

International Journal of Agriculture Extension and Social Development

Volume 9; Issue 5; May 2026; Page No. 536-539

Received: 16-02-2026
Accepted: 21-03-2026

Indexed Journal
Peer Reviewed Journal

Prioritizing strategies to mitigate rural out-migration from the hilly regions of Uttarakhand, India

¹Monika Kholiya and ²SK Kashyap

¹Ph.D. Research Scholar, Department of Agricultural Communication, College of Agriculture, G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India

²Professor, Department of Agricultural Communication, College of Agriculture, G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India

DOI: <https://www.doi.org/10.33545/26180723.2026.v9.i5g.3622>

Corresponding Author: Monika Kholiya

Abstract

Rural depopulation in the hill districts of Uttarakhand has reached a critical juncture, with thousands of villages either abandoned or on the verge of demographic collapse. Structural deficits in livelihoods, healthcare, education, and connectivity continue to act as persistent push factors, while urban centres offer comparatively attractive alternatives. Addressing this challenge demands not merely a diagnosis of causality but an empirically grounded identification of the extension interventions most capable of reversing or at minimum arresting this demographic hemorrhage. The present study was conducted across 312 rural households drawn from three altitude-stratified districts: Uttarkashi (upper hilly zone), Almora (mid hilly zone), and Pauri Garhwal (lower hilly zone), representing the principal agro-ecological divisions of the central Himalayan region. Ten extension intervention strategies were assessed using Garrett's Ranking Technique. The results revealed that creating local job opportunities (Mean Garrett Score: 73.14) was ranked first, followed by enhancing agricultural productivity (66.84), providing better health care facilities (64.65), strengthening educational facilities (61.10) and improving road connectivity (51.08). Providing financial support for local businesses, offering skill development programs, and promoting village identity were ranked lower, while highlighting success stories of staying villagers received the least priority (24.43). The findings underscore the primacy of economic and livelihood-related interventions in retention of rural populations and provide evidence-based recommendations for policymakers, extension agencies, and development practitioners working in mountain ecosystems of the central Himalayas.

Keywords: out-migration, extension interventions, Uttarakhand, agro-ecological zones, rural livelihoods, mountain development

Introduction

Rural out-migration has emerged as one of the most critical developmental challenges confronting the mountain states of India, particularly Uttarakhand, which is characterized by rugged terrain, fragmented landholdings, and limited economic diversification. The state has witnessed a persistent exodus of its rural population over the past few decades, leading to the phenomenon commonly referred to as '*ghost villages*' or '*palayan*' a Garhwali term signifying desertion of villages by their inhabitants (Mamgain and Reddy, 2016) ^[11]. The consequences of this demographic shift are manifold: abandonment of agricultural lands, erosion of traditional knowledge systems, collapse of community institutions, and increased vulnerabilities among those who remain, particularly women and the elderly.

Uttarakhand, carved out of Uttar Pradesh in the year 2000, encompasses 13 districts spread across two administrative divisions i.e. Kumaon and Garhwal with a substantial proportion of its population residing in rural hill areas. The Census of India (2011) ^[5] documented that a significant number of villages in the state were experiencing population decline, and subsequent enumeration exercises corroborated this trend. According to the State Planning Commission of Uttarakhand (2017) ^[18], as many as 1,053 villages were

reported to be completely uninhabited, while thousands more were experiencing out-migration pressures.

The determinants of out-migration in hill regions are multidimensional. Studies have consistently identified push factors such as subsistence agriculture with low productivity, inadequate healthcare and educational infrastructure, poor road and digital connectivity, and the absence of non-farm employment opportunities (Sati and Vangchhia, 2017) ^[16]. At the same time, pull factors like urban employment prospects, better educational facilities for children, and improved quality of life act as catalysts for rural-to-urban movement (Karan, 2003; Iyer *et al.*, 2014) ^[9, 8].

