# GOVERNING COMMON PROPERTY RESOURCES AND POLITICS OF ENGAGEMENT:

# A CASE STUDY OF BORDER VILLAGES IN THE UNION TERRITORY OF LADAKH

*Thesis Submitted to the*

*University of Calicut for the Award of the Degree of*

**DOCTOR OF PHILOSOPHY IN POLITICAL SCIENCE**

***By***


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**February 2026**

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I hereby declare that the work presented in the thesis entitled ***"GOVERNING COMMON PROPERTY RESOURCES AND POLITICS OF ENGAGEMENT: A CASE STUDY OF BORDER VILLAGES IN THE UNION TERRITORY OF LADAKH"*** is based on the original work done by me under the guidance of **Dr. NASEER PONNARATH KUNNUMMAL**, Assistant Professor, Department of Political Science, Government College Madapally, Kozhikode and has not been included in any other thesis submitted previously for the award of any degree. The contents of the thesis are undergone plagiarism check using **iThenticate** software at C.H.M.K. Library, University of Calicut, and the similarity index found within the permissible limit. I also declare that the thesis is free from AI generated contents.



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Both the adjudicators have not recommended any modifications or suggestions and therefore the original thesis is resubmitted as such. The soft copy is attached is the same as that of resubmitted copy.

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***Limseer Ali P. A.***

# ABBREVIATIONS

| | |
|---|---|
| AAY | : Antyodaya Anna Yojana |
| APL | : Above Poverty Line |
| BADP | : Border Area Development Programme |
| BDO | : Block Development Officer |
| BPL | : Below Poverty Line |
| CPRs | : Common Property Resources |
| DDMA | : District Disaster Management Authority |
| GLG | : Geo-Political Livelihoods and Governance |
| GLOFs | : Glacial Lake Outburst Floods |
| IAD | : Institutional Analysis and Development Framework |
| ICIMOD | : International Centre for Integrated Mountain Development. |
| IITM | : Indian Institute of Tropical Meteorology |
| ISRO | : Indian Space Research Organisation |
| J&K | : Jammu & Kashmir |
| LAC | : Line of Actual Control |
| LAHDC | : Ladakh Autonomous Hill Development Council |
| LOC | : Line of Control |
| MGNREGA | : Mahatma Gandhi National Rural Employment Guarantee Act |
| NH | : National Highway |
| NBSS & LUP | : National Bureau of Soil Survey and Land Use Planning |
| NGOs | : Non-Government Organisations |
| NRLM | : National Rural Livelihood Mission |
| PDMC | : Per Drop More Crop |
| PEI | : Politics of Engagement Index |
| PHH | : Priority Household |
| PHE | : Public Health Department |
| PKVY | : Paramparagat Krishi Vikas Yojana |
| PRIs | : Panchayati Raj Institutions |
| RGICS | : Rajiv Gandhi Institute for Contemporary Studies |

| | |
|---|---|
| SES | : Social–Ecological Systems |
| SI | : Sustainability Index |
| SLF | : Sustainable Livelihoods Framework |
| SPSS | : Statistical Package for the Social Sciences |
| TPI | : Threat Perception Index |
| UT | : Union Territory |
| VIF | : Variance Inflation Factor |
| VVP | : Vibrant Villages Programme |
| WWF | : World Wide Fund for Nature |

# ABSTRACT

**C**ommon Property Resources (CPRs) are essential for livelihood security in fragile mountain regions. In the trans-Himalayan borderland of Ladakh, especially in the frontier villages of Kargil district, CPR governance is influenced by environmental challenges, climate stress, militarization, and changing state-community relations after Ladakh became a Union Territory in 2019. While traditional commons research acknowledges that local communities can manage shared resources sustainably through collective institutions, it often assumes political stability and local autonomy. These conditions greatly change in militarized border areas. This study examines CPR governance and community engagement in Ladakh's border villages by considering livelihood dependence, institutional dynamics, geopolitical influences, and sustainability issues. The study aims to achieve four interconnected goals: to map the types of CPRs available and assess how they contribute to household livelihoods; to examine mixed governance structures that include traditional institutions, formal administrative bodies, and military involvement; to analyze participation patterns, inequalities, power relations, and conflicts regarding access to and sharing of CPR benefits; and to identify major ecological and geopolitical threats to CPR sustainability. The study uses a quantitative-focused mixed-methods approach. Primary data were gathered through a structured household survey of 245 households in five border villages Hardas, Shilikchay, Mushkoo, Kaksar, and Darchik along with interviews with key informants and secondary sources. Composite indices for CPR Utilization, Politics of Engagement, Threat Perception, Governance Effectiveness, and Sustainability were created using Min-Max normalization and validated through Cronbach’s Alpha. The study applied descriptive statistics, ANOVA, chi-square tests, correlation analysis, and multiple regression models for hypothesis testing. The findings show a strong reliance on CPRs, with nearly three-fourths of households depending on shared resources, particularly glacier-fed irrigation systems, alpine pastures, and cultural commons. These resources serve mainly as subsistence safety nets instead of commercial assets. Governance is characterized by a blend of institutions and fragmentation: traditional authorities maintain social legitimacy, but centralized administrative control has grown since 2019, often limiting community participation and eroding trust. The military plays a significant role as a non-civil actor in resource governance, changing access through buffer zones, surveillance, and negotiated arrangements. The study highlights that engagement politics significantly affect CPR governance outcomes. Inclusive participation, community representation, and culturally relevant governance practices build trust, accountability, and sustainability. In contrast,

securitized, top-down interventions negatively impact resource use and governance effectiveness. Major threats to CPR sustainability include climate-induced water scarcity, pasture degradation, tourism pressure, and land restrictions related to security. Contrary to traditional commons theory, increased threat perception leads to a decrease in CPR use rather than overexploitation. The study supports an integrated Geo-Political Livelihoods and Governance (GLG) framework, emphasizing that CPR governance in border areas is shaped by power imbalances, geopolitical constraints, and institutional interactions. The study concludes that achieving sustainable and fair CPR management in Ladakh's border villages needs participatory and locally relevant governance practices that align community institutions with administrative and security needs.

***Key Words:*** *Common Property Resources (CPRs); Borderland Governance; Militarization; Institutional Dynamics; Community Participation; Politics of Engagement; Governance Effectiveness; Sustainability; Geopolitical Influences; Power Relations*

# സംഗ്രഹം

പരിസ്ഥിതിലോല മേഖലകളിൽ ജനങ്ങളുടെ ഉപജീവനത്തിന് വളരെ നിർണ്ണായകമായ ഒന്നാണ് പൊതുസ്വത്ത് വിഭവങ്ങൾ (Common Property Resources - CPRs). ലഡാക്ക് പോലൊരു ട്രാൻസ്-ഹിമാലയൻ അതിർത്തി മേഖലകളിൽ (പ്രത്യേകിച്ച് കാർഗിൽ ജില്ലയിലെ ഗ്രാമങ്ങളിൽ), ഇവയുടെ നടത്തിപ്പിനെ കാലാവസ്ഥാ വ്യതിയാനം, സൈനികവൽക്കരണം, 2019-ൽ ലഡാക്ക് കേന്ദ്രഭരണ പ്രദേശമായതിനു ശേഷമുള്ള ഭരണമാറ്റങ്ങൾ എന്നിവ ശക്തമായി സ്വാധീനിക്കുന്നുണ്ട്. സാധാരണയായി ഇത്തരം വിഭവങ്ങൾ പ്രാദേശിക സമൂഹങ്ങൾ കൂട്ടായി കൈകാര്യം ചെയ്യുമെന്നാണ് പരമ്പരാഗത ഗവേഷണങ്ങൾ പറയുന്നത്. എന്നാൽ ഇതിന് രാഷ്ട്രീയ സ്ഥിരതയും പ്രാദേശിക സ്വയംഭരണവും ആവശ്യമാണ്. സൈനികവൽക്കരിക്കപ്പെട്ട അതിർത്തി പ്രദേശങ്ങളിൽ ഈ സാഹചര്യങ്ങൾ തികച്ചും വ്യത്യസ്തമാണ് എന്ന് ഈ പഠനം കണ്ടെത്തുന്നു.

ലഡാക്കിലെ അതിർത്തി ഗ്രാമങ്ങളിലെ ഉപജീവനാശ്രയങ്ങൾ, അധികാരബന്ധങ്ങൾ, ഭൂരാഷ്ട്രീയ സ്വാധീനങ്ങൾ, സുസ്ഥിരതാ പ്രശ്നങ്ങൾ എന്നിവയെ സംബന്ധിച്ച് ഈ പഠനം വിശകലനം ചെയ്യുന്നു. വിവിധതരം പൊതുവിഭവങ്ങളെ തിരിച്ചറിയാനും, ഗൃഹോപജീവനത്തിൽ അവയുടെ പങ്ക് വിലയിരുത്താനും, പരമ്പരാഗത-ഔദ്യോഗിക-സൈനിക സംവിധാനങ്ങൾ ഉൾപ്പെടുന്ന മിശ്ര ഭരണരീതികളെ വിശകലനം ചെയ്യാനും ഈ പഠനം ലക്ഷ്യമിടുന്നു.

ഹർദാസ്, ശിലിക്ചയ്, മുഷ്കൂ, കക്സാർ, ദർചിക് എന്നീ അഞ്ചു അതിർത്തി ഗ്രാമങ്ങളിലെ 245 കുടുംബങ്ങളെ ഉൾപ്പെടുത്തിയാണ് പഠനം നടത്തിയത്. സർവേകൾ, പ്രധാന വിവരദായകരുമായുള്ള അഭിമുഖങ്ങൾ, ദ്വിതീയ ഡാറ്റ എന്നിവ അടിസ്ഥാനമാക്കി കാണ്ടിറ്റേറ്റീവ് കേന്ദ്രീകൃത മിശ്രരീതിയാണ് ഈ ഗവേഷണത്തിനായി

അവലംബിച്ചിരിക്കുന്നത്. വിവരവിശകലനത്തിനായി Min–Max നോർമലൈസേഷൻ, ക്രോൺബാച്ച്സ് ആൽഫ, ഡിസ്ക്രിപ്റ്റീവ് സ്റ്റാറ്റിസ്റ്റിക്സ്, ANOVA, Chi-square, കോറിലേഷൻ, ബഹുവരി റിഗ്രഷൻ മോഡലുകൾ എന്നിവ ഉപയോഗിച്ചു.

ഉപജീവന ആശ്രയത്തിന് ഏകദേശം മുക്കാൽ ഭാഗം കുടുംബങ്ങളും ഹിമാനി-ജലസേചന കനാലുകൾ, ആൽപൈൻ മേച്ചിൽപ്പുറങ്ങൾ, സാംസ്കാരിക പൊതുസ്ഥലങ്ങൾ തുടങ്ങിയവയെയാണ് ആശ്രയിക്കുന്നത്. ഇവ വാണിജ്യ ആവശ്യങ്ങൾക്കല്ല, മറിച്ച് അടിസ്ഥാന ഉപജീവനത്തിനായാണ് പ്രധാനമായും ഉപയോഗിക്കുന്നത്. ഭരണനിർവഹണത്തിലെ മാറ്റങ്ങൾ പരമ്പരാഗത നേതൃത്വത്തിന് ജനങ്ങൾക്കിടയിൽ സ്വാധീനമുണ്ടെങ്കിലും, 2019-ന് ശേഷം വന്ന കേന്ദ്രീകൃത ഭരണനിയന്ത്രണം സമൂഹത്തിന്റെ പങ്കാളിത്തം കുറയ്ക്കുകയും വിശ്വാസം ക്ഷയിപ്പിക്കുകയും ചെയ്തു. സൈനിക ഇടപെടൽ: ബഫർ സോണുകൾ, നിരീക്ഷണം എന്നിവയിലൂടെ വിഭവങ്ങളിലേക്കുള്ള പ്രവേശനം നിയന്ത്രിക്കുന്നതിൽ സൈന്യം ഒരു പ്രധാന ഭരണകർത്താവായി മാറി. സുരക്ഷ മുൻനിർത്തിയുള്ള ഇത്തരം ഇടപെടലുകൾ ഭരണഫലപ്രാപ്തിയെ ദുർബലപ്പെടുത്തുന്നു. കാലാവസ്ഥാവ്യതിയാനം മൂലമുള്ള ജലക്ഷാമം, മേച്ചിൽപ്പുറങ്ങളുടെ നശീകരണം, വിനോദസഞ്ചാരം, സുരക്ഷാകാരണങ്ങളാലുള്ള ഭൂമി ഉപയോഗ നിയന്ത്രണങ്ങൾ എന്നിവ വിഭവങ്ങളുടെ സുസ്ഥിരതയ്ക്ക് വലിയ വെല്ലുവിളികൾ ഉയർത്തുന്നു.പരമ്പരാഗതമായ പൊതുസിദ്ധാന്തങ്ങൾക്ക് വിരുദ്ധമായി, ഇത്തരം പ്രദേശങ്ങളിൽ ഭീഷണികൾ വർദ്ധിക്കുമ്പോൾ വിഭവങ്ങളുടെ അമിത ഉപയോഗത്തിന് പകരം ഉപയോഗം കുറയുന്നതായാണ് കണ്ടെത്തിയത്.

അതിർത്തിപ്രദേശങ്ങളിലെ പൊതുവിഭവ ഭരണം അധികാര അസമത്വങ്ങളാലും ഭൂരാഷ്ട്രീയ നിയന്ത്രണങ്ങളാലും

സ്വാധീനിക്കപ്പെടുന്നു എന്ന് ഈ പഠനം സംയോജിത 'Geo-Political Livelihoods and Governance (GLG)' മാതൃകയിലൂടെ വ്യക്തമാക്കുന്നു. സമൂഹത്തിന്റെ പങ്കാളിത്തവും, പ്രാദേശികമായി അനുയോജ്യമായ രീതികളും, സുരക്ഷാ ആവശ്യങ്ങളും സമന്വയിപ്പിച്ചുകൊണ്ടുള്ള ഒരു ഭരണരീതിയാണ് ലഡാക്കിലെ അതിർത്തി ഗ്രാമങ്ങളിൽ സുസ്ഥിരത ഉറപ്പാക്കാൻ അനിവാര്യം.

***മുഖ്യപദങ്ങൾ:***: പൊതുസ്വത്ത് വിഭവങ്ങൾ (CPRs); അതിർത്തി പ്രദേശ ഭരണസംവിധാനം; സൈനികവൽക്കരണം; സ്ഥാപന ഗതിവിചാരങ്ങൾ; സമൂഹ പങ്കാളിത്തം; പങ്കാളിത്തത്തിന്റെ രാഷ്ട്രീയം; ഭരണ കാര്യക്ഷമത; സുസ്ഥിരത; ഭൂരാഷ്ട്രീയ സ്വാധീനങ്ങൾ; അധികാരബന്ധങ്ങൾ.

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# CHAPTER I

# INTRODUCTION


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# CHAPTER I

# INTRODUCTION

## 1.1 Introduction

**C**ommon Property Resources (CPRs) like pastures, forests, water bodies, irrigation systems, and communally managed lands have always played a pivotal role in the livelihoods of rural communities, especially in ecologically sensitive and resource-poor areas. Unlike private or state property, CPRs are defined by their shared use, collective management, and socially embedded rules of use and exclusion. In mountain and border areas like Ladakh, CPRs act as essential livelihood buffers in terms of providing water, fodder, fuelwood, grazing areas, and additional income sources, thus enhancing the resilience of households against climatic variability, economic uncertainty, and socio-political shocks. However, the management of CPRs has also witnessed a paradigm shift over the years. While classical theories such as Hardin's "*Tragedy of the Commons*" conceptualized common resources as necessarily vulnerable to degradation, later empirical research revealed that common resources can be effectively managed by local communities using institutions, rules, and collective action. However, much of this literature presumes relatively stable governance contexts, which fail to account for the complexities of border areas, where resource use is significantly impacted by militarization, securitization, and state control.

In the border villages of Ladakh, CPR governance is shaped not only by natural constraints but also by geopolitical dynamics, security policies, and state interventions, especially after the change in Ladakh's status to a Union Territory in 2019. The traditional institutions that earlier governed access to commons now do so in conjunction with, and sometimes in conflict with, the formal state institutions and the military, changing the dynamics of access, participation, and control. This is happening at a time when climate change-related stresses such as glacier melting, unpredictable snowfall, and water shortages further increase the dependence of the communities on CPRs while undermining their sustainability. Notwithstanding the significance of CPRs to the livelihoods and resilience of the people of Ladakh, there is a dearth of empirical studies that bring together institutional governance, political engagement, and border politics to make sense of commons governance. The current study tries to fill this gap by studying how the interplay of livelihood dependence, institutional structure, military-civil relations, and community engagement influences CPR governance and sustainability in the border villages of Kargil district.

## 1.2 Background of the Study

Common Property Resources (CPRs) like grazing grounds, forests, water bodies, irrigation systems, and community-managed properties have always played a critical role in the sustenance of rural livelihoods, especially in ecologically sensitive and resource-poor areas. CPRs can be differentiated from private and state property in terms of joint access rights, collective management, and socialized norms governing access and exclusion (Ostrom, 1990). In agrarian and pastoral societies, particularly in mountainous areas, CPRs serve as critical livelihood buffers by providing fodder, fuel, water, and additional income, thus improving the resilience of households against climatic, economic, and social disturbances (Jodha, 1992; Berkes & Folke, 1998).

