vehicle)
6- Next to Household

(b) Quality?
1- Very Bad
2- Bad
3-Good
4-Excellent
5-N/A

Table X Household Expenditure

In the past 12 Months:		Answer (Rupee)
Computer		
Other electronic goods (e.g. DVDs, TV)		
Household appliances (e.g. furniture, kitchen ware, refrigerators, air conditioners, bedding)		
Wedding/Engagement/Funerals		
Luxury goods (e.g. Jewelry and luxury car)		
Home improvement (e.g. roof, floor, plumbing)		
Income taxes, land taxes, housing and property taxes, etc.		
Repair and other expenses for personal vehicle (Registration, Fines, etc.)		
Health	Doctor fees	
	Traditional Medicine and Health Services	
	Hospital/Clinic Fees	
	Medicine/Drugs	
	Laboratory tests	
	Operations	
Productive assets (e.g. sewing machine)		
Setting up a business/Opening a store		
House or land purchase (ghar and ghaderi, except land for agricultural purposes)		
Loan Repayment		
Farming equipment (e.g. trucks, tractor)		
Resource conservation equipment (e.g. drip irrigation, plastic mulching)		
Education/apprenticeship (including tuition fees, tutor fees, school uniform, books, and supplies)		
Other: (Specify)		

In the past 30 days:		Answer (Rupee)
Food	Grains, maize meal, and pulses	
	Fruits	
	Vegetables	
	Dairy	
	Meat	
Fuel	Firewood (Bundlewood, Logwood, Sawdust)	
	Kerosene oil	
	Coal, Charcoal	
	Cylinder gas	
	Matches, Candle, Lighter, Lantern	
Transportation	Public (e.g. bus/taxi fares)	
	Personal (e.g. petrol, diesel, motor oil)	
Cell phone/mobile phone	Initial Cost	
	Service Bills	
Rent for Housing		
Payment for utilities (e.g. gas, water, electricity) if separate from rentals		
Wages paid to servants, gardeners, gatekeepers, etc.		
Household cleaning articles (Washing soap, powder, etc.)		
Entertainment (Cinema, Radio tax, Cable TV, Cassette rentals, etc.)		
Newspapers, Books, Stationery supplies		
Clothing and footwear		

Table Y Information about **NUTRITION for household members** who lived in the household for at least 1 day in the last 12 months. (Follow the same order as in Table A.)

Number in "A"	Name of Head Name of Spouse Code for Others: Son=S#; Daughter=D#; Grandson=GS#; Granddaughter=GD#; Relative=R#; Other=0#	Has an overall healthy diet?	Consume protein at least once a week?	If consume, Quality of Protein? *a*	Consume milk/milk products at least once a week?	If consume, Quality of milk/milk products? *a*	Consume fruit at least once a week?	If consume, Quality of Fruit? *a*	Consume vegetables (not starch) at least once a week?	If consume, Quality of Vegetables? *a*
1		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
2		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
3		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
4		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
5		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
6		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
7		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
8		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
9		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
10		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
11		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
12		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
13		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
14		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
15		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
16		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
17		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code
18		Yes No Unk	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code	Yes No Unk	Code

(a) Quality?
1- Very Bad
2- Bad
3-Good
4-Excellent
5-N/A

Table Z1 Information about **FOOD SECURITY for household members** who lived in the household for at least 1 day in the last 12 months.

1	"We worried whether our food would run out before we got money to buy more."	Often Sometimes Never NA
2	"The food that we bought just didn't last and we didn't have money to get more."	Often Sometimes Never NA
3	"We couldn't afford to eat balanced meals."	Often Sometimes Never NA
4	"We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food."	Often Sometimes Never NA
5	"We couldn't feed our children a balanced meal, because we couldn't afford that."	Often Sometimes Never NA
6	"The children were not eating enough because we just couldn't afford enough food."	Often Sometimes Never NA
7	Did you or other adults in the household ever cut the size of your meals or skip meals because there wasn't enough money for food?	Yes No NA
8	(If yes to question 7) What month in which it occurred? (All that apply)	Code
9	Did you or other adults ever eat less than you or they ought because there wasn't enough money for food?	Yes No NA
10	Were you or other adults ever hungry, but didn't eat, because there wasn't enough money for food?	Yes No NA
11	Did you or other adults lose weight because there wasn't enough money for food?	Yes No NA
12	Did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food?	Yes No NA
13	(If yes to question 12) What month in which it occurred? (All that apply)	Code
14	Did you ever cut the size of any of the children's meals because there wasn't enough money for food?	Yes No NA
15	Were the children ever hungry but you just couldn't afford more food?	Yes No NA
16	Did any of the children ever skip a meal because there wasn't enough money for food?	Yes No NA
17	(If yes to question 16) What month in which it occurred? (All that apply)	Code
18	Did any of the children ever not eat for a whole day because there wasn't enough money for food?	Yes No NA