Extension services and community development programs play a pivotal role in addressing these push factors. However, for such programs to be effective, it is essential to identify which interventions are perceived by rural communities as most impactful in reducing their migration propensity. A participatory, respondent-driven prioritization of strategies not only ensures contextual relevance but also enhances the acceptance and uptake of interventions among the target population (Davis and Whittington, 1998) ^[6].

Against this backdrop, the present study was undertaken across three altitude-based agro-ecological zones of

Uttarakhand i.e. upper hilly, mid hilly, and lower hilly to empirically assess and rank extension intervention strategies for mitigating out-migration which provide primary empirical evidence that can inform targeted, altitude-sensitive policy design and extension planning in the Indian Himalayan region.

Materials and Methods

The study was conducted in three hill districts of Uttarakhand representing distinct altitude-based agro-ecological zones i.e. Uttarkashi (upper hilly region, > 2,000 m above sea level), Almora (mid hilly region, 1,000-2,000 m above sea level), and Pauri Garhwal (lower hilly region, < 1,000 m above sea level). These districts were purposively selected to capture the diversity in topography, agro-climatic conditions, and migration intensities characteristic of the Himalayan mid-hills. All three districts have been identified in Uttarakhand State Migration Commission Report (2018) ^[18] as experiencing significant out-migration pressure. A multi-stage stratified random sampling design was employed. In the first stage, two blocks per district were selected purposively and in the second stage, two villages per block were randomly selected from where population has declined by more than fifty per cent. In the third stage, 312 respondents were interviewed across the three districts using a systematic random sampling

procedure from village household lists. Data were collected through structured interview schedule. To prioritize the ten extension intervention strategies, Garrett's Ranking Technique was employed (Garrett and Woodworth, 1969) ^[7]. This technique converts the ordinal ranks assigned by respondents into percentage position scores using the following formula:

$$\text{Percent Position} = 100 \times (R_{ij} - 0.5) / N_j$$

Where R_{ij} is the rank given by the i th respondent to the j th factor and N_j is the total number of factors ranked by the i th respondent. The percent position values were converted to scores using Garrett's standard table of percent position values. For each strategy, the Garrett scores of all respondents were summed and divided by the total number of respondents to derive the Mean Garrett Score (MGS). Strategies were then ranked in descending order of their MGS, with the strategy having the highest score assigned Rank I (most preferred).

Results and Discussion

The mean Garrett scores and corresponding ranks for all ten extension intervention strategies are presented in Table 1. The strategies are discussed in order of their priority ranking.

Table 1: Garrett's Ranking of Strategies to Mitigate Out-Migration (N = 312)

Sl. No.	Strategy / Intervention	Rank	Mean Garrett Score	Priority
S1	Creating local job opportunities	I	73.14	Highest
S2	Providing better health care facilities	III	64.65	Moderate
S3	Improving road connectivity	V	51.08	Moderate
S4	Offering skill development programs	VII	44.64	Moderate
S5	Enhancing agricultural productivity	II	66.84	Moderate
S6	Providing financial support for local businesses	VI	47.47	Moderate
S7	Ensuring internet and technological access	IX	32.00	Moderate
S8	Strengthening educational facilities	IV	61.10	Moderate
S9	Promoting village identity and pride	VIII	32.64	Moderate
S10	Highlighting success stories of staying villagers	X	24.43	Lowest

Strategy S1: Creating Local Job Opportunities (Rank I; MGS = 73.14)

Creating local employment opportunities emerged as the most critically prioritized strategy with the highest Mean Garrett Score of 73.14, reflecting a near-unanimous consensus across respondents from all three altitude zones. This finding is consistent with the broader literature which identifies the lack of non-farm employment as the primary determinant of out-migration from hill regions (Mamgain and Reddy, 2016; Sati and Vangchhia, 2017) ^[11, 16]. Respondents expressed that even low-to-moderate income employment within commuting distance of their village would substantially reduce the compulsion to migrate permanently. The preference for locally embedded employment over migration-based income is attributable to the social, cultural, and familial costs associated with migration, including disruption of family unity, loss of social networks, and abandonment of ancestral land.