The management of CPRs has long been an area of academic debate. The early theoretical approaches, such as Hardin's (1968) "*Tragedy of the Commons*," posited that shared resources are inevitably overused and degraded in the absence of private property or state control. However, later empirical studies contested this pessimistic view by illustrating that local communities possess the capacity to design and implement effective institutional solutions for sustainable CPR management through shared norms, monitoring, and sanctioning systems (Ostrom, 1990; Agrawal, 2001). These developments shifted the academic gaze towards community-based natural resource management and the role of institutions in CPR outcomes. Although these approaches have contributed immensely to the understanding of CPR management, much of the existing literature has tended to assume relatively stable socio-political settings in which communities function with a certain degree of autonomy from coercive external forces. These assumptions are highly questionable when applied to borderland areas, where resource management is inextricably linked with national security concerns, militarization, and territorialization. In such areas, CPRs are not merely livelihood resources but also strategic sites that are subject to state surveillance, restricted access, and competing claims (Peluso & Lund, 2011; Robbins, 2012).

Border areas are distinct socio-political spaces where the politics of livelihood and geopolitics converge. Political ecologists have shown that the governance of the environment in border areas is characterized by securitization, enclosure, and territorialization, which often result in the marginalization of local users in the name of national security (Zimmerer & Bassett, 2003; Peluso & Vandergeest, 2011). In militarized borders, users may face limitations in accessing common lands, grazing routes may be changed, and traditional institutions may be undermined as military and administrative authorities increasingly dominate space and

resource control. The trans-Himalayan region of Ladakh is a case in point. Ladakh is a region of high altitude, arid conditions, short growing seasons, and limited arable land. The rural economy of Ladakh is extremely dependent on CPRs such as alpine meadows, glacial-fed irrigation channels, and community forests (Dame & Nüsser, 2011). These resources are essential for agro-pastoralist livelihoods and serve as a vital safety net in a region characterized by high climatic variability and ecological vulnerability. However, the region's proximity to international borders with Pakistan and China has led to extreme militarization, particularly in villages close to the Line of Control (LoC).

In the border villages of Ladakh, CPR governance is impacted not only by environmental factors but also by security regulations, military land use restrictions, and administrative interventions. Pastures may be located in restricted areas, seasonal grazing may need military permits, and irrigation channels may be impacted by infrastructure development projects undertaken for strategic reasons. Such processes fundamentally transform the terms of access, control, and benefit-sharing for CPRs, creating new forms of exclusion, conflict, and inequality.

The climate change impacts on CPR-dependent communities in Ladakh are serious. Studies show that glaciers are melting faster, snowfall patterns are changing, and extreme weather events are happening more frequently in the Himalayan region. These changes are directly affecting water availability and pasture productivity (Nüsser et al., 2019; ICIMOD, 2020). As a result, livelihood insecurity in border villages grows, where households already struggle with limited economic opportunities and restricted access to markets and services. The Sustainable Livelihoods Framework (SLF) highlights that livelihoods depend on the interaction of assets, institutional processes, and a vulnerability context shaped by shocks, trends, and seasonality (Chambers & Conway, 1992; Scoones, 1998). In places like Ladakh, vulnerability is both ecological and geopolitical. Military tensions, border closures, and security alerts act as external shocks that directly impact resource access and livelihood strategies. This makes CPR governance crucial for survival and sustainability.

Recent changes in institutions have also affected CPR governance in Ladakh. The reorganization of the region into a Union Territory in 2019 significantly altered the administrative structure, centralizing governance and changing the relationship between local communities and the state. While this shift introduced new development programs, it also raised concerns about weakening traditional governance institutions like the Goba and

Churpon, reducing local autonomy, and limiting community participation in decision-making (IDR, 2020). In this situation, the idea of the Politics of Engagement is essential. Engagement goes beyond participation; it involves power, representation, and the ability of communities to negotiate access and influence decisions that impact their livelihoods (Cornwall, 2008; Gaventa, 2006). In Ladakh's border villages, engagement often takes place within uneven power dynamics between civil administration and the military. Communities must navigate complicated institutional environments to gain access to CPRs.

Even though there is increasing awareness of the importance of CPRs in borderland livelihoods, there is little research that thoroughly examines how governance structures, military-civil relations, and political engagement affect CPR use and sustainability in militarized areas like Ladakh. Most existing studies on Himalayan commons have focused on ecological adaptation or traditional management practices, often overlooking the influence of geopolitics and security institutions. This study aims to fill that gap by providing a detailed analysis of CPR governance in the border villages of Kargil district, combining livelihood analysis, institutional assessment, and political ecology perspectives.

## 1.3 Statement of the Problem

Common Property Resources (CPRs) like alpine pastures, glacial-fed irrigation systems, forests, and riverine commons are essential for the livelihoods and survival strategies in the border villages of Ladakh. In this region, which faces high-altitude ecological challenges, small private landholdings, and uncertain climate conditions, these shared resources are vital for supporting agro-pastoral economies, food security, and social ties. Traditionally, CPRs in Ladakh were managed by established community groups and local customs that controlled access, ensured fair distribution, and promoted sustainable use. However, in recent decades, the management of CPRs in Ladakh’s border villages has changed dramatically. Increased border militarization, expanded security infrastructure, and administrative changes—especially after Ladakh became a Union Territory—have significantly affected access, control, and decision-making regarding shared resources. CPRs now face land-use restrictions, security enclosures, and competing authorities, including traditional leaders, civil administration, and the military. These changes have reduced local independence, created less accountability among institutions, and led to new forms of exclusion, inequality, and conflict within and between communities. Meanwhile, climate change has caused problems like glacier retreat, erratic snowfall, and water shortages, making communities more dependent on CPRs while threatening their ecological health. The combination of environmental issues and geopolitical

constraints has increased vulnerability for livelihoods, especially for families with few private assets and a heavy reliance on commons. Despite the importance of CPRs for livelihoods and resilience in Ladakh's border villages, there is a significant lack of thorough research that looks into how governance structures, political activity, and power dynamics influence the use, sustainability, and conflicts concerning CPRs in militarized border areas. Most existing studies on CPR governance focus on community-based management in stable political settings and often miss the impact of border politics, military power, and diverse institutions. As a result, there is limited knowledge about how communities negotiate access to commons when faced with unequal power, how participation and representation work within changing governance systems, and how both ecological and geopolitical threats impact the long-term sustainability of CPRs. Given this context, this study aims to address the lack of a unified understanding of CPR governance in Ladakh's border villages that considers livelihood reliance, institutional structures, political involvement, and sustainability challenges. Without this understanding, policy actions might undermine traditional governance, increase inequalities, and jeopardize both livelihood security and ecological resilience. This study therefore seeks to fill this gap by examining the availability, governance, participation dynamics, and sustainability of CPRs in selected border villages of Ladakh, focusing on how community institutions, state authority, and military influence interact.

## 1.4 Significance of the Study

The current study is a major theoretical and empirical contribution to the existing body of literature on Common Property Resource (CPR) governance, as it contextualizes the research within the complex socio-ecological and geopolitical setting of Ladakh's border villages. By combining the Institutional Analysis and Development (IAD) approach, the Sustainable Livelihoods Framework (SLF), Political Ecology, and the Politics of Engagement approach, the research makes a major contribution to the understanding of the role of power relations, institutional pluralism, and militarization in shaping CPR access and management. Unlike the traditional CPR literature, which posits relatively autonomous community governance, the current research places a major emphasis on negotiated engagement between communities, civil administration, and military institutions, thus applying the theory of commons to conflict-ridden and geopolitically sensitive border regions.

The current study also has a major practical and policy relevance. By using systematic empirical research and developing composite indices to measure political engagement, threat perception, governance effectiveness, and sustainability, the current research offers evidence-

based facts for the development of inclusive and context-sensitive CPR governance frameworks in Ladakh. The research findings are highly relevant in the post-Union Territory governance setting, as they offer a set of guidelines for improving community representation, integrating traditional institutions, and enhancing cooperative civil-military relations that are sensitive to the imperatives of livelihood security and ecological sustainability, as well as national security. The current research also offers a transferable lesson for other mountainous and border regions around the world, where the intersection of livelihood security, environmental vulnerability, and geopolitics is a major concern.

## 1.5 Objectives of the Study

The broad objectives of the study is to examine the governance, politics, and community engagement surrounding common property resources in the border villages of Ladakh, with special reference to their livelihood, sustainability, and conflict dimensions. Specific objectives are:

1. To map the availability and types of CPRs and assess their contribution to household livelihoods and community survival strategies.
2. To analyze the governance structures of CPRs, including traditional institutions, formal administrative bodies, and the role of military/border politics.
3. To study the patterns of participation, inclusiveness, inequalities, and conflicts in CPR access, control, and benefit-sharing.
4. To identify the major threats, sustainability concerns, and opportunities for equitable CPR governance.

## 1.6 Hypotheses of the Study

- H1: The availability, accessibility, and utilization of Common Property Resources (CPRs) significantly contribute to household livelihoods and socio-economic well-being in the border villages of Ladakh.
- H2: Dimensions of politics of engagement, including power and influence, political involvement, community representation, military–political interface, and cultural–geopolitical factors, have a significant influence on community perceptions, participation, trust, and overall governance of common-property resources (CPRs).
- H3: Household perceptions of threats to Common Property Resources (CPRs), levels of political engagement, and governance effectiveness significantly influence the utilization and sustainability of CPRs in border villages of Ladakh.

## 1.7 Research Methodology

The current study employs a descriptive-analytical approach with a quantitative-dominant mixed methods strategy to analyze the governance, politics of engagement, and sustainability of Common Property Resources (CPRs) in the border villages of Ladakh. The research approach is deemed suitable in light of the complex nature of the research problem, which requires an understanding of the livelihood dependence on CPRs, institutional frameworks, power dynamics, and community perceptions in a militarized and ecologically sensitive setting. The research approach facilitates a systematic description of the existing situation as well as an analytical exploration of the inter-relationships between key variables. The research is essentially cross-sectional, with data being gathered at a point in time through a household survey conducted in 2025 in five border villages of Kargil district short-listed for the study. The quantitative data provide the central focus of the analysis and are used to develop composite indices to measure CPR use, politics of engagement, threat perceptions, effectiveness of governance, and sustainability. The composite indices facilitate comparative and inferential analysis at the village, social group, and governance level.

### 1.7.1 Theoretical Framework

The theoretical framework of the study is conceptualized to understand the complex and mutually constitutive processes of Common Property Resource (CPR) management in the border villages of Ladakh. The framework draws on an interdisciplinary approach that combines the Institutional Analysis and Development (IAD) framework, the Sustainable Livelihoods Framework (SLF), Political Ecology, and the Politics of Engagement approach. This allows for a general understanding of CPR use and sustainability, which is not only determined by resource endowment and social norms but also by power relations, institutional diversity, and external interventions triggered by border militarization. The IAD framework is used as the institutional lens to analyze rules-in-use, actors, and decision-making processes for CPR management, and the idea of institutional bricolage to describe how CPR management practices are combined with traditional knowledge and formal administrative and military institutions. The SLF framework locates CPRs within household livelihoods, highlighting their significance as a safety net in situations of ecological and economic risk. Political Ecology adds a critical twist to the framework by highlighting the importance of power, access, and territoriality, especially the role of the military and the state in border regions to shape resource access. The Politics of Engagement approach operationalizes these frameworks by analyzing the quality of interaction, representation, and negotiation between communities, the state, and

security institutions. The framework conceptualizes CPR sustainability as a product of the interaction between threat perception, political engagement, and governance effectiveness. It argues that in militarized border areas, CPR sustainability is not only an ecological issue but also a political and institutional process that is shaped by trust, participation, and negotiated access.

### 1.7.2 Conceptual Framework

The conceptual framework of the research represents the integrated theoretical approaches in an operational framework for examining the governance of Common Property Resource (CPR) in the border villages of Ladakh. The framework conceptualizes the sustainability of CPRs as a function of the dynamic relationship between the livelihood assets of households, political and institutional engagement, and perceived ecological and geopolitical threats. The framework is organized into three interrelated levels of analysis: livelihood dependence and access, institutional and political processes, and social-ecological outcomes. At the first level of analysis, the framework highlights the livelihood-access relationship, wherein the household livelihood asset endowment (natural, human, financial, and social capital) and access mechanisms shape the CPR use intensity and access. At the second level of analysis, the institutional-political nexus serves as a governance filter that shapes CPR access and use. The institutional-political nexus is operationalized using the Politics of Engagement, which captures power relations, representation, participation, and the military-civil relation in CPR resource governance. At the third level of analysis, the framework concentrates on social-ecological outcomes, wherein threat perception and governance effectiveness shape CPR use intensity and sustainability.

### 1.7.3 Operational Definitions

For this study, key concepts are clearly defined to maintain clarity, measurement, and consistency between theories and observed data. The study uses a mixed-methods approach focused on quantitative data. It translates abstract ideas like governance effectiveness, political engagement, threat perception, and sustainability into measurable indicators through structured survey responses and composite indices.

Common Property Resources (CPRs) are defined as natural and semi-natural resources that the community collectively accesses, uses, and manages, instead of being owned by individuals or controlled solely by the state. In the study area, CPRs consist of alpine pastures, communal grazing lands, glacial-fed irrigation channels (kuls), river resources, forest

patches, medicinal plant areas, and religious or cultural commons. The availability of CPRs is measured by the presence or absence of specific resources in a village. Utilization is assessed at the household level, based on the frequency of use, purposes, and dependence for livelihood.

Utilization of CPRs means how much households rely on these resources for their livelihood activities and basic needs. This is measured using a composite Utilization Index that includes standardized indicators for the perceived importance of CPRs, the portion of household income from CPR-related activities, involvement in CPR use, income generated directly from resources, and how often resources are used. Higher index values show more dependence on CPRs.

Household Livelihood Assets are defined based on the Sustainable Livelihoods Framework and refer to the resources households have to pursue livelihood strategies. In this study, livelihood assets are operationalized using certain indicators: natural capital (size of landholding), human capital (education level of the household head), financial capital (ration card category as a measure of income status), and social capital (community ties and participation in local institutions).

Politics of Engagement is defined as the nature of interactions between community members, traditional institutions, formal administrative bodies, and military authorities in the governance of CPRs. It is measured using the Politics of Engagement Index (PEI), which uses multiple indicators to capture power and influence, political involvement, community representation, military–political relationships, and the cultural and geopolitical context. Higher PEI scores indicate more inclusive and participatory governance.

Governance Effectiveness refers to how well institutions governing CPRs can enforce rules, resolve conflicts, ensure fair access, and protect community rights over resources. It is measured through Likert-scale responses that reflect trust in institutions, fairness in decision-making, rule enforcement capabilities, and the legitimacy of authority structures.

Threat Perception is the community's understanding of risks that affect CPR availability and use. This is measured using the Threat Perception Index (TPI), which compiles household responses to ecological threats (like climate change, water scarcity, and pasture degradation), human pressures (overgrazing, tourism), and geopolitical threats (military activities, border restrictions). Higher TPI values indicate greater perceived vulnerability.

Sustainability of CPRs refers to the long-term ability of common property resources to support livelihoods without causing ecological harm or institutional failures. It is measured using a Sustainability Index that combines indicators of resource availability trends, governance effectiveness, community willingness to act collectively, conservation practices, and reversed threat perception scores. Higher sustainability scores indicate a more resilient socio-ecological system.

### 1.7.4 Data Sources and Data Collection

The study relies on both primary and secondary sources of data, which allow for a comprehensive and triangulated analysis of the governance, politics of engagement, and sustainability of Common Property Resources (CPRs) in the border villages of Ladakh. The primary data represent the central empirical anchor of the study and were gathered through a comprehensive field survey in 2025 in the selected border villages of Kargil district. The primary tool for gathering primary data was a structured household survey questionnaire conducted through face-to-face interviews with carefully selected respondents. The questionnaire was designed to gather information on the socio-economic profiles of the households, CPRs availability and utilization patterns, livelihood dependence, governance structures, political engagement, interactions with administrative and military establishments, and perceptions of ecological and geopolitical hazards. The survey questionnaire used a mix of Likert-type scale questions, binary responses, and ordinal variables to enable both quantitative analysis and the development of composite indices. Besides the household survey, the primary data were gathered through a series of key informant interviews with village heads, traditional leaders, Panchayat members, and administrative officials, as well as through focus group discussions and field observations.

The secondary data was obtained from official publications, records, and published sources to complement and contextualize the primary data. The key secondary sources of data were the reports and statistical publications of the District Statistics & Evaluation Office, Kargil (2023-24), Census of India (2011), records of the Ladakh Autonomous Hill Development Council (LAHDC), village-level revenue and Panchayat records, and district development and disaster management reports. Further, policy reports, government notifications on land use and resource management, and reports from the concerned departments such as agriculture, irrigation, and rural development were also referred to. The literature on CPR governance, political ecology, borderland studies, and Himalayan livelihoods was also surveyed to develop the conceptual and analytical framework of the research.

### 1.7.5 Population

The population for the present study comprises all the households residing in the selected border villages of the Kargil district in the Union Territory of Ladakh, where the livelihoods are largely dependent on Common Property Resources (CPRs). The selected border villages are geographically close to the Line of Control (LoC) and are marked by ecological vulnerability, agro-pastoral livelihood patterns, and a high degree of interaction between community institutions, the civil administration, and the military. The household was taken as the unit of analysis, as the CPR access, utilization, and livelihood decisions are largely made at the household level. In particular, the population for the present study comprises all the households in the five selected border villages of Hardass, Darchik, Shilikchay, Kaksar, and Mushkoo. The total number of households in these five villages, as per the village records and the Census of India (2011), is 667, which constitutes the sampling frame for the quantitative component of the study. Apart from the households, other institutional actors such as traditional leaders (Goba, Lambardar, Churpon), elected Panchayat members, officials of the Ladakh Autonomous Hill Development Council (LAHDC), and representatives of the security agencies dealing with the communities on issues related to resource access also comprise the population for the qualitative component of the study.

