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Changing livelihood patterns in Ladakh: From traditional farming to tourism-based livelihoods; A qualitative review of the evidence

¹Mohd Rafee, ²Saket Kushwaha, ³Rubiya Banoo and ⁴Sajida Banoo

¹Department of Commerce and Management, University of Ladakh, Leh, India

²Office of the Vice-Chancellor, University of Ladakh, Leh, India

³CSIR-National Physical Laboratory, New Delhi, India

⁴Department of Chemistry, University of Ladakh, Kargil, India

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Corresponding Author: Mohd Rafee

Abstract

Ladakh, a cold-desert region of the Indian Trans-Himalaya, is undergoing one of the most rapid livelihood transitions in the Himalayan arc, as households move from an integrated agro-pastoral economy toward tourism-based occupations. This paper synthesises the dispersed scholarly and institutional evidence on how and why this transition is occurring, what it means for agriculture, food security, culture and community institutions and whether farming and tourism can coexist as complementary livelihoods. Adopting a qualitative, integrative review design informed by the Sustainable Livelihoods Framework and push-pull migration theory, it draws on peer-reviewed studies, book chapters and institutional and governmental reports published between the early 1990s and 2025, spanning land-use analysis, household surveys, food-system research, socio-hydrology and official tourism statistics. The synthesis finds a consistent pattern of contracting cultivation, conversion of irrigated land to construction and reallocation of household labour toward guesthouses, transport and trekking, driven less by agrarian distress than by an unusually lucrative, spatially concentrated and seasonally shock-prone tourism economy. Rather than a wholesale abandonment of agriculture, the evidence points to a translocal reorganisation of the household across space, in which retained land, water rights and food stores continue to function as insurance against tourism's volatility and in which women and the elderly increasingly sustain what cultivation remains. The review concludes that the pivotal policy question is not whether to choose tourism or agriculture but how to design their coexistence and it identifies deliberate agriculture-tourism convergence as the most promising pathway for a fragile high-altitude economy. By integrating evidence hitherto scattered across disciplines, the paper offers a consolidated account of Ladakh's transition and a research agenda centred on the village-level voices that remain under-documented.

Keywords: Ladakh, livelihood transition, tourism, agro-pastoralism, youth migration, sustainable livelihoods, integrative review, Indian Himalayan Region

1. Introduction

High-mountain economies across the Himalaya are being reorganized around services, mobility and state transfers and nowhere is this reorganisation more visible than in Ladakh. For centuries, livelihoods in this arid Trans-Himalayan region rested on a tightly integrated system of irrigated barley and wheat cultivation, horticulture and livestock herding, sustained by glacier and snow-fed irrigation channels and dense institutions of communal labour and reciprocity (Dame and Nüsser, 2011, Nüsser *et al.*, 2012) ^[4, 8, 20]. Since the region was opened to visitors in 1974, however, tourism has grown from a marginal activity into the organising force of the regional economy, with arrivals expanding-despite geopolitical and pandemic shocks-into the hundreds of thousands annually (Pelliciardi, 2021) ^[24]. By 2023 the Union Territory recorded approximately 525,000 tourist arrivals, of which roughly 36,000 were foreign visitors (Figure 2, Table 3), confirming tourism's consolidation as the mainstay of the regional economy (Tourism Department, Leh, 2024, Ministry of Tourism, 2025) ^[17]. The attainment of Union Territory

status in 2019 and the subsequent surge in domestic tourism have accelerated this shift, triggering rapid land-use change, urban expansion around Leh and a reallocation of household labour from fields to guesthouses, taxis and trekking routes (Buerkert *et al.*, 2025, Dame *et al.*, 2019) ^[4, 9].

The consequences of this transition are contested. Tourism has unquestionably raised cash incomes, generated employment and financed education and housing, homestay programmes have even channelled tourism revenue toward conservation and women's incomes in remote settlements (Anand *et al.*, 2012) ^[1]. Yet a growing body of evidence points to declining cultivation of traditional staples, abandonment or conversion of ancestral agricultural land, deepening dependence on subsidized food imports and the erosion of the cooperative institutions that once underpinned village life (Dame, 2018, Dame and Mankelow, 2010, Ladon *et al.*, 2023) ^[4, 6, 7, 15]. Because tourism in Ladakh is confined to a short summer season and is acutely sensitive to external shocks, an economy organised around it is also structurally vulnerable (Pelliciardi, 2021) ^[24].

What remains poorly understood is the human interior of this transition: why young Ladakhis are leaving agriculture, how families weigh the security of land against the liquidity of tourism income, how elderly farmers and women experience the thinning of village labour and whether local actors themselves believe farming has a future. Existing scholarship on Ladakh's transformation rests largely on land-use analysis, household surveys and food-system studies (Buerkert *et al.*, 2025, Dame, 2018) ^[4, 6], rich qualitative accounts of aspiration, identity and decision-making at the village level are scarce and the evidence that does exist is dispersed across disciplines and rarely read together. This review addresses that gap by consolidating the scattered evidence into a single synthesis and identifying where primary inquiry is most needed.

The review pursues seven objectives

1. To examine the transformation of livelihood patterns in Ladakh,
2. To explore why younger generations are withdrawing from traditional agriculture,
3. To understand migration from villages to Leh and other tourism centres,
4. To examine the socio-economic benefits households derive from tourism-based livelihoods,
5. To investigate the consequences for agriculture, food security, culture and community institutions,
6. to synthesize evidence and perceptions concerning the future of farming, and
7. To propose policy measures capable of balancing tourism and agriculture. The remainder of the paper reviews the relevant literature, sets out the theoretical framework and review methodology, synthesizes the evidence thematically and discusses it in comparative Himalayan perspective before drawing out implications for policy and research.

