Abstract:
Household study was carried out in small village of Karnali Zone, Nepal, with the intention to investigate the outcome of migration on household farm production and its subsequent effect on household level food security. Based on survey report, impact of migration on these two variables are rather complex. On one hand, result illustrates negative impact of migration on household farm production through decrease in most productive family male labor and through increase in female participation in agriculture work force. On other hand, though migration is negatively affecting farm production, remittance is helping household to reduce the problem of food insecurity to some extent but in the case of lower cast remittance in not sufficient to overcome the problem of food insecurity. Therefore probability of remain migrant is higher among lower cast population. Although, outcome is complex but on a whole results are quite encouraging and statistically significant.

Key words: Migration, Household, Remittance, Agriculture Production, Food Security, Food Insecurity, Labor.
1) Introduction:

Nepal is one of the least developed countries, predominated by agriculture as a major source income and employment, also, about 65 percent of population primarily dependent on agriculture for their livelihood. Beneath agriculture dominance as a major source of income and employment, the current rate of population growth and increase in labor force participation not only creating pressure on agriculture land, but also affecting the household capacity to carry out sustainable and sufficient agriculture production activities. In conjunction with, the performance of agriculture land itself is not satisfactory and sufficient enough to fulfill the consumption need of rural household. Agriculture production is mainly affected by unreliable weather, difficult terrain, insufficient transportation network, limited irrigation facilities, lack of inputs and so on. Consequently, Nepalese rural agriculture household is increasingly dependent on non-farm activities in order to overcome consumption gap due to poor condition of agriculture sector.

In Nepal, farming merely provides sufficient means of survival for the rural population, thus most of the rural households are found to be involved in a range of activities which is not limited to rural non-farm. In order to overcome consumption deficiencies, poor household follows series of principle like expansion of agriculture, diversification into non-agriculture source of income, migrating to other place for employment etc. These activities helps rural household to minimize production-consumption gap, thereby to encourage continue agricultural activities.

Essentially rural agriculture household livelihood strategy in Nepal is categorized into three division such as- subsistence agriculture, livelihood diversification through non-farm activities and seasonal or permanent migration. In presence of excessive population pressure on farmland, rural agricultural households have option of, either to increase farm productivity or non-farm income in order to fulfill households basic consumption need. Given this constraint in agriculture sector, it requires household to search for the alternate non-farm employment so as to maintain household consumption requirement. In the absence of domestically available non-farm employment, households member are left with the option of searching for employment opportunity outside the rural sector. Therefore, since last two decades migration become significant household strategy to bridge the deficiency of agriculture sector. It is also evident from growing trend of labor force migration in Nepal, the number of migrant in Nepal has increased significantly in last two decades; at present total percentage of migrant population in Nepal is 36.9 percent (CBS 2010/11) it includes both in and out migration.
In Nepal most of the migrant population originates from rural agriculture sector and its subsequent effect on agriculture sector is remain unnoticed and unexplored. Moreover it cannot not be ridiculed the significance of migration as strategy for rural household against consumption deficiency but the actual long term impact of continuous migration on agriculture sector is very much debatable. From the beginning, migration was not only assumed to be livelihood strategy for rural population but also it has important measure for macroeconomic stability for economy. So far policy makers in Nepal have only focused on Migrant remittance, because remittance in term of foreign currency makes BOP situation of a country better and stable (Pant, Raut, Pandey 2011). Also, impact of remittance on economy comes through various channels such as saving, investment, growth, increase consumption, poverty reduction and income redistribution. Remittance is affecting positively to the GDP stability by lowering the probability of current account deficit (Pant 2008). Ideally, economic policy was structured on the premises of belief that remittance send back home will transmit into economic development by means of extra savings, capital formation and increase in demand for domestically produce goods. Thus in long run it will create employment opportunity within the economy. But contrary to above argument, only two percent of remittance is used for capital formation (CBS 2010/11) and instead of generating demand for domestically produced goods remittances are leading to more consumption-led imports. According to CBS 2003-04, 15 percent of total economically active male population in the country was engaged in migration. Inflow of remittance has increase from USD 1.1 billion in 2000 to USD 1.6 billion in 2007 (World bank 2008), but actual amount is still much higher than as reported. At present remittance is accounted for 23 percent of Gross Domestic Product of Nepal.

Though migration has positive impact on macroeconomic indicators and livelihood of rural population, nevertheless it’s imperative to recognize the consequences on the rural agriculture sector in short and long run both.

1.1) General Problem

Historically migration is important source of livelihood for Nepalese population to minimize consumption gap and to improve living standard. In other words, agriculture is sole breadwinner for the rural households; the role of migration is recognized as catalyst to overcome consumption deficiency in the event of low agriculture production, invest in agriculture to improve productivity, pay back debt, safeguard against unanticipated events etc. Also, migration plays significant role in changing the agricultural practices and production in rural economy. It strangulate traditional pattern of agriculture system which was dominated by male work force to female dominated agriculture system, which result in fall in agriculture production. Apart from agriculture, migration has a wide range of impact start from micro household to macro economy level. But the issue of migration has hardly holds any significant
acknowledgment from govt. of Nepal in its policy in spite of decade long pattern of migration. Even modest attention came from the researcher, policy makers to analyze the inter-linkage between decade long migration and its impact on rural agriculture sector.

Mainly literature hypothesized that international migration and remittance reduce poverty via its direct effect on poor household because remittance goes directly in the hands of poor household. In Nepal role of remittance in poverty reduction was first acclaimed by the Nepal Living Standard Survey 2004. According to CBS report (2004), poverty declined from 42 percent in 1995/96 to 31 percent in 2003/04, and major reason was attributed to work related migration and inflow of remittance. Similarly, one study concluded that international migration and remittance serve to reduce severity of poverty in poor countries; any 10 percent increase in size of international migration, leads to 2 percent fall in share of population living on less than $ 1.00 per person per day (Adam Jr. Richard and Page John 2005).