(a) Months

1-Baishakh	7-Kattik
2-Jeth	8- Mangsir
3-Asar	9- Pus
4-Saun	10- Magh
5-Bhadau	11- Fagun
6-Asoj	12- Chait

Table Z2 Information about **FOOD SECURITY for household members** who lived in the household **BEFORE ANY Household MIGRATION**.

1	"We worried whether our food would run out before we got money to buy more."	Often Sometimes Never NA
2	"The food that we bought just didn't last and we didn't have money to get more."	Often Sometimes Never NA
3	"We couldn't afford to eat balanced meals."	Often Sometimes Never NA
4	"We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food."	Often Sometimes Never NA
5	"We couldn't feed our children a balanced meal, because we couldn't afford that."	Often Sometimes Never NA
6	"The children were not eating enough because we just couldn't afford enough food."	Often Sometimes Never NA
7	Did you or other adults in the household ever cut the size of your meals or skip meals because there wasn't enough money for food?	Yes No NA
8	(If yes to question 7) What month in which it occurred? (All that apply) *a*	Code
9	Did you or other adults ever eat less than you or they ought because there wasn't enough money for food?	Yes No NA
10	Were you or other adults ever hungry, but didn't eat, because there wasn't enough money for food?	Yes No NA
11	Did you or other adults lose weight because there wasn't enough money for food?	Yes No NA
12	Did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food?	Yes No NA
13	(If yes to question 12) What month in which it occurred? (All that apply) *a*	Code
14	Did you ever cut the size of any of the children's meals because there wasn't enough money for food?	Yes No NA
15	Were the children ever hungry but you just couldn't afford more food?	Yes No NA
16	Did any of the children ever skip a meal because there wasn't enough money for food?	Yes No NA
17	(If yes to question 16) What month in which it occurred? (All that apply) *a*	Code
18	Did any of the children ever not eat for a whole day because there wasn't enough money for food?	Yes No NA

(b) Transportation
1- Foot (Without Load)
2- Bicycle/Richshaw
3- Motorcycle/Tempo
4- Car/Bus
5- Mixed (Foot/Vehicle)
6- Next to Household

(a) Months

1-Baishakh	7-Kattik
2-Jeth	8- Mangsir
3-Asar	9- Pus
4-Saun	10- Magh
5-Bhadau	11- Fagun
6-Asoj	12- Chait

Table AA Information about **NETWORKS for household members** who lived in the household for at least 1 day in the last 12 months. (Follow the same order as in Table A.)

Number in "A"	Name of Head Name of Spouse Code for Others: Son=S; Daughter=D; Grandson=GS; Granddaughter=GD	Belong to any group/ organization/ network/ association?	Which groups or organizations do they belong to? (All that apply) *a*	How many times per month do they meet for group activity?	Average time required to attend a group activity? Including transport time	Transport used? *b*	Cost of Transport? (Rupee)	Monthly fees/dues paid to group? (Rupee)	Own a cell phone?
1		Yes No Unk	Code			Code			Yes No Unk
2		Yes No Unk	Code			Code			Yes No Unk
3		Yes No Unk	Code			Code			Yes No Unk
4		Yes No Unk	Code			Code			Yes No Unk
5		Yes No Unk	Code			Code			Yes No Unk
6		Yes No Unk	Code			Code			Yes No Unk
7		Yes No Unk	Code			Code			Yes No Unk
8		Yes No Unk	Code			Code			Yes No Unk
9		Yes No Unk	Code			Code			Yes No Unk
10		Yes No Unk	Code			Code			Yes No Unk
11		Yes No Unk	Code			Code			Yes No Unk
12		Yes No Unk	Code			Code			Yes No Unk
13		Yes No Unk	Code			Code			Yes No Unk
14		Yes No Unk	Code			Code			Yes No Unk
15		Yes No Unk	Code			Code			Yes No Unk
16		Yes No Unk	Code			Code			Yes No Unk
17		Yes No Unk	Code			Code			Yes No Unk
18		Yes No Unk	Code			Code			Yes No Unk