2. Literature review

2.1 Traditional agriculture and agro-pastoralism in Ladakh

Ladakh's traditional economy is best characterised as combined mountain agriculture: small, irrigated plots of barley, wheat and pulses on valley floors and alluvial fans, apricot and apple horticulture at lower elevations, fodder cultivation and transhumant or nomadic pastoralism on high pastures (Dame and Nüsser, 2011) ^[8]. Production in this cold desert depends almost entirely on meltwater from glaciers, snowfields and permafrost, distributed through sophisticated community-managed irrigation channels whose maintenance and water-turn rules constitute a socio-hydrological system in their own right (Nüsser *et al.*, 2012) ^[20]. As glacier retreat and shifting snowmelt regimes intensify spring water scarcity, communities have developed adaptive responses-including artificial ice reservoirs and the re-engineering of channel networks-that underscore both the centrality of the cryosphere to Ladakhi agriculture and its growing precarity under climate change (Nüsser *et al.*, 2019a, 2019b) ^[21, 22]. Labour bottlenecks at sowing and harvest were historically resolved through reciprocal work arrangements and shared draught animals, embedding agriculture in institutions of mutual obligation rather than markets. On the Changthang plateau, Changpa pastoralists organised livelihoods around

yak, sheep and pashmina-goat herding, with mobility patterns finely adapted to sparse pasture (Goodall, 2004b) ^[14]. Scholarship has long noted both the resilience of this system and its fragility before external shocks-a duality popularized, if romantically, by Norberg-Hodge (2000) ^[19] and refined by subsequent empirical work.

2.2 Tourism growth and its footprint

Tourism began abruptly with the opening of the region in 1974 and has since evolved through distinct phases shaped by geopolitics, film-induced demand, road and air connectivity, and, most recently, post-2019 domestic tourism growth (Pellicciardi, 2021) ^[24]. Analyses of tourist-arrival series show a market that is volatile and non-linear, expanding rapidly in good years and collapsing under external shocks, which complicates local planning and investment (Pellicciardi, 2021) ^[24]. Estimates of tourism receipts for Leh District indicate that by the early 2010s the sector had already become the region's principal source of private cash income (Pellicciardi, 2013) ^[23]. The sector's footprint is spatially concentrated: Leh town has absorbed most hotels, guesthouses and services, driving rapid urbanization, construction on former agricultural land and mounting pressure on water and waste systems (Dame *et al.*, 2019) ^[9]. Environmental assessment of trekking corridors and vehicle-based tourism identifies campsite degradation, waste accumulation and pressure on fragile alpine ecosystems as recurring impacts (Geneletti and Dawa, 2009) ^[12]. At the same time, community-based formats such as the Korzok homestay initiative demonstrate that tourism can be organized to supplement-rather than supplant-pastoral livelihoods, with earnings accruing to women and incentives aligned with wildlife conservation (Anand *et al.*, 2012) ^[1].

2.3 Livelihood diversification in mountain regions

The wider literature on rural livelihoods provides the conceptual vocabulary for interpreting Ladakh's transition. Diversification-the construction of a portfolio of farm and non-farm activities-is the norm rather than the exception among rural households in developing regions, undertaken both to accumulate and to manage risk (Ellis, 2000) ^[11]. Livelihoods research insists that such portfolios be read through the assets households command and the institutional structures that mediate access to them (Chambers and Conway, 1992, Scoones, 1998) ^[5]. In high mountains specifically, diversification increasingly takes translocal form: household members distribute themselves across villages, regional towns and distant cities, knitting together farm production, wages, remittances and subsidized food into a single livelihood system (Dame, 2018) ^[6]. This literature cautions against reading the decline of full-time farming as the simple death of agriculture, it may equally signal agriculture's repositioning within multi-sited household strategies (Scoones, 2013) ^[27].

2.4 Youth aspirations and rural out-migration

Rural-to-urban migration is among the most consequential demographic processes in the Himalaya. In Ladakh, Goodall (2004a) ^[13] documented early waves of movement from nomadic pastoral communities into Leh, showing that migration decisions blended economic motives with the pursuit of education, healthcare and religious life and warning that urban policy ignored these micro-level

dynamics at its peril. Elsewhere in the Indian Himalaya the process has advanced further: Uttarakhand has experienced depopulation severe enough to produce hundreds of so-called ghost villages, with unemployment and low farm returns as principal push factors and educated youth the most mobile group (Sati, 2021) ^[25]. Recent work links this mobility to climate stress on rain-fed agriculture, showing that vulnerability and weak adaptive capacity in farming correlate strongly with out-migration of young men, leaving behind older and disproportionately female populations (Biella *et al.*, 2022) ^[2]. The regional Hindu Kush Himalaya assessment similarly treats migration as a defining, ambivalent feature of mountain livelihood change (Wester *et al.*, 2019) ^[29]. Push-pull framings (Lee, 1966) ^[16] remain analytically useful here, but the Himalayan literature increasingly emphasizes aspiration-the pull of urban lifestyles, modern occupations and education-alongside agrarian distress.

2.5 Food security under transition

Livelihood change in Ladakh is inseparable from its food system. Dame and Nüsser (2011) ^[8] showed that the Public Distribution System's subsidised rice and wheat fundamentally altered household calculations, reducing the subsistence importance of barley and reshaping diets, even as local production persisted. Longitudinal village evidence from Zangskar records measurable land-use change, including shifts away from staple grains (Dame and Mankelaw, 2010) ^[7]. By the late 2010s, translocal livelihood diversification had produced a supply-oriented food system marked by reduced land-based production, increased market reliance and gendered and intergenerational burdens, alongside eroding rural institutions (Dame, 2018) ^[6]. Recent mixed-method work confirms the trajectory: household surveys in Leh and Diskit find agricultural income now one source among many, with tourism and services ascendant and land increasingly valued for construction rather than cultivation (Buerkert *et al.*, 2025) ^[4].