### 1.7.6 Sample Design

The study uses a multi-stage sampling design to achieve systematic, representative, and contextually informed selection of study units for the analysis of governance, politics of engagement, and sustainability of Common Property Resources (CPRs) in the border villages of Ladakh. The multi-stage sampling design was found to be appropriate in the context of the geographical distribution of settlements, administrative complexity, and variability in livelihood dependence and institutional arrangements in the border villages. In the first stage of the sampling design, the Kargil district in the Union Territory of Ladakh was purposively selected because of its geographical location along the Line of Control (LoC), the dependence of rural livelihoods on CPRs, and the engagement of local communities, the civil administration, and the military in the region. In the Kargil district, the Drass and Kargil blocks were purposively selected because they house a group of frontline border villages that are affected by security restrictions, ecological risks, and institutional changes due to the reorganization of Ladakh as a Union Territory.

In the second stage, a list of border villages falling within the identified blocks was compiled to form the sampling frame. From the list, five villages Hardass, Darchik, Shilikchay,

Kaksar, and Mushkoo were identified to capture diversity in terms of geographical location, distance to the LoC, livelihood activities, ethnic groups, and military influence. The selection of these villages helped to ensure that both transitional semi-urban settlements and distant villages along the LoC were included, thus adding to the analytical strength of the study. In the third stage, the households in the identified villages were the final sampling units. Using the list of villages and the Census of India 2011, the total number of households in the five villages was 667. The sample size was calculated using Cochran's formula for finite populations, with a confidence level of 95 percent, a margin of error of 5 percent, and an estimated population proportion of 0.5, giving a sample size of 245 households. To make the sample representative, it was allocated proportionately to the villages according to the actual number of households in each village. Finally, systematic random sampling was used in each village to select the households for the survey. The list of households from Panchayat and revenue records was used as the sampling frame, and the sampling interval was calculated by dividing the total number of households by the sample size for each village.

### 1.7.7 Data Analysis Techniques

The collected data that were analyzed using a mix of descriptive, comparative, and inferential statistical methods, along with qualitative interpretation. This approach aimed to examine the governance, politics of engagement, and sustainability of Common Property Resources (CPRs) in the border villages of Ladakh. The analysis was conducted with the help of the Statistical Package for the Social Sciences (SPSS) and followed a systematic process for data coding, cleaning, and validation.

In the first stage, descriptive statistical methods were used to summarize the socio-economic characteristics of households, the types of CPRs available, and patterns of resource use. Frequencies and percentages described categorical variables like occupation, education, community group, and types of CPRs. For continuous and Likert-scale variables, measures such as mean and standard deviation were applied. This stage set a contextual baseline for understanding variations at the village and household levels. In the second stage, the study created composite indices to put into practice multidimensional theoretical constructs. These included the Utilization Index of CPRs, the Politics of Engagement Index (PEI), the Threat Perception Index (TPI), and the Sustainability Index (SI). Before creating the indices, indicators measured on different scales were standardized through Min-Max normalization to ensure they could be compared. The internal consistency and reliability of multi-item scales were tested using Cronbach's Alpha, which confirmed the robustness of the indices.

The third stage included comparative statistical analysis to look at differences across villages, community groups, and administrative units. One-way Analysis of Variance (ANOVA) tested for statistically significant differences in CPR usage, political engagement, and sustainability scores across five selected villages and across social categories. Independent sample t-tests were used to evaluate differences between groups such as Drass and Kargil tehsils and between male- and female-headed households. Chi-square tests examined relationships between categorical variables, like occupation and village, or perceived resource decline and location. In the final stage, inferential statistical techniques tested the hypotheses and explored causal relationships among key variables. Pearson's correlation analysis assessed the strength and direction of relationships between variables like landholding size and CPR utilization, as well as between dimensions of political engagement and governance perceptions. Multiple linear regression analysis identified the factors influencing governance effectiveness, CPR use, and sustainability. Diagnostic tests, including the Variance Inflation Factor (VIF) for multicollinearity and Durbin-Watson statistics for autocorrelation, ensured the validity of the regression models. Qualitative data gathered from key informant interviews, focus group discussions, and field observations were analyzed thematically to support and interpret the quantitative findings.

The theoretical framework, conceptual model, and detailed research design of the study are laid out in Chapter III.

## 1.8 Limitations of the Study

Notwithstanding the methodological rigor and empirical richness of the study, it is prone to certain limitations that must be borne in mind while drawing inferences from the results. Firstly, the current study is based on a cross-sectional research approach, where data is gathered at a point in time. Consequently, the results of the analysis reflect the community views, governance structures, and CPR use patterns prevailing at the time of conducting the survey. Secondly, the current study is based on self-reported data gathered from household surveys and interviews. Although every effort was made to ensure reliability by using standardized research tools and techniques of triangulation, the answers to questions on the effectiveness of governance, political participation, and perceived threats might be prone to biases from respondents, limitations of recall, or hesitation to respond freely, especially on issues concerning military presence and border protection. Thirdly, while the chosen villages are representative of varied borderland settings, the current study is geographically confined to five villages in the Kargil district. Although this facilitates in-depth analysis and understanding,

the results may not be completely generalizable to other border areas of Ladakh or other Himalayan border areas with different socio-political or ecological profiles. The study is more focused on analytical generalization than statistical generalization. Fourth, the compilation of composite indices like the Politics of Engagement Index, Threat Perception Index, and Sustainability Index involves certain methodological simplifications, including equal weighting and normalization. Although these indices facilitate better analytical understanding and comparability, they may not completely capture the complex and constantly evolving character of power relations and ecological processes involved in CPR governance. Finally, certain limitations imposed by institutional access constraints, especially concerning formal military statistics and internal administrative decision-making, restricted the scope of analysis of certain aspects of governance. Thus, the study largely represents community-level experiences and perceptions of military and administrative engagement rather than institutional perspectives.

### 1.9 Organization of the Study

The thesis is organized into eight chapters, each addressing specific aspects of the research problem and contributing to a thorough analysis of the governance and politics of engagement around Common Property Resources (CPRs) in the border villages of Ladakh.

Chapter I: Introduction provides the background and context of the study. It highlights the significance of Common Property Resources in border areas. This chapter includes the problem statement, study objectives, research questions, hypotheses, significance of the study, limitations, and the overall organization of the thesis.

Chapter II: Review of Literature critically looks at existing theoretical and empirical studies related to CPR governance, political ecology, borderland studies, and sustainable livelihoods. It identifies major debates, methodological approaches, and research gaps that shape the conceptual orientation and focus of this study.

Chapter III: Theoretical Framework and Research Design outlines the theoretical foundations and conceptual framework guiding the study. It integrates perspectives from institutional analysis, sustainable livelihoods, political ecology, and the politics of engagement. This chapter also details the research design, data sources, population and sample design, data collection methods, operational definitions, and analytical techniques used in the study.

Chapter IV: Common Property Resources in Border Villages of Ladakh: Institutional and Political Setting presents the social, political, and institutional context of CPR governance in the study area. It describes the study villages, their ecological traits, and the broader political environment that influences CPR access and management.

Chapter V: Availability, Use, and Governance of Common Property Resources in Ladakh's Border Communities examines the types, availability, and patterns of CPR use in the selected villages. The chapter looks at how CPRs support household livelihoods and explores differences in access and use based on socio-economic and spatial factors.

Chapter VI: Institutional Governance of Common Property Resources in Border Villages focuses on governance arrangements and the politics of engagement. It analyzes the roles of traditional institutions, formal administrative bodies, and military authorities in CPR management, with a focus on participation, representation, power dynamics, and governance effectiveness.

Chapter VII: Sustainability and Equity in Common Property Resource Governance: Challenges and Opportunities assesses sustainability outcomes and equity issues in CPR governance. It examines ecological, socio-economic, and geopolitical threats, collective action dynamics, and opportunities for enhancing inclusive and sustainable CPR governance in border regions.

Chapter VIII: Findings and Conclusion combines the key empirical findings of the study and presents the overall conclusions. It discusses the theoretical and policy implications of the findings and provides recommendations and directions for future research.

# CHAPTER II

# REVIEW OF LITERATURE

2.1 Introduction
2.2 Conceptual Foundations of CPRs
2.3 Governance of CPRs in India
2.4 Community Participation in CPRs
2.5 Political Economy in CPR Governance
2.6 Socio-Economic Dimensions of CPR Use
2.7 Governing Commons in Ladakh
2.8 Contemporary Challenges
2.9 Research Gap
2.10 Conclusion

# CHAPTER II

# REVIEW OF LITERATURE

## 2.1 Introduction

A significant subject of discourse in academics has been the management of Common Property Resources (CPRs), which examines the complex interactions among institutional structures, community participation, and ecological sustainability. Studying community organisation and management of shared natural resources such as pastures, woodlands, and water bodies may yield significant insights into local governance systems and their connections to broader political and environmental processes. The significance of these processes is heightened in the borderland context of Ladakh due to the region's fragile nature, strategic position, and evolving sociopolitical setting.

This chapter provides a comprehensive assessment of the theoretical, conceptual, and empirical literature pertaining to CPR governance and the politics of participation in border communities. The review emphasises political geography, institutional economics, and borderland studies, utilising interdisciplinary perspectives to establish the conceptual foundation for the present research. From Garrett Hardin's "Tragedy of the Commons" (1968) to Elinor Ostrom's foundational ideas of collective action and institutional design (1990, 2005), it delineates notable philosophical progressions.

Since the early 1980s, scholarly interest in CPRs has increased in India, encompassing diverse study on the social, economic, and ecological dimensions of the commons. Researchers have examined the distribution and utilisation of CPRs, their dependence on rural livelihoods, and the institutional frameworks that regulate their management and conservation. This chapter is organised around the topics of conceptual foundations, Indian governance, community engagement and collective action, political economy and power dynamics, socio-economic and cultural dimensions, contemporary concerns and evolving debates, research deficiencies, and a final synthesis. This study expands upon the extensive body of literature by emphasising significant issues, conceptual linkages, and research deficiencies, particularly within the specific socio-political and ecological setting of Ladakh's border settlements.

## 2.2 Conceptual Foundations of Common Property Resources (CPRs)

Hardin (1968) posits that individuals acting rationally in pursuit of their own interests will eventually deplete common resources, serving as the conceptual basis for CPR governance. Hardin found that either state control or privatisation was essential for the

sustainable management of the commons as an open access system, employing a deductive and model-based approach. His methodology illuminated the collective action dilemma; nonetheless, it faced criticism for neglecting social structures and community norms while presuming unimpeded access.

This perspective initiated extensive discourse in common property theory, receiving both commendation and critique from political scientists, ecologists, and economists. This concept has faced criticism for neglecting the significance of local governance frameworks, collaboration, and community standards in the sustainable management of shared resources, yet effectively highlighting the issue of common resource use. Common property systems tend to function optimally in the presence of strong social institutions and collective decision-making, as demonstrated by subsequent research, particularly works by Ostrom and colleagues. Hardin's work remains fundamental in the examination of resource management and environmental governance as it delineates the inherent contradiction between individual rationality and communal sustainability.

Subsequent theorists, in contrast, have demonstrated that communities often establish effective laws and punishments for sustainable utilisation, and that common resources are seldom unregulated. Hardin's concept prompted counterarguments highlighting the importance of teamwork, societal norms, and local government systems in regulating individual behaviour.

Berkes *et al.,* (1989) investigated the critical role of local and traditional institutions in preserving ecological equilibrium and fostering sustainable livelihoods. The debates on collective action and property rights are the theoretical basis for CPR research. Berkes presented an alternative perspective by illustrating the evolution of institutional structures governing resource access, utilisation, and conservation in several traditional societies. Berkes posits that Common-Pool Resources (CPRs) constitute a social-ecological system whereby flexible institutions, indigenous knowledge, and communal norms underpin sustainable governance. He emphasised that the commons are governed by social administration and collective ownership, rather than being open-access or privately held.

Berkes' compilation includes several case studies from fisheries, forests, grazing lands, and water resources, illustrating that community-based management is a prevalent and effective strategy rather than an exception. From an ecological perspective, CPR management integrates ecosystem resilience, sustainable harvesting, and biodiversity preservation. Berkes emphasised the relationship between ecological and social systems. Berkes' book contextualises CPR management within the broader framework of sustainable development,

asserting that social justice and community empowerment are vital for environmental conservation. Unlike top-down, state-centric development strategies, ecological sustainability and communal welfare were incorporated.

Ostrom (1990) instigated a paradigm shift in our comprehension of CPRs. Her empirical research demonstrated that self-organised institutions founded on mutual respect, trust, and collective decision-making enable communities globally to manage their resources effectively. Ostrom advocated for polycentric governance a framework including many overlapping decision-making centres that enhance flexibility and local engagement rather than endorsing uniform policy prescriptions.

Ostrom's seminal work, has profoundly influenced discourse on resource management and collective action. Ostrom's contributions underscore the significance of community-based solutions in addressing the intricacies of resource allocation and sustainability by challenging the prevailing notions of the tragedy of the commons and advocating for the efficacy of local government. This study will initially analyse Ostrom's theoretical frameworks, including institutional economics and polycentric governance systems, which underscore the vital importance of social capital and trust in the management of common-pool resources. We will examine the empirical studies derived from her work, elucidating the methodologies employed and the principal findings. This research will examine recent advancements in the field, including novel methodologies and multidisciplinary perspectives that persistently shape our comprehension of community resource management, considering the contemporary challenges in implementing collective action. This literature summary intends to encapsulate the key results from Ostrom's research and propose future avenues for investigation to further the study of collective action and commons governance. Ostrom contests traditional top-down methodologies in resource management by emphasising the potential for communities to effectively oversee their resources via local knowledge and governance.

Subsequent writings by Ostrom (2008) elaborated on the transformation of institutions to address complexity, promoting adaptable, multi-tiered governance over rigid, centralised frameworks. Her research highlighted the significance of social capital, institutional legitimacy, and local knowledge in the management of sustainable commons. Ostrom critiques traditional approaches to manage common-pool resources (CPRs) and advocates for multi-tiered, adaptive governance instead of simplistic "optimal" solutions. The research highlights the complexity of natural resource systems and critiques scholars' tendency to propose universal answers. She advocates for a polycentric strategy that recognises the significance of local institutions and community engagement, contesting the conventional reliance on

centralised governmental authority or privatisation as the sole viable solutions to environmental degradation. The research highlights the necessity of establishing context-specific, adaptable institutions that foster user trust and participation for sustainable environmental management. Ostrom asserts that communities often administer shared resources more efficiently than externally imposed systems when provided with explicit norms, monitoring frameworks, and graduated punishments. She illustrates how institutional variety and self-governance enhance the resilience of natural and social systems via extensive empirical evidence.

Stevenson (1991) drawing on Ostrom's research, employed institutional economics to redefine the economic perspective of common-pool resources (CPRs). His theoretical model, focussing on transaction costs, property rights, and incentive structures, illustrated that, with clearly defined user boundaries, enforceable regulations, and adaptable dispute resolution mechanisms, community management can achieve both ecological stability and economic efficiency. He presents a comprehensive theoretical framework that employs collective action theory and institutional economics to reinterpret the economic perspective of common property regimes. The research challenges the prevalent view of the "tragedy of the commons," asserting that deficiencies in institutions and governance, rather than the inherent depletion of communal resources, are responsible.

Stevenson theorises the sustainable management of shared resources by communities through appropriate institutional frameworks, situating common property within a broader analytical paradigm of property rights, transaction costs, and incentive structures. The research employs an analytical and model-based technique to illustrate the dynamic interactions among users, regulations, and resource results, integrating microeconomic theory, game-theoretic reasoning, and particular land-use situations.

The primary objective of the study is to establish a comprehensive framework for economics that elucidates the conditions under which common property regimes may operate successfully and equitably. Stevenson asserts that well-defined user limits, locally implemented regulations, graded consequences, and mechanisms for supervision and dispute resolution are critical determinants of the success of such systems. The findings indicate that robust institutional architecture and the community's ability to adapt to social and ecological changes are more critical determinants of effective resource management than the kind of ownership. Stevenson's theoretical models demonstrate that economic efficiency and ecological stability may arise from group behaviour fostered by explicit rules and incentives.

The study has significant practical implications for water resource management, forest governance, and land-use policy, advocating for local participation and decentralisation rather than complete privatisation or state control. The primary contribution of the study is its integration of institutional diversity with economic rationality, establishing the theoretical foundation for subsequent empirical research on common-pool resource management. Nonetheless, substantial research deficiencies persist in the limited empirical examination of these theoretical assertions across many political and social situations.

Adhikari (2021) provides a comprehensive examination of the economics of common-pool resources, using concepts from environmental policy, property rights theory, and new institutional economics. His methodology underscores the need of participatory governance by demonstrating that sustainability relies not just on efficiency but also on legitimacy, equality, and adaptability. He delivers a comprehensive examination of the theoretical and empirical advancements in understanding the management and governance of common pool resources (CPRs) in 'The Economics of Common Pool Resources: A Review.' Focussing on contemporary institutional economics, property rights theory, and policy analysis, the study systematically investigates CPR systems. It underscores that local communities establish both formal and informal organisations to manage their shared property resources. The research examines the impact of incentive systems, transaction costs, and property rights frameworks on user decisions and the subsequent effects of those decisions on sustainable management outcomes.

Adhikari underscores the need of context-specific governance frameworks that reflect ecological diversity and social variability by integrating concepts from institutional and environmental economics. His analysis asserts that the sustainability of CPR relies on the legitimacy, equity, and adaptability of institutional frameworks, alongside economic efficiency. He emphasises the significance of participatory governance in ensuring ecological resilience and sustainable livelihoods, providing a vital foundation for the development of transdisciplinary approaches to resource economics.

Kadekodi (2023) analyses the conceptual framework of common property resource management, focussing on its implications and implementation within the Indian context. It provides case studies and a statistical overview that underscore the challenges and successes in the management of India's common property resources. The research, which examines both theoretical models and practical experiences inside the country, underscores the need of community engagement and sustainable practices in resource management. Kadekodi empirically synthesises information from forests, pastures, and water bodies to illustrate the

continued significance of CPRs for rural livelihoods, especially for marginalised groups. Nevertheless, conventional management methods have often been compromised by elite capture, privatisation, and governmental oversight. Kadekodi employs an interdisciplinary approach, integrating sociology, ecology, and economics, to evaluate institutional efficiency. His reflections underscore the necessity of participative, contextually tailored approaches rather than universal policy frameworks. The conclusion of the essay advocates for equitable governance frameworks that integrate traditional norms with modern legal and administrative practices.

