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Effects of International Migration in Agriculture Sector of Nepal

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Abstract

This paper aims to explore the multidimensional impact of international migration on agricultural sector of Nepal. It focuses on changes in labor force, land use, and remittance utilization. The systematic review of literature and regression analysis reveals that migration has resulted in significant labor shortages, land abandonment, and declining agricultural engagement particularly in hill regions. It has also enabled productivity gains through remittance financed investments in improved and modern technologies. There is emergence of feminization of agriculture due to outmigration of men members of the farming households. This is a major coping mechanism followed in the labor scarce situation. Regression analysis indicate that remittance inflows have negative effect on expanding paddy cultivation area but has a strong positive relationship with paddy productivity. This highlights the potential to improve yields through better inputs and technologies. The findings claim the necessity of policy interventions that could channel remittances toward productive agricultural uses and address the challenges of labor scarcity and gender inequality to ensure long-term agricultural sustainability in a migration driven economy of Nepal.

Keywords: International migration, labor shortage, remittance, feminization of agriculture

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Introduction

Migration is a global phenomenon that has been characterized with human mobility, social transformation and civilization. United Nations (1998) defines migration as a movement of a person or a group of persons, either across an international border or within a state, involving a permanent or semi-permanent change of residence. Poverty, unemployment, political instability, and the demand for foreign labor are the major reasons for migration in Nepal (Adhikari & Hobley, 2015).

Internal migration from rural to urban areas was common in Nepal, but since the 1990s, international migration particularly to Gulf countries, Malaysia, and India increased due to better income opportunities (Seddon et al., 2002). In FY 2021, the remittance collected from over 4 million people working abroad contributed nearly 23.8% of GDP (Department of Foreign Employment, 2022). On the other side, migration has created considerable pressures on the country's agricultural sector due to reduced workforce, change in agricultural land use resulting in reduction of cultivated area and increased land fragmentation due to remittance dependent households' shift from staple crops to low maintenance orchards or leave their land fallow (Paudel et al., 2020). Simultaneously, remittances have enabled some farmers to invest in inputs and technology (Maharjan et al., 2020). These changes vary based on places. This trend has restructured the agrarian economy of the country, necessitating further research on its long-term implications such as food security and rural development.

In this context, the paper aims to analyze how international migration have influenced agriculture sector of Nepal. This objective is further endorsed with two key research questions: First, how has outmigration altered the availability of agricultural labor in Nepal? Second, what coping strategies farming households have adopted in response to the labor changes?

Methodology

The article is based on a systematic review of secondary literatures such as existing peer-reviewed studies, government reports, and institutional publications. Data related to the migration, remittance, foreign exchange and paddy production were collected through document review then compiled and analyzed using Microsoft Excel. Data on personal

remittance received (in current US$) was extracted from Data Bank of World Bank which then was converted into Nepalese Rupees by using foreign exchange data from Nepal Rastra Bank. Tools such as tables and graphs were used to present the data visually. Analytical methods include trend analysis, correlation, and regression to assess the impact of remittance on paddy cultivation area and productivity.

Literature Review

Theoretical Review and Application in Nepalese Context

Migration is the result of push factors like poverty, low wages, and poor infrastructure in rural areas, and pull factors such as employment and better services in urban or foreign destinations (Lee, 1966). In Nepal, rural poverty, low farm incomes, limited non-farm jobs, limited land access, and climate vulnerabilities, lack of infrastructures etc. push people out, while foreign employment attract them with the higher wages and demand for low-skilled labor. The urban jobs in Kathmandu and other cities show them opportunities with jobs, higher wages, better education and health care. Internal as well an international migration has resulted in farm labor availability affecting agricultural sector of the country.

Increase in productivity and wages for economic development is the result of transfer of surplus labor from the agricultural (traditional) sector to the industrial (modern) sector (Lewis, 1954). In Nepal, labor is migrating out of agriculture but the industrial and service sectors have not grown proportionately. This causes a labor vacuum in rural areas without productive absorption elsewhere.

As result of increasing migration of male members of the family, women take responsibility for both farm labor and household decision-making (Lastarria-Cornhiel, 2008). In Nepal, women's participation in agriculture is rising, but they often lack access to land, credit, and extension services, which limits their productivity.

Migration and Agriculture in Nepal

Both internal as well as international migration has considerably reformed the country's agricultural sector over the past two decades. This review synthesizes recent literature (2018–2024) on how migration

influences farming systems, labor dynamics, and rural livelihoods highlighting gaps in policy responses. With the sociological perspective, migration and mobility can also be analyzed with modernization process in Nepal (Sapkota, 2023).

The agricultural sector of Nepal faces severe labor shortages due to outmigration of male members of the family. Studies between 2010 and 2020 estimate a 22% decline in farm labor, with 67% of households reporting difficulties in hiring workers (Maharjan et al., 2020). Migration has led to feminization of agriculture. About 34% of farms are now managed by women, who face triple burdens of farming, care work, and limited decision-making power (FAO, 2022; Gartaula et al., 2020). The agricultural productivity of the country has reduced due to migration of young people leaving only 58% of remaining farmers are over 50 years old (CBS, 2021). The situation is severe in hills as hills face highest outmigration, leading to land abandonment. 8% of arable land in mid-hill districts lies fallow (Paudel et al., 2020).

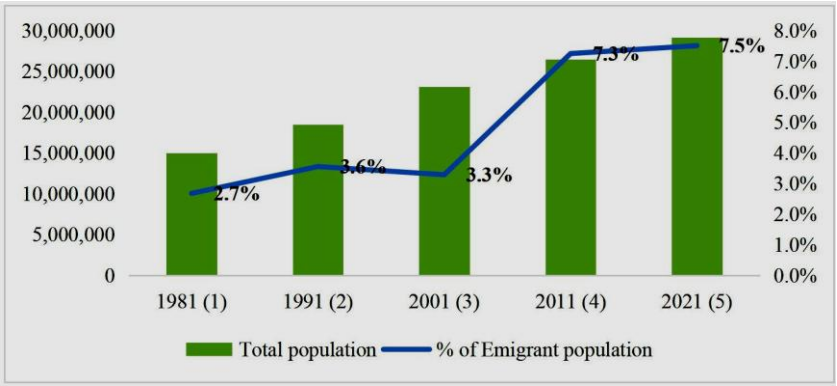
Remittances from international migration have negative as well as positive effect on agriculture. Only 12% of remittances are invested in farming, with most spent on consumption, education, or housing (World Bank, 2023 and Neupane and Poudel, 2023). The remittances receiving households that invest in agriculture do not get increased productivity due to absence of skilled labor (Acharya et al., 2019). In contrary, some households use remittances for mechanization (e.g., tractor purchases rose 19% in migrant households) or commercial crops like coffee (CBS, 2021). More remittance-driven farm investments is observed in Terai due to better market access (CBS, 2021). However, agricultural engagement has declined as migrant families see farming as economically unrewarding (Paudel et al., 2020). Moreover, this issue is also aligned with the agriculture, land and livelihood of people (Sapkota, 2016). Migration has restructured agrarian economy of the country, creating labor deficits but also funding limited modernization. In this context, future research should explore return migration's potential and gender-responsive policies to sustain agriculture.

Result and Findings

Trend of International Migration in Nepal

The graph below with the data from 1981 to 2021 shows a clear increasing trend of both total population and the percentage of emigrant population of Nepal. In 1981, only 2.68% of the population lived abroad, but in 40 years in 2021, this figure had nearly tripled to 7.51%. While country's population steadily increased from approximately 15 million to over 29 million in 40 years, the percentage of people migrating abroad grew more sharply, particularly after 2001. The emigrant population rose from 3.29% to 7.25% between 2001 and 2011 likely driven by rising unemployment, poverty, and the expansion of overseas job markets, especially in the Gulf and Malaysia(Figure 1). This trend demonstrates the increasing significance of emigration as livelihood strategy for the Nepalese households over the past four decades.

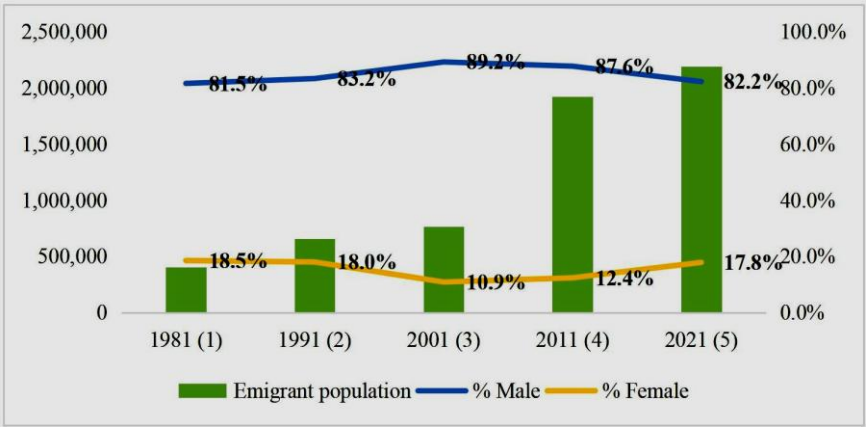
Figure 1 : Trend of international migration



From 1981 to 2021, there has been a substantial growth in emigrant population in Nepal. Figure 2 illustrates the domination of male migrants (over 80%) throughout this period. In 2001 and 2011, over 88% of emigrants were male, indicating limited female participation. This situation may have prevailed due to the influence of cultural norms, legal restrictions, and risk perceptions existed in the country. Nevertheless, by 2021, the proportion of female migrants reached back to 18%, indicating a

gradual shift in gender roles and increasing female agency in international migration. This growing trend in female migration may also be due to the growing opportunities for them in sectors like domestic work, caregiving, and education abroad.

Figure 2 : Trend of international migration by gender



Positive Effects of Migration on Agriculture in Nepal

Several positive impacts of remittances on farming sector, particularly through the inflow and utilization is captured in recent literatures. Remittances serve as source of investment for the farmers to purchase agricultural inputs, lease land, invest in irrigation, and adopt modern technologies (Acharya et al., 2019). The study on maize farming conducted by Acharya et al., 2019, found that migrant households mostly invest the remittances in improved seeds, fertilizers, and mechanization compared to non-migrant households, contributing to higher productivity in some cases. The study also found that there has been enhancement of agricultural resilience due to proper utilization of remittances. According to Timsina, 2014, remittances safeguard the farming families in the adverse circumstances such as crop failure, natural disasters, or market fluctuations for continuing their agricultural activities.

Migration also creates enabling environment for the transfer of knowledge and practices. Returnee migrants introduce new technologies

and ideas related to farming techniques, market linkages etc. resulting in innovation and diversification in rural agriculture (Neupane & Poudel, 2023). Furthermore, as a coping strategy, land consolidation and mechanization are emerging in the high outmigration areas of the country. Due to labor scarcity, farming households often lease their land and form cooperatives, promoting more efficient land use and increased adoption of labor-saving technologies (Magar et al., 2024). Although these trends are not uniform across the country, these indicate that migration has indirectly resulted in modernization and commercialization of agriculture. Feminization of agriculture due to male members' migration has women's decision-making roles in farm management. Even though there are challenges in accessing credit and extension services, there has been evidences of improvements in women's empowerment and agricultural leadership (Timsina, 2024).

Negative Effects of Migration on Agriculture in Nepal

Even though international migration has brought financial benefits to rural households in Nepal, several studies found that it has created adverse effects on the agricultural sector. One of the most frequently cited impacts is the shortage of agricultural labor, especially among young men, who are the predominant group migrating abroad (Timsina, 2024). As a result, families left behind often composed of elderly and women struggle to maintain the same level of agricultural activity, leading to a decline in farm labor availability and land under cultivation. This is particularly visible in hilly and remote areas, where mechanization is limited and agriculture remains labor-intensive (Magar et al., 2024).

The outmigration of healthy household members also leads to abandonment of lands and reduced cropping intensity. Jaquet et al. (2016), in a study of the Harpan watershed in western Nepal, reported that migration had contributed to a shift in livelihood patterns away from agriculture, increasing dependency on remittances and resulting in neglected land management. Similarly, Neupane and Poudel (2023) observed that migration in Roshi Rural Municipality led to reduced agricultural engagement and productivity, as remittance income often diverted attention from farming to consumption or non-agricultural investments. Another concern is the loss of traditional knowledge and

generational farming skills, as youth migrate abroad rather than inherit and continue family farming practices threatening long-term food security (Timsina, 2024). Additionally, Acharya et al. (2019) noted that although remittances supported some input purchases, they rarely resulted in increased overall production due to labor constraints and limited strategic planning.

Coping Mechanism of Farmers to the Negative Impacts of Migration

Farmers use several adaptive measures to overcome the negative impacts of migration. With the migration of a large proportion of male household members, especially youth, women have increasingly taken on decision-making roles and direct involvement in agricultural work. This trend is commonly referred to as the "feminization of agriculture" (Lastarria-Cornhiel, 2008; FAO, 2022). Women now handle tasks ranging from land preparation to marketing of produce, often with limited resources and support.

To compensate for household labor shortages caused by out-migration, many families hire wage laborers, either from within the community or from other districts. However, this increases production costs and is not always affordable for smallholder or subsistence farmers (Neupane & Poudel, 2023). Farmers adapt by shifting from labor-intensive to less labor-demanding crops, such as millet, buckwheat, or fodder species. This reduces the labor burden but may also lower income and food diversity (Paudel et al., 2020; Maharjan et al., 2020). Where possible, families invest in mechanical tools and equipment such as mini-tillers, threshers, and irrigation pumps often financed through remittances. Mechanization helps offset the lack of manpower and improves efficiency (Timsina, 2024). Use of tractors and threshers in Terai has increased but its use is limited in hills due to terrain. Some migrant households choose to lease out land to neighbors or enter into sharecropping arrangements, allowing land to remain cultivated while reducing direct labor involvement (Gartaula et al., 2017). 27% of migrant households lease land to others, often under informal terms (Maharjan et al., 2020).

A Case- Effect of Remittance in Paddy

As a representation of effect of remittance in agricultural sector of Nepal, a short analysis is carried out on paddy. To examine the relationship and effect of remittance on paddy production and productivity, regression analyses were conducted using annual remittance data in relation to paddy cultivation area and paddy productivity.

With the data from 2003/04 to 2022/23, the regression analysis shows the effect of remittance inflow on paddy production area in Nepal. The results show that 22.6% of the variation in paddy production area is explained by changes in remittance inflow. There is a negative relationship (coefficient for remittance= -0.0069) between remittance inflow and paddy production area. This indicates that one unit increase in remittance tends to decrease paddy production area by 0.0069 unit. Still, this effect is statistically significant, as the P-value 0.0339 is less than 0.05. This implies that even though remittance is not the dominant determinant, it has a systematic relationship with paddy production area in Nepal.

Table 1 : Regression analysis performed for remittance and paddy production area

Regression Statistics	
Multiple R	0.475836
R Square	0.22642
Adjusted R Square	0.183444
Standard Error	49016.44
Observations	20

Table 2 : ANOVA test of the statistics

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.27E+10	1.27E+10	5.268447	0.033949
Residual	18	4.32E+10	2.4E+09		
Total	19	5.59E+10			

Table 3 : Summary of statistical analysis

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	1523857	18875.47	80.73214	1.69E-24	1484201	1563513	1484201	1563513
Remittance (NPR. 00,000)	-0.00691	0.003009	-2.29531	0.033949	-0.01323	-0.00058	-0.01323	-0.00058

This regression analysis evaluates the impact of remittance inflow (in NPR 00,000) on paddy productivity across 2003/04 to 2022/23. This shows a very strong positive correlation between remittance and paddy productivity, with multiple R of 0.93. R Square of 0.864 indicates that approximately 86.4% of the variation in paddy productivity is explained by remittance inflow alone. The coefficient for remittance is $1.01 \times 10^{-}7$, which, while numerically small due to the scale of remittance units, is highly statistically significant. A one unit increase in remittance increases the paddy productivity by $1.01 \times 10^{-}7$. This means that increases in remittance are strongly associated with improvements in paddy productivity. P-value being far below than 0.01 indicates a systematic and robust relationship between remittance inflow and paddy productivity. The results indicate that the remittance inflow plays a significant role in enhancing paddy productivity in Nepal, likely by enabling access to better inputs, technologies, or farm management practices.

Table 4 : Regression analysis for remittance inflow and paddy productivity

Regression Statistics	
Multiple R	0.929528
R Square	0.864023
Adjusted R Square	0.856469
Standard Error	0.15455
Observations	20

Table 5 : ANOVA test

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.731934	2.731934	114.3754	3.15E-09
Residual	18	0.429942	0.023886		
Total	19	3.161876			

Table 6 : Summary of statistical analysis

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	2.691709	0.059515	45.22758	5.44E-20	2.566673	2.816745	2.566673	2.816745
Remittance (NPR. 00,000)	1.01E-07	9.49E-09	10.69464	3.15E-09	8.15E-08	1.21E-07	8.15E-08	1.21E-07

Discussion

The findings highlight the dual effects of international migration on agricultural sector of Nepal. The regression analysis results show that the remittance inflow has significantly negative impact in the paddy cultivation area. This is due to the situations such as labor shortages resulted by outmigration of working-age males, especially in hilly regions. This results in land abandonment or underutilization. Furthermore, reduced incentive for land intensive production and investment of remittances in non-agricultural aspects such as urban employment, education, housing etc. may have resulted in reduced paddy production area. These results are similar to that of previous studies (e.g., Paudel et al., 2020; Neupane & Poudel, 2023), which found that households often shift away from labor-intensive farming, leave land fallow, or lease it out. Therefore, while remittance offers economic benefit, it does not necessarily result in greater agricultural engagement or land use.

Similarly, the regression analysis between remittance inflow and paddy productivity shows a strong and statistically significant positive relationship between remittance and paddy productivity. This indicates that remittance is being partially invested in agricultural inputs, mechanization, irrigation, technologies or better farm management practices. This finding

is consistent with studies by Acharya et al. (2019) and Timsina (2024), which argue that the farming households with remittance income are more likely to adopt improved technologies and practices such as mechanization, improved seeds and fertilizers, and irrigation. These investment decisions made by the farming households appear to enhance productivity on existing plots rather than expanding cultivated land. This reflects a trend toward agricultural intensification rather than expansion. Also, despite the increased workload for women, feminization of agriculture may also contribute to more careful land management as women are considered as good as proper management. These findings suggest that there is requirement for targeted agricultural policies that facilitate the use of remittances in enhancing access to farm mechanization, extension services, and credit for rural women and smallholders. This will help bridge the gap between remittance driven income growth and sustainable agricultural development in a labor scarce context.

Conclusion

International migration has both opportunities and challenges in reshaping the agricultural sector of Nepal. On one hand, the outmigration of labor has resulted in reduced cultivated land, labor shortages, and weakening of traditional farming practices, remittance inflows on the other hand have provided households with capital to invest in agricultural inputs and technologies. The regression analysis confirms this duality: remittances show negative effect on expanding paddy cultivation area but has strong relationship with increased productivity. This indicates that remittances can enhance agricultural efficiency if properly utilized, yet their potential remains constrained by persistent labor deficits and shifting household priorities. Therefore, policies that promote the productive use of remittances such as support for mechanization, women farmers, and agricultural entrepreneurship are essential for sustaining agriculture in increasingly migration dependent rural economy.

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