2.6 Tourism versus agriculture: Substitution or synergy?

Whether tourism displaces or can be harnessed to support agriculture is the pivotal policy question. Evidence for displacement includes conversion of irrigated fields to guesthouses and commercial plots, labour reallocation during the overlapping summer peak of both sectors and the devaluation of farm work in youth aspirations (Buerkert *et al.*, 2025, Dame *et al.*, 2019) ^[4, 9]. Evidence for potential synergy includes homestay models that monetise village life without abandoning it (Anand *et al.*, 2012) ^[11] and institutional analyses arguing that combined farming and tourism possess complementary strengths-ecological knowledge, cultural authenticity and food provisioning on one side, cash income and market access on the other-that could be integrated through deliberate convergence strategies (Ladon *et al.*, 2023) ^[15]. Comparative work on mountain ecotourism reinforces this reading, cautioning that tourism yields durable livelihoods only where it is deliberately embedded in local economies and conservation goals rather than left to unregulated growth (Nepal, 2002) ^[18]. The unresolved tension

between these readings motivates the present review's central question: has tourism replaced farming in Ladakh or are hybrid livelihoods emerging?

2.7 Research gap

Four gaps emerge from this review. First, the Ladakh literature is dominated by remote sensing, household surveys and food-system analysis, in-depth qualitative studies of how villagers themselves narrate the move from farming to tourism are rare. Second, youth aspirations-central to the transition-are typically inferred from migration statistics rather than examined directly. Third, the socio-cultural consequences of livelihood change, including effects on communal labour institutions, gender roles and farming identity, remain under-theorized for Ladakh relative to other Himalayan regions. Fourth, local perceptions of whether tourism and agriculture can coexist have not been systematically documented, despite their obvious relevance to policy. This review consolidates what is known across these dimensions and specifies where primary inquiry would add most.

3. Theoretical framework

This review is anchored in the Sustainable Livelihoods Framework (SLF), which conceptualises livelihoods as the capabilities, assets and activities required for a means of living and evaluates them by their resilience to stress and shocks and their effects on the natural resource base (Chambers and Conway, 1992, DFID, 1999, Scoones, 1998) ^[5, 26]. The SLF's five capitals-natural, physical, human, financial and social-provide an analytical grid for tracing what households gain and lose as they move from farming to tourism: land and water rights (natural capital) may be converted into guesthouses (physical and financial capital), while communal labour institutions (social capital) atrophy and new skills (human capital) are acquired. Crucially, the framework directs attention to vulnerability context and institutional mediation-seasonality, geopolitical shocks, state subsidies and tourism policy-rather than treating household choices as free-floating (Scoones, 2013) ^[27].

Because the transition is enacted substantially through the spatial mobility of the young, the SLF is paired with push-pull migration theory (Lee, 1966) ^[16]. Push factors in the Ladakhi case include agrarian labour intensity, small and fragmenting landholdings and climatic water stress, pull factors include tourism wages, urban amenities, education and the status attached to modern occupations. Reading push-pull dynamics through the SLF prevents an economic reduction: migration and occupational change appear as portfolio decisions taken within households and villages, shaped by aspirations and institutions as much as by wage differentials (Dame, 2018, Ellis, 2000) ^[6, 11]. Together, the two lenses generate the review's guiding propositions-that tourism-led diversification restructures rather than simply enriches household asset portfolios and that its sustainability depends on whether seasonal, shock-prone tourism income is buffered by retained agrarian assets (Figure 1).

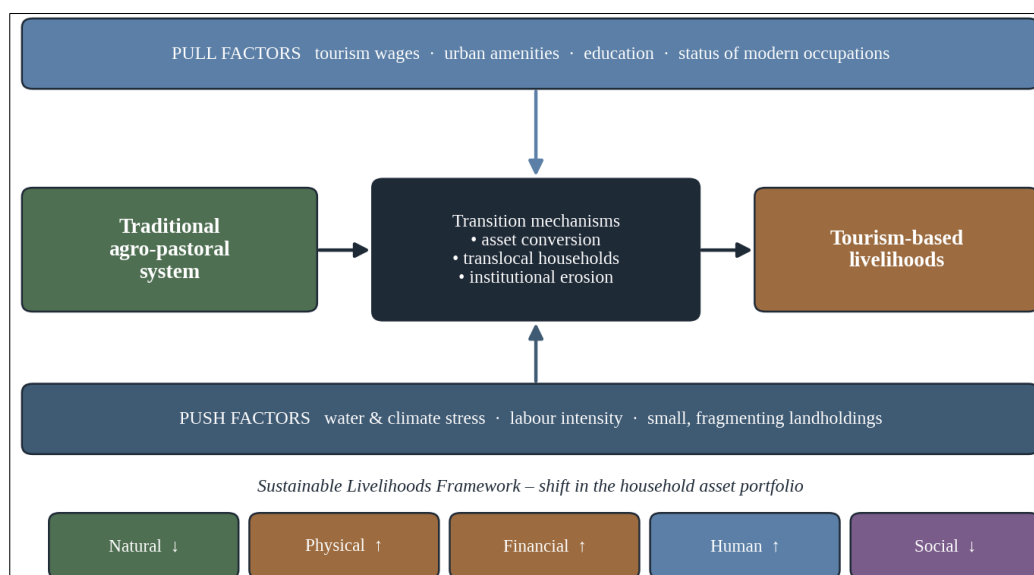


Fig 1: Conceptual framework: The sustainable livelihoods framework and push-pull migration theory applied to Ladakh's transition. Push and pull factors drive asset conversion, trans local household reorganization and institutional erosion, shifting the household portfolio away from natural and social capital toward physical, financial and human capital, retained agrarian assets act as insurance against tourism's volatility

4. Review methodology

4.1 Review design and approach

This paper adopts a qualitative, integrative literature review design. An integrative review suits a field in which evidence is dispersed across disciplines and methods-remote sensing, household surveys, food-system studies, socio-hydrology, ethnography and official tourism statistics-and in which the aim is to consolidate heterogeneous findings into a coherent interpretation rather than to statistically pool comparable results. The review is interpretivist in orientation: it treats livelihood change as constituted by the meanings that land, work, mobility and the future hold for Ladakhi households and it reads the quantitative and spatial literature alongside qualitative accounts in order to reconstruct those meanings.

4.2 Scope and source identification

The evidence base was assembled through structured searches of Scopus, Web of Science and Google Scholar, complemented by backward and forward citation chaining from key studies and by targeted retrieval of grey literature. Search terms combined place identifiers (Ladakh, Leh, Nubra, Sham, Changthang, Zaskar, Kargil, Trans-Himalaya) with thematic terms (livelihood, agriculture, agro-pastoralism, tourism, migration, food security, land-use change, homestay, pashmina). Institutional and governmental sources-including the Ministry of Tourism's India Tourism Data Compendium, records of the Ladakh Autonomous Hill Development Councils and the UT Tourism Department and regional syntheses by the International Centre for Integrated Mountain Development-were retrieved directly. The temporal scope spans the early 1990s to 2025, capturing both foundational accounts of the traditional economy and recent post-Union-Territory analyses, English-language sources were included, with Ladakhi and Hindi-language materials consulted where available.

4.3 Inclusion and appraisal of sources

Sources were included if they addressed livelihoods,

agriculture, pastoralism, tourism, migration or food security in Ladakh or provided directly comparable evidence from the wider Indian Himalaya and if they were peer-reviewed, issued by a recognised institution or otherwise verifiable against a publisher or agency record. Conceptual and theoretical works on rural livelihoods and migration were included to frame the analysis. Non-scholarly commentary and sources whose claims could not be verified were excluded. Each empirical claim carried into the synthesis is attributed to its original source, no primary interview or survey data were generated for this review and no participant accounts are reported.

4.4 Synthesis approach

Retrieved evidence was analysed through thematic synthesis (Braun and Clarke, 2006)^[3]: findings were coded inductively, grouped into candidate themes corresponding to the review's objectives and then mapped onto the five capitals and vulnerability context of the Sustainable Livelihoods Framework. Convergences, tensions and disconfirming findings across studies were noted explicitly and Ladakhi evidence was read comparatively against the broader Himalayan literature to distinguish region-specific dynamics from shared mountain processes. The confidence attaching to each theme was appraised qualitatively-on the number, consistency and directness of the supporting studies, in the spirit of the GRADE-CERQual approach-rather than by statistical pooling, which the heterogeneity of the evidence precludes (Table 2).

4.5 Limitations of the review

Three limitations qualify the synthesis. First, it depends on the coverage of the existing literature, which is spatially uneven: research clusters around Leh and its immediate valleys, while Kargil, Zaskar and the Changthang pastoral zone are comparatively thinly documented. Second, the pace of change since 2019 means that the most recent transformations are captured by a small number of studies

and by provisional official statistics that warrant cautious interpretation. Third, a review of published evidence cannot substitute for the village-level voices-of elderly farmers, tourism-sector youth, women and headmen-whose absence from the literature this paper identifies as a gap, the synthesis therefore points toward, rather than replaces, primary qualitative fieldwork.

5. Synthesis of evidence

This section integrates the empirical evidence across the

reviewed corpus under eight themes derived from the review's objectives. Each theme reports what the accumulated literature documents, notes where findings converge or diverge, links the pattern to the relevant capital of the Sustainable Livelihoods Framework and identifies residual gaps. Table 1 summarises the principal reviewed sources, their sites and methods and the capitals they most directly inform, Table 2 records the direction of evidence and the reviewer's confidence for each theme.