Berkes *et al.,* (1989) established the theoretical foundation for viewing CPRs as socio-ecological systems. It shown that indigenous civilisations often establish intricate institutional frameworks that reconcile use with conservation, rather than functioning as irrational exploiters. Berkes (2007) considerably expanded this perspective by introducing the concept of Traditional Ecological Knowledge (TEK), a dynamic system of belief and practice. Empirical research indicate that the integration of environmental ethics with social and cultural behaviours renders Traditional Ecological Knowledge (TEK) essential for the regulation of Common-Pool Resources (CPR).

Berkes offers a foundational theoretical framework for understanding the interconnections between cultural values, sustainable resource management, and Traditional Ecological Knowledge (TEK). TEK is an intricate system of ideas, behaviours, and knowledge developed over time by continuous human interaction with ecosystems. It illustrates how local communities maintain ecological resilience via adaptive management and traditional institutions, utilising multidisciplinary perspectives from ecology, anthropology, and systems theory. Berkes designates this concept as "sacred ecology," and the examination underscores how traditional societies often operate within a cohesive worldview where social, spiritual, and ecological elements are interrelated. The findings indicate that social learning, collective norms, and feedback mechanisms are more crucial for the sustainability of community-based resource systems than external control. The study's practical value is in demonstrating how the integration of indigenous knowledge into contemporary environmental governance may enhance conservation and policy results.

The dispute between economists and ecologists over the optimal management of commons whether community-based, privatised, or centralized culminated in the emergence of research on Common-Pool Resources (CPRs). Berkes (1989) and Kadekodi (2003) advocated for context-specific, participatory approaches that integrate traditional practices with modern institutions. This research indicates that effective management necessitates compliance

with institutional design principles, which encompass nested enterprises, local monitoring, graded punishments, and clearly delineated boundaries.

Sheikh (2010) assert that ecological knowledge is transmitted via oral traditions, rituals, and communal cooperation in alpine regions such as Ladakh. Sheikh's ethnographic study demonstrates that organisations like the goba employ rotational systems and collective decision-making to regulate access to pastures and irrigation water, ensuring sustainability and equity.Sheikh conducts a comprehensive analysis of Traditional Ecological Knowledge (TEK) and its role in sustaining community-based resource management systems within the fragile alpine ecology of Ladakh. The research elucidates how indigenous norms, rooted in local ecological knowledge, have historically maintained a balance between human livelihood demands and natural limitations.

Sheikh investigates the regulation of land utilisation, water allocation, and pastoral activities by traditional institutions using ethnographic research, participatory observation, and interviews with village elders. The primary objective of the study is to illustrate that Traditional Ecological Knowledge (TEK) is a dynamic system of environmental governance, shaped by millennia of adaptation to high-altitude ecological constraints, rather than merely a cultural artefact. The findings indicate that equitable access to community resources such as pastures and irrigation water was ensured through collective decision-making, reciprocity, and rotational usage systems. Sheikh argues that ecological sustainability is significantly jeopardised by the erosion of traditional wisdom due to modernism, market integration, and administrative centralisation. The research highlights that formal governmental initiatives often overlook the ecological rationale embedded in local traditions. Its purpose is to facilitate the integration of traditional knowledge into contemporary development planning and natural resource management.

The study significantly enhances the relationship between ecological anthropology and sustainable development by presenting empirical evidence from a distant yet environmentally vital region. Nevertheless, the study is deficient in a quantitative assessment of ecological impacts and presents various discrepancies when compared to other Himalayan sites. He underscores the significance of indigenous knowledge systems as foundational for sustainable and democratic resource governance in Ladakh.

Collectively, these studies indicate that CPR governance should be regarded as a product of institutional frameworks, cultural legacy, and ecological development, wherein

social cohesiveness and community identity are fundamentally intertwined with resource management.

## 2.3. Governance and Management of Common Property Resources in India

In the early 1980s, academics began an examination of the ecological, economic, and social significance of Common Property Resources (CPRs) in rural India, leading to increased study and policy discourse around CPRs. In India, the management of Common Property Resources (CPRs) evolved within a complex institutional framework shaped by community traditions, state participation, and colonial legacies. Early state policies often compromised local stewardship and customary rights by seeing common-pool resources primarily as commercial assets subject to official authority.

An essential historical and legal analysis of this shift is presented in Singh (1986). His research demonstrates how colonial forest legislation institutionalised bureaucratic power and marginalised local stewardship by reclassifying community-owned forests as state property. He asserts that prior management systems, which maintained ecological balance through social norms and customary rules, were systematically eroded by this process. Singh's research indicates that the impoverishment of forest-dependent people resulted from both ecological depletion and political and legal marginalisation.

Subsequent to independence, the Indian government undertook development-oriented programs to restore the commons. Many of these activities, however, persisted in employing hierarchical administrative frameworks. The Joint Forest Management (JFM) program and the National Forest Policy (1952, 1988) exemplified the gradual shift towards participatory management; yet, their implementation often faced challenges due to bureaucratic dominance and inadequate community empowerment.

Singh presents a pioneering analysis of the interconnections between legal institutions, forest management, and the socioeconomic marginalisation of Indian communities dependent on forests. This research situates the historical evolution of forest administration within the broader political economy of colonial and postcolonial state formation. It argues that traditional custodianship was gradually supplanted by a legal and political process that transformed forests from community-managed commons into state-owned resources. This study employed a qualitative and historical-legal technique to discern the institutional processes that facilitated the augmentation of state control over forests, examining legislative actions, judicial rulings, and administrative documentation.

The primary objective of the research is to illustrate how legal systems intensified the erosion of customary rights and the resultant impoverishment of the local population. Singh demonstrates that the ecological and social sustainability of forest landscapes diminished due to the shift from communal management to bureaucratic administration. His research emphasises that poverty among forest residents stems from discriminatory legislative frameworks rather than only from resource limitations. The study demonstrates how forest restrictions limited access, rendered subsistence practices unlawful, and heightened dependence on state organisations using interpretative case studies. The work's practical implications arise from its call to reevaluate governance and property rights to restore ecological equilibrium and community engagement. Singh established the foundation for further study in common property theory.

Jodha (1992) provided a significant critique of development models that overlooked Common Property Resources (CPRs) in rural economies. Jodha shown via comprehensive field research in arid regions of India that Common Property Resources (CPRs) are vital livelihood assets that provide marginal and landless communities with fuelwood, fodder, water, and non-timber forest products. He assessed their advantages for rural households, emphasising their twin functions as ecological safeguards and economical safety nets. Jodha redefined CPRs from useless wastelands into instruments for environmental sustainability and poverty alleviation.

His work highlights the economic, social, and ecological importance of Common Pool Resources (CPRs) and promotes their reintegration into rural development programs. It is founded on extensive empirical research carried out in the arid regions of India. Jodha asserts that CPRs are community-managed natural resources vital to rural lives, including irrigation systems, forests, grazing lands, and water bodies.

Jodha argues that CPRs serve as a crucial safety net for the rural impoverished, particularly in ecologically precarious regions, opposing the prevailing development narrative that prioritises private ownership and market-oriented expansion. He contends that the marginalisation of vulnerable populations, environmental deterioration, and livelihood insecurity are all repercussions of the neglect exhibited by politicians and scholars towards these resources.

Empirical data from Jodha's field research indicates that CPRs significantly influence employment, income generation, and household sustenance. Community Protected Reserves enhance agricultural income by supplying fuelwood, food, water, and non-timber forest

products to landless and smallholder farmers. Jodha highlights the non-market contributions of Common Pool Resources (CPRs), including their role in maintaining ecological equilibrium, safeguarding biodiversity, and enhancing soil and water retention, alongside these quantifiable benefits. In dry regions, these environmental processes are essential for sustaining agricultural productivity and ensuring long-term ecological stability. He advocates for community-based management systems that recognise collective decision-making, customary rights, and local knowledge as essential components of effective resource governance.

Kadekodi (2003) expanded this viewpoint by integrating economics, sociology, and ecology to evaluate CPR governance. His study highlighted the significance of institutional diversity by indicating that formal state institutions and traditional management approaches often coexist. Empirical research indicates that privatisation and elite capture weaken communal institutions, whereas community participation enhances resource sustainability in forests, pastures, and water bodies. Kadekodi advocated for the establishment of context-specific governance frameworks that amalgamate legal and administrative innovations with traditional wisdom.

Chopra *et al.,* (1990) further investigated the subject of participatory development in CPR management. They highlighted that accountability and ecological equilibrium are enhanced when local communities participate in resource planning and oversight. Their interdisciplinary research highlighted decentralisation, local leadership, and stakeholder engagement as essential components of effective governance, utilising both qualitative and quantitative methodologies. However, they underscored the imperative for genuine devolution of authority and cautioned against superficial participation.

They assert that participatory development has emerged as a pivotal technique in the discourse on resource management and sustainable development, particularly with common property resources (CPRs). This literature study aims to provide a comprehensive analysis of participatory development, starting with its definition and conceptual framework, which lay the foundation for understanding its principles and objectives. Theoretical underpinnings provide essential ideas and models that inform implementation, while the historical context of participatory development illustrates how paradigm shifts have influenced its use over time.

A review of common property resources underscores their significance in development, including their many types and roles in resource management and community empowerment. Successful examples of participatory development are illustrated through case

studies and empirical data, alongside the challenges and limitations faced by practitioners throughout implementation. Comprehending participatory development processes necessitates a knowledge of stakeholder perspectives, particularly those of local communities and governmental entities. Methodological strategies in the literature encompass participatory action research as well as qualitative and quantitative research procedures. The primary objective of this literature review is to encapsulate the most significant findings and discuss their implications for practice and policy, so contributing to the ongoing discourse on common property resources and participatory development.

Baral (2023) investigated the evolution of decentralised natural resource governance (DGNR) in India from the 1990s. Due to centralised policy frameworks and decentralised institutional responsibilities, his study critically assessed how the rhetoric of engagement often failed to materialise in fact. Baral asserts that dichotomous concepts such as "state versus community" overly simplify the complexities of governance and obscure the power disparities that affect decision-making. He advocated for the restructuring of governance systems to enhance accountability and foster substantial local engagement.

The 73rd Constitutional Amendment created the Panchayati Raj Institutions (PRIs) to enhance local governance in rural areas. Empirical research, however, demonstrates contradictory findings: while PRIs have enhanced access and representation in certain regions, they have also encountered challenges related to administrative overlap, gender bias, and elite control. According to scholars such as Jodha (1992) and Kadekodi (2003), decentralisation devoid of institutional capacity building risks reinforcing local hierarchies instead of promoting inclusivity.

Singh's (1986) and Jodha's (1992) critiques are relevant when assessing the persistent struggle between centralised bureaucracy and communal autonomy. The effective execution of collective governance remains uneven, notwithstanding progressive legislation such as the Forest Rights Act (2006), due to bureaucratic inertia and the neglect of indigenous institutions.

Since the 1990s, India has prioritised participatory decentralised governance of natural resources (DGNR), as noted by Baral. It highlights DGNR's failure to achieve significant objectives such as the conservation of natural resources, substantial local participation, and the incorporation of local knowledge. The research highlights how conceptual dichotomies, such as state vs community and centralisation against decentralisation, misrepresent the relationship between local agency and state authority, therefore oversimplifying the complex reality of

governance. Baral emphasises that fragmented institutional responsibilities and restricted regulatory frameworks have compromised local autonomy and hindered the effectiveness of community-based management initiatives. The study employs theoretical and policy analyses to demonstrate that genuine decentralisation requires a restructuring of power relations, legal frameworks, and accountability mechanisms to enable meaningful participation. The study identifies a significant deficiency in effective local engagement in decentralised natural resource governance, which undermines the overall efficacy of DGNR projects.

The amalgamation of formal administrative frameworks with traditional governance systems has emerged as an increasingly significant field of research in recent years. Dawa (2021) cites Ladakh's transformation as a Union Territory as an illustration of this shift. His qualitative study indicates that administrative reorganisation has adversely affected traditional organisations such as the Goba and Tsogpa, which have historically managed communal resources, while also creating new opportunities for development. Dawa's research indicates that an increase in state authority, absent institutional alignment, can result in the erosion of local legitimacy and participatory governance.

Meinzen-Dick *et al.*, (2020) emphasise polycentric governance as an effective framework for India's common pool resources (CPRs). Their analysis indicates that overlapping institutional arrangements among state agencies, NGOs, and local user groups can enhance flexibility and resilience. They assert that social capital, collective effort, and knowledge dissemination at several levels are essential for effective management, alongside policy formulation. They analyse the challenges of managing common-pool resources in India via the lens of polycentric governance. Their investigation illustrates the collaboration of many organisations, ranging from government authorities to local user groups, in influencing the sustainability and security of the commons.

The authors assert that decentralised and overlapping governance arrangements can enhance resilience by facilitating local adaptation and cross-scale collaboration. They emphasise that, alongside legal regulations, social capital, collective endeavours, and stakeholder information exchange are essential for effective commons management. The research enhances our understanding of how governance networks and institutional diversity may optimise resource management in a rapidly changing socio-ecological context.

The literature on CPR governance in India illustrates a complex trajectory, encompassing colonial centralisation, postwar bureaucratisation, gradual decentralisation, and

participatory governance. Ostrom's theoretical advancements and the practical studies conducted by Indian scholars illustrate the necessity of integrating formal governmental procedures, local institutions, and community agency for the sustainable management of commons. Nonetheless, persistent challenges such as policy fragmentation, insufficient institutional capacity, and elite capture continue to hinder effective policy implementation.

## 2.4. Community Participation and Collective Action in CPR Management

Theoretical studies and practical resource management programs have emphasised the role of local communities in sustaining common property resources (CPRs). Participatory governance has contested the shortcomings of top-down political authority and the inequities of privatisation. Empirical studies indicate that communities often possess the institutional frameworks, social norms, and ecological knowledge necessary for sustainable resource governance (Ostrom, 1990).

Berkes *et al.,* (1989) illustrates the historical effectiveness of traditional societies in managing communal resources. Berkes illustrated through global case studies, encompassing forests and fisheries, that community ownership constitutes a distinct institutional framework based on reciprocity, social governance, and mutual accountability, as opposed to unrestricted access or private ownership. His research refuted the belief that communal resources inevitably decline, emphasising the importance of social norms and informal sanctions in regulating consumption and preserving ecological sustainability.

Berkes linked indigenous knowledge to sustainable governance frameworks in his 2007 research on Traditional Ecological Knowledge (TEK). He asserts that TEK is a dynamic system of knowledge, practice, and belief developed through continuous interaction with ecosystems. Berkes posits that communities may maintain ecological equilibrium by altering local institutions, as they depend more on social learning, adaptive management, and collective decision-making than on externally imposed regulations.

Successful joint efforts need social capital, common norms, and trust. Ostrom (1990) and Stevenson (1991) assert that trust among resource users enhances collaboration and lowers transaction costs. This concept was created by Fuys and Dohrn (2010), who examined the impact of social legitimacy and customary authority on participation in resource governance. They asserted that locally generated notions of legitimacy influenced resource management and access, alongside legal systems.

Their comparative analysis of community-managed systems across several geographical regions revealed that effective and fair governance arises from both internal and external respect for local institutions. Nevertheless, conflicts, marginalisation, and deterioration can arise when official acts undermine local credibility. Fuys and Dohrn concluded that the cornerstone of efficient commons governance is legitimacy, rather than only formal regulation.

Sheikh (2010) provided a significant empirical case from the high-altitude region of Ladakh to demonstrate how indigenous cooperative societies have historically assisted individuals in managing scarce resources. His ethnographic research illustrates how Traditional Ecological Knowledge (TEK) and entities such as the goba (village head) and tsogpa (village assembly) regulate access to grazing and irrigation resources by agreement. Sheikh's research revealed that Ladakhi communities employed reciprocity, peer oversight, and rotational access to maintain equilibrium between human needs and natural limitations, therefore exemplifying effective sustainable governance of common-pool resources.

Although community-based governance was lauded in the initial CPR literature, subsequent studies indicated that community participation is not invariably equitable. The allocation of rewards and responsibilities in CPR systems is often shaped by factors like gender, caste, class, and ethnicity. Chopra *et al.,* (1990) observed that participatory frameworks often exclude women and lower caste groups from decision-making processes. They advocated for inclusive approaches to natural resource management that take into account social justice and gender equity.

Empirical research from India indicates that governance outcomes, such as sustainability and conflict resolution, significantly enhance when women assume prominent roles in resource management committees. Decentralisation measures, such as the Panchayati Raj system, may reproduce local hierarchies, as emphasised by Baral (2023), suggesting that institutional reforms must tackle underlying socioeconomic disparities with administrative restructuring.

Numerous studies have examined successful community-led commons management projects that integrate traditional institutions with adaptable strategies. According to the research by Dolma and Rishi (2018) on community resource management in Ladakh's trans-Himalayan people, organisations like tsogpa and goba remain crucial for the management of pastures, water systems, and forests. These organisations provide equitable access through participatory decision-making, penalties, and customary norms, as evidenced by their mixed-

method study, which incorporated focus groups and household surveys. Conventional resilience strategies are being compromised by urbanisation and climate change, leading to increasing apprehensions.

Wani *et al.*, (2025) shown in their investigation of community-driven ecotourism initiatives in the Trans-Himalayan region that participatory techniques enhance environmental sustainability and sociocultural continuity. Ecotourism initiatives promote biodiversity conservation and strengthen community identity when local stakeholders are involved in planning, decision-making, and benefit-sharing procedures. The research underscores that enhanced sustainability is achieved by empowering individuals to manage their environment rather than relying on externally imposed development strategies.