Perhaps household who receives remittance has a multiplier income effect via the expenditure on the development of a region. It creates off farm employment within the country through consumption expenditure on locally produced consumption goods, and also has multiplier effect on income of non migrant (Pant, Raut, Pandey 2011). Ratha (2003) concluded in his study by stating remittance not only raises the level of household welfare in developing countries but also it has multiplier income effect because remittances mostly spent on the locally produced consumption goods.

Although there are several claims in favor of migration, its consequence on domestic agriculture is still to be analyzed properly. There are some evidences that explain the impact of migration on agriculture production. Migration has labor loss relation, migration of family member is followed by fall is family labor supply, thereby it affects the agriculture production of migrant household if household is reluctant to use hired labor or in case of scarcity hired labor. One such study in Nepal shows that migration leads to fall in gross agriculture output; one migrated labor reduces the gross agriculture production by NPR. 18,000. Recent study by Amina (2010) in Shangya District of Nepal found inverse relation between the migration and farm production. In the case of developing country like Nepal where market imperfection prevails, migration may leads to fall in land conservation as land conservation is mostly labor intensive (Aryal J. P 2004). Also, in the case of hired-in labor it is assumed that hired labors cannot be a close substitute of family labor. Aryal (2004) also found that family practicing intensive farming face labor shortage during the peak agriculture season due to the increase in migration. Therefore in Nepal, migration is not only helping to reduce poverty to some extent but also at the same time it is retarding agriculture production as well (Pant, Raut, Pandey 2011).
These myriads of discussion enlighten the urgent need to study the complex relationship between migration and food security via agriculture production. In the long run, the blow of migration can increase vulnerability of rural farming household, which could retard growth of agriculture sector and the growth of economy as well. In this regard significant research has been carried out at both micro and macro level across the countries, but studies focusing on Nepal is quite few and scattered. As we discussed above, very little attention has been paid to analyze the varied face of migration. As of now findings on migration are rather mix. Some suggests remittances are used to overcome credit constrain and therefore invested in new technology to increase income opportunity. Whereas other indicates, remittances are primarily spent on consumption and livelihood expenditure and thereby don’t have any significant impact on the development of sending counties.

Therefore it seems requisite to closely analyze the impact of migration on agriculture production and its subsequent effect on household food security. Beneath above discussion, the objective of the study is to understand the effect of migration on farm production of migrant origin household and its food security. But in this regard literatures do not put much light on the diverse role of migration on migrant sending economy. In fact literature recurrently emphasizes on the positive impact of migration on agriculture production through presumed investment in agriculture sector. In a country like Nepal where most of the migrant labor force originates from the agriculture sector, it is more likely that migration will reduce the total supply labor force in agriculture sector. Generally it is presumed that at the initial phase of migration, surplus labor comes out of the agriculture sector, thereby the productivity of remaining labor force goes up with same gross agriculture production. But over a period of time, exodus of labor from agriculture sector creates shortage of labor force, and thereby it decreases the agriculture production.

Unlike rural non-farm self employment activities, migration is important over the other option available to a farm household so as to improve livelihood through the secured income in terms of remittance. Though predisposition of migration makes a household member unavailable for farm activities for extended period of time, but remittance send back home can aid to improve family livelihood. Therefore, this research is design with anticipation to explain the effect of migration on household agriculture production and food security via addition of income in terms of remittance.

2) Empirical Review

Over a period of time conflicting views have emerged to articulate migration and its subsequent impact on migrant origin economy. In the process, outlook on migration has changed and evolved; alternatively numerous theories on migration have emerged such Neoclassical economic: macro, Neoclassical: micro, New economics of labor
migration, Dual labor market theory. According to NELM (New Economics of Labor Migration), impact of migration at migrant origin economy falls in these two extremes, positive or negative. Also, effect of migration varies according to various stages of migration and region as well (Jones 1998). Therefore, it seems essential to discuss what different researches have to say on these two extremes of migration at origin.

In Nepal migration become a culture of every household, even during the main harvesting season 44 percent of household across the country have at least one family member out to pursue distant labor opportunity (WFP Nepal 2008). Historically India is most preferred destination for Nepali migrant, indeed 40 percent of Nepalese migrant ended up in India (WFP 2008). Despite of such a significant fraction of population absent from a country, it’s equally important to understand its impact on real economy. Keeping aside its positive impact on poverty reduction which was confirmed by the CBS 2003/04 Nepal, its impact in agriculture sector is quite depressing. In fact, migration has kept the Nepalese agriculture sector deprived of labor force required at a crucial period of cultivation. Similarly, in the context of Nepal foreign employment is decade long phenomena and over a period of time it has decreased the labor force from agriculture sector and affected the agriculture productivity to a large extent but this exodus of labor has not been studied adequately (Pant, Pandey, Raut 2011).

Due to the week understanding of theoretical base which mired in nineteenth-century concepts, models and assumption, result of various earlier study on migration is a imitation of one after another. Conclusion drawn by Durant 1996 in Mexico, Black 1993 in Portugal and Leinback and Watkins 1998 in Indonesia, have granted the importance of remittance which is directly used to improve the agriculture by allowing farmer to purchase improved input, increase yield, grow market crops, expand irrigation and overcome capital and credit constrain. Also, De Haas 2001 in Morocco found that migration leads to the agricultural transformation in a positive way; it was found that those household having international migrant have high willingness to invest in agriculture sector. One such study from Mexico, migration leads to increase in investment in agriculture, and household land use decision for those who remain behind to stay on the land (Gurri and Morran 2001, Kearney 1996, Massey 1998). Household which has migrant member, invest certain amount of migrant earning in productive investment, even it is found that migrant household members are spending on long term agriculture investment. Therefore there is significant increase in investment in agriculture and improved household welfare due to migration (Cohen 2004). Similarly, De Haas 2005 and Taylor 1996 concluded that, migrant households are more likely to invest in productive enterprises than the non migrant household. Contrary to the above argument, it has been observed that migration has a labor loss relation, which is overlooked so far, can cause fall in agriculture production and productivity in long run.
Without denying the favorable impact of migration on national economy, migration can also make agriculture sector deprived on valuable labor force which can affect the agriculture production in long run. Unlike above argument, migration can make substantial reduction in the size of rural work force and it can remove the large chunk of potential working age population from the rural agriculture sector (Black R. 1993). Apart from win-win proposition, migration has adverse impact on the agriculture structure of the region. In many cases migration will create labor shortage, which cause stagnation of agriculture, overburden to those who remain (Jokisch B. D 2002). Similarly, Zimmeres K. (1993) found that male migration is leading to labor shortage, abandoning of land conservation measures and reducing enthusiasm for agriculture improvement. Migration can increase household total income, but it may not be sufficient to overcome the adverse effect of lost labor. Similar study from central Mali by Toulmin C. (1992) illustrate that effect of young man absence was particularly worse for the small household and the receipt of remittance is considered to be poor substitute in place of young man. Recent study by Amina M. (2010) in western Nepal concluded that labor migration is causing a loss of family labor, and thereby household try to compensate this lose labor by hire-in-labor. However, it is also found that hired labor is unable to replace loss family labor. Therefore increase in number of labor migration from Nepal since last two decade causing decline in agriculture production (Ray D. P 2004).

Brad (2007) migration accelerated the fall in agriculture production and shift the household activity towards the cattle raising. Jokish B. D. (2002) discussed several effect of migration like inadequate attention to agriculture, deleterious effect on the cultural and social organization that sustain agriculture, stagnation of agriculture base and overburdening to those who remains back. It has also observed that remittance leads to the “moral hazard” problem on the part of household. Assured income in the form of remittance will disincentivise the household to work more in the field. Azam and Gubert (2006), the more households are insured by the migrants remittance, the lesser incentive to these households to work more and harder in the field. Similarly Taylor and Wouterse (2008) in Mali, moral hazard on the part of family members left behind. Rozelle, Taylor and deBrauw (1999), study from China found that the loss of labor due to migration have significantly reduced grain yield. Migrant remittance may reduce work effort in agriculture field which require physical laborer (William S. 2007).

Another important impact which cause decline in agriculture production is comes through the increase in women participation in agriculture work force. The selectivity and blow of migration are unlikely to be gender neutral. Specifically, it changes the role women in household once male member migrates. Therefore effect of male migration not only limited to the fall in productivity on the part of male member but also it affects the women’s own farm
productivity due the addition of one more responsibility of farm management along with the compulsory household work. It increases the women’s responsibility, now women’s are increasingly left with the task of farm management including having to overcome production constraint in the absence of male household labor (Sifelani Tsiko 2009). One such finding from Nepal confirms the sizeable increase in women’s work load due to the male migration (WFP 2008). This paradigm shift have postulates new concerns, women’s now have to perform dual role in the absence of male participants, including the household work women’s have to perform the farm work as well. Henceforth, it leads to the “feminization of agriculture” (ICIMOD report 2010, ESAF 2004, Katz 2003). Migration alters the nature of women’s work, it incorporates the additional work of farm management, and thereby it increases the number of task performed by the women (Richard Black 1993, Schmook 2008).

Though migration reduces productive labor force from agriculture, but remittance received by the household increases the household welfare. One such study by William Shaw 2007 indicates that remittance reduces poverty and also contributes towards the smoothing consumption of poor, because motivation behind the migration is to improve earning and diversify the earning to minimize the risk. In Nepal it was found that most of the remittances were used for the consumption need such as food, education, clothing, health (WFP 2008). And remittance plays a role of input to increase the household welfare (ICIMOD 2010). Durand and Massey 1994, emphasis that remittances are basically used for the household’s basis need only. Remittance increases the household welfare significantly (Black R. 1993). Therefore in spite of some negative impact of migration, back door use of remittance will help household to enhance the welfare and food security.

3) Research Design and Methodology

This study was conducted in Kalikot district, a hilly region of Nepal which is a part of Karnali Zone and countries most backward region. Hilly and mountain regions have higher incidence of migration due to the higher poverty and insufficient farm production. For most of the migrant from these regions, primary destination is India because of low cost and lesser risk. Traditionally, populations who live in hills and mountains have a smaller farm size and perform subsistence farming only. Therefore, most of the Hilly and Mountain regions are severely affected by the food insecurity due to low farm production. Thus, Kalikot district is preferred because of higher intensity of migration from this region to India and higher incidence of food insecurity.

3.1) Research Design
After the review of existing literature and identification of specific problem, step is to identify the various data to be used and various sources from where to acquire those data. Once required data’s are collected, it will be used to analyze the general problem.

3.1.1) Sampling procedure and sample size
Aligned with the objective of study, approach is undertaken to make a comparison between the migrant and non-migrant household, and analyze the impact on farm production and food security. After the initial approach, a VDC (Village Development committee) was selected which represent both migration and non-migrant household with different caste. Therefore DAHA VDC was selected because it captures the required division of household on the basis of migrant and caste. Within the DAHA VDC four villages were selected, three represent higher cast population and one represent lower cast (Dalit) population from both migrant and non-migrant household.

3.1.2) Data collection and procedure
To fulfill the objective of study, primary field survey was conducted covering 106 household during the month of December 2011. Assistance of local village facilitator (VF) was called for because VF supposed to have knowledge about the village population and local language. Afterward a structure of questionnaire was developed for the survey and attention was paid to keep the questionnaire simple and concise to avoid any confusion and ambiguity. And finally questionnaire was translated into local language to make local reader and enumerator understand the question and objective clearly.

3.2) Methodology used for research
Research used both quantitative and qualitative information collected during primary survey. Qualitative information was itself explanatory but quantitative information more in a raw form; therefore econometric tools were used to make a systematic analysis and comparison among the variables. Econometric tool was used because it is useful to analyze and interpret the impact of particular intervention. Based on the information, analysis is carried out in two steps:

3.2.1) Descriptive Analysis: Mean median and numbers are used to describe the economic and demographic characteristic of population and household. Mostly simple table are used for the descriptive analysis work.

3.2.2) Econometric Analysis: Econometric tool were used to fulfill the objective of study. Though econometric tool are bit complex but it is equally useful in answering research questions. Simple regression analysis was used to
conclude the impact of migration on agriculture production and food security. Only STATA software is used to make a systematic analysis of variables.

Econometric Model: Simple regression analysis was used to draw econometric model. With focusing on research question and objective, dependent and independent variables were shorted out for the model. Due to the difficulty in accessing number of hours of female participation in agriculture, only perception question are used to access the women participation in agriculture work force. Basically one model each is used to assess the impact of migration on food production and food security:

Model for Food production:

\[
Y = \beta_0 + \beta_1 + \cdots + \beta_k + u
\]

[Y: Farm production, \(\beta_0\): Constant, \(\beta_1, \ldots, \beta_k\): Independent variables, U: Error or residual term]

Model for Food Insecurity:

\[
Y = \beta_0 + \beta_1 + \cdots + \beta_k + u
\]

[Y: Food Insecurity, \(\beta_0\): Constant, \(\beta_1, \ldots, \beta_k\): Independent variables, U: Error or residual term]

4) Major findings

4.1) Relation between Migration and farm production

Aligned with the empirical review; this section will discuss the impact of migration on agriculture production based on primary survey report.

4.1.1) Analytical Approach

Underlining our understanding, effect of migration is not only limited to addition of income in the form of remittance but also it has differential effect on agriculture production. According to NLEM, usually people migrates in the absence of credit, capital and labor market in underdeveloped countries and migrants remittance will help household to gain access to credit, liquidity and income insurance. In addition, remittance can also be used to invest in agriculture to enhance the technology and to overcome risk of future fall in consumption due to the uncertainty. Empirical evidence from NELM concluded that migration also has labor loss relation which can restrain the growth of agriculture sector (J. Edward Taylor). In presence of imperfect market environment in underdeveloped countries, perfect replacement of “lost labor” is unlikely to available, and thereby causes immediate negative impact on agriculture production (J. Edward Taylor).
Initial expectation from this study is to observe the variation in agriculture production due to migration. Therefore, this study is using Ordinary least square (OLS) to observe the factors affecting household farm production.

Model is specified as:

\[ \text{FP: } f (\text{Z}) \] \hspace{1cm} \text{............... (1)}

\[ \text{Z: } h(x_1, x_2, x_3, x_4, x_5, \ldots \ldots \ldots x_k) \] \hspace{1cm} \text{............... (2)}

Where,

FP: Food production

Z: vector of explanatory variables

\[ x_1, x_2, x_3, x_4, x_5, \ldots \ldots \ldots x_k \]: Explanatory variables

K: Total no of explanatory variables

**Dependent Variable:**

Total production of Paddy

Total production of Millet

**Explanatory variables:**

Caste of Household

Migration Status of Household

Amount of owned land used for the production

Age of household head

Age square of household head

No of adult member in household

**4.1.2) Results and discussion**

Analysis is focusing on those households having involved in production of paddy and millet. More fundamentally, applying broad views on preference of cultivation and consumption, these two crops are identified that will be sufficient to evoke necessary relation between migration and food production. Adding to that, altogether 98 household for paddy and 91 household for Millet are sorted out by the regression. Similarly, some other crops like wheat and maize are also important but excluded from analysis because wheat is mainly preferred among the less poor or richer households for both cultivation and dietary, whereas in the case of maize, over a period of time its dietary preference is also falling among poor households. Therefore, unlike other crops, paddy and millet is expected to capture the difference in production due to the migration only.
### Table 4.1: Estimate effect on Paddy production

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caste</td>
<td>-22.69449***</td>
<td>8.7930</td>
<td>.011</td>
</tr>
<tr>
<td>Migrant Status of Household, (Migrant = 1, Non migrant = 0)</td>
<td>-65.9984**</td>
<td>22.1111</td>
<td>.004</td>
</tr>
<tr>
<td>Owned land Used for Production</td>
<td>1459.866***</td>
<td>59.269</td>
<td>.000</td>
</tr>
<tr>
<td>No of Adult Member in Household</td>
<td>5.3810</td>
<td>5.426</td>
<td>.324</td>
</tr>
<tr>
<td>Age of Household head</td>
<td>4.2338</td>
<td>4.0585</td>
<td>.300</td>
</tr>
<tr>
<td>Age Square term</td>
<td>-.04212</td>
<td>.04247</td>
<td>.324</td>
</tr>
<tr>
<td>Intercept</td>
<td>-28.9968</td>
<td>92.9318</td>
<td>.756</td>
</tr>
</tbody>
</table>

No. of Observation: 98

Adjusted R square: 0.9305

Source: Authors Primary survey (2011)

*** Significant at 1 %, ** significant at 5 %, * Significant at 10 %

### Table 4.2: Estimate effect on Millet production

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caste</td>
<td>-1.427</td>
<td>8.202</td>
<td>.862</td>
</tr>
<tr>
<td>Migrant Status of Household, (Migrant = 1, Non migrant = 0)</td>
<td>-42.362**</td>
<td>20.695</td>
<td>.044</td>
</tr>
<tr>
<td>Owned land Used for Production</td>
<td>558.995***</td>
<td>76.37</td>
<td>.000</td>
</tr>
<tr>
<td>No of Adult Member in Household</td>
<td>17.471***</td>
<td>4.519</td>
<td>.000</td>
</tr>
<tr>
<td>Age of Household head</td>
<td>-5.245</td>
<td>3.832</td>
<td>0.175</td>
</tr>
</tbody>
</table>
Impact of Migration:

Traditionally agriculture sector is overburdened by the excessive labor force; at initial phase of migration it may lead to the increase in productivity of remaining labor force. But, over a period of time when migration becomes a culture it often creates a shortage of labor force in household and also in labor market. Similarly in study area, the process of labor migration result into the loss of family labor specially the use of family male labor force for the farming. Historically male migration is a tradition of study area, during the conflict and after the conflict exodus increased considerably. What is seen is India is a most preferred destination for male labor migration to safeguard the livelihood of family member back home. Empirical observation illustrates that 100 (67 migrant) percent migrant from the study area are male only and more than ninety percent of them have migrated to India. Whenever family member is out to pursue distance employment opportunity, his part of work had to share by the other members of household. Typically, when household is working under full capacity, any addition of work in the absence of family member will be shared by the other members of the household. In most of the cases, additional work burden due to the migration is a root for fall in agriculture production. Primary reason for the drop in agriculture production is loss of productive member of household which cannot be fully compensated by sharing work among remaining family members. In addition to this, it is found that most productive young member of family is more likely to migrates, therefore it become even more difficult to compensate the loss of labor. It has been observed that average age of migrant in study area is 33.53 and median is 30 years, it conclude the loss of young and productive member from household. Similarly, in a society where migration is dominated by male, additional work load in the absence of productive male member often shared by the women in the household. It increases the female work load and overburdens them with the one additional role of farm management. In the absence of physical competence and skill required to perform both the responsibility effectively, any extra work load due to male migration will lead to fall in their own productivity. Therefore
continuous migrations from rural agriculture sector renders to “feminization of agriculture”, and succeeded by the fall in agriculture production.

Interestingly, persistence of migrations from rural households makes even more difficult to find a hired-in labor to replace lost family labor. Same proposition is highlighted by the survey result where 50 percent of households are reported to encountered labor shortage several times in a year, in particular during a peak agriculture season. For some reason even if hired labor are available households are reluctant to use them because of cost attached with hired labor, and more often poor households are unlikely to use hired labor. Noticeably, women’s are preferred to perform all additional work themselves or with the exchange of family labor between the household instead of hired-in labor if it’s available. From our perception question Table 6.10, 49 out of 54 migrant households have reported that women’s work load in farm has increased considerably after the migration of male member and also from the same table, 40 and 43 households out of 54 experiencing fall in farm production along with the problem of labor shortage. It has been observed that some households are using contemporary strategy of exchange of family labor to reduce the effect of lost family labor. However strategic importance of exchange of family labor cannot ridicule but same strategy is not sufficient to nullify the effect of lost family labor and reduce the women’s work load. Also, exchanges of family labor can only be materializing when other household do need the labor from same household.

Evidence from study area illustrates the difference in proportion of family male labor between migrant and non-migrant’s household. Table 6.7 shows the difference in total male family labor endowment in migrant and non-migrant household. In total migrant households proportion of male family labor is significantly lesser than the non-migrant household. Also from perception question table no. 6.10, women’s are reported to have increased in work load and they are to spend more time than before in agriculture field due to the migration of male member. Therefore it validates the above argument of labor loss and feminization of agriculture due to the male labor migration. Our regression analysis also show that migration have significant impact on both paddy and millet production at 1 percent level and 5 percent of significance. Therefore negative coefficient of Migration for both paddy and millet validates the negative impact of migration on household food production.

Impact of other factors:

Though the objective of study is to analyze the impact of migration on household farm production, but other factors affecting farm production are also relevant for the study. Given the experience, caste system is very much prevalent in rural Nepal which generally structures the role and entitlement of each cast in the society. Based on infield
experience and survey report, it’s a lower cast population mainly depend on wage earning from agriculture sector, migrants remittance and subsistence farming in own land. It has been observed that precarious state of living of lower cast is due to the low occupancy of agriculture land and less capital to improve agriculture land compared to upper caste populations. As a result lower cast population has lesser agriculture production in comparison higher caste. Therefore influence of caste on agriculture production is quite vital outcome to design any policies in the future.

The sparse amount of pertinent micro-level survey data on other factors like land, age and no of adult member in household also establish significant relation with the agriculture production. Compliance with assumption, land also shows the positive relation with agriculture production. All these factors have positive impact on production except age which gives negative impact after a threshold level. It seems when an individual crosses certain level of age limit, any addition of age will reduced the productivity of individual. Though there are positive correlation between this these factors and agriculture production, but age doesn’t have significant impact on production and no. of adult member’s impact is rather mix. Effect of number of adult is significant for paddy but not for millet because unlike paddy, millet is a crop which requires minimal effort for cultivation and planting, and also women’s are primarily preferred for millet plantation. Therefore impact of migration on millet is very minimal compared to paddy.

4.2) Impact of Migration and remittance on food security at Household level

As with impact on agriculture production, the effect of remittance on food security of household is primarily a function of migration selectivity. In the context of this research, if migrants mainly originate from relatively poor households, migration is more likely to imply greater food security for household. Perhaps, remittance send back home will elevate the household well being via expenditure of remittance on consumption goods.

Therefore based on the expectation on effect of remittance, primary survey and descriptive analysis illustrate different level of food insecurity faced by households, migrant and non migrant. While collecting primary data on food security, question was based on the number of month household had to face food problem (food insecure) and only the households own farm production and purchases from non farm income taken in to account to measure food security. Therefore, analysis of food insecurity in this paper is not taking into account some other component of food insecurity like dietary diversity, calorie intake, per capita expenditure etc, though they are equally relevant for the analysis. Due to the time constrain while collecting primary data it was not possible to collect all the information related to the food security.
4.1.1) Analytical approach

In our discussion so far, household migration decision is a coordinated decision of household to overcome the risk of future fall in consumption, to increase the household welfare with the addition of income in the form of remittance and to overcome credit market imperfection. Moreover, remittance plays a role of insurance against the fall in consumption level due to variant and idiosyncratic risk. In the absence of any income insurance, rural populations are vulnerable to fall in food insecurity in the future in the event of any tragedy or unwanted events. Seasonal migration of Nepalese workers to India is primarily explained by the declining consumption and existence of food insecurity. Seasonal migration to India provide secondary source of income to Nepalese workers which helps them to cover basic need (ESAF 2007). Thus, remittances received by households are primarily used to improve the consumption level. WFP Nepal 2008 found that major part of remittance were used for food, health, education and then used to repay the loan to local moneylenders. Remittance significantly improves the household welfare (Peter Quartey 2006). Evidence also suggests that remittance helps to improve the consumption of food and investment in education. Significant differences were noticed in terms of total income, calorie intake and child nutrition status between migrant and non-migrant households in Nigeria (Martinetti C. Enrica 2010). Therefore, migration and remittance is expected to have positive impact on household food security situation and increase welfare state of family, though it has some negative impact on farm production.

In order to access the impact of migration on food security (insecurity), different variables are taken into the consideration which can probably explain the differential impact of migration on food security (insecurity) of household. Therefore to analyze the impact of migration on food security, we have taken food insecurity (in term of month) as dependent variable. Also, in place of migrant household status we are using remittance as our primary explanatory variable to measure the effect of remittance on food insecurity. At the same time we are using total income (excludes remittance) as our explanatory variable which will explain the impact of other income source on food insecurity. We are using same OLS model which we used in earlier section, but with different dependent variable and explanatory variables.

**Dependent Variable:**

Food insecurity

**Explanatory variables:**

Caste of Household

Remittance
Owned land used for the production

Total member in household

Total Income

4.2.2) Results and discussion

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caste</td>
<td>1.5016***</td>
<td>.2231</td>
<td>.000</td>
</tr>
<tr>
<td>Remittance</td>
<td>-.0000394**</td>
<td>.0000176</td>
<td>.027</td>
</tr>
<tr>
<td>Income from Agriculture</td>
<td>9.77</td>
<td>.000021</td>
<td>.963</td>
</tr>
<tr>
<td>Total Income</td>
<td>-7.02**</td>
<td>3.4</td>
<td>.041</td>
</tr>
<tr>
<td>Total member in Household</td>
<td>-.0539</td>
<td>.105</td>
<td>.609</td>
</tr>
<tr>
<td>Intercept</td>
<td>.4714</td>
<td>.7834</td>
<td>.549</td>
</tr>
</tbody>
</table>

No. of Observation: 105

Adjusted R square: 0.4362

Source: Authors Primary survey (2011)

*** Significant at 1 % , ** significant at 5 %, * Significant at 10 %

Impact of Remittance:

Result from OLS estimator suggests negative impact of remittance on food insecurity month for a household and this estimate is quite significant as well. Which means addition of income in the form of remittance is helping household to improve food security. From survey report it’s found that primary factor influencing migration of member is food insecurity. Therefore, the amount send back in the form of remittance is primarily spent on the food consumption.

Average amount of remittance in cash is NPR 20,388, which means every migrant household, keeping other factor constant, will have improvement in food security condition by .803 month. Not only the remittance in the form of cash, but also household receives remittance in the form of kind like cloths, medicine, electronic items etc, which also
helps household to improve welfare level. While summarizing we can conclude that remittance is helping household to improve food security situation and increase the household welfare level. Remittance in the form of cash and kind are equally important for household to improve livelihood.

**Impact of other factors:**

Impact of other factors on household food security is equally important to examine. So far study suggests that lower caste population is more vulnerable to food insecurity, particularly dalit households are more prone to transitory food insecurity. Therefore, probability of migration from dalit household is quite high. From discrete statistics it has found that more than 90 percent of dalit household have at least one migrant member, and primary reason for migration is either food insecurity or unemployment. Other than caste other significant factor affecting food insecurity is income from agriculture and total income from other sources, which look quite obvious, higher the income from agriculture and other sources higher the production and purchasing power and hence higher will be the food security (lesser food insecurity). Although remittance is reducing the food insecurity, it’s also found that remittance receiving households, particularly lower caste (dalits) are the severely affected by the food insecurity. Also, dalit household are found to be involved in migration. It signifies that effect of caste is more than the effect of remittances. More precisely, lower cast household has higher probability of having food insecurity compared to higher cast, so they are the one who migrates first. Even in most of the cases remittance is not sufficient enough to overcome food insecurity of lower cast household, it only reduces food insecurity to some extent. Therefore lower caste household don’t have much option rather than remain as migrant for longer period of time. Table 6.11 illustrates that, more than 90 percent of dalit (Lower caste) households are involved in migration and at the same time all these dalit (Lower caste) household including migrant household are severely affected by the food insecurity. Therefore we can conclude that dalit households are prone to food insecurity despite of migrant income.

5) Conclusion:

After analyzing the primary data, it concluded that migration from rural agriculture sector has significant impact on sending household in both ways. Migration has negative impact on production of paddy and millet due to the loss of male family labor. Household that left with females to manage farm and other household activity, do not use or use very less hired labor because of cost attached with hired labor that poor household cannot afford. On such circumstances women’s participation in agriculture labor force have increased, however increased women’s participation doesn’t overcome the loss of male work force due to the difference in physical competence between the
genders. In other case hired labors are unable to replace lost family labor, thus all this factor resulting into negative impact on crop production.

Migration has complex relation; in one hand it decreases the crop production through the loss of valuable male family labor, in other, its help household to minimize food insecurity. This finding also provides the evidence that remittance has significant effect on the improvement of household food security with the addition of income in the form of remittance. Result from this study indicates that migration is collective decision of household and primary reason for the migration from study area is risk of food insecurity. Similarly, lower cast population is prone to food insecurity and remittance send back home is not sufficient to overcome consumption deficiency. Therefore lower castes migrants will remain choose to be exile to earn for family.

Reference

Hein De Haas (2001). Migration and agricultural transformations in the oases of Morocco and Tunisia. KNAG.
Appendix

6) Field study results

This section will illustrate the field study results and their interpretation. Households are divided according to the status of migration along with the other major characteristic. Simple tables are used to explain the characteristic and information about the households.

6.1) Household characteristics:

Division of Household

Households are divided according to cast and gender. These figures also include the absent migrant member of household. When we compared household size across the caste, size doesn’t show much difference. All three different castes have almost similar size.
Table: 6.1: Household composition according to caste and gender

<table>
<thead>
<tr>
<th>Caste</th>
<th>Total Household</th>
<th>Total Members</th>
<th>Male</th>
<th>Female</th>
<th>Avg. Size of HH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bramins</td>
<td>49</td>
<td>277</td>
<td>134</td>
<td>143</td>
<td>5.65</td>
</tr>
<tr>
<td>Chettri</td>
<td>20</td>
<td>147</td>
<td>75</td>
<td>72</td>
<td>7.37</td>
</tr>
<tr>
<td>Dalits</td>
<td>37</td>
<td>221</td>
<td>109</td>
<td>112</td>
<td>5.97</td>
</tr>
</tbody>
</table>

Majority of households are involved in agriculture activity and primary occupation for household adult and head is agriculture. Table also shows that major occupation for majority of adult member who has age above ten is agriculture.

Table: 6.2: Major occupation of adult member of household

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Agriculture</th>
<th>Masson</th>
<th>Office</th>
<th>Teaching</th>
<th>Business</th>
<th>Laborer</th>
<th>Politics</th>
<th>Astrology</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>214</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>17</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>479</td>
</tr>
</tbody>
</table>

In term of education level among adult members of household, 3.9 is average years of education across the population, but level of education differs across the caste. Dalit adult population has 2.98 years of average education, whereas Bramin and chettris has relatively higher 4.32 average years of education.

6.2) Migration in the sample area

Out of total 54 migrant household in the area, 10 of them have more than one migrant member. Except the two household, migrant destination for the rest is homogeneous, they chose to migrate to India because of accessibility, cost effectiveness and less risky in term of return, employment and earning. Out of 67 migrants 65 of them are migrated to India and remaining two is migrated to Qatar. Those migrants who migrated to India mostly works in informal sector on contractual basis. Work is temporary in the sense that they can return back home at peak agriculture session every year. Most of the migrants migrate to India during winter season (Dec/Jan) when season is not conducive for the agriculture, where each migrant spend on an average 8.91 months.

Table 6.3: Pattern of Migration

<table>
<thead>
<tr>
<th>DEC/JAN</th>
<th>FEB/MAR</th>
<th>MAR/ APR</th>
<th>MAY/JUN</th>
<th>JUL/AUG</th>
<th>AUG/SEP</th>
<th>SEP/OCT</th>
<th>OCT/NOV</th>
<th>NOV/DEC</th>
<th>TOTAL</th>
</tr>
</thead>
</table>
Basically it’s found that most of migrants originate from dalit households for different reason. Out total 37 interviewed dalit household, 36 of them have at least one migrant member. Also, in total of 67 migrant from study area 68.65 percent are dalits.

Table: 6.4: Migrant member according to caste

<table>
<thead>
<tr>
<th>Bramins</th>
<th>Chettris</th>
<th>Dalits</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>6</td>
<td>46</td>
<td>67</td>
</tr>
<tr>
<td>22.3%</td>
<td>8.95%</td>
<td>68.65</td>
<td>100%</td>
</tr>
</tbody>
</table>

Given the composition of family members and migrant, most important variable we have to consider is average age of migrant. The mean age of a migrant is 33.53 years and median is 30 years, which indicates most productive members of household prefer to migrate. This also explains a major difference in the labour use patterns in migrant and nonimmigrant households.

**Reason for Migration:**

Household have different reason to choose migration as alternative source of income. Primary survey report illustrates, food deficit within the household is a primary reason for the migration, which is accentuated by the poverty and employment in the region. Out of total 53 households, 41 have said food deficit is a primary reason for the migration, also poverty and unemployment add into the problem of food deficit. We can also see the average number of dependent in migrant and non migrant households and it’s fractionally higher in migrant household 2.46 than non migrant 1.96. From the figure of average number of dependent in migrant and non migrant we can’t say anything substantial in relation to migration decision.

Table: 6.5: Reason for migration

<table>
<thead>
<tr>
<th>Total</th>
<th>Food Deficit</th>
<th>Poverty</th>
<th>Unemployment</th>
<th>Debt Repayment</th>
</tr>
</thead>
<tbody>
<tr>
<td>53</td>
<td>41</td>
<td>3</td>
<td>8</td>
<td>1</td>
</tr>
</tbody>
</table>

Table: 6.6: Average economic dependent member (child below 10 years of age)

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migrant</td>
<td>1.87</td>
<td>1.94</td>
<td>2.46</td>
</tr>
</tbody>
</table>
6.3) Labor Endowment

Households size itself reflects the labor endowments of the household. In study area, all people above age of 10 have certain responsibility primarily for farming and than for household. Therefore, according to the result in table indicates that number of male household worker is comparatively less in migrant household, whereas women don’t migrate; the numbers of female household workers are relatively similar in both migrant and non-migrant household.

Table: 6.7: labor endowment in migrant and non-migrant household

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Bramins</th>
<th>Chettris</th>
<th>Dalits</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migrant HH</td>
<td>48</td>
<td>105</td>
<td>39</td>
<td>30</td>
<td>84</td>
<td>153</td>
</tr>
<tr>
<td>Non-Migrant HH</td>
<td>114</td>
<td>112</td>
<td>150</td>
<td>69</td>
<td>7</td>
<td>226</td>
</tr>
</tbody>
</table>

Out of 106 surveyed household, 54 answered they are facing labor shortage in the area, during peak agriculture season finding hired-in labor is difficult when household had to employ additional labor. These problems can be explained by the increase in number of migration from the area for a long time.

6.4) Cropping Pattern

Paddy is most important cereal crop in the study area followed by wheat, millet etc. Traditionally staple cereal crop in the study area was a millet and maize, but since last two to three decades people choice had shifted to paddy. Therefore they use land primarily for the production of paddy and then followed by other crops. Though preference for other crop has gone down but household still cultivate more than two crops.

Table: 6.8: Yield of various crops

<table>
<thead>
<tr>
<th></th>
<th>Paddy (Kg)</th>
<th>Wheat (Kg)</th>
<th>Maize (Kg)</th>
<th>Millet (Kg)</th>
<th>Potato (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migrant HH</td>
<td>24500</td>
<td>9500</td>
<td>7380</td>
<td>6320</td>
<td>2500</td>
</tr>
<tr>
<td>Average</td>
<td>544</td>
<td>206</td>
<td>210.8</td>
<td>162</td>
<td>250</td>
</tr>
<tr>
<td>Non-Migrant HH</td>
<td>14920</td>
<td>6620</td>
<td>3700</td>
<td>5235</td>
<td>4350</td>
</tr>
</tbody>
</table>
6.5) Consumption pattern

Since tradition of cereal crop production changed over the period of time, the pattern of consumption has also changed preference for rice and wheat has increased. Whereas dependence on traditional crop likes millet for daily consumption still exist more within the relative poor household. Out of 106 household, 100 household consume rice every day, also consumption frequency is high for wheat and millet as well. Higher consumption of rice is also due to the status factor in the region, households which prefer rice and wheat attains higher status. Therefore from the production and consumption pattern we have opted for two crops namely paddy and millet, to measure the impact of migration and other factor on production.

Table: 6.9: consumption pattern of various crops

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Every day</th>
<th>Very few days</th>
<th>Only on festivals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>0</td>
<td>100</td>
<td>4</td>
<td>2</td>
<td>106</td>
</tr>
<tr>
<td>Wheat</td>
<td>2</td>
<td>90</td>
<td>14</td>
<td>0</td>
<td>106</td>
</tr>
<tr>
<td>Meat</td>
<td>1</td>
<td>5</td>
<td>16</td>
<td>84</td>
<td>106</td>
</tr>
<tr>
<td>Millet</td>
<td>6</td>
<td>81</td>
<td>19</td>
<td>0</td>
<td>106</td>
</tr>
</tbody>
</table>

6.6) Perception question:

Survey was also based on some perception question to know what people have actually experiencing in the region. Basically perception question was focused only on the migrant household because of requirement of research question.

Table: 6.10: Perception of migrant household

<table>
<thead>
<tr>
<th>Decline in production due to migration of HH member</th>
<th>Labor shortage due to the migration of male member</th>
<th>Women have to work more in the farm due to migration</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>43</td>
<td>49</td>
</tr>
</tbody>
</table>
Out of 54 surveyed migrant household 40 household reported that they are experiencing the fall in production of agriculture due to the migration of member. Further, 43 household admit that they are facing labor shortage problem due to male migration, also difficulty in finding hire labor to substitute the loss of migrant member. Women’s participation in agriculture and number of hours women need to spend in agriculture has increased in the absence of male member. Among migrants household, women’s of 49 household have to spend more time in the field and women’s participation in agriculture have also increased.

6.7) Food Security:

Survey report suggests that problem food insecurity primarily exists in lower caste population. All the dalit households are food insecure and the extent of food insecurity among dalits are higher than the other higher caste.

Table: 6.11: State of food security

<table>
<thead>
<tr>
<th></th>
<th>Bramins and Chettris (No of HH)</th>
<th>Dalits (No of HH)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Insecure</td>
<td>23</td>
<td>37</td>
<td>60</td>
</tr>
<tr>
<td>Average (In Months)</td>
<td>3.60</td>
<td>5.73</td>
<td>4.91</td>
</tr>
</tbody>
</table>