Table 1: Summary of the principal reviewed evidence

Source	Focus and site	Approach / data	Key finding relevant to the review	SLF capital(s)
Anand <i>et al.</i> (2012) ^[1]	Homestay tourism, Korzok (Changthang)	Case study	Community homestays supplement pastoral incomes, earnings reach women, incentives align with conservation	Financial, Social, Natural
Biella <i>et al.</i> (2022) ^[2]	Climate-migration nexus, Indian Himalaya	Vulnerability analysis	Farm vulnerability and weak adaptive capacity track young-male out-migration, ageing, feminized farm labour	Human, Natural
Buerkert <i>et al.</i> (2025) ^[4]	Land transitions, Leh and Diskit	Household survey + land-use	Agricultural income now one of several, land valued for construction over cultivation, services ascendant	Natural → Physical/Financial
Dame (2018) ^[6]	Translocal food security, Ladakh	Mixed methods	Multi-sited households, supply-oriented food system, gendered/intergenerational burdens, eroding institutions	Social, Financial, Human
Dame and Mankelow (2010) ^[7]	Land-use change, Stongde (Zangskar)	Longitudinal village study	Measurable land-use change, including shift away from staple grains	Natural
Dame and Nüsser (2011) ^[8]	Food security and subsidies, Ladakh	Field study	PDS grains reduced subsistence role of barley and reshaped diets, local production persists	Natural, Financial
Dame <i>et al.</i> (2019) ^[9]	Urbanisation, Leh	Socio-ecological analysis	Construction on former farmland, water and waste pressure, rapid urban expansion	Natural → Physical
Geneletti and Dawa (2009) ^[12]	Tourism impacts, Ladakh	Environmental impact assessment	Trekking and vehicle tourism cause campsite degradation, waste and alpine pressure	Natural
Goodall (2004a) ^[13]	Rural-urban migration, Leh	Case study (3 communities)	Migration blends economic motives with education, health and religious life	Human, Financial
Goodall (2004b) ^[14]	Changpa pastoralism, Changthang	Ethnographic	Differing pastoralist responses to change, yak, sheep and pashmina-goat herding	Natural, Social
Ladon <i>et al.</i> (2023) ^[15]	Tourism-agriculture balance	Issue brief / analysis	Farming and tourism have complementary strengths, deliberate convergence proposed	Financial, Natural, Social
Nüsser <i>et al.</i> (2012) ^[20]	Irrigation socio-hydrology, central Ladakh	Socio-hydrological study	Community-managed meltwater channels function as institutions, recent change documented	Natural, Social
Nüsser <i>et al.</i> (2019a) ^[21]	Cryosphere-fed irrigation, NW Himalaya	Comparative case studies	Meltwater livelihoods increasingly precarious, adaptation via channels, pipes, ice reservoirs	Natural
Nüsser <i>et al.</i> (2019b) ^[22]	Artificial glaciers, Ladakh	Socio-hydrology	Adaptive ice-reservoir strategies under a changing cryosphere	Natural, Human
Pelliciardi (2013) ^[23]	Tourism receipts, Leh District	Economic estimation	By the early 2010s tourism was already the principal private cash-income source	Financial
Pelliciardi (2021) ^[24]	Tourist arrivals 1974-2020, Leh	Time-series analysis	Arrivals volatile, non-linear and shock-prone, operating season short	Financial (vulnerability)
Sati (2021) ^[25]	Out-migration, Uttarakhand	Regional analysis	Ghost villages, unemployment and low farm returns push, educated youth most mobile	Human, Financial
Wester <i>et al.</i> (2019) ^[29]	HKH regional assessment	Multi-author synthesis	Migration a central, ambivalent driver of mountain change, rising food-import dependence	Regional context

Sources are listed alphabetically. Arrows (→) denote the direction of asset conversion described by the source. The table records documented findings only, no effect sizes are pooled

5.1 Declining agriculture and land under transition

The most consistently documented dimension of Ladakh's transition is the contraction and repurposing of cultivated land. Land-use analyses in central Leh District and the Nubra village of Diskit record a shift in which agricultural income has become one source among several and land is increasingly valued for construction rather than cultivation,

as irrigated plots and orchards give way to guesthouses, commercial buildings and residential expansion (Buerkert *et al.*, 2025, Dame *et al.*, 2019)^[4, 9]. Longitudinal village evidence from Stongde in Zangskar independently documents measurable land-use change, including shifts away from staple grains, indicating that contraction is not confined to the tourism core (Dame and Mankelow, 2010)^[7].

Underlying this repurposing is the growing precarity of the meltwater-fed irrigation system on which cultivation depends: glacier retreat and shifting snowmelt regimes intensify spring water scarcity, while the communal channel networks and water-turn institutions that once distributed this water are simultaneously strained by labour withdrawal (Nüsser *et al.*, 2012, 2019a, 2019b) ^[20, 21, 22]. In SLF terms, the conversion represents a transformation of natural capital-land and water rights-into physical and financial capital in the form of built tourism assets, often irreversibly. The evidence converges on the direction of change but is thinner on its precise extent outside Leh and Diskit and on the condition of irrigation infrastructure in depopulating villages-gaps that village-level inquiry would address.

5.2 Youth aspirations and the devaluation of farm work

Across the Himalaya, the withdrawal of the young from agriculture is driven by a combination of low farm returns and the rising status of non-farm and urban occupations. In Uttarakhand, unemployment and poor agricultural returns operate as principal push factors, with educated youth the most mobile group (Sati, 2021) ^[25], climate stress on rain-fed farming compounds this, correlating with the out-migration of young men (Biella *et al.*, 2022) ^[2]. For Ladakh specifically, Goodall (2004a) ^[13] showed early that migration from pastoral communities into Leh blended economic motives with the pursuit of education, healthcare and religious life-an aspirational dimension that pure wage-differential accounts miss. The tourism economy sharpens this dynamic by offering cash incomes and social status that farm work is perceived to lack (Buerkert *et al.*, 2025, Dame *et al.*, 2019) ^[4].

^{9]}. This theme maps onto human capital-education and new service-sector skills-and its interaction with aspiration and social norms. The literature, however, largely infers youth aspirations from migration statistics rather than documenting them directly and evidence on whether and under what conditions, young Ladakhis return to agriculture is almost absent.

5.3 Tourism as economic opportunity

The economic pull of tourism is well established. By the early 2010s, tourism had already become Leh District's principal source of private cash income (Pelliciardi, 2013) ^[23] and arrivals-roughly 525,000 in 2023-now far exceed the resident population of the Leh core, underlining the sector's scale relative to the local economy (Pelliciardi, 2021, Tourism Department, Leh, 2024) ^[24]. The post-Union-Territory surge in arrivals is shown in Figure 2 and Table 3. Tourism has financed housing, education, vehicles and homestay and guesthouse enterprises and the community-based Korzok homestay initiative demonstrates that well-designed formats can channel earnings to households and specifically to women, while aligning incentives with conservation (Anand *et al.*, 2012) ^[1]. Yet the same literature stresses the fragility of this opportunity: arrival series are volatile, non-linear and acutely sensitive to geopolitical and pandemic shocks and the operating season is short (Pelliciardi, 2021) ^[24]. Tourism thus augments financial capital rapidly but unreliably. Evidence on income magnitudes and investment patterns remains largely aggregate, how individual households perceive and manage the reliability of tourism earnings is not well documented.

Table 3: Recorded tourist arrivals to Ladakh, selected years

Year	Total arrivals	Foreign	Domestic	Source / note
1974	527	-	-	Opening year (Pelliciardi, 2021) ^[24]
2019	≈ 279,000	-	-	Reported by UT administration (2024)
2022	≈ 531,000	21,259	≈ 510,000	Tourism Department, Leh (2024) ^[28]
2023	≈ 525,000	36,315	≈ 489,000	Tourism Department, Leh (2024) ^[28]

Figures are rounded and, for 2019-2023, are as reported by the Union Territory administration, they should be finalised against the tourism department, Leh records before submission. Dashes indicate figures not separately reported

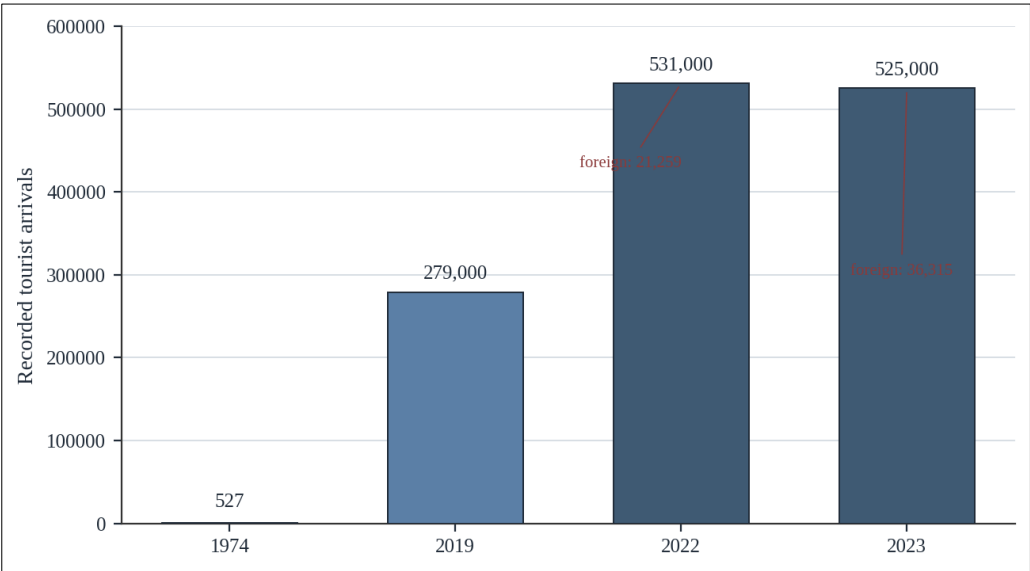


Fig 2: Recorded tourist arrivals to Ladakh for selected years, showing the post-Union-Territory surge. Foreign-arrival counts are annotated where separately reported. Sources: Pelliciardi (2021), tourism department, Leh (2024) ^[24, 28]

5.4 Migration to Leh and tourism hubs

Migration in Ladakh is best understood not as wholesale rural exodus but as translocal reorganisation. Dame (2018)^[6] shows that households distribute their members across villages, regional towns and distant cities, knitting farm production, wages, remittances and subsidized food into a single, multi-sited livelihood system. Goodall (2004a)^[13] documented the earlier movement of nomadic pastoralists into Leh and the wider Himalayan literature records more advanced depopulation-Uttarakhand's ghost villages-where push factors dominate (Sati, 2021)^[25]. The regional synthesis of the Hindu Kush Himalaya likewise frames migration as a central, ambivalent feature of mountain livelihood change, capable of both relieving and reproducing vulnerability (Wester *et al.*, 2019)^[29]. For Ladakh, the translocal reading implies that fields retained and worked by those who remain are part of, not residual to, the household strategy-an interpretation with direct significance for the SLF and for policy, since social and natural capital are retained as buffers. Precise data on the composition of migration streams-whole-family versus seasonal versus split-household-and on remittance flows back to Ladakhi villages are, however, scarce.

5.5 Changing family structure and communal institutions

Ladakh's traditional agriculture was embedded in institutions of reciprocal labour, shared draught animals and community-managed irrigation-forms of social capital as essential to production as land or water (Nüsser *et al.*, 2012, Norberg-Hodge, 2000)^[19, 20]. The reviewed evidence indicates that labour withdrawal and translocal dispersal erode these institutions: as households reallocate labour to tourism and as members disperse, the reciprocal arrangements that resolved sowing and harvest bottlenecks and the collective maintenance of channels, become harder to sustain (Dame, 2018, Nüsser *et al.*, 2019a)^[6, 21]. This constitutes a depletion of social capital that is difficult to reverse and that feeds back into agricultural decline. The literature documents the erosion in general terms but offers little fine-grained evidence on how specific institutions-water-user arrangements, festival and monastery participation, elder care and land-inheritance decisions-are being renegotiated, a gap best filled by ethnographic and village-level study.

5.6 Women's changing role in farming and tourism

A recurring finding across mountain contexts is the feminisation of agriculture as men move into non-farm work. In the Indian Himalaya more broadly, out-migration of young men leaves older and disproportionately female populations to sustain cultivation (Biella *et al.*, 2022)^[2]. Ladakh's translocal food system produces gendered and intergenerational burdens, with women absorbing much of the remaining agricultural labour alongside household

responsibilities (Dame, 2018)^[6]. At the same time, tourism can enhance women's financial capital and decision-making where formats are designed to do so: the Korzok homestays channelled earnings directly to women (Anand *et al.*, 2012)^[1]. The evidence thus points to a double movement-intensified farm workload and new earning opportunity-whose net effect on women's wellbeing and autonomy is not settled in the literature and merits direct investigation.

5.7 Food security and dietary change

Livelihood change in Ladakh is inseparable from its food system. Dame and Nüsser (2011)^[8] demonstrated that the Public Distribution System's subsidised rice and wheat reshaped household calculations and diets, reducing the subsistence importance of barley even as local production persisted. Subsequent work traces a trajectory toward a supply-oriented food system marked by reduced land-based production and greater market reliance (Dame, 2018)^[6], corroborated by land-use evidence of declining cultivation (Buerkert *et al.*, 2025)^[4]. The regional assessment situates this within a broader Hindu Kush Himalaya pattern of rising food-import dependence and its attendant vulnerabilities (Wester *et al.*, 2019)^[29]. In SLF terms, the food-security function of retained agriculture-buffering households against price and supply shocks-emerges as a strategic asset rather than a vestige. Perceptions of self-sufficiency loss and food-price anxiety, particularly in remote sites with fragile supply lines, are plausible but under-documented.

5.8 The perceived future of farming

Whether agriculture has a future in Ladakh is the question on which the literature is most openly divided. The default trajectory implied by land-use evidence is continued contraction, with land valued for construction over cultivation (Buerkert *et al.*, 2025)^[4]. Against this, analyses of the tourism-agriculture balance argue that combined farming and tourism possess complementary strengths-ecological knowledge, cultural authenticity and food provisioning on one side, cash and market access on the other-that could be integrated through deliberate convergence rather than left to substitution (Ladon *et al.*, 2023)^[15]. The Korzok experience and the broader mountain-ecotourism literature suggest that tourism can supplement rather than supplant land-based livelihoods where it is embedded in local economies and conservation goals (Anand *et al.*, 2012, Nepal, 2002)^[1, 18]. The balance of evidence indicates that farming's future is conditional rather than foreclosed-dependent on whether policy and markets make agriculture competitive with and complementary to, tourism. Local perceptions of that future, however, remain the least documented dimension of all and are precisely where primary qualitative research is most needed.

Table 2: Thematic synthesis and confidence in the evidence

Theme	Direction of evidence	Principal sources	SLF capital	Confidence*
5.1 Declining agriculture and land conversion	Consistent contraction, land shifting to construction	Buerkert 2025, Dame <i>et al.</i> 2019, Dame and Mankelow 2010 [4, 7, 9]	Natural → Phys./Fin.	High
5.2 Youth withdrawal from farming	Youth exit driven by returns, aspiration, status	Goodall 2004a, Sati 2021, Biella 2022, Buerkert 2025 [2, 4, 13, 25]	Human	Moderate
5.3 Tourism as economic opportunity	Large but volatile income gains	Pelliciardi 2013, 2021, Anand 2012 [1, 23, 24]	Financial	High
5.4 Migration to Leh / tourism hubs	Translocal, split-household reorganisation	Dame 2018, Goodall 2004a, Wester 2019 [6, 13, 29]	Social, Financial	Moderate
5.5 Erosion of communal institutions	Reciprocal labour and irrigation weakening	Nüsser 2012, 2019a, Dame 2018, Norberg-Hodge 2000 [6, 19, 20]	Social	Moderate
5.6 Women's changing role	Feminised farming plus new earning roles	Dame 2018, Biella 2022, Anand 2012 [1, 2, 6]	Human, Fin., Social	Moderate
5.7 Food security and dietary change	Rising market and PDS reliance	Dame and Nüsser 2011, Dame 2018, Buerkert 2025, Wester 2019 [4, 6, 8, 29]	Natural, Financial	High
5.8 Perceived future of farming	Contested, conditional on convergence	Ladon <i>et al.</i> , 2023, Buerkert 2025, Anand 2012, Nepal 2002 [1, 4, 15, 18]	Cross-cutting	Low

*Confidence is the reviewer's qualitative appraisal of the number, consistency and directness of the supporting studies (analogous to the GRADE-CERQual approach for qualitative evidence). It is not a statistical estimate and no effect sizes were pooled

6. Discussion

This synthesis supports a central claim: Ladakh's movement from agro-pastoral farming to tourism-based livelihoods is real and rapid, but it is better characterised as a translocal reorganisation of household asset portfolios than as a simple abandonment of agriculture and its sustainability hinges on whether seasonal, shock-prone tourism income is buffered by retained agrarian assets. Read against the wider Himalaya, the transition is distinctive in its driver but familiar in its symptoms.

In Uttarakhand, depopulation and farmland abandonment have been propelled principally by agrarian distress and unemployment—a push-dominated dynamic culminating in ghost villages (Sati, 2021) [25], with climate vulnerability amplifying the exodus of young men and leaving older, female-majority populations behind (Biella *et al.*, 2022) [2]. Ladakh exhibits comparable symptoms—fallowed terraces, aging farm labour, feminized cultivation—but the proximate driver is a pull dynamic: an unusually lucrative, spatially concentrated tourism economy (Pelliciardi, 2013, 2021) [23, 24]. This distinction matters for policy, because pull-driven transitions leave households with more resources and potentially more choice, than distress-driven ones.

Second, the evidence supports a translocality reading of Ladakh's food system and labour allocation (Dame, 2018) [6].

because households are documented to split rather than abandon-retaining fields worked by elders and women while the young earn in Leh—the transition is a reorganisation of the household across space, not a simple exit from agriculture and interventions should target the household portfolio rather than the individual farmer (Ellis, 2000, Scoones, 2013) [11, 27]. Third, the sustainability question turns on vulnerability. Tourism arrivals in Ladakh are demonstrably shock-prone (Pelliciardi, 2021) [24], the season is short and the sector's growth is already straining water and urban systems (Dame *et al.*, 2019, Geneletti and Dawa, 2009) [9, 12]. The evidence that agrarian assets function as insurance-land, water rights and food stores cushioning tourism downturns—strengthens the case for deliberate agriculture-tourism convergence (Ladon *et al.*, 2023) [15] over laissez-faire substitution. These two divergent trajectories are represented in Figure 3: the default path of substitution tends toward agricultural decline and heightened vulnerability, whereas a deliberately managed path of convergence tends toward hybrid, more resilient livelihoods. The Korzok homestay experience shows one institutional form such convergence can take (Anand *et al.*, 2012) [1], land-use evidence from Leh and Diskit shows the default trajectory if it is not pursued (Buerkert *et al.*, 2025) [4].

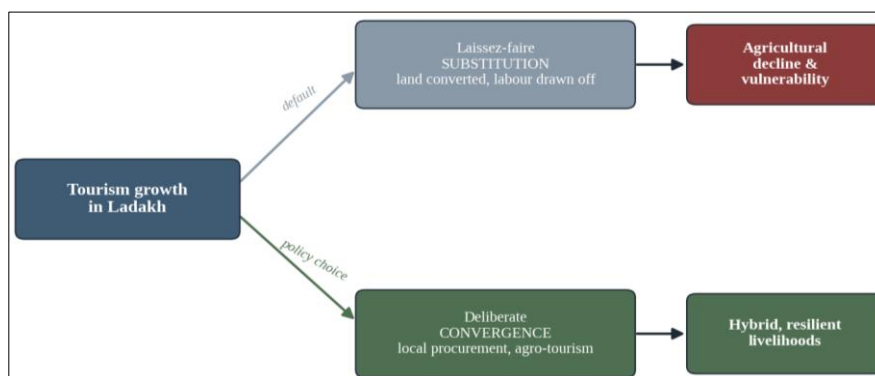


Fig 3: Two livelihood pathways from tourism growth in Ladakh. Laissez-faire substitution—land converted and labour drawn off—tends toward agricultural decline and vulnerability, whereas deliberate agriculture-tourism convergence, through local procurement and agro-tourism, tends toward hybrid, resilient livelihoods. The path taken is treated in the literature as a policy choice rather than an inevitability

Theoretically, the Ladakhi case refines both lenses on which the review draws. For the Sustainable Livelihoods Framework, it illustrates a transition in which the conversion of natural into physical and financial capital is unusually visible and often irreversible, while social capital-embodied in reciprocal labour and communal irrigation-emerges as the quiet variable whose erosion propagates through the whole system. For migration theory, it shows the limits of a purely push-driven, distress-centred account: Ladakh's is a predominantly pull-driven transition in which aspiration and status, not only wage differentials, move people off the land (Goodall, 2004a, Lee, 1966)^[13, 16]. Integrating the two lenses, the case suggests that in high-mountain economies the decisive question is not whether households diversify but whether diversification retains or discards the agrarian assets that underwrite resilience.

7. Policy implications

Five directions follow from the synthesis. First, agriculture-tourism convergence: institutionalize local procurement by hotels and homestays, farm-stay and agro-tourism certification and culinary tourism built on barley, apricot and dairy products, so that visitor spending flows into fields rather than only past them (Ladon *et al.*, 2023)^[15]. Second, youth re-engagement: targeted support for high-value and organic niche production, protected cultivation and processing enterprises that offer margins and status competitive with tourism wages. Third, community-based tourism formats with demonstrated livelihood and conservation co-benefits, extending the homestay model with quality standards and equitable rotation systems (Anand *et al.*, 2012)^[1]. Fourth, carrying-capacity and land-use planning: zoning to protect irrigated farmland from conversion, environmental management of trekking corridors and water-sensitive urban planning in Leh (Dame *et al.*, 2019, Geneletti and Dawa, 2009)^[9, 12]. Fifth, resilience buffering: recognising that tourism income is seasonal and shock-prone (Pellicciardi, 2021)^[24], policy should treat retained agricultural capacity, including its food-security function alongside the Public Distribution System (Dame and Nüsser, 2011)^[8], as strategic insurance for the Union Territory rather than a sector in managed decline.

Conclusion

This review set out to consolidate the dispersed evidence on Ladakh's movement from an agro-pastoral to a tourism-centered economy-why the young are leaving the fields, how households recompose their livelihoods and what is gained and lost in the exchange. Synthesising land-use analysis, household surveys, food-system research, socio-hydrology and tourism statistics, it finds a consistent pattern of contracting cultivation and converted land driven by an unusually lucrative but seasonal and shock-prone tourism economy, unfolding not as outright abandonment but as a translocal reorganisation in which retained land, water and food stores serve as insurance and in which women and the elderly increasingly sustain what farming remains. The paper's contribution is threefold: it integrates evidence hitherto scattered across disciplines into a single account, it specifies the mechanisms-aspiration, seasonality, institutional erosion and asset conversion-through which the transition operates, and it reframes the policy problem from

choosing between tourism and agriculture to designing their coexistence. Its principal limitation is intrinsic to its method: a synthesis of published evidence cannot capture the village-level voices-of elderly farmers, tourism-sector youth, women and headmen-that remain largely absent from the record. Future research should therefore prioritise primary qualitative fieldwork across Ladakh's contrasting livelihood zones, extend the inquiry longitudinally and give particular attention to Kargil's distinct trajectory.

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