They share insightful study on community-driven ecotourism in the Trans-Himalayan region, emphasising the necessity of local participation for sustainability. The authors assert that substantial community involvement is essential to maintain a balance between ecological conservation and sociocultural continuity. The study indicates that active participation of local stakeholders in planning, decision-making, and benefit-sharing enhances cultural resilience and environmental stewardship in ecotourism. The basis is based on case studies undertaken in Ladakh and other high-altitude regions.

The research situates itself within the broader framework of sustainable development, illustrating the distinctions between grassroots tactics and externally imposed tourism practices that often overlook the perspectives of indigenous populations. The authors assert that community institutions and traditional knowledge systems are essential for biodiversity conservation, the reinforcement of local identity, and the management of natural resources. The paper addresses the challenges of commercialisation, seasonality, and infrastructural limitations that threaten the viability of ecotourism initiatives within the fragile Trans-Himalayan environment. This study underscores the imperative of engaging local communities as environmental stewards to preserve environmental sustainability and cultural resilience in the Trans-Himalayan area.

The literature assessment on collective action and community involvement indicates that social cohesiveness, leadership legitimacy, and participation quality are essential elements of successful common-pool resource management. The integration of traditional governance systems with formal administrative institutions presents great opportunities for inclusive and flexible administration. Preserving these systems amid industrialisation, environmental challenges, and legal alterations remains highly difficult.

## 2.5. Political Economy and Power Relations in CPR Governance

Understanding Common Property Resource (CPR) governance requires an examination of the broader political and economic frameworks that determine ownership, control, and access. Scholars in political ecology and institutional economics have highlighted the influence of power imbalances on the allocation of benefits and exclusions within resource frameworks. Governance frameworks, while intended to promote widespread participation, often mirror the objectives of prevailing actors whether state agencies, local elites, or external organisations.

Baral's (2023) critical study indicates that, despite progressive rhetoric, decentralisation has failed to realise genuine community empowerment in the context of participatory decentralised governance of natural resources (DGNR) in India. Baral asserts that reallocating administrative duties without dispersing authority sometimes reinforces existing hierarchies in policy design. The research revealed that the "state versus community" dichotomy simplifies governance by obscuring the complex interactions among local agency, political patronage, and bureaucratic processes. Baral's findings emphasise that successful decentralisation necessitates both institutional reform and a restructuring of power dynamics to ensure accountability and inclusivity.

Fuys and Dohrn (2010) asserted that patterns of access and exclusion are influenced by legitimacy and authority, rather not only by formal property rights. Their methodology aligns with the political economics perspective, which asserts that social interactions are the foundation of power, and that governance outcomes are dictated by the decision-making process and the persons who wield it. This is particularly apparent in regions such as Ladakh, where government-mandated administrative frameworks exist alongside traditional institutions, often leading to competing assertions and contested legitimacy.

This works provide an extensive examination of the institutional and social aspects of common property resource (CPR) management. They assert that socially created concepts of authority, legitimacy, and customary practices greatly impact resource access and governance, more so than ownership or legal structures in communities. They highlight that community-based management systems frequently function through informal but resilient institutions that govern access to, use of, and capitalisation on shared resources, thereby surpassing traditional biophysical and economic models. Fuys and Dohrn illustrate via empirical examples that resource management is often successful and sustainable when local communities wield legitimate authority acknowledged by both internal and external stakeholders. Conversely,

disputes over resources, attempts at marginalisation, and environmental degradation frequently occur when these regional systems of legitimacy are threatened by foreign laws or governmental actions. Their argument emphasises that the heart of efficient CPR governance is legitimacy rather than simply formal legal recognition. They expand the discussion on common property regimes by elucidating the interactions of access, authorisation, and legitimacy, therefore underscoring the significance of context, culture, and power dynamics in the establishment of sustainable resource management. Fuys and Dohrn's perspective significantly enhances our comprehension of the context-dependent and participatory approaches essential for the maintenance of common property regimes across diverse ecological and sociopolitical environments.

Dawa (2021) provides a critical analysis of the alterations in Ladakh's governance institutions following its designation as a Union Territory (UT) in 2019. His analysis indicates that the new governmental structure has eroded traditional institutions such as the tsogpa (village council) and goba (village head), despite enhancing bureaucratic efficiency and resource allocation. Historically, these organisations facilitated collective resource management, resolved conflicts, and mediated community engagement.

Dawa asserts that administrative centralisation has disrupted the balance between state authority and local autonomy. The UT designation has undermined the legitimacy of community-based governance, although generating new chances for policy implementation and infrastructural advancement. The subsequent clashes between traditional authority and bureaucratic control exemplify the complex power dynamics that characterise borderland government.

Dawa's study illustrates how state restructuring and institutional layering may both empower and hinder communities within the broader context of CPR governance. His findings align with Ostrom's (2008) notion of polycentric governance, which promotes multi-tiered collaboration rooted on local legitimacy and warns against rigid centralisation.

Dawa critically analyses the consequences of Ladakh's conversion to a Union Territory, highlighting the effects of this political restructuring on community involvement and local administration. Administrative reform is a multifaceted process that reconfigures the relationship between the state and traditional institutions, such as the goba and tsogpa, while simultaneously modifying bureaucratic structures at various levels. The study reveals conflicts between existing local self-governance structures and centralised authority, use a qualitative approach that encompasses policy analysis, interviews, and community case studies. The

results demonstrate that restructuring has improved resource allocation and administrative efficiency, but has simultaneously reduced local autonomy and conventional communal decision-making procedures. The erosion of conventional governance frameworks has resulted in less community engagement and a deterioration in institutional legitimacy regarding the administration of communal resources. The study highlights the necessity of incorporating indigenous institutions within contemporary administrative frameworks to achieve governance that is inclusive and culturally relevant. Nonetheless, its restricted temporal breadth and disregard for gendered and ecological effects underscore the need for more research. In conclusion, the study significantly enhances the understanding of how administrative centralisation may alter identity, development involvement, and governance dynamics in Ladakh's post-restructuring context.

Bhan and Behera (2017) examine the impact of civil-military relations on administration and development in the Kargil border region of Ladakh. Their qualitative analysis indicates that Kargil is a key frontier where civilian governance and national security interests intersect. The authors assert that while prolonged militarisation has enhanced infrastructural and economic stability, it has simultaneously complicated the differentiation between military authority and civilian governance.

Research indicates a duality in reality: while military institutions provide security, employment, and developmental support, their pervasive influence concurrently constrains local autonomy and decision-making. Bhan and Behera indicate that disputes about land utilisation, environmental stewardship, and community participation in planning processes often arise from the overlapping jurisdictions of military and civil organisations. They assert that institutional structures that equilibrate national security objectives, the democratic rights of local communities, and their developmental aspirations are essential for the viability of borderland governance.

The indirect impacts of military infrastructure on common pool resource governance are evident. Conventional management practices in some border towns have been disrupted by limited access to pastures and grazing lands, mobility constraints, and the transformation of resource regions into security zones. The study's findings emphasise that power in borderland administration is not just administrative or political but also topographical, manifested through infrastructure control, monitoring, and restrictions on the landscape.

This work meticulously analyse the intricate dynamics of civil-military relations in the Kargil border area, assessing the impacts of sustained militarisation on local governance,

cultural identity, and development. They assert that Kargil functions as a strategic boundary where ordinary civilian life and security needs converge, creating unique socio-political issues. The authors investigate the simultaneous presence of the military's security duties and its developmental role using a qualitative research approach that encompasses discourse analysis, policy analysis, and field interviews. Research demonstrates that the military's presence has promoted infrastructural development and economic stability; nevertheless, it has also incited confrontations over authority, land use, and decision-making autonomy. The paper asserts that the indistinct borders between military and civilian spheres in local administration provide both possibilities and problems. An essential understanding is that effective government at the border necessitates mechanisms that equilibrate the security, democratic rights, and developmental demands of border communities. Their study situates Kargil within the paradigm of civil-military cohabitation rather than conflict, so contributing to larger debates on border studies and reconciliation. Bhan and Behera emphasise a lack of longitudinal data about the changing socioeconomic effects of militarisation, highlighting the need for more multidisciplinary study.

Smyer Yü and Michaud (2017) offer an interdisciplinary perspective on the Himalayan borderlands as sites of negotiation, where local identities, subsistence strategies, and governance are shaped by international and regional dynamics. Their curated collection analyses the management of development, belonging, and sovereignty in politically sensitive places throughout trans-Himalayan regions, including Ladakh, Nepal, and Tibet.

The authors assert that continuous interactions between local adaptation and state power define borderland governance. They illustrate via ethnographic and comparative research how state-driven territorialisation has profoundly transformed regional economies and traditional management systems through infrastructural initiatives, border securitisation, and militarisation. Nevertheless, via habitual acts of defiance, flexibility, and informal governance, communities continue to exercise agency.

Their study indicates that borderland regions are dynamic political ecologies where identity, belonging, and survival are inextricably connected to resource governance, and should not only be seen as peripheries. Smyer Yü and Michaud assert that while anthropological research illuminates local adaptation, a disconnect persists between these ethnographic insights and institutional and policy frameworks. This gap underscores the need for international comparative study that investigates how governance has evolved in response to shifting ecological and geopolitical dynamics.

Their works provide a thorough multidisciplinary examination of the social, cultural, and ecological changes taking place in the Himalayan borders. In a rapidly modernising yet geopolitically sensitive region, the editors compiled ethnographic and regional studies examining how people navigate issues of identity, belonging, and livelihood. Their research utilises qualitative approaches, including as ethnography, field observation, and comparative regional analysis, to illuminate the daily lives of inhabitants in disputed highland areas. The primary framework integrates concepts of mobility, border governance, and cultural resilience globally. Smyer Yü and Michaud emphasise how globalisation, militarisation, and infrastructural development alter traditional livelihoods and spatial conceptions. The book predominantly emphasises anthropological viewpoints, with less attention to political ecology or institutional governance frameworks. It acknowledges the conflict between local adaptive practices and state-imposed territorialisation, although it minimises the significance of participatory governance and policy frameworks. Longitudinal and cross-border comparative studies are essential to evaluate the changing governance dynamics in response to emerging geopolitical forces. Smyer Yü and Michaud advocate for the conceptualisation of borders as sites of interaction rather than isolation.

The politics of representation in CPR governance is a persistent theme in these books. Communities are rarely homogeneous; rather, they exist within intricate political frameworks where both formal and informal organisations wield influence. Despite the objective of decentralisation reforms in India being to empower local administrations, factors such as caste, gender, and party affiliation can result in selective participation (Chopra *et al.*, 1990; Baral, 2023).

In Ladakh, formal administrative bodies such as district administrations and Hill Development Councils exist alongside traditional organisations like the Tsogpa and Goba. This institutional pluralism may increase governance diversity, although it may also lead to overlapping jurisdictions and ambiguous authority. Coordination across these systems is essential for efficient governance to prevent institutional conflict and ensure that marginalised people remain actively engaged.

The management of shared resources is inherently political, as indicated by studies on the political economy of common-pool resource governance. Power dynamics affect access, participation, and sustainability, whether via administrative restructuring, decentralisation initiatives, or militarisation. Scholars such as Dawa (2021), Baral (2023), and Bhan & Behera (2017) assert that governance involves negotiating legitimacy and power within evolving sociopolitical contexts, rather than merely formulating regulations. The negotiations become

far more challenging in regions such as Ladakh because to the complex interaction of natural elements, identity, and security concerns.

## 2.6 Socio-Economic and Cultural Dimensions of CPR Use

Common property resources are important for social unity, ecological equilibrium, and sustainable livelihoods in India's rural regions, particularly in elevated locations such as Ladakh. Beyond supplying essential resources such as fuel, food, and water, common property resources (CPRs) including pastures, forests, and water bodies are fundamental to intergenerational continuity and community cohesion.

In Ladakh, characterised by a short planting season and arid environment, cooperative resource management is vital for survival. Dolma and Rishi (2018) demonstrated that ancient norms and rotational systems continue to be employed by village organisations such as the tsogpa (village assembly) and goba (village head) to regulate access to water, pastures, and forest resources. Their mixed-method study indicates that community engagement ensures equitable access, prevents overexploitation, and maintains ecological balance. Nonetheless, these established governance frameworks are increasingly being undermined by modernity, climate change, and escalating political intervention.

Angchok *et al.*, (2016) also examined the management of tsogs, or sacred forest groves, in Ladakh's Nubra Valley. These groves furnish essential resources like as timber, forage, and pastureland, and are managed as communal property by the community. The research demonstrates how self-regulation, religious sanctions, and informal peer oversight facilitate resource conservation in these fragile ecosystems. Nonetheless, overexploitation transpired when these areas were perceived as open-access zones due to the impact of foreign policy. Their findings underscore the ongoing necessity of conventional enforcement strategies and community care for the preservation of high-risk alpine habitats.

Jina (2019) provides a comprehensive anthropological and ecological analysis of the transhumance practices in Ladakh, which are crucial for the implementation and governance of Common Pool Resources (CPR). The research demonstrates that pastoralists' seasonal movement between low winter valleys and high-altitude summer pastures optimises resource use and fosters ecosystem regeneration. Transhumance is a social institution based on collective ideals, customary rights, and cooperation among herding tribes, rather than only an economic activity.

Jina's research illustrates how traditional migratory patterns have been disrupted by industrialisation, decentralization, and infrastructural development, leading to diminished herd

diversity and resource degradation. He asserts that preserving conventional management frameworks that equilibrate resource utilisation with natural cycles is crucial for the sustainability of pastoral systems. This work is significant as it links social organisation with environmental adaptation, demonstrating that community-based governance, mobility, and ecological knowledge must be linked for sustainable livelihoods in high-altitude environments.

In addition to material dependence, the social dimension of CPRs include identities, rituals, and perspectives grounded in ecological principles. Norberg-Hodge (2016) provides a comprehensive ethnographic and ecological critique of globalisation through an analysis of traditional Ladakhi culture and society. She illustrates how pre-modern Ladakh sustained an autonomous and ecologically balanced existence via collaboration, reciprocity, and community-managed commons. Nonetheless, these systems were disrupted by the emergence of consumerism, centralised governance, and market-driven expansion, leading to ecological deterioration and social fragmentation.

Norberg-Hodge's study reveals that the moral economy of Ladakh's communities, characterised by a cultural emphasis on collaboration and aid, is deeply intertwined with traditional ecological knowledge. Her endorsement of "localisation" as an alternative paradigm for development aligns with broader discourses on environmental ethics and sustainable development. The multidisciplinary approach of the work, integrating anthropology, ecology, and development studies, illustrates the interconnection between ecological sustainability and cultural resilience.

Traditional Ecological Knowledge (TEK) was similarly defined by Berkes (2007) as a dynamic system integrating belief, practice, and observation. TEK provides insights on conservation, agriculture, grazing, and irrigation methods that enhance livelihoods and biodiversity in Himalayan communities such as Ladakh. These practices are experimentally validated by Sheikh (2010) and Dolma & Rishi (2018), demonstrating how cultural norms regulate resource access and provide social fairness.

The works of Rizvi (1996) illuminate the social and historical transformations in the borderland settlements of Ladakh. Ladakh functions as a trans-Himalayan nexus that promotes economic and cultural exchange among Tibet, South Asia, and Central Asia, as indicated by his study. These historical networks fostered institutional collaboration and collective control of transboundary commons, encompassing trade routes and grazing areas, while also enabling commerce. Post-partition of India, the decline of caravan commerce dismantled communal frameworks, altering resource availability and socioeconomic connections.

Rizvi offers an extensive anthropological and historical examination of Ladakh, greatly improving our understanding of trans-Himalayan civilisations. His study positions the region as a crucial nexus among Tibet, South Asia, and Central Asia, influenced by millennia of pilgrimage, trade, and cultural interchange. Rizvi analyses Ladakh's evolution from a traditional trading hub to a politically unstable frontier using an interdisciplinary approach that combines geography, anthropology, and history, utilising qualitative methods including ethnographic observation, archival research, and the examination of historical travel accounts. The study focusses on several ethnic and religious groups, including Buddhists, Muslims, and Brokpas, whose social structures and flexible livelihoods illustrate the heterogeneity of Ladakhi culture. His study clarifies patterns in social resilience, religious syncretism, and multicultural cohabitation in the context of changing political and environmental situations.

Rizvi's major contribution is in transforming Ladakh from a secluded outpost into a historically interconnected hub of cross-cultural interchange. The study is pertinent to contemporary debates over regional management, sustainable development practices, and the preservation of cultural assets in vulnerable mountainous regions. The research contains several shortcomings, including its failure to address environmental deterioration, gendered dimensions of social development, and geopolitical transformations that occurred post-1990s. These gaps highlight the imperative for improved multidisciplinary research that synthesises frameworks for participatory governance, development studies, and political ecology. Rizvi's research offers a solid basis for comprehending the cultural struggles and sociopolitical events that continue to affect Ladakh's position within the larger Himalayan area.

Rizvi illustrates how communities adapted by embracing new livelihood strategies, including as tourism and wage labour, while border closures and political reconfigurations eroded traditional trade-based institutions. However, these alterations exacerbated socioeconomic inequality and diminished community cohesion. The study indicates that ancient trade organisations functioned as collaborative governance frameworks founded on credit networks, reciprocity, and rules for dispute resolution, many of which align with principles of Common-Pool Resource management.