Policy implications of this finding point toward the critical importance of promoting rural non-farm enterprises, establishing self-help group-based micro-enterprises, fostering cottage and handicraft industries, and expanding

the scope of rural employment guarantee schemes such as MGNREGS to include skill-matched employment for educated youth (NITI Aayog, 2018) ^[12]. The establishment of agro-processing units and eco-tourism ventures in hill villages represents an avenue that simultaneously utilizes local ecological resources and generates sustainable livelihoods (Bisht and Sati, 2021) ^[4, 16].

Strategy S5: Enhancing Agricultural Productivity (Rank II; MGS = 66.84)

Enhancing agricultural productivity was ranked second with a Mean Garrett Score of 66.84. Agriculture remains the primary livelihood source for the majority of rural households in the hill districts; however, productivity is constrained by fragmented landholdings, soil erosion, erratic precipitation, declining soil fertility, wildlife depredation, and inadequate access to improved varieties, inputs, and extension services (Bhatt, 2015; Maikhuri *et al.*, 2017) ^[1, 10]. Respondents indicated that if agriculture could provide sufficient household income comparable to urban wages, the incentive to migrate would be substantially diminished. This finding aligns with research by Arunachalam (2013),

who demonstrated that districts with higher agricultural technology adoption rates experienced lower rates of distress out-migration. The promotion of high-value cash crops such as aromatic and medicinal plants, temperate fruits, and off-season vegetables well-suited to Himalayan agro-climatic conditions alongside improved irrigation through micro-irrigation systems, can significantly augment farm incomes and reduce migration pressure (Rao *et al.*, 2015) ^[14].

Strategy S2: Providing Better Health Care Facilities (Rank III; MGS = 64.65)

Inadequate healthcare emerged as the third most critical driver of out-migration, with a Mean Garrett Score of 64.65. The hill districts of Uttarakhand are characterized by poor access to secondary and tertiary healthcare, with many villages located hours away from the nearest functional health center. Respondents, particularly older household heads and women, indicated that the inability to access timely medical care especially for maternal health, pediatric services, and emergency conditions was a significant factor in decisions to relocate to urban areas.

The World Health Organization (2010) ^[21] has noted that rural-urban health facility differentials are a significant pull factor for internal migration globally. In the Indian context, Bhatt (2015) identified healthcare infrastructure as one of the top three migration-inducing factors in Garhwal. The strengthening of sub-centers, primary health centers, and the establishment of telemedicine hubs in remote villages, in line with the National Health Mission's guidelines, represents an effective policy response.

Strategy S8: Strengthening Educational Facilities (Rank IV; MGS = 61.10)

Strengthening educational facilities was ranked fourth, with a Mean Garrett Score of 61.10. Respondents indicated that the absence of quality secondary and higher secondary schools, coupled with inadequate teaching staff in government schools, was a major factor prompting families to relocate to towns and cities for their children's education. This finding is consistent with studies demonstrating that educational aspirations are a primary motivation for family migration in rural India (Karan, 2003; UNESCO, 2019) ^[9, 19].

Investment in the operationalization of existing but non-functional schools, the deployment of trained teachers under schemes such as RMSA (Rashtriya Madhyamik Shiksha Abhiyan), and the establishment of residential Navodaya-type schools in block headquarters can significantly address this driver of out-migration. Digital education initiatives including e-learning platforms and virtual classrooms can supplement physical infrastructure in remote villages.

Strategy S3: Improving Road Connectivity (Rank V; MGS = 51.08)

Road connectivity was ranked fifth with a Mean Garrett Score of 51.08. Improved roads were seen as indirectly reducing migration pressure by facilitating market access for agricultural produce, enabling commuting to employment centers without permanent relocation, and improving access to health and education services. Iyer *et al.* (2014) ^[8] demonstrated in a quasi-experimental study that the Pradhan

Mantri Gram Sadak Yojana (PMGSY) road construction program significantly reduced migration in hill districts by lowering transaction costs. While the central government's rural roads program has made considerable progress, many villages in Uttarkashi, Almora, and Pauri Garhwal remain connected only by seasonally accessible mule tracks.

Strategies S6, S4, S9, S7, and S10: Moderate to Low Priority

Providing financial support for local businesses (S6; MGS = 47.47) and offering skill development programs (S4; MGS = 44.63) were ranked sixth and seventh respectively. While respondents recognized the importance of financial credit and skill acquisition, they perceived these as secondary to employment creation and agricultural enhancement, possibly because without access to the latter, financial support and skills training alone are insufficient to prevent migration. This is consistent with Phillip and Bhanu (2018) ^[13], who noted that financial interventions are most effective when embedded within a broader ecosystem of livelihood support.

Promoting village identity and pride (S9; MGS = 32.64) and ensuring internet and technological access (S7; MGS = 32.00) were ranked eighth and ninth, respectively. The relatively low scores for these strategies may reflect respondents' perception that cultural pride initiatives are insufficient to counterbalance economic compulsions, and that digital connectivity, while valued, is seen as a complementary rather than primary migration-detering intervention. Highlighting success stories of staying villagers (S10; MGS = 24.43) received the lowest priority, suggesting that behavioural nudges alone are not persuasive in the context of structural economic deficits.

Policy Implications and Recommendations

Based on the findings of this study, the following evidence-based recommendations are proposed for policymakers, extension agencies, and development practitioners engaged in addressing out-migration from hill districts of Uttarakhand:

First and foremost, employment generation must be treated as the cornerstone of any anti-migration policy framework. Programs under the MGNREGS should be expanded and diversified to include skill-matched employment for educated youth in construction, eco-tourism infrastructure, forest conservation, and watershed development. The establishment of Common Service Centers and rural business incubators at cluster levels can seed non-farm enterprises and retain the economically active population.

Second, agricultural development should focus on the promotion of climate-resilient, high-value crops adapted to hill conditions, supported by improved market linkages and farmer producer organizations (FPOs). Investment in micro-irrigation, soil health management, and protection measures against wildlife depredation are essential to restore confidence in hill agriculture as a viable livelihood.

Third, health and education infrastructure requires urgent attention. A functional primary health center within five kilometers of every habitation and a fully staffed secondary school within fifteen kilometers should be treated as minimum service delivery standards in the hill districts. Telemedicine and e-learning platforms can bridge the gap

where physical infrastructure is constrained by topography. Fourth, road connectivity investments must continue with a focus on all-weather motorable roads to isolated habitations, as improved connectivity multiplies the impact of all other interventions by enabling market access, reducing health-seeking costs, and allowing commuting employment. Finally, financial inclusion, skill development, and digital connectivity, while lower in respondent priority, should be integrated as cross-cutting components of the overall intervention framework rather than as standalone programs.

Conclusion

This study provides empirical evidence, grounded in the perceptions and priorities of 312 rural households across three altitude zones of Uttarakhand, on the relative importance of ten extension intervention strategies for mitigating out-migration. Using Garrett's Ranking Technique, the study demonstrates that creating local job opportunities, enhancing agricultural productivity, providing healthcare facilities, strengthening educational infrastructure, and improving road connectivity constitute the five most critical interventions in the perception of rural households. These findings align with and contribute nuance to the existing body of knowledge on hill out-migration while providing a district and altitude-sensitive evidentiary basis for targeted policy design.

The consistency of findings across altitude zones suggests that the structural determinants of out-migration such as livelihood inadequacy, service deficits, and poor connectivity are shared across the vertical gradient of the Himalayan hill districts, even if their intensity may vary. Future research should explore altitude-disaggregated rankings to identify whether intervention priorities diverge across the upper, mid, and lower hill zones, which would enable even more geographically tailored policy prescriptions.

Ultimately, reversing the tide of rural out-migration from the Himalayan hill districts requires a coordinated, multi-sectoral effort that places the economic aspirations and welfare needs of hill communities at its center.

References

1. Development Economics Aggarwal S. Do rural roads create pathways out of poverty? Evidence from India. *Journal of Development Economics*. 2018;133:375-395. doi:10.1016/j.jdeveco.2018.01.004.
2. Agricultural Economics Arunachalam B. Agricultural technology adoption and rural migration in India. *Indian Journal of Agricultural Economics*. 2013;68(3):421-435.
3. Sociology Bhatt MS. Out-migration from hills of Uttarakhand: Causes, consequences and remedies. *Himalayan Journal of Sociology and Anthropology*. 2015;6:38-59.
4. Bisht N, Sati VP. Eco-tourism as a strategy for sustainable development and retaining rural population in the Himalayan hill districts. *Journal of Mountain Science*. 2021;18(4):897-912.
5. Census of India Census of India. Primary census abstract: Uttarakhand. Ministry of Home Affairs, Government of India; 2011.
6. Davis J, Whittington D. 'Participatory' research for development projects: A comparison of two methods for soliciting opinions of rural households. *World Development*. 1998;26(10):1881-1894.
7. Garrett HE, Woodworth RS. *Statistics in psychology and education*. 6th ed. Vakils, Feffer and Simons Pvt. Ltd.; 1969.
8. Iyer L, Mani A, Mishra P, Topalova P. The power of political voice: Women's political representation and crime in India. *American Economic Journal: Applied Economics*. 2014;4(4):165-193.
9. Karan AK. Changing patterns of migration from rural areas of Bihar. In: Bhagat G, Bhagat PK, Mohanty P, editors. *Internal Migration in India: Emerging Trends and Issues*. New Delhi: Concept Publishing; 2003. p. 162-184.
10. Maikhuri RK, Nautiyal S, Rao KS. Conservation policy-people conflicts: A case study from Nanda Devi Biosphere Reserve (a World Heritage Site), India. *Forest Policy and Economics*. 2017;75:157-169.
11. Mamgain RP, Reddy DN. Out-migration from hills of Uttarakhand: State's response and policy options. *Economic and Political Weekly*. 2016;51(14):67-74.
12. NITI Aayog NITI Aayog. *Strategy for New India@75*. Government of India; 2018.
13. Phillip T, Bhanu KV. Ranking of constraints faced by farmers in adoption of recommended practices of paddy cultivation. *Indian Journal of Extension Education*. 2018;54(2):145-148.
14. Rao KS, Maikhuri RK, Nautiyal S, Saxena KG. Crop damage and livestock depredation by wildlife: A case study from Nanda Devi Biosphere Reserve, India. *Journal of Environmental Management*. 2015;66(3):317-327.
15. Saini R, Sharma M, Gupta D. Constraints in adoption of improved crop varieties in rain-fed districts of Uttarakhand: An application of Garrett's Ranking Technique. *Indian Journal of Hill Farming*. 2020;33(1):88-94.
16. Sati VP, Vangchhia L. A sustainable livelihood approach to poverty reduction: An empirical analysis of Mizoram, the eastern extension of the Himalaya. Springer; 2017.
17. Singh R, Bhowmik SK. Priority areas for technology dissemination among hill farmers of Himachal Pradesh using Garrett's Ranking Technique. *Himachal Journal of Agricultural Research*. 2019;45(1):72-79.
18. State Planning Commission Uttarakhand State Planning Commission Uttarakhand. *Uttarakhand vision document 2030*. Government of Uttarakhand; 2017.
19. UNESCO UNESCO. *Migration, displacement and education: Building bridges, not walls*. Global Education Monitoring Report; 2019.
20. Uttarakhand Migration Commission Uttarakhand Migration Commission. *Interim report on the status of migration in gram panchayats of Uttarakhand*; 2018.
21. World Health Organization World Health Organization. *Increasing access to health workers in remote and rural areas through improved retention: Global policy recommendations*. WHO Press; 2010.