(a) Groups, Organization, Association Type

1-Farmer/fisherman
2-Irrigation related
3-Trade/Business
4-Professional
5-Hometown
6-Trade Union
7-Religious/Spiritual
8-Neighborhood/village council
9-Political
10-Cultural
11-Environmental Protection
12-Sports Group
13-Veterans
14-Youth Group
15-Parent-teacher
16-Other:_____

APPENDIX 2
STATA CODE

****FOR CHAPTER III and CHAPTER IV****

```
clear
cd "C:\Users\memadhavregmi\Desktop\Datafile_May11"
use mig_may11, replace
**********Frequency Table**********
tabulate all_mig
tabulate nomig_in_out
tabulate outcount_mig
*******Descriptive Statistics *********
describe  all_mig nomig_in_out outcount_mig  house_head all_gender age agesq all_marital
school_year male_num female_num male_educ female_educ hh_educ land_area  anim_unit
wealth_indx wealth_indxsq in_network out_network
*******Summary for dependent variable and individual*********
summarize  all_mig nomig_in_out outcount_mig  house_head all_gender age agesq
all_marital school_year
*******Summary for household characteristics*********
by region: drop hhid if _n != _N
summarize male_num female_num male_educ female_educ hh_educ land_area  anim_unit
wealth_indx wealth_indxsq in_network out_network
***more on descriptive**
tab hhid if all_mig==1 & hh_situ==1
tab hhid if nomig_in_out==2 & hh_situ==1
tab hhid if nomig_in_out==3 & hh_situ==1
tab hhid if all_mig==1 & all_gender==0
```

```
tab hhid if all_mig==1 & all_gender==1
tab hhid if all_mig==1 & all_gender==.
tab hhid if nomig_in_out==2 & all_gender==0
tab hhid if nomig_in_out==3 & all_gender==0
tab hhid if nomig_in_out==2 & all_gender==1
tab hhid if nomig_in_out==3 & all_gender==1
sum age if nomig_in_out==1
sum age if nomig_in_out==2
sum age if nomig_in_out==3
tab hhid if all_mig==1 & all_marital==1
tab hhid if all_mig==1 & all_marital==0
tab hhid if all_mig==1 & all_marital==.
tab hhid if nomig_in_out==2 & all_marital==1
tab hhid if nomig_in_out==3 & all_marital==1
tab hhid if nomig_in_out==2 & all_marital==0
tab hhid if nomig_in_out==3 & all_marital==0
sum school_year if all_mig==1
sum school_year if nomig_in_out==1
sum school_year if nomig_in_out==2
sum school_year if nomig_in_out==3
sum male_num if all_mig==1
sum male_num if nomig_in_out==2
sum male_num if nomig_in_out==3
sum female_num if all_mig==1
sum female_num if nomig_in_out==2
```

sum female_num if nomig_in_out==3

sum male_educ if all_mig==1

sum male_educ if nomig_in_out==2

sum male_educ if nomig_in_out==3

sum female_educ if all_mig==1

sum female_educ if nomig_in_out==2

sum female_educ if nomig_in_out==3

sum hh_educ if all_mig==1

sum hh_educ if nomig_in_out==2

sum hh_educ if nomig_in_out==3

sum land_area if all_mig==1

sum land_area if nomig_in_out==2

sum land_area if nomig_in_out==3

sum anim_unit if all_mig==1

sum anim_unit if nomig_in_out==2

sum anim_unit if nomig_in_out==3

sum wealth_indx if all_mig==1

sum wealth_indx if nomig_in_out==2

sum wealth_indx if nomig_in_out==3

sum in_network if all_mig==1

sum in_network if nomig_in_out==2

sum in_network if nomig_in_out==3

sum out_network if all_mig==1

sum out_network if nomig_in_out==2

sum out_network if nomig_in_out==3

*********GRAPHICS**********GRAPHICS*****************GRAPHICS******

***some new variables needed to be generate for descriptive statistics only**

*#1.

gen two_mig=all_mig

label var two_mig "Migration or not?"

label define two_mig_label 1"Migration" 0 "No Migration", replace

label values two_mig two_mig_label

tab two_mig

*#2.

gen three_mig=nomig_in_out

label var three_mig " No Migration or Migration (Internal or International)?"

label define three_mig_label 1"No Migration" 2"Internal Migration" 3"International Migration", replace

label values three_mig three_mig_label

tab three_mig

*#3.

gen male=1 if all_gender==1

*#4.

gen female=1 if all_gender==0

*#5.

gen head=1 if house_head==1

gen other=1 if house_head==0

*****NOW LET'S MAKE GRAPHS*********

vioplot age, over (two_mig)

vioplot age, over (three_mig)

vioplot school_year, over (two_mig)

vioplot school_year, over (three_mig)

statplot Married Unmarried, over(two_mig) s(sum) xpose varnames

statplot Married Unmarried, over(three_mig) s(sum) xpose varnames

statplot male female, over(two_mig) s(sum) xpose varnames

statplot male female, over(three_mig) s(sum) xpose varnames

statplot head other, over(two_mig) s(sum) xpose varnames

statplot head other, over(three_mig) s(sum) xpose varnames

graph bar (mean) male_educ female_educ, over(two_mig)

graph bar (mean) male_educ female_educ, over(three_mig)

graph bar (mean) male_num female_num, over(two_mig)

graph bar (mean) male_num female_num, over(three_mig)

graph bar (mean) land_area, over(two_mig)

graph bar (mean) land_area, over(three_mig)

graph bar (mean) anim_unit, over(two_mig)

graph bar (mean) anim_unit, over(three_mig)

graph bar (mean) wealth_indx, over(two_mig)

graph bar (mean) wealth_indx, over(three_mig)

graph bar (mean) in_network out_network, over(two_mig)

graph bar (mean) in_network out_network, over(three_mig)

*****REG TABULATION***REG TABULATION****REG TABULATION****

****REGRESSION I: Binary Probit for Migration Decision**

eststo: probit all_mig house_head all_gender age agesq all_marital school_year male_num female_num male_educ female_educ hh_educ land_area anim_unit wealth_indx wealth_indxsq in_network out_network

esttab using mig.rtf, se wide star(* 0.10 ** 0.05 *** 0.01) b(%9.3f)

***Marginal Effects Regression I**

probit all_mig house_head all_gender age agesq all_marital school_year male_num female_num male_educ female_educ hh_educ land_area anim_unit wealth_indx wealth_indxsq in_network out_network

estpost margins, dydx (house_head all_gender age agesq all_marital school_year male_num female_num male_educ female_educ hh_educ land_area anim_unit wealth_indx wealth_indxsq in_network out_network)

****REGRESSION II: Multinomial logit for Migration Destination **

eststo:mlogit nomig_in_out house_head all_gender age agesq all_marital school_year male_num female_num male_educ female_educ hh_educ land_area anim_unit wealth_indx wealth_indxsq in_network out_network, baseoutcome(1)

esttab using mig1.rtf, se wide star(* 0.10 ** 0.05 *** 0.01) b(%9.3f)

***Marginal Effects Regression II**

mlogit nomig_in_out house_head all_gender age agesq all_marital school_year male_num female_num male_educ female_educ hh_educ land_area anim_unit wealth_indx wealth_indxsq in_network out_network, baseoutcome(1)

estpost margins, dydx(house_head all_gender age agesq all_marital school_year male_num female_num male_educ female_educ hh_educ land_area anim_unit wealth_indx wealth_indxsq in_network out_network) predict(outcome(2))

mlogit nomig_in_out house_head all_gender age agesq all_marital school_year male_num female_num male_educ female_educ hh_educ land_area anim_unit wealth_indx wealth_indxsq in_network out_network, baseoutcome(1)

estpost margins, dydx(house_head all_gender age agesq all_marital school_year male_num female_num male_educ female_educ hh_educ land_area anim_unit wealth_indx wealth_indxsq in_network out_network) predict(outcome(3))

REGRESSION III: Multinomial logit for Migration Destination choices

eststo:mlogit outcount_mig house_head all_gender age agesq all_marital school_year male_num female_num male_educ female_educ hh_educ land_area anim_unit wealth_indx wealth_indxsq in_network out_network, baseoutcome(1)

esttab using mig2.rtf, se wide star(* 0.10 ** 0.05 *** 0.01) b(%9.3f)

***Marginal Effects Regression III**

mlogit outcount_mig house_head all_gender age agesq all_marital school_year male_num female_num male_educ female_educ hh_educ land_area anim_unit wealth_indx wealth_indxsq in_network out_network, base(1)

estpost margins, dydx(house_head all_gender age agesq all_marital school_year male_num female_num male_educ female_educ hh_educ land_area anim_unit wealth_indx wealth_indxsq in_network out_network) predict(outcome(2))

mlogit outcount_mig house_head all_gender age agesq all_marital school_year male_num female_num male_educ female_educ hh_educ land_area anim_unit wealth_indx wealth_indxsq in_network out_network, base(1)

estpost margins, dydx(house_head all_gender age agesq all_marital school_year male_num female_num male_educ female_educ hh_educ land_area anim_unit wealth_indx wealth_indxsq in_network out_network) predict(outcome(3))

```
mlogit outcount_mig house_head all_gender age agesq all_marital school_year male_num
female_num male_educ female_educ hh_educ land_area  anim_unit  wealth_indx
wealth_indxsq in_network out_network, base(1)
estpost margins, dydx(house_head all_gender age agesq all_marital school_year male_num
female_num male_educ female_educ hh_educ land_area  anim_unit wealth_indx
wealth_indxsq in_network out_network) predict(outcome(4))
```

****FOR CHAPTER V****

```
clear
cd "C:\Users\memadhavregmi\Desktop\Datafile_May11"
use fs_may11.dta, replace
**********Frequency Table**********
tabulate HouseFS
tabulate AdultFS
tabulate ChildFS
polychoric HouseFS AdultFS ChildFS
*******Descriptive Statistics*********
summarize HouseFS AdultFS ChildFS GenderHh AgeHh ConsTech EduSec   DepenRatio
AnimUnit  HybRiceMaize     WageOutDist RemitOutCoun AgLivInc LandArea
********Endogenity Test**********************
**Endogenity test for conservation agriculture***IV is Degrad***
poisson ConsTech Degrad GenderHh AgeHh EduSec   DepenRatio   HybRiceMaize
WageOutDist RemitOutCoun  AgLivInc LandArea,vce(robust)
predict pohat
gen po_resid= (ConsTech-pohat)
```

oprobit HouseFS ConsTech po_resid GenderHh AgeHh EduSec DepenRatio AnimUnit HybRiceMaize FruitNum WageOutDist RemitOutCoun AgLivInc LandArea,vce(robust)

oprobit AdultFS ConsTech po_resid GenderHh AgeHh EduSec DepenRatio AnimUnit HybRiceMaize WageOutDist RemitOutCoun AgLivInc LandArea,vce(robust)

oprobit ChildFS ConsTech po_resid GenderHh AgeHh EduSec DepenRatio AnimUnit HybRiceMaize WageOutDist RemitOutCoun AgLivInc LandArea,vce(robust)

*** There is no problem of endogeneity due to conservation tech in all three regressions*

Endogeneity test for hybrid rice*IV is ProdArabLand*****

probit HybRiceMaize ProdArabLand GenderHh AgeHh ConsTech EduSec DepenRatio AnimUnit WageOutDist RemitOutCoun AgLivInc LandArea,vce(robust)

predict prhat

predict pr_resid, deviance

oprobit HouseFS pr_resid HybRiceMaize GenderHh AgeHh ConsTech EduSec DepenRatio AnimUnit WageOutDist RemitOutCoun AgLivInc LandArea,vce(robust)

oprobit AdultFS pr_resid HybRiceMaize GenderHh AgeHh ConsTech EduSec DepenRatio AnimUnit WageOutDist RemitOutCoun AgLivInc LandArea,vce(robust)

oprobit ChildFS pr_resid HybRiceMaize GenderHh AgeHh ConsTech EduSec DepenRatio AnimUnit WageOutDist RemitOutCoun AgLivInc LandArea,vce(robust)

***** There is no problem of endogeneity due to hybrid rice in all three regressions*

******Now it is good to estimate the final regression models**********

**********For Household FS**********

eststo: oprobit HouseFS GenderHh AgeHh ConsTech EduSec DepenRatio AnimUnit HybRiceMaize WageOutDist RemitOutCoun AgLivInc LandArea,vce(robust)

esttab using h2.rtf, se wide star(* 0.10 ** 0.05 *** 0.01) b(%9.3f)

```
* predicted probabilities*
predict hfs1probit, pr outcome(1)
predict  hfs2probit, pr outcome(2)
predict hfs3probit, pr outcome(3)
predict hfs4probit, pr outcome(4)
display hfs1probit hfs2probit hfs3probit hfs4probit
* calculating marginal effects**
oprobit HouseFS   GenderHh AgeHh ConsTech EduSec   DepenRatio  AnimUnit
HybRiceMaize    WageOutDist RemitOutCoun  AgLivInc LandArea,vce(robust)
margins , dydx(*) predict (outcome(1))
margins , dydx(*) predict (outcome(2))
margins , dydx(*) predict (outcome(3))
margins , dydx(*) predict (outcome(4))
**********For Adult FS**********
eststo: oprobit AdultFS   GenderHh AgeHh ConsTech EduSec   DepenRatio  AnimUnit
HybRiceMaize    WageOutDist RemitOutCoun  AgLivInc LandArea,vce(robust)
esttab using a2.rtf, se wide star(* 0.10 ** 0.05 *** 0.01) b(%9.3f)
* calculating marginal effects**
oprobit AdultFS   GenderHh AgeHh ConsTech EduSec   DepenRatio  AnimUnit
HybRiceMaize    WageOutDist RemitOutCoun  AgLivInc LandArea,vce(robust)
margins , dydx(*) predict (outcome(1))
margins , dydx(*) predict (outcome(2))
margins , dydx(*) predict (outcome(3))
margins , dydx(*) predict (outcome(4))
```

predicted probabilities

predict adfs1probit, pr outcome(1)

predict adfs2probit, pr outcome(2)

predict adfs3probit, pr outcome(3)

predict adfs4probit, pr outcome(4)

display adfs1probit adfs2probit adfs3probit adfs4probit

**********For Children FS**********

eststo: oprobit ChildFS GenderHh AgeHh ConsTech EduSec DepenRatio AnimUnit HybRiceMaize WageOutDist RemitOutCoun AgLivInc LandArea,vce(robust)

esttab using c1.rtf, se wide star(* 0.10 ** 0.05 *** 0.01) b(%9.3f)

*calculating marginal effects***

oprobit ChildFS GenderHh AgeHh ConsTech EduSec DepenRatio AnimUnit HybRiceMaize WageOutDist RemitOutCoun AgLivInc LandArea,vce(robust)

margins , dydx(*) predict (outcome(1))

margins , dydx(*) predict (outcome(2))

margins , dydx(*) predict (outcome(3))

predicted probabilities

predict chfs1probit, pr outcome(1)

predict chfs2probit, pr outcome(2)

predict chfs3probit, pr outcome(3)

display chfs1probit chfs2probit chfs3probit

****Marginal Effects of REMITANCE at Each Categories of Dependent Variables**

At Household Level

oprobit HouseFS GenderHh AgeHh ConsTech EduSec DepenRatio AnimUnit HybRiceMaize WageOutDist RemitOutCoun AgLivInc LandArea,vce(robust)

margins, at((means) _all (asobserved)RemitOutCou) predict (outcome(1))

margins, at((means) _all (asobserved)RemitOutCou) predict (outcome(2))

margins, at((means) _all (asobserved)RemitOutCou) predict (outcome(3))

margins, at((means) _all (asobserved)RemitOutCou) predict (outcome(4))

At Adult Level

oprobit AdultFS GenderHh AgeHh ConsTech EduSec DepenRatio AnimUnit

HybRiceMaize WageOutDist RemitOutCoun AgLivInc LandArea,vce(robust)

margins, at((means) _all (asobserved)RemitOutCou) predict (outcome(1))

margins, at((means) _all (asobserved)RemitOutCou) predict (outcome(2))

margins, at((means) _all (asobserved)RemitOutCou) predict (outcome(3))

margins, at((means) _all (asobserved)RemitOutCou) predict (outcome(4))

At Children Level

oprobit ChildFS GenderHh AgeHh ConsTech EduSec DepenRatio AnimUnit

HybRiceMaize WageOutDist RemitOutCoun AgLivInc LandArea,vce(robust)

margins, at((means) _all (asobserved)RemitOutCou) predict (outcome(1))

margins, at((means) _all (asobserved)RemitOutCou) predict (outcome(2))

margins, at((means) _all (asobserved)RemitOutCou) predict (outcome(3))

VITA

Madhav Regmi was born in Nepal, a country of Lord Gautam Buddha and Mount Everest. He received his BS in Agriculture Science degree from Institute of Agriculture and Animal Science, Tribhuvan University, Nepal in 2010. Thereafter, he worked in a non-government organization based in Sunsari district of Nepal, for few months as a project coordinator of Livelihood Project funded by World Vision International Nepal (WVIN). He also worked as a youth coordinator in a human right organization called Amnesty International Nepal Innovative Youth Network, Bharatpur, for two years.

Madhav joined the MS in Agriculture Economics program in the Department of Agricultural Economics and Agribusiness at Louisiana State University in the Spring of 2013. He plans to begin his doctorate after graduation.