Rizvi offers a comprehensive historical and ethnographic analysis of Ladakh's trans-Himalayan trade routes, examining the effects of commerce, migration, and cross-cultural exchanges on the region's socioeconomic and political dynamics. The study investigates the caravan trade as a crucial institution that enabled interregional communication prior to the formation of contemporary state boundaries, connecting Ladakh to Tibet, Central Asia, and the Indian subcontinent. The intricate hierarchies between commercial elites and peasant traders

that enabled cross-border commerce are highlighted, employing archival sources, oral histories, and anthropological material. The results demonstrate that commerce served as a means of fostering communal cohesiveness, diplomacy, and cultural exchange, in addition to its economic purpose. The research contends that Ladakh's conventional economy was disrupted, resulting in changes to livelihood, settlement, and social structure due to the reduction in trans-Himalayan commerce after political split and border closures. It is essential to recognise that trade networks have historically functioned as collaborative governance systems, characterised by implicit regulations concerning credit, routes, and conflict resolution. The research improves comprehension of Ladakh's historical economy in the context of wider dialogues on borderland resilience and regional adaptation. It underscores the need for more comparative studies that connect historical trade patterns with current changes in mobility, tourism, and economic dynamics in Ladakh due to globalisation.

Gupta (2014) presents an alternate perspective through her ethnographic study of the Balti community located near the Indo-Pak border in Kargil. The study elucidates how prevalent cultural landscapes and traditional familial structures were disrupted by military and geopolitical estrangement. The Baltis utilise memory, language, and rituals to maintain cultural continuity across borders despite official restrictions. Cultural continuity functions as a kind of resilience against environmental and political volatility, as Gupta's research demonstrates the interconnection between borderland identities, ecological belonging, and collective memory.

Gupta conducts an ethnographic investigation on marginality, identity, and belonging within the Balti group in Ladakh, near the Indo-Pak border. The study demonstrates the interaction of governmental narratives on security, cultural continuity, and geopolitical tensions that influence the daily lives of those living in border areas. Gupta underscores that the Baltis maintain transnational ties via shared memories, language, and cultural traditions, despite their geographical and political separation from kin beyond the border. The study highlights the paradox of belonging, in which borderland communities are essential to the nation-state yet are symbolically peripheral in its political awareness. Gupta's research substantially advances borderland studies by illustrating how ordinary individuals navigate identity, resilience, and belonging in militarised and politically disputed environments.

The socioeconomic dimensions of CPR utilisation in Ladakh reveal adaptive strategies that integrate social innovation and ecological prudence. Dolma and Rishi (2018) assert that communities employ adaptive norms responsive to changing ecological conditions to regulate common-pool resources (CPRs). In the Trans-Himalayan region, where climatic extremes and environmental volatility persist, this adaptability has proven crucial for survival.

Ladon *et al.,* (2023) provide more insights into mountain agropastoralism by examining the alterations in traditions prompted by modernisation and tourism demands. Their research illustrates how community-oriented pasture and water management sustains the link between agriculture output and cattle management. Ladakhi communities exemplify the resilience of indigenous systems by maintaining principles of ecological reciprocity and communal management under external adversities. Consequently, agropastoralism is framed in the research as both a cultural institution and an economic activity vital for maintaining socio-ecological balance.

The research on the social and cultural dimensions of CPR use indicates that resource governance in Ladakh transcends just economic value. Common property systems are embedded in social structures that regulate cooperation, conflict resolution, and cultural traditions and belief systems. Collectively, the studies conducted by Rizvi et al., indicate that resource governance in Ladakh integrates ethical responsibility with practical necessity. Nonetheless, these frameworks of social ethics and ecological knowledge are in risk of being compromised by modernism, militarisation, and centralised administration.

## 2.7 Governing the Commons in Ladakh: Insights from Existing Studies

Jina's (2019) detailed examination of transhumance activities in Ladakh primarily examines the ecological, economic, and cultural dimensions of pastoral migration in high-altitude environments. The research illustrates that Ladakh's agro-pastoral subsistence system has always relied significantly on seasonal migration between lower valleys and higher pastures. It highlights how herding cultures have developed adaptive strategies to address resource scarcity, geographical constraints, and climatic extremes through ethnographic study and spatial analysis. The findings indicate that transhumance is a sociocultural institution grounded on environmental stewardship, customary rights, and social collaboration, as well as serving as a means of subsistence. Research indicates that traditional systems have been increasingly disrupted by modernisation, road connection, and sedentarization regulations, leading to alterations in land usage, reduced herd mobility, and a deterioration of communal grazing standards. According to a significant argument, preserving traditional management institutions in accordance with natural cycles is crucial for the sustainability of high pasturelands. The integration of mobility, adaptation, and communal property management significantly enhances our understanding of human-environment interactions within the trans-Himalayan framework. It indicates that assessing the long-term impacts of development and climate change on transhumant livelihoods need quantitative ecological data and longitudinal study.

Dolma and Rishi (2018) analyse the functioning of common property resource management systems in the trans-Himalayan communities of Ladakh, emphasising the role of community-based organisations in sustaining rural livelihoods and maintaining ecological equilibrium in fragile alpine ecosystems. The study examines local governance practices related to pastures, irrigation, and forest resources via a mixed-method approach that integrates field observation, focus group discussions, and household surveys. The findings indicate that traditional institutions such as the tsogpa and goba significantly influence resource management through established norms, sanctions, and collective decision-making. The research indicates that these systems align social organisation with natural cycles, hence minimising resource degradation and fostering equitable access. Nevertheless, the resilience of these communal structures is being compromised by several substantial challenges, including modernity, climate fluctuations, and more governmental intervention. The authors assert that sustainability and participation in resource governance might be enhanced by integrating formal governance processes with traditional management systems. The study contributes substantial empirical evidence to the discourse by situating common property theory within Ladakh's unique socio-ecological context. Nevertheless, it emphasises that comparative research across diverse trans-Himalayan regions are essential for a comprehensive understanding of the disparities in institutional performance and adaptation strategies.

Ladon *et al.,* (2023) analyse the dynamics of mountain agropastoralism in Ladakh, located in India's Trans-Himalaya, focussing on the adaptations of traditions and institutions in response to environmental and socioeconomic changes. The study emphasises that centuries of human-environment interaction have shaped Ladakh's agropastoralism, a finely balanced system in which crop cultivation and livestock rearing are intricately linked for livelihood stability. The authors underscore the essential function of customary institutions and collective decision-making in managing common property resources such as meadows and water, which are crucial for sustaining productivity in a challenging environment. The research employs fieldwork and participatory observation to demonstrate how external influences, such as tourism, modernity, and climate change, are altering traditional land use practices and eroding community-based governance structures. The research reveals considerable local resilience despite these limits, since communities persist in adapting their methods while maintaining the core ideals of ecological balance and collaboration. The study contributes to broader discussions on socio-ecological resilience and sustainable resource management by illustrating how traditional practices in Ladakh offer valuable insights for managing fragile alpine ecosystems under changing global circumstances.

In the Nubra Valley of Ladakh, India, Angchok *et al.*, (2016) focus on the sustainable management of common property resources, namely tsogs (forest groves). It underscores the importance of these resources in providing local populations with access to grazing pasture, fuel wood, and aesthetic value in a perilous high-altitude environment. The study addresses the overexploitation of tsogs, which jeopardised their sustainability as they were perceived as uncontrolled open-access resources. It emphasises the role of local players in the conversion of tsogs into a communal property resource governed by institutional regulations for sustainable utilisation. The method emphasises the obligations of many stakeholders by examining distinct categories of norms and regulatory patterns associated with tsogs management. The predominant informal, community-based monitoring methods are identified as peer monitoring and self-discipline among users. This study does not investigate the potential scalability of local institutional norms to other regions with similar ecological and social conditions. This paper does not consider the influence of external variables, like as market pressures or climate change, on the sustainability of tsogs and their management strategies.

## 2.8. Contemporary Challenges and Emerging Debates

A significant impediment to the sustainability of Common Property Resources (CPRs) is climate change, particularly in mountainous and ecologically sensitive regions such as Ladakh. The pressure on local groups responsible for shared resource management has intensified owing to global warming, glacial retreat, water scarcity, and altered precipitation patterns.

Tucker *et al.*, (2021) conduct a comprehensive assessment of the governance challenges faced by Mountain Social–Ecological Systems (MtSES) globally. Insufficient policy integration, inadequate local involvement, and disjointed institutional frameworks are recognised as the primary barriers to sustainability in their worldwide study of researchers and practitioners. The study indicates that multi-tiered, participatory governance, which harmonises local adaptive capacities with global environmental objectives, is crucial for effective administration in mountainous regions. It underscores that although local governance may mitigate specific risks, pervasive issues such as centralisation and corruption often obstruct progress.

These findings hold considerable significance in the Himalayan context. The capacity of groups like as Tsogpa and Goba to maintain ecological equilibrium has been challenged by Ladakh's climatic volatility, which has disrupted traditional irrigation patterns, grazing resources, and livelihood security. Resilience in these contexts is increasingly perceived as

reliant on adaptive governance frameworks that integrate scientific methodologies with traditional ecological knowledge.

Armitage (2007) integrates resilience thinking with multi-level governance in this idea. His work underscores the imperative of integrating community-based governance with higher levels of government through collaboration and knowledge sharing. Armitage advocates for polycentric, deliberative governance that recognises the dynamic interrelation between natural and social systems, highlighting adaptive learning and flexibility as crucial for managing complex commons systems.

Armitage examines the role of multi-level governance in facilitating learning and adaptation within complex social-ecological systems. This pertains to the management of common-pool resources. It emphasises the necessity of linking community-based administration with higher governmental tiers, integrating traditional and scientific knowledge, and fostering collaboration and information exchange to enhance adaptability and resilience among individuals. The review encapsulates principles from three prominent academic disciplines: political ecology, resilience theory, and common property theory. This integration aims to deliver a thorough comprehension of commons governance within a multi-tiered architecture. The technique encompasses multidisciplinary integration, the use of real-world examples to illustrate theoretical concepts, and a critical, context-specific analytical approach to comprehend and enhance commons governance. It underscores the vital significance of multidisciplinary methodologies, profound contextual comprehension, acknowledgement of power dynamics, and robust deliberative procedures in fostering adaptive and equitable management of shared resources.

The border regions of Ladakh have experienced significant alterations in resource utilisation and governance structures as a result of socio-economic transformations, demographic upheavals, and developmental demands.

Hussain *et al.,* (2023) assert that the rapid urbanisation of Kargil, a Trans-Himalayan town, driven by migration and infrastructural expansion, has altered land use and strained water resources. Remote sensing data indicates that agricultural and pasture regions are being transformed into urban settlements, affecting traditional livelihoods and ecological stability.

The authors assert that urbanisation in high-altitude areas such as Kargil encompasses both potential and risk. It enhances administrative importance and connectivity; nevertheless, it also introduces waste management challenges, increased water usage, and unsustainable

construction practices. Traditional commons governance structures, reliant on community engagement and collective ethics, are jeopardised by these alterations.

They examine the phenomenon of mountain urbanisation in the Trans-Himalayan town of Kargil, Ladakh. They concentrate on the socioeconomic and geographical determinants influencing its expansion. The research underscores that administrative significance, infrastructural advancement, and migration from neighbouring rural regions are the principal drivers of rapid urban growth in this delicate alpine environment. The authors employ field surveys and remote sensing to demonstrate significant alterations in land use, exemplified by the conversion of agricultural land into residential and commercial zones. The research indicates that Kargil's urban expansion reflects both environmental strain and modernisation, resulting in increased demand on local ecosystems, waste management, and water supplies. The research offers significant insights into the difficulties of sustainable urban development in elevated Himalayan communities such as Kargil.

Tripathi and Dogra (2024) present an alternate perspective through their ethnographic research on the Changpa pastoralists of Ladakh. Their study situates the issues of border militarisation, modernisation, and sedentarization within the framework of political ecology. They argue that although border infrastructure and state-sponsored development projects have generated new economic opportunities, they have simultaneously eroded indigenous ecological knowledge, communal grazing patterns, and pastoral mobility. The profound displacement of local governance structures by state-driven modernity is seen in the economic and cultural alienation of nomadic tribes.

The authors assert that the marginalisation of pastoralists is a political process wherein bureaucratic control and national security supersede regional autonomy, rather than merely a developmental concern. Their findings underscore the imperative for inclusive governance models in border policy frameworks that integrate ecological awareness, cultural identity, and mobility.

This study presents a critical sociocultural examination of the Changpa pastoralists of Ladakh, emphasising the impact of modernity, state policy, and border militarisation on their traditional livelihoods. The writers examine the enduring estrangement faced by this nomadic tribe, whose way of existence is inextricably linked to the delicate trans-Himalayan ecology. State-led development and border security measures have facilitated new infrastructure and economic possibilities; they have also impeded the Changpas' access to their land, mobility, and the preservation of their culture. The research demonstrates that peripheral communities

frequently bear the costs of strategic and developmental interventions by contextualising these changes within the frameworks of political ecology and borderland studies. Tripathi and Dogra contend that the Changpas are disadvantaged both economically and epistemically, since their pastoral identities and indigenous knowledge systems are increasingly eroded by modern state rationalities. Tripathi and Dogra explicate the emergence of alienation via the fragmentation of social unity, ecological dislocation, and the diminishment of communal independence, using critical theoretical frameworks and ethnographic viewpoints. The research substantially improves our understanding of borderland communities in South Asia by highlighting the significance of inclusive development models that acknowledge cultural uniqueness, ecological interdependence, and local agency in high-altitude pastoral environments.

In the Trans-Himalayan region of Ladakh *et al.,* (1994) examined the intricate link between land-use alterations and animal conservation. Their research indicates that traditional land-use patterns have been affected by socioeconomic developments, such as increased cow grazing and construction projects, jeopardising the fragile equilibrium between wildlife populations and domestic herding. They advocated for conservation practices that integrate modern ecological research with traditional resource management methods, fostering the coexistence of subsistence needs and biodiversity protection.

The authors examine the intricate relationship between animal protection and land use alterations in Ladakh, situated in the Trans-Himalayan area. Their research demonstrates that socioeconomic and policy-driven developments have profoundly transformed traditional pastoral practices that were previously viable. They assert that habitat degradation and competition between domestic and wild ungulates are attributable to heightened livestock grazing, infrastructural expansion, and population pressures. They emphasise that these alterations jeopardise the fragile high-altitude ecosystems that sustain species such as the snow leopard and Tibetan argali. The research emphasises the necessity of conservation techniques that integrate contemporary ecological insights with traditional resource management practices. The authors propose an equitable approach to satisfy food requirements while conserving biodiversity through the promotion of community engagement and adaptable governance.

Torre *et al.,* (2022) in ‘Revitalising Collective Resources in Mountain Areas Through Community Engagement and Knowledge Co-creation’ reported analogous findings, demonstrating that cooperative learning and knowledge co-production enhance the resilience of mountain communities. Their findings indicate that the amalgamation of traditional and scientific knowledge enhances creativity, fortifies trust, and amplifies local capacity for

adaptive management. They assert that this participatory method is vital for revitalising community resource governance and preventing the decline of traditional systems owing to modernising pressures.

They examine the improvement of sustainable management of collective resources in mountainous areas via collaborative learning and participatory governance. The authors contend that community participation and knowledge co-creation are essential to address issues such as depopulation, economic decline, and the deterioration of conventional management systems. Their study demonstrates that the amalgamation of scientific knowledge with indigenous wisdom promotes social cohesiveness, improves adaptive ability, and nurtures trust. The research demonstrates that co-creation processes foster a sense of responsibility for communal resources and stimulate innovative ideas, therefore empowering communities. Torre et al. emphasise the significance of employing inclusive, participatory approaches to enhance the resilience of mountain socio-ecological systems throughout time and to restore communal resource control.

Ostrom (2008) and Armitage (2007) assert that institutional resilience underscores the importance of flexibility, trust, and collaborative networks for effective stewardship of shared resources. Polycentric governance, characterised by many decision-making centres capable of adapting to evolving conditions, is essential for fostering resilience in vulnerable areas such as Ladakh, where socio-ecological elements fluctuate rapidly.

Recent research underscores the growing importance of polycentric and participatory governance models that integrate many levels of authority local, regional, and national. Meinzen-Dick *et al.,* (2020) assert that polycentric systems enhance collaboration among several stakeholders, hence increasing resilience through the incorporation of redundancy and adaptation. Their study on CPRs in India indicates that fostering trust and collaboration enables overlapping governance organisations, including local user groups, NGOs, and state agencies, to collaborate effectively in resource management.

Tucker *et al.,* (2021) present analogous arguments advocating for co-management frameworks that emphasise inclusivity and continuous learning. These initiatives not only democratise resource governance but also bridge the knowledge disparity between indigenous and scientific systems. In politically sensitive regions such as Ladakh, where centralisation, militarisation, and swift economic development complicate multi-level coordination, these methods face challenges in execution.

The authors investigate the sustainability problems faced by mountain social-ecological systems (MtSES), which deliver vital ecosystem services but are susceptible to catastrophe risks and variations in the global environment. It emphasises that effective governance is essential for protecting natural resources and enhancing the quality of life for communities reliant on MtSES. Their analysis identifies enduring governance issues, including fragmented institutional frameworks, inadequate local involvement, ineffective policy integration, and the marginalisation of mountain communities from national and international development agendas, as indicated by a global survey of researchers and practitioners. This study underscores the necessity of enhanced governance at all levels to render mountain social-ecological systems (MtSES) more sustainable. Addressing governance issues is essential for efficient management and conservation in mountainous regions. For sustainable mountain management, a comprehensive approach is required that considers both local and external governance dynamics. Stronger local government can address certain issues; but, many problems, such as corruption, stem from external factors. The study indicates that top-down policy methods frequently fail to comprehend the complexity of mountain socio-ecological systems, resulting in poor implementation and inequitable benefits across various populations. The authors promote participatory governance approaches that emphasise fairness, resilience improvement, and the incorporation of local knowledge. The study provides comparative observations from many mountainous regions, including the Himalayas, Andes, and Alps, to illustrate his findings.

