Socio-economic impacts of out migration on maize production in Rolpa district, Nepal

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ABSTRACT

Labor migration has profound effects on agriculture production. It is increasing in the mid-hills of Nepal, and it leads to labor scarcity in agriculture. This study explored the effects of outmigration on maize production. The study was conducted at Rolpa Municipality and Sunil Smriti Rural Municipality, Rolpa district, Nepal. A total of 100 households with 50 respondents from migrant households and 50 respondents from non-migrant households were selected using a random sampling technique. Key informants interview, focus group discussion, and the household survey was used to collect data. Both descriptive and inferential statistical methods were used for the analysis. Results showed that the productivity of maize in non-migrated households was 2.93 t ha⁻¹ which was significantly higher than that in migrated households (2.45 t ha⁻¹). The maize income was decreased by US\$ 19.41 in each individual outmigration. The 20% of remittance was used for food and clothing whereas the least share (5%) was invested in agricultural inputs. The adoption of mechanized technology was not significantly affected by remittance. The women's drudgery in the migrated households was found higher as compared to that in non-migrated households. Along with outmigration, it was observed that there was an increasing trend of land abandonment and exit from agriculture in the survey site. Therefore, the government should implement a policy which encourages people to invest remittance in agriculture specifically in the mechanized system that saves time, money, and drudgery.

INTRODUCTION

Nepal is an agro-based country. Two third population involved in agriculture for their livelihood. However, its contribution to GDP is estimated to remain only at 26.98% in the current fiscal year (MOF 2018). Nowadays, remittance income from outmigration contribute a considerable portion in GDP of the country. Nepal was one of the top remittance recipient countries in the world with a share of 28% in GDP (World Bank 2018). Nepal received 784 billion remittance in the fiscal year 2018/2019 (Nepal Rastra Bank 2019). Out-migration is the process of moving out of the native community in search of better job and opportunity which is prevalent in rural part due to low income and earning opportunities (Schwilch et

al. 2014). Low paying job and even limited opportunity results in outflow of large number of energetic youth for foreign job (Economic Survey, 2016). About 20 percent of the total population is absentee population in Nepal (CBS, 2011). In Nepal, male out-migration is predominant over female due to which female work burden and additional work load make them in the position to make their decision (Gartaula et al. 2010; Lastarria-Cornhiel, 2006).

Maharjan et al. (2012) highlighted that out migration as one of the factor behind low production and productivity. Their study revealed that due to remittance income from out-migration, people take least care and show minimal interest for production of subsistence crop like maize. Labor scarcity as a direct consequence of out-migration, may lead to exit from agriculture and land abandonment (Gartaula et al. 2010). On the other hand, it helps to bring feminization and women empowerment as a counterpart of major male outmigration Gartaula et al. (2010).

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Moreover, due to high work load on female, manual agro-system is changing to mechanized system (Tiwari et al. 2017). An understanding of outmigration status at the household level can have significant policy implication and can be helpful to gain some insights on channeling remittance in the agricultural sector. Remittances, money sent from abroad, are linked to land use, for instance through investment in machinery or new crops. Remittances are not only defining household consumption and investment patterns, but are also transforming the structure and dynamics of the country's overall economy. The remittances have significant effects on agriculture production.

The specific objectives of this study were to analyze socio-economic determinant of migration in the study area, determine the impact of out-migration in production and productivity of maize, assess the impact of outmigration on female work load and determine impact of remittance on mechanization of agriculture.

MATERIALS AND METHODS

Description of Study Area

The study was carried out in Rolpa, District Nepal where Prime Minister Agriculture Modernization Project, (PMAMP), Project Implementation Unit, Maize zone has been implementing. Study area lies in western hill in Province No. 5 which is 280 km west from Kathmandu district, Nepal and 109 km from Butwal, Nepal. Longitude and latitude of the study district Rolpa is 82.648344 and 28.381562 respectively. It covers an area of 1,879 km² with population of 221,177 (CBS 2011).

Data collection and Sampling techniques

For study purpose, two local bodies of Rolpa district namely, Rolpa municipality and Sunilsmriti rural municipality were purposively selected as those areas are under the maize zone of PM-AMP with huge number of remittance receiving households. A total of 100 households were surveyed with total of 50 respondents from migrant households and 50 respondents from non-migrant households using random sampling techniques. Migrant households and matching sample of non-migrant households was selected to undertake a comparative analysis of differences in maize productivity parameters, mechanization and women empowerment level. Primary data were collected through pre tested semi structured interview schedule, Focus group Discussion (FGD) and Key Informant Interview (KII). A FGD was conducted in a group of 2 extension officers from Maize zone, Rolpa, 3 agriculture facilitators and 7 maize producing progressive farmers. The primary data were collected and verified by the data collected through FGD and KII.

Our study assumes out-migration as one of the factor behind low production and productivity. Due to remittance income from out-migration, people take least care and show minimal interest for production of subsistence crop like maize (Maharjan et al. 2012). We assume two major consequences of out-migration. Labour scarcity as a first consequence of out-migration, which may lead to exit from agriculture and land abandonment (Gartaula et.al. 2010). Secondly, on other hand investment of remittance income from out-migration in production enhancing technology and mechanized system, could have positive effect on maize production (Rozelle et. al. 1999).

Data Analysis

The obtained data were systematically arranged. SPSS (version 25.0), MS-EXCEL 2010 were used to get the analyzed result. To analyze the socioeconomic characteristic, descriptive statistics like mean, percentage and frequencies were used. Regression model, t-test and chi square test were used as inferential statistics.

The regression model was determined as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

Where,

Y = Total agricultural production in terms of monetary term

X₁ = Land holding size per household in ropani

X₂ = Number of economically active member

X₃ = migration status of the family

This approach was given and used in a research done by Rozelle et al. (1999).

RESULTS AND DISCUSSION

Socio-economic determinants of migration

The sample population was dominated by Janajati. There was no significant difference among the different ethnic community and migration. It depicted that migration was not altered by the caste group in the society. The literacy rate of non-migrated households (77.81) was significantly higher than migrated households (70.55) at 5% level of significance. Due to low qualification, they hardly find job in the study area, so were forced to out-migrate. Literacy rate of the sampled population was 74.13 (Table 1). From the study it was found that the dependency ratio of non-migrated households (98) was significantly higher than migrated households (70). The dependency ratio of overall study area was 83 which was higher than the dependency ratio of national average, seventy (CBS 2016). In migrated households, female headed family (58%) were higher than male headed family (42%) whereas male headed family

Table 1. Socio-demographic characteristics of respondent households in Rolpa, Nepal

Characteristics	Migrated household	Non-migrated household	Overall	Chi-square value	p-value
Ethnicity					
Brahmin	3(6)	4(8)	7(7)	0.921	0.922
Chhetri	11(22)	11(22)	22(22)		
Janajati	28(56)	28(56)	56(56)		
Dalit	4(8)	5(10)	9(9)		
Others	4(8)	2(4)	6(6)		
Total	50(100)	50(100)	100(100)		
Literacy rate	70.55	77.81	74.13	-2.48**	0.015
Dependency ratio	70	98	83	-2.54**	0.013
Male headed	21(42)	40(80)	61(61)	19.192***	0.000
Female headed	29(58)	10(20)	39(39)		

*** and ** mean significant at 1% and 5% level of significance, Numerical values within parentheses indicates the percentage of respective category.

(80%) were higher than female headed family (20%) in member non-migrated household. There was significant difference in gender of household head between members migrated households and non-migrated households. It may be due to male outmigration. After male migration, female in the family became the household head to make decision and bear more responsibility.

Total gross income of households were obtained by adding on-farm (agriculture and livestock) and off farm gross income. As compared to member non-migrated household (US\$ 2288.04), migrated household (US\$ 5474.71) had more than double total income as remittance substantially contribute in total income of migrated households. Agriculture in non-migrating household contributed 35.77% of the total income which was higher than migrating households (7.12%). Whereas, livestock contribution in non-migrated households (9.55%) was higher than migrated households (6.20%) (Table 2). It is one of the rural district of Nepal having per capita income of 100\$ and have an average life expectancy of 52 years (NPC, 2014).

Mean farm size and abandoned area

The mean farm size of a household was 0.309 ha in the study area. The farm size was categorized according to mean farm size. Nearly two third (64%) of the households were found to have farm with size less than mean farm size whereas more

than one third (36%) of the households had farm with farm size more than average farm size. Similarly, total abandoned mean area in migrated households (0.124 ha) was higher than that of non-migrated households (0.065 ha) and it was significant that with migration total abandoned area increases. Of the total abandoned area, 65% was contributed by the migrated households.

Migrant destination and number of migrants per household

Out of 50 migrated households, the result revealed that 41 households (82%) migration destination was gulf countries like United Arab Emirates (UAE), Saudi Arabia, Qatar, and Malaysia. Only 2% of the people was migrated to Japan and 4% to America and Australia for higher education. Average number of out migrant among migrant households was 1.18 per household. Among fifty migrated household sample, forty four household (88%) have only one member migrated outside, four households (8%) have two member migrated outside, one household (2%) have similar three member and four member migrated outside.

Causes of outmigration and its impacts

Various causes along with their index was given in the Table 3. Major cause of outmigration was low income source of respondent household followed by low employment opportunity, low

Table 2. Income status of the respondent households in Rolpa, Nepal, 2019

Income	Migrated household (USD)	Non-migrated household (USD)	Overall (NRs.)
Agriculture	389.96(7.12)	818.64(35.77)	604.30
Livestock	339.81(6.20)	218.65(9.55)	279.23
Business	225.89(4.12)	319.13(13.94)	272.51
Remittance	4352.70(79.50)	0(0)	2176.35
Government job	125.80(2.29)	725.13(31.69)	425.46
Wage	40.55(0.74)	206.49(9.02)	123.52
Annual gross income	5474.71(100)	2288.04	3881.37

Numerical values within parentheses indicates the percentage of respective category.

Table 3. Rank for causes of outmigration and its problems in agriculture

Causes	Index	Ranking
Low income source other than agriculture	0.84	I
Low employment opportunity	0.70	II
Low income from agriculture	0.58	III
Influence (migration of neighbor)	0.51	IV
Problem due to outmigration	Index	Ranking
Labor shortage in agriculture	0.79	I
Women drudgery	0.7	II
Land abandonment	0.605	III
Increase wage rate/price	0.375	IV

Table 4. Productivity of maize by respondent category in Rolpa, Nepal, 2019

Variable	Migrated household	Non-migrated household	Overall	Mean Difference	T-value	p-value
Productivity (t ha ⁻¹)	2.45	2.93	136.83	-23.95	-5.92***	0.000

*** mean significant at 1% level of significance

income from agriculture, political conflict and influence. The finding was in line with finding of (Gautam, 2015) which revealed major cause of outmigration was low income and poor economic conditions. The least important causes of outmigration was influence of the neighbor migrant on the respondent households. The result showed that the major direct effect of outmigration was on labor availability in agriculture sector. Labor shortage during peak period of crop operation decreased the productivity of the crops as a whole. It was followed by women drudgery, land abandonment and increase in wage. The finding was in line with the finding of Bhandari and Reddy (2015). Outmigration of people who in earlier involved in agriculture production, causes labor scarcity as a major visible problems. It led to another problem women drudgery which was mentioned in the finding of Maharjan et al. (2012). Table 3 showed the cause of out migration and its impacts in the study area.

Remittance use pattern

The distribution of remittance has been categorized into 9 groups namely; food and clothing, education, health, social function, loan repayment, residential plots, agriculture input, luxurious goods and saving. Figure 1 shows the distribution of remittance income for different purpose. Large share of the remittance income was used for food and clothing (19.84%). The 12% of the total remittance income was invested in education sector. Similar finding was in line with the finding of Dhungana and Pandit (2014) where the remittance of migrants was used primarily for food and education. It was followed by luxurious goods (12.28%), residential plots and housing (9.76%), repayment of loan taken during departure (9.5%), social function (8.32%), health (8.12%), and agriculture input (4.86%). There was the lowest expense of the remittance in agricultural

sector (purchase of equipment's inputs, hiring labor and agricultural assets). Of the total remittance income, 14.68% was saved by the respondent households (Figure 1).

Impact of outmigration on productivity of maize

Average maize yield per hectare of land in non-migrated households was 2.93 t which was significantly higher than that in migrated households (2.45 t) (Table 4). This was in line with the research finding of Tamang et al. (2014) and Ghimire et al. (2016). There is significant difference in maize yield in migrated and non-migrated household. It was found that the migration of an additional family member led to a maize yield loss of 3497.1 kg ha⁻¹ in rural Public Republic of China (Rozelle et al. 1999). It may be due to remittance income from out-migration, people take least care and show minimal interest for production of subsistence crop like maize (Maharjan et al. 2012). Similarly, negative effect of outmigration was found on crop income (Azam and Gubert 2002; Schwilch et al. 2014; Kattel and Upadhyay 2018). Finding of Kattel and Upadhyay (2018) revealed that the farm income decreased by 358% among migrated households as compared to non-migrant households.

Effect of migration on income from maize production

The effect of out migration on maize production was tried to assess quantitatively by taking different associated variables. Migration status was taken as a dummy variable as a regression for dependent variable; and maize production was taken as dependent variable. For the regression analysis, maize production was converted to monetary term in Rupees. The monetary value of the entire crop produced in a year was calculated on the basis of current local market price. The independent variable which

Figure 1. Remittance distribution of respondents for various purposes in Rolpa, Nepal, 2019

showed high correlation with each other ($r > 0.5$) and low degree of correlation with the dependent variable were dropped from the regression model. Finally four variables with high degree of correlation with dependent variable and low degree of correlation with each were included in the model. Independent variable which had strong correlation with maize production (Y), were entered step by step in final regression model to work out the contribution in the model.

The agriculture production, particularly maize production, largely depended on the size of land holding. The effect of land holding size was found highly contributing factor in the total agriculture production contributing 76.9% ($R^2 = 0.769$) variance in total variance of the model (Table 5). Beta coefficient of total land holding is 2915.83, this means in one ropani of land of a household increased income from maize by US\$ 26.26 (1 ha = US\$ 516). Similarly, migration was also a major

factor which contributed 14.3% ($R^2 = 0.143$) variance in total variance of the model. And the share of one economically active member earns US\$ 19.41 per year. Every individual migrated outside of the country contribute US\$ – 19.41 on maize income, that is maize income is decreased by 19.41 USD in each individual outmigration (Table 6).

Outmigration and its impact on work division and women empowerment

The results revealed the 78% of the respondents household in member migrated household had female member in farmer group which was significantly higher than that of non-migrant households (56%) at 1% level of significance. Total number of labor hired in migrated households was seen higher than non-migrated households. The male labor hired per season of maize cultivation in migrated households (4.12) was significantly higher than that of non-

Table 5. Linear regression model in assessing the effects of different variables on agricultural production in Rolpa, Nepal, 2019

Independent variable	Model	R	R Square	R Square Change
Land holding	1	0.877 (a)	0.769	0.769 (76.9)
Migration status	2	0.378(b)	0.143	0.143(14.3)
Economically active(age between 16 to 59)	3	0.016(c)	0.016	0.016(1.6)

a. Predictors: (Constant), Total amount of land holding

b. Predictor :(Constant), Migration status, migrated to outside country or not

c. Predictor: (Constant), economically active family member

d. Dependent variable: Income from maize production in rupee

Table 6. Estimation of effect remittance on maize production in Rolpa, Nepal, 2019

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Significance
	B	Std. Error			
(Constant)	2.18	19.09		0.114	0.909
Total land holding of family member	26.26	1.59	0.843	16.460	0.000
Migration Status	-19.41	12.08	-0.083	-1.606	.112
Economically active family member (15 to 59 years old)	11.29	4.70	0.116	2.40	0.018

a. Dependent Variable: Total Income from maize production in rupee
 $R^2 = 0.785$, Adj $R^2 = 0.778$, std error = 6123.231, F= 116.937

Table 7. Membership in group/cooperative and labour hired for maize cultivation

Member involved	Migrated household	Non-migrated household	overall	chi-square test value	p-value
Male	7(14)	18(36)	25(25)	20.337***	0.000
Female	39(78)	28(56)	67(67)		
None	4(8)	4(8)	8(8)		
Total	50(100)	50(100)	100		
Male labour hired	4.12	0.68	4.8	4.515***	0.000
Female labour hired	1.70	0.68	2.38	1.907**	0.059
Total	5.82	1.36	7.18		

*** and ** mean significant at 1% and 5% level of significance

migrated households (0.68) at 1% level of significance. Whereas, the female labor in migrated households hired was higher than non-migrated households at 10% level of significance (Table 7). The scenario showed male labor void scenario in agriculture. It indicated member migrated households had male labor scarcity so they hired more male labor than female. It was supported by the finding of Maharjan et al. (2012).

Work division of male and female in agricultural (maize production) and decision making activities

The study (Figure 2) focused on the effect of outmigration on gender work division on maize production. Male and female involvement in maize production was studied. The result revealed high women drudgery in migrated households than the non-migrated households in overall. In activities like tillage and land preparation male were mostly involved. Whereas manure application, seed sowing, intercultural operation, harvesting were mostly carried majorly by female. Due to outmigration, gender role on agricultural activities has been changing with time. Shifting male role to female results in feminization of agriculture labor. So the women drudgery in member migrated household was found higher in all the activities

than non- migrated households as illustrated in the figure below. The finding was in line with the finding of Devkota and Pyakuryal (2017) which stated the gender work division is being changing due to socio-economic change.

Effect of outmigration on mechanization in agricultural sector

The adoption category was made on the basis of use of tractor/mini tiller. The households using tractor/mini tiller in tillage operation of maize were categorized into adopter, and those who use bullock were categorized into non-adopter category. There was not significant association in adoption of the mechanized technology (tractor/mini tiller) with migration. Migration and remittance had not any effect on adoption of mechanized technology. It proved the remittance was not invested significantly in buying and hiring machineries in migrant household.

The mean investment of non-migrated households (US\$ 70.93) was higher than the investment of migrated households (US\$ 59.63) for maize production. It was non-significantly associated with the migration status. The investment to buy modern machinery was also not significantly associated with the migration status, as there was not high mean difference of

Table 8. Investment in mechanized technology and its adoption by respondent category, Rolpa, Nepal 2019

Variables	Migrated household	Non-migrated household	Overall/mean value	t-test value	p-value
Tractor/ mini tiller user	30(30)	25(25)	55(55)	1.010	0.315
Bullock user	20(00)	25(32)	45(45)		
Total investment in maize production (USD)	59.63	70.93	-11.23	-0.762	0.448
Investment in mechanized technology (USD)	19.43	21.08	-16.57	-0.210	0.834

Numerical values within parenthesis indicates percentage of respondent's category

investment between migrating (US\$ 19.43) and non-migrating households (US\$ 21.08). (Table 8). The remittance income in migrated households did not made significance difference in mechanization to replace female drudgery. The finding was in line with the finding of Bhandari and Reddy (2015) in which remittance did not significantly boost up the mechanization of farm as there was minimum investment of remittance on farm assets like machinery.

Figure 2. Work division in agricultural activities in Rolpa, Nepal, 2019

CONCLUSIONS

This study assessed the out-migration and its effect on maize production based on the household survey in Rolpa district. Outmigration of economically active population led to labor scarcity in agriculture. The remaining household members contributed less on the crop management activities resulting decline in production. Remittance was used the most for food, clothes and education and the least for agriculture. Very few the migrant household had remittance invested on productive assets like machinery that reduce work drudgery. It showed adoption of mechanized technology was not significantly affected by remittance. Lower adoption of mechanized technology and decreased in availability of male labor in the study site reinforced feminization in agricultural labor. Overall, outmigration triggered feminization in both labor and decision making process. Along with outmigration, hazard of land abandonment and exit from agriculture was being increasing in the study site. Although out-migration of people from the area had positive effect on household income, it was found negative impacts on maize production. For reduction of land abandonment and increasing maize production in maize zone Rolpa, it was recommended that government should build investment favorable environment in agriculture sector by making it more profitable focusing agricultural mechanization.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

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