



Nexus of climate change, smallholder farmers food security and rural out-migration in Nepal: From fields to new horizons

Kandel, Giri Prasad¹; Bavorova, Miroslava¹; Ullah, Ayat¹; Sylvester Amoako Agyemang¹; Pradhan, Prajal²
¹Czech University of Life Sciences, Czech Republic; ²Energy and Sustainability Research Institute Groningen (ESRIG), University of Groningen, Groningen 9747 AG, Netherlands

Introduction

Nepal's smallholder farmers are increasingly vulnerable to climate change, suffering from unpredictable weather patterns and reduced crop yields that threaten their livelihoods (Kandel et al., 2023).

Food security in Nepal is heavily linked to the agricultural sector, where smallholder farmers are struggling to sustain their livelihoods in the face of climate shocks and low crop yields (Asare-Nuamah, 2021).

Remittances from migrants account for 27% of Nepal's GDP, providing essential financial support that alleviates poverty and enhances food security (World Bank, 2023).

Migration has become an important adaptation strategy for rural households in Nepal, driven by climate change and food insecurity. As climate-related shocks devastate agricultural yields, families are increasingly forced to seek alternative livelihoods to ensure their survival (Black et al., 2011).

Objectives

To investigate the factors affecting rural out-migration of rural smallholder farmers in Nepal.

To assess the impact of rural out-migration on food security of smallholder farmers in Nepal.

Conceptual framework

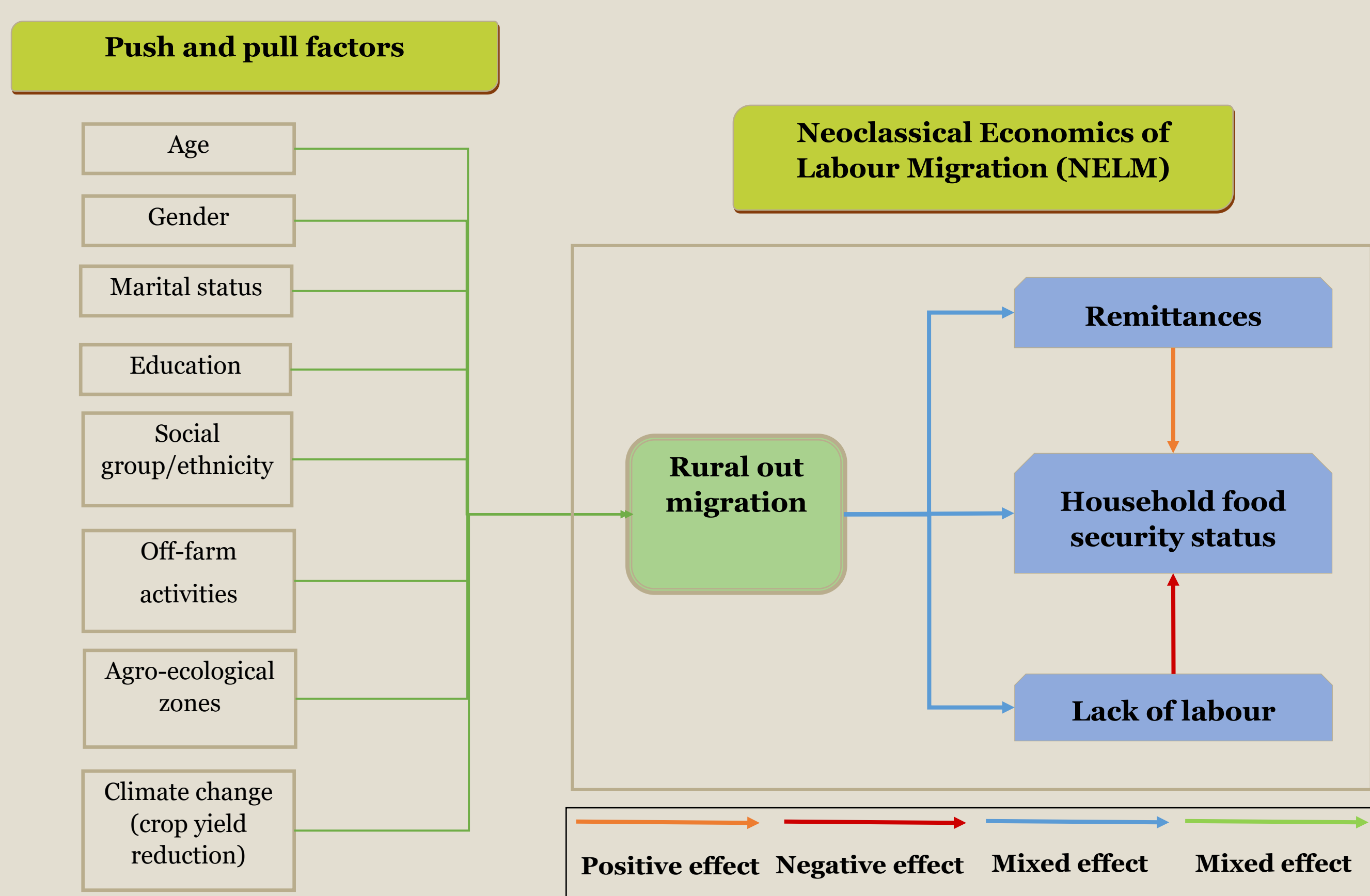


Figure 1: Conceptual Framework (combination of push pull theory and NELM)



Figure 2: Field survey and data collection

Methodology

Sampling procedure: Multistage; Purposive sampling to select 3 Agro-ecological regions (Mountain region: Mustang district, Hilly region: Baglung district & Plain region: Chitwan District), 9 villages (3 from each district)

Sampling method: Random sampling of 400 smallholder farmers

Analytical tool: PSM, ESR

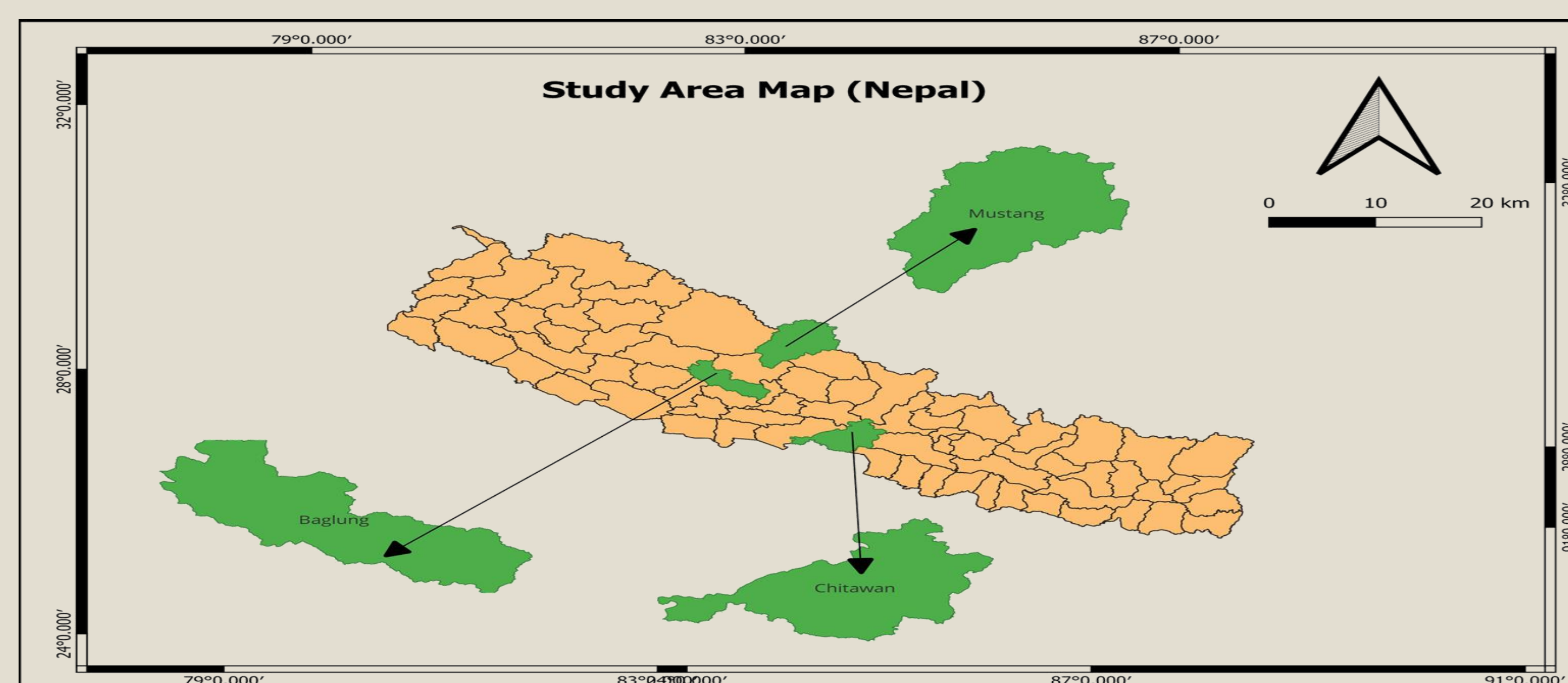


Figure 3. Map of the study area

Results

Table 1. Treatment effect of rural out-migration on Food security (PSM and ESR model)

Variable	PSM			ESR				
	Treatment group	Control group	Difference	Treatment group	Control group	Difference		
	Coef	Coef	Std. Err (combined)	Coef	Coef	Std. Err (combined)		
FCS	70.13	74.82	-4.69	3.40	69.76	61.08	8.68***	0.49

Note: *, **, and *** denotes $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively.

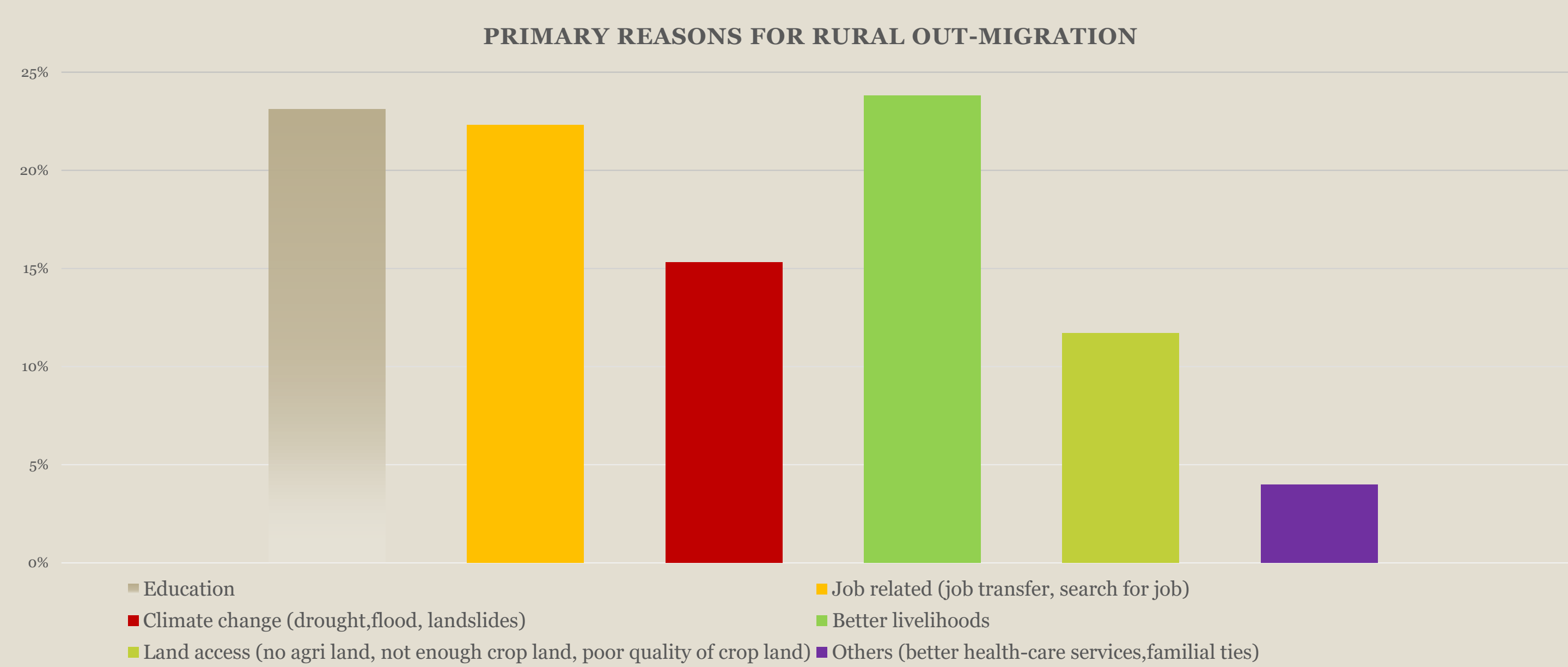


Figure 3: primary reasons for rural out-migration (all migrants, n=141)

Conclusions

Migration significantly improves the food security of smallholder households. The ESR model shows that without migration, households would have experienced an 8.68 points decline in their food consumption score, highlighting the positive role of migration in improving food security.

While migration contributes to food security and livelihood diversification, it also poses challenges such as land abandonment and labour shortages in rural areas.

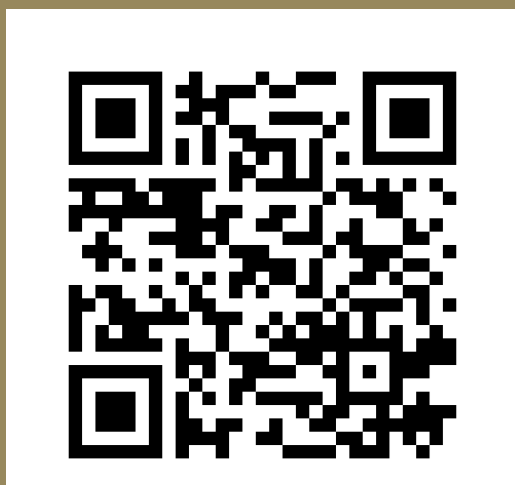
The study advocates a shift from a 'flight strategy' based on migration to a 'fight strategy' focused on empowering rural farmers. To improve local livelihoods, reduce dependence on migration and build a more resilient rural economy in Nepal, investment in education and agricultural innovation is essential.

Acknowledgment

The study appreciates the support of Faculty of Tropical Agrisciences, Czech University of Life Science Prague for Funding the data collection under the Internal Grant Agency (grant number: 20223113)

Contact

Name: Giri Prasad Kandel
 Organization: Czech University of Life Sciences
 Email: carlours.girish49@gmail.com / kandelg@af.czu.cz



References

- Asare-Nuamah, P. (2021). Climate variability, subsistence agriculture and household food security in rural Ghana. *Heliyon*, 7(4), e06928.
- Black, R., Adger, W. N., Arnell, N. W., Dercon, S., Geddes, A., & Thomas, D. (2011). The effect of environmental change on human migration. *Global Environmental Change*, 21(SUPPL. 1), S3–S11.
- Kandel, G. P., Bavorova, M., Ullah, A., Kaechele, H., & Pradhan, P. (2023). Building resilience to climate change: Examining the impact of agro-ecological zones and social groups on sustainable development. *Sustainable Development*.