Norberg-Hodge (2016) and Wani *et al.,* (2025) emphasise that tourism and globalisation exert opposing influences on mountain ecosystems. Unregulated commercialisation threatens ecological sustainability and cultural integrity, but ecotourism offers financial opportunities and incentives for conservation. In juggling these conflicting demands, community-based solutions that place an emphasis on local ownership and benefit-sharing have shown more effectiveness.

Norberg-Hodge presents a compelling ethnographic and ecological critique of globalisation through a comprehensive examination of Ladakh's traditional civilisation and its evolution under modern developmental pressures. The essay discusses the disintegration of a formerly self-sufficient and environmentally balanced society, which became socially fragmented, economically reliant, and culturally diminished due to exposure to global market forces and government-led modernisation. Norberg-Hodge utilises a qualitative and participatory research technique based on comprehensive field observation to clarify the complex relationships between culture, the environment, and community wellness. The study

aims to clarify how Ladakh's indigenous knowledge systems and sustainable practices may provide valuable insights for rethinking development in a progressively globalised society. This indicates that the rise of consumerism, centralised control, and the monetary economy has undermined traditional values such as environmental stewardship and charity. Norberg-Hodge asserts that modernisation frequently harms the environment and precipitates considerable mental health issues in mountain communities, despite its purported benefits. The research aims to promote localisation, which involves improving local economies, education, and governance to counteract the homogenising impacts of globalisation. This study primarily demonstrates an innovative perspective on development grounded in cultural resilience and ecological harmony.

The shift fuelled by tourism reinterprets the notion of commons, converting traditional grazing grounds, wetlands, and revered landscapes into marketable commodities. To ensure that tourism enhances rather than undermines community-based resource governance, scholars recommend regulatory frameworks that include environmental ethics and local participation.

The present research on CPR governance reveals a dynamic sector influenced by the interconnected challenges of urbanisation, militarisation, globalisation, and climate change. There is consensus among this study that multi-level, flexible, and participatory approaches are essential for sustainable governance in fragile environments. Authors such as Armitage (2007), *Tucker et al.,* (2021), *Torre et al.,* (2022), and Meinzen-Dick *et al., (*2020) together demonstrate that resilience is contingent upon continuous learning, collaboration, and legitimacy, alongside institutional design. In borderland contexts like Ladakh, where geopolitical sensitivity and environmental vulnerability intersect, this adaptability is crucial for enduring commons administration.

## 2.9 Research Gap

Despite the substantial and growing body of literature on Common Property Resources (CPRs), significant research gaps persist, particularly on the intersections of borderland governance, ecological fragility, and political change.

Despite minimal concentration on high-altitude trans-Himalayan regions such as Ladakh, the bulk of CPR studies in India have been on the management of forests, water, and pastures in central and southern regions. Despite the valuable empirical analyses provided by academics such as Jodha (1992), Dolma & Rishi (2018), and Angchok *et al.,* (2016), there is a scarcity of systematic studies investigating the effects of borderland geopolitics, militarisation, and administrative restructuring on resource governance. The unique geostrategic significance

and climatic susceptibility of Ladakh need a regional approach to commons governance that integrates political, cultural, and environmental factors.

Despite substantial research on collective action and participatory management (Ostrom, 1990; Berkes, 1989; Kadekodi, 2003), the power dynamics affecting institutional performance in frontier regions have been inadequately explored. The tension between local autonomy and state authority is emphasised in the works of Baral (2023) and Dawa (2021); nonetheless, there is a lack of empirical evidence about the influence of these dynamics on regular governance practices in border communities. Moreover, whereas civil-military connections (Bhan & Behera, 2017) and the impact of security institutions on land-use patterns are evidently pertinent to borderland contexts, they are hardly included into CPR discourse.

Limited research examines intra-community differences, particularly those related to gender, caste, or ethnicity, despite widespread recognition of community participation. According to Chopra *et al.,* (1990) and Norberg-Hodge (2016), empowerment does not always equate to engagement. Investigating whose perspectives are acknowledged in decision-making and how gendered experiences affect access to and control over communal resources is essential in Ladakh, where local institutions are deeply rooted in traditional hierarchies.

A significant amount of the research continues to depend on static institutional models rather than employing dynamic, process-oriented assessments that consider political and environmental changes. Ostrom's (2008) polycentric framework provides a flexible conceptual model; nevertheless, its practical applicability in rapidly evolving environments, such as Ladakh's transition to Union Territory status, are little explored. Methodologically, there is a scarcity of longitudinal, interdisciplinary research that integrate institutional economics, political ecology, and ethnography to elucidate the evolution of commons governance.

Recent studies (Tucker *et al.,* 2021; Fox *et al.,* 1994; Hussain *et al.,* 2023) underscore the escalating threats that urbanisation, modernisation, and climate change provide to fragile ecosystems. Currently, there is a deficiency of empirical research connecting these environmental processes to institutional resilience and adaptation in border regions. There is limited understanding of community perceptions and responses to climate change impacts, as well as the systematic incorporation of traditional ecological knowledge into governmental frameworks. So, further research is needed in the following areas:

1. Borderland Governance: How CPR administration is shaped in frontier areas such as Ladakh by administrative reorganisation, security concerns, and geopolitical forces.

2. Institutional Hybridization: The relationship between formal state institutions and traditional governance systems.
3. Power and Participation: How gender, local hierarchies, and political economics influence group decision-making.
4. Adaptive Governance: the process by which communities create adaptable, situation-specific plans in reaction to social and political upheavals.
5. Comparative and Longitudinal Analysis: Cross-regional empirical research to evaluate differences in ecological sustainability and institutional resilience.

In addition to advancing CPR theory, filling in these gaps will offer important new perspectives on environmental governance and engagement politics in northern India's border regions.

## 2.10 Conclusion

The literature review indicates that the management of common property resources is a burgeoning and substantial field of study that integrates ecology, economics, sociology, and politics. The intellectual progression of CPR studies reveals a significant shift from prescriptive models of privatisation or state control to participatory, context-sensitive governance frameworks, moving from Hardin's (1968) to Ostrom's (1990, 2008) hopeful theories of collective action and institutional diversity.

Scholars such as Jodha (1992), Kadekodi (2003), and Chopra *et al.*, (1990) have demonstrated the significance of Common Property Resources (CPRs) for rural lives in India. Subsequent researchers, like Baral (2023), Dawa (2021), and Dolma & Rishi (2018), have analysed the institutional and political complexities of decentralisation and local participation. These aspects collectively demonstrate that power dynamics, legitimacy, and cultural context are crucial for sustainable resource management.

Research by Sheikh (2010), Norberg-Hodge (2016), Rizvi (2019), Jina (2019), and Wani *et al.*, (2025) demonstrates that traditional ecological knowledge and community frameworks have historically regulated scarce resources through reciprocity and collaboration in the unique context of Ladakh. These systems are encountering unprecedented challenges due to recent developments such as globalisation, militarisation, administrative upheaval, and climate change. Research demonstrates that a community's capacity to adapt, evolve, and preserve institutional legitimacy during change is essential for the sustainability of common-pool resource control.

Recent research highlights institutional resilience, adaptive co-management, and polycentric governance as ways for achieving sustainable and equitable administration of commons. In politically sensitive border regions, these frameworks must address elevated levels of governmental authority, security requirements, and environmental vulnerability.

In summary, the literature study offers a comprehensive theoretical framework and a set of guiding principles for the further analysis of engagement politics and the administration of common property resources in the border villages of Ladakh. However, the observed research gaps highlight the need for more empirical investigation, particularly regarding the impact of border politics on resource accessibility and the integration of local ecological knowledge into governmental practices. This chapter establishes the foundation for forthcoming analytical sections that will investigate how individuals in border villages in Ladakh manage commons governance under changing political and environmental conditions.

# CHAPTER III

# THEORETICAL FRAMEWORK & RESEARCH DESIGN


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# CHAPTER III

# THEORETICAL FRAMEWORK AND RESEARCH DESIGN

## 3.1 Introduction

The current chapter describes the theoretical underpinnings and methodological approach that form the basis of the study on the governance and politics of engagement related to Common Property Resources (CPRs) in the border villages of Ladakh. In view of the intricate relationship between the vulnerability of the environment, the militarized geopolitical context, traditional institutional systems, and the livelihood dependence of the region, it is necessary to have a strong theoretical and methodological framework to guide the systematic inquiry.

The chapter is organized into three major parts. The first part of the chapter discusses the theoretical framework, which integrates the Institutional Analysis and Development (IAD) Framework, Sustainable Livelihoods Framework (SLF), Political Ecology, and the Politics of Engagement approach. The framework developed from the theories is explained in the second part of the chapter. The third part of the chapter discusses the research design, which explains the methodological approach, type of data, sample design, data collection tools, and analytical methods used. It also discusses the operationalization of variables, reliability and validity issues, and the ethical aspects of the field.

## 3.2 Theoretical Framework

The governance of Common Property Resources (CPRs) in the trans-Himalayan region of Ladakh highlights a complex mix of environmental vulnerability, cultural significance, political change, and military presence. Border villages along the Line of Control (LoC), like Darchik, Hardas, Kaksar, Mushkoo, and Shilikchay, rely heavily on shared natural resources such as alpine pastures, glacial water systems, medicinal plants, forests, and cultural commons to support their agro-pastoral livelihoods. These resources go beyond just economic value; they are intertwined with social identities, community survival strategies, and historical cultural practices that define a sense of belonging and territory (Baviskar, 2005; Agrawal, 2001). At the same time, these resources operate in a highly securitized environment shaped by tensions between India and Pakistan, military activities, land acquisition for defense, and restricted access zones.

Traditional scholarship on commons, influenced by Garrett Hardin's (1968) idea of the "*Tragedy of the Commons,*" assumed that shared access leads to overuse and degradation unless privatized or regulated by an external body. However, later research by Elinor Ostrom (1990, 2005) challenged this view, showing that communities can manage their shared resources through collective rules, cooperation based on trust, and social norms. Despite this, Ostrom's Institutional Analysis and Development (IAD) framework assumes that resource users operate with a degree of autonomy when making rules. This autonomy disappears in areas with intense state surveillance and military oversight, like the border villages of Ladakh.

The change of Ladakh's status to a Union Territory (UT) in 2019 after the abrogation of Article 370 brought about a new administrative structure that centralizes decision-making and alters local governance. Traditional community roles, such as the Goba (village head), Chhurpon (water manager), and pasture committees, have historically been vital for managing CPRs. However, their authority is increasingly challenged by bureaucratic changes, land regulations, and military oversight (Dutta, 2023; Singh, 2021). Moreover, livelihood security faces threats from climate change, receding glaciers, unpredictable snowfall, and disasters, which raise dependence on CPRs and heighten conflict. Given these challenges, the study adopts a framework that combines the IAD framework, the Sustainable Livelihoods Framework (SLF), Ribot and Peluso's Theory of Access, Political Ecology, and the Politics of Engagement. This framework offers a multi-faceted analytical approach to assess governance, institutional power dynamics, reliance on livelihoods, and sustainability issues in militarized border regions.

### 3.2.1 Institutional Analysis and Development (IAD)

Ostrom's IAD framework provides a structured way to analyze the interactions among actors, resource systems, and institutional arrangements in a defined "Action Arena" (Ostrom, 2005). It breaks down CPR governance into components: outside variables (resource attributes, community characteristics, and existing rules), action situations, interaction patterns, outcomes, and feedback loops. This structure helps examine how governance results, like resource equity, conflict management, sustainability, and legitimacy, develop within Ladakh's CPR system. In border villages, the Action Arena involves various actors, including local households, village councils, traditional leaders, UT administrators, Indian Army and paramilitary groups, the Border Roads Organisation, and wildlife or forest authorities. Each of these groups has different levels of authority and decision-making power, creating uneven governance relationships. Critics, however, argue that the IAD framework does not sufficiently

address the structural inequalities and historical political contexts that shape resource relations (Clement, 2010; Cleaver, 2012). In Ladakh, governance is influenced by not just institutional rules but also political, ethnic, military, and geopolitical factors that redefine access, voice, and power. The mix of force and authority complicates Ostrom's assumption of voluntary rule-making.

To overcome these limitations, the idea of Institutional Bricolage offers a broader perspective. According to Cleaver (2012), institutions are not usually carefully planned; instead, they grow through the improvised combination of social norms, practices, legalities, and power dynamics. In Ladakh, institutional bricolage shows when villagers negotiate water access during religious festivals, rely on personal connections to obtain military permissions, or merge traditional and formal systems for resolving disputes. This theoretical approach helps explain the changing governance landscape brought about by the UT restructuring and ongoing militarization. Instead of simply replacing traditional authority with formal governance, new hybrid forms emerge. The Goba can retain social legitimacy even when the UT administration has formal authority, and military leaders can hold informal but significant power over grazing or movement permissions.

### 3.2.2 Sustainable Livelihoods Framework (SLF) and Theory of Access

The Sustainable Livelihoods Framework (Chambers & Conway, 1992; DFID, 1999) views livelihood practices as influenced by access to five types of capital: Natural, Human, Social, Physical, and Financial, all within a particular vulnerability context. In Ladakh, CPRs are crucial to livelihoods because of limited private farming land, extreme climate risks, and reliance on pastoral livestock, subsistence farming, and forest resources. The vulnerability context in Ladakh includes climate shocks (like glacier melting, flash floods, and shorter growing seasons), socio-economic challenges (youth outmigration and rising fodder prices), and geopolitical issues (movement restrictions, shelling, and displacement).

To enhance the SLF, this study includes Ribot and Peluso's (2003) Theory of Access, which differentiates between rights-based property access and ability-based access. The ability to benefit from resources is influenced by authority, identity, social connections, capital, knowledge, technology, and coercive power. In border villages, military operations and security measures often dictate who can access pastures, forests, or water supplies. The gap between property rights and access is significant: villagers might have traditional claims to

pastures but could be prevented from accessing them due to military orders, wildlife reserve boundaries, or fencing.

### 3.2.3 Political Ecology and the Politics of Engagement

Political Ecology examines how environmental governance is influenced by power dynamics, authority, knowledge, and larger political and economic structures (Robbins, 2012; Peluso & Watts, 2001). In militarized border regions, environmental decision-making is shaped by national security, territorial control, and strategic interests. Conservation efforts and land acquisition can serve as tools for state control and exclusion in a process known as strategic enclosure. To put political ecology into practice, this research uses the Politics of Engagement, which looks at how communities get involved in decision-making and navigate power imbalances (Cornwall, 2008; Li, 2012). It focuses on the quality of participation, agency, and representativeness rather than just its existence. Engagement can vary from collaborative and open to merely symbolic, coercive, or militarized.

## 3.3 Conceptual Framework: The Geo-Political Livelihoods and Governance (GLG) Model

The current study creates a specific framework called the Geo-Political Livelihoods and Governance (GLG) Model to examine how Common Property Resources (CPRs) are governed and how local politics function in the border villages of Ladakh. This framework builds on several theoretical foundations: the Sustainable Livelihoods Framework (SLF), Ribot and Peluso's Theory of Access, the Institutional Analysis and Development (IAD) framework, Institutional Bricolage, Political Ecology, and the Politics of Engagement. The GLG model describes the sustainability of CPRs in Ladakh's border villages as the result of three connected areas: (i) household livelihoods and access to common resources, (ii) institutional and political processes of governance, and (iii) social-ecological results shaped by threat perceptions and resilience dynamics.

At the heart of the GLG model is the argument that CPR sustainability in a militarized border area depends not just on the physical availability of resources or household needs. Instead, it arises from a dynamic interaction between ecological and geopolitical threats, household resources and access methods, and the politics of engagement. This includes the power relations and interactions between communities, the civil administration, and the security establishment. The model unfolds in three analytical phases that correspond to the study's empirical chapters: Phase I looks at the Livelihood–Access Nexus, Phase II explores

the Institutional–Political Interface, and Phase III analyzes Social–Ecological Outcomes and Sustainability. These phases outline a clear way to tackle the four specific objectives related to CPR mapping, governance analysis, participation and conflict, and sustainability issues.

### 3.3.1 Phase I: The Livelihood–Access Nexus

The first phase of the GLG model aims to explain how and why households depend on and use CPRs in the border villages of Ladakh. This phase is based on the Sustainable Livelihoods Framework and Ribot and Peluso's Theory of Access. The main idea is that household use of CPRs is not random or purely cultural; it is influenced by the arrangement of livelihood resources and access methods. In this phase, the "Asset Pentagon" illustrates the key conditions that drive dependency on CPRs. Natural capital mainly refers to the size and quality of private landholdings. In the GLG model, having natural capital does not necessarily reduce dependence on CPRs; rather, it is suggested that households with larger private land may actually need more access to common pastures and irrigation water to make their land productive. Thus, the model sees CPRs as essential supplementary inputs for both poorer and better-off households.

Human capital is measured through factors like education and the size of the household workforce. Higher education levels can sometimes lead to less direct dependence on CPRs, like moving into salaried or service jobs. However, a larger household workforce can increase the ability to use labor-intensive CPRs like distant grazing lands, fuelwood collection, and gathering medicinal plants. Financial capital is indicated by items like ration card status (APL/BPL), which serve as indicators of economic vulnerability. For Below Poverty Line households, CPRs are viewed as a safety net, providing crucial goods like fodder, fuel, and food. Relatively better-off households may use CPRs to build wealth, supporting livestock-based income or surplus production.

Physical capital in this framework includes owning livestock, access to irrigation systems, and other productive assets. Livestock ownership increases reliance on grazing commons and crop residue, while irrigation infrastructure adds value to water as a CPR. Social capital comes from membership in religious, cultural, or community networks, often acting as gateways to shared resources. In Ladakh's villages, water distribution, grazing rights, and religious or cultural commons are often organized through community or religious bodies, making social capital essential for accessing what may be seen as "club goods."

Between these household assets and the final result of CPR use lies an Access Filter, drawn from the Theory of Access. The GLG model highlights that holding a legal, customary, or historical right over a resource does not guarantee actual access to it. Access is influenced by a mix of spatial factors and social-political identity markers. Spatially, the distance of the village or specific households from the Line of Control, military post placement, landmines, restricted zones, and the location of sensitive areas all determine how usable certain CPRs are in practice. Socially and politically, factors like ethnicity, community affiliation (Balti, Shina, Dard, Purig), kinship ties, and local political connections affect which households or groups can negotiate access, seek special consideration, or garner support when access is contested. This phase concludes with the development of a CPR Utilization Index, which measures the intensity and diversity of household-level CPR use across various types (water, pastures, forests, religious-cultural commons, etc.). In the GLG model, CPR utilization is represented as a function of livelihood assets and access methods.

***Utilization of CPRs = f (Asset Pentagon, Access Mechanisms)***

### 3.3.2 Phase II: The Institutional–Political Interface

The study creates a specific framework called the Geo-Political Livelihoods and Governance (GLG) Model to examine how Common Property Resources (CPRs) are governed and how local politics function in the border villages of Ladakh. This framework builds on several theoretical foundations: the Sustainable Livelihoods Framework (SLF), Ribot and Peluso's Theory of Access, the Institutional Analysis and Development (IAD) framework, Institutional Bricolage, Political Ecology, and the Politics of Engagement. The GLG model describes the sustainability of CPRs in Ladakh's border villages as the result of three connected areas: (i) household livelihoods and access to common resources, (ii) institutional and political processes of governance, and (iii) social-ecological results shaped by threat perceptions and resilience dynamics.

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the Institutional–Political Interface, and Phase III analyzes Social–Ecological Outcomes and Sustainability. These phases outline a clear way to tackle the four specific objectives related to CPR mapping, governance analysis, participation and conflict, and sustainability issues.

### 3.3.3 Phase III: Social–Ecological Outcomes and Sustainability

The third phase of the GLG model examines the long-term social-ecological outcomes of CPR governance in the border villages, focusing particularly on sustainability, resilience, and perceived threats. This phase is informed by Social–Ecological Systems (SES) thinking and integrates a Threat Perception lens. It posits that community behavior towards CPRs is shaped not only by current material needs, assets, and institutional arrangements, but also by how villagers cognitively perceive risk and future insecurity. At the heart of this phase is the Threat Perception Index (TPI), which aggregates different categories of risk as perceived by communities. Ecological threats include climate-related phenomena such as glacier retreat, erratic snowfall, and extreme weather events that destabilize agricultural cycles and water availability. Anthropogenic threats encompass overgrazing, land degradation, unregulated tourism, infrastructure expansion, and population pressure on limited commons. Geopolitical threats arise from military maneuvers, shelling, cross-border tension, landmines, and the declaration of restricted zones or firing ranges that suddenly transform accessible commons into prohibited spaces.

The GLG model advances a Threat–Withdrawal Hypothesis to conceptualize the behavioral response to such threat perceptions. Contrary to classical models of open access where scarcity or threat leads to more intense competition and overexploitation (a “race to the bottom”), the framework proposes that in militarized borderlands high levels of perceived threat can instead induce withdrawal from certain CPRs. If a pasture is located near the LoC and is perceived as dangerous due to shelling or landmines, households may strategically avoid using it, even if it remains ecologically available. This can result in under-utilization of distant or risky commons and over-concentration of pressure on safer, near-village CPRs, producing uneven patterns of resource use and new ecological stresses.

The central outcome in this phase is the Sustainability Index (SI), which conceptually reflects the resilience of the CPR system in terms of three dimensions: ecological availability, governance effectiveness, and collective action capacity. Ecological availability concerns the perceived and actual condition of resources whether stocks are stable, declining, or improving. Governance effectiveness refers to whether rules are enforced fairly, conflicts are resolved, and

institutions are able to coordinate usage in ways that prevent degradation. Collective action captures the willingness and ability of community members to contribute labour, resources, and time to CPR maintenance, such as repairing irrigation channels, managing communal lands, or participating in village meetings and negotiations with external actors.

In this phase, the TPI and PEI are conceptually linked to sustainability outcomes via the mediating role of governance effectiveness. High threat perception, if not accompanied by strong and trusted governance mechanisms, can lead to withdrawal, fragmentation, or breakdown of collective management, undermining sustainability. Conversely, where governance is seen as fair, inclusive, and effective, communities may be better able to adapt to threats, reorganize usage patterns, and maintain CPRs in a resilient manner despite adverse conditions. Thus, the GLG model conceptualizes sustainability not simply as an ecological state but as an emergent property of social, institutional, and cognitive processes.

Bringing the three phases together, the GLG model gives a unified conceptual representation of CPR governance and sustainability in Ladakh's border villages. At its most compact, the model can be expressed as:

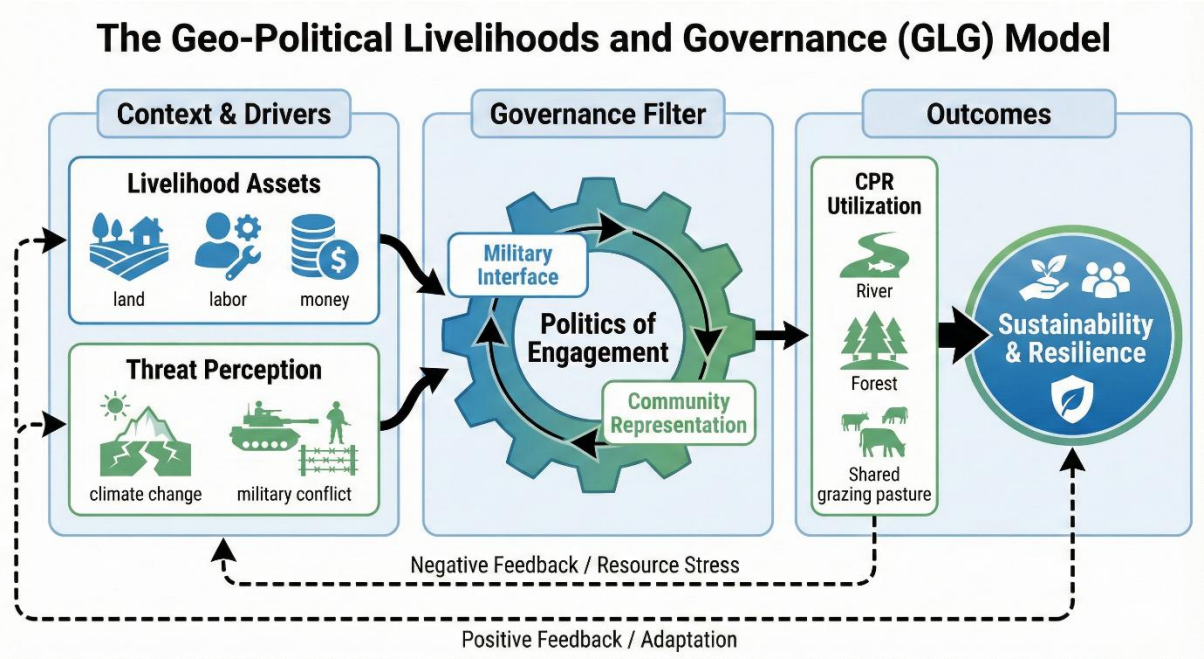
***Sustainability (S) = ƒ (Threat Perception (TPI), Politics of Engagement (PEI), Governance Effectiveness)***

In this integrated framework, Threat Perception (TPI) is a negative driver, as higher levels of threat perception are assumed to decrease the safe and equitable use of some CPRs and create new risks for sustainability. Politics of Engagement (PEI) is a positive driver when it is inclusive, participatory, and representative. Higher levels of meaningful engagement are assumed to increase trust, compliance with rules, and collective problem-solving, thus improving the effectiveness of governance. Governance effectiveness is, in turn, conceptualized as an important mediator of threats and sustainability. When threats are high, effective governance can maintain or even improve resilience by coordinating adaptive actions; when governance is weak or exclusive, the same level of threats can hasten degradation, conflict, or social retreat.

Finally, the GLG model also includes feedback mechanisms. Outcomes of sustainability, where CPRs remain productive and equitably governed, are expected to strengthen community trust in institutions and, in turn, improve the Politics of Engagement. Resource degradation, exclusion, or conflict can, conversely, increase threat perceptions, reduce trust, and weaken collective action, which can then feedback into the system as

increased TPI and decreased PEI. In this manner, the conceptual framework acknowledges that CPR governance in Ladakh's border villages is not a static system but a dynamic and evolving social-ecological system.

**Figure 3.1 Conceptual Framework**




*Source: Designed by Author based Various Theories*

### 3.3.4 Definition and Operationalization of Variables

The study employs a mixed-method approach to quantification, converting qualitative perceptions (Likert scales) and raw socio-economic data into standardized composite indices. The primary method of standardization used across all indices is Min-Max Normalization, which rescales variables to a range of 0 to 1 to ensure comparability.

**I. Outcome Variables (Dependent):** These variables measure the tangible results of the interaction between the community and the resources.

**Utilization Index of CPRs:** A composite measure of the intensity, frequency, and economic reliance of a household on Common Property Resources. It reflects the "Livelihood Strategy" component of the Sustainable Livelihoods Framework. Calculated as the unweighted average of five standardized sub-indicators.

1. Perceived Importance: Household rating of CPR importance (1-5 Scale).
2. Livelihood Dependence: Approximate percentage of household livelihood derived from CPRs (0-100%).

3. Labor Dependence: Percentage of working members engaged in CPR-based activities (0-100%).
4. Direct Income: Binary variable (1 = Earns income from CPRs, 0 = Does not).
5. Frequency of Usage: Average frequency of use across different CPR types (Scale: 1=Never to 5=Daily).

Range: 0 (No Utilization) to 1 (Maximum Utilization).

**Sustainability Index (SI)**: A multidimensional measure of the long-term viability of the socio-ecological system. It integrates ecological availability with institutional capacity and social capital (IAD Framework). Computed as the average of standardized scores from the following indicators:

1. Resource Availability Change: Trend over last 10 years (Decrease=1, Increase=3).
2. Current Availability: Presence of key CPR types (Binary).
3. Threat Perception (Reverse Coded): 1 - TPI. (Higher score = Lower Threat).
4. Community Conservation Initiatives: Participation level in patrols/plantations.
5. Governance Effectiveness: Perception of rule enforcement and institutional authority.
6. Collective Action: Willingness to contribute labor/money for conservation.

Range: 0 (Unsustainable) to 1 (Highly Sustainable).

**II. Explanatory & Process Variables (Independent/Mediator):** These variables explain *why* utilization and sustainability vary, focusing on governance and threats.

**Politics of Engagement Index (PEI)**: A quantification of the power dynamics, institutional access, and quality of interaction between the community, the state, and the military. It operationalizes the "Politics of Engagement" theory. An aggregate index constructed from 16 variables grouped into five dimensions.

1. Power & Influence: Who holds decision-making power (Local vs. UT/Military) and fairness of distribution.
2. Political Involvement: Frequency of political visits and use of CPR issues in elections.
3. Community Representation: Presence of Goba vs. formal councilors; perceived "voice" in decisions.

4. Military-Political Interface: Frequency of direct negotiation with the Army; perception of Army prioritizing its own needs.
5. Cultural & Geopolitical Context: Integration of customary norms (e.g., Res) into formal rules; influence of border tension.

Interpretation: High Score = Inclusive, participatory, and culturally aligned governance. Low Score = Exclusionary, top-down, or militarized control.

**Threat Perception Index (TPI)**: The community's cognitive assessment of risks posing a danger to their resource base. This serves as a proxy for the "Vulnerability Context" in the SLF. A composite score derived from:

- Binary Indicators: Selection of specific threat drivers (Climate Change, Overgrazing, Military Activity, Tourism).
- Likert Ratings: Intensity of agreement with threat statements (e.g., "Military activities are putting pressure on resources" - Scale 1-5).

Responses are standardized and averaged. Higher TPI indicates a community under severe stress (ecological or geopolitical).

**Household Livelihood Assets**: Conceptual Definition: The stock of capital available to a household to generate a livelihood (SLF).

- Natural Capital: Total landholding size (measured in Canals).
- Human Capital: Education level of household head (No formal, Primary, Secondary, Higher).
- Financial Capital: Ration Card Status (APL, BPL, AAY) used as a proxy for income category.
- Social Capital: Community membership (Balti, Shina, Dard, Purig).

**III. Control/Context Variables**

- Revenue Village: (Darchik, Hardas, Kaksar, Mushkoo, Shilikchay). Used to test spatial heterogeneity.
- Tehsil: (Drass vs. Kargil). Used to test administrative and climatic differences.
- Post-UT Governance Change: Perception of change since 2019 (Scale 1-5). Used to measure the impact of the administrative shift from J&K State to Union Territory.

Table 3.1 presents an overview of the major variables included in this study, along with their classification, theoretical role within the conceptual framework, and methods of measurement. The independent variables Threat Perception (TPI) and Politics of Engagement (PEI) represent the contextual and governance-related drivers influencing community interactions with Common Property Resources (CPRs). TPI captures community-level assessments of ecological, geopolitical, and socio-economic risk, while PEI reflects the inclusiveness and power dynamics within governance structures, operationalizing the Politics of Engagement approach. Governance Effectiveness functions as a mediating variable, shaping how institutional arrangements influence household-level access and decision-making regarding CPRs. The CPR Utilization Index serves as an intermediate dependent variable that measures the intensity and frequency of resource use, representing the immediate behavioral outcome of political, social, and ecological pressures. The Sustainability and Resilience Index (SI) is the final dependent variable that evaluates long-term system performance and adaptive capacity. Each variable is operationalized using a combination of Likert-scale ratings and composite index construction, ensuring comparability across heterogeneous qualitative and quantitative indicators.

**Table 3.1 Operationalization of Variables Used in the Study Model**

| Variable | Type | Role in Model | Measurement |
|---|---|---|---|
| Threat Perception (TPI) | Independent | Driver of resource use behavior | Likert-based composite index |
| Politics of Engagement (PEI) | Independent / Mediator | Governance interface | Composite index |
| Governance Effectiveness | Mediator | Filters interaction between state & community | Likert |
| CPR Utilization | Dependent (intermediate) | Outcome of power negotiation | Frequency & intensity index |
| Sustainability & Resilience (SI) | Final dependent | System outcome | Composite index |

*Source: Conceptual framework*

## 3.4 Research Design

The present study combines quantitative and qualitative approaches to analyze the governance, use, and sustainability of Common Property Resources (CPRs) in the border villages of Ladakh. This mixed-method strategy is suitable given the complex socio-ecological and geopolitical context of resource governance in border areas, where quantitative indicators alone cannot fully capture power dynamics, institutional interactions, cultural context, and the realities of militarization. The design follows Creswell and Plano Clark's (2018) framework of

concurrent triangulation. This approach allows for the collection and analysis of quantitative survey data alongside qualitative narrative evidence, which are then merged for interpretation.

### 3.4.1 Purpose and Rationale of the Study

The main goal of this study is to examine the governance dynamics, engagement politics, and livelihood dependence tied to Common Property Resources (CPRs) in the border villages of Ladakh. It focuses particularly on sustainability outcomes, changes in institutions, and issues surrounding conflict. CPRs such as alpine pastures, glacial water systems, community forests, and medicinal plant landscapes support agro-pastoral livelihoods in the region. However, their management is increasingly complicated due to ecological fragility, administrative changes, and military tensions. This study seeks to understand how these pressures shape resource access, community involvement, and governance effectiveness within the unique socio-political context of the India-Pakistan border region.

The rationale for this research comes from a recognized gap in existing studies on CPR governance. Much of the current scholarship has focused on community-based and state-led resource management without taking into account the governance challenges in militarized and secured border areas. Traditional theories of the commons, especially Ostrom's design principles, assume a space for community action that is relatively independent, with limited outside interference. These assumptions do not hold in Ladakh, where military institutions, the Union Territory administration, and traditional village structures interact in overlapping and often conflicting ways. Thus, this study adopts a diverse method and a political ecology-informed approach to critically analyze how power, participation, and institutional variety affect CPR outcomes.

Additionally, the research aims to assess how Ladakh's political transition to Union Territory status in 2019 has changed governance structures, influenced traditional institutions like the Goba and Chhurpon, and affected community trust and resource rights. Understanding these changes is essential, as institutional authority and political legitimacy greatly impact local abilities for collective action and sustainability. The study also addresses the urgent need to evaluate resilience and long-term sustainability in light of climate change and increased geopolitical uncertainty, both of which pose threats to livelihoods and ecological stability in the region.

### 3.4.2 Sources of Data

The study uses both primary and secondary data to analyze the governance, use, and sustainability of Common Property Resources (CPRs) in the border villages of Ladakh. Combining these two data sources allows for a better understanding of the complex socio-ecological and political environment in which resource management occurs.

Primary data were gathered directly from households and key stakeholders in the case study villages of Darchik, Hardas, Kaksar, Mushkoo, and Shilikchay, located along the Line of Control in Kargil district. Data collection involved a structured household survey, which measured livelihood dependence, CPR use patterns, perceptions of threats, governance experiences, and sustainability indicators. In addition to the survey, qualitative information was obtained through interviews with key informants, including the Goba (village headman), Chhurpon (traditional water manager), panchayat leaders, Union Territory administration officers, and representatives of the Indian Army and Border Roads Organisation, who interact with communities regarding land and resource access. Field observations were recorded to document the physical layout of resource spaces and informal governance practices.

Secondary data served as a complementary source to confirm primary findings and to outline the historical, administrative, and policy context of CPR governance. The main secondary data source was the District Statistics & Evaluation Office (DSEO) in Kargil (2023–2024), which provided district-level information on population, land use, agricultural and pastoral activities, and developmental indicators. Additional secondary sources included official records from the Revenue and Land Records Department, the Ladakh Autonomous Hill Development Council (LAHDC), the Rural Development and Panchayati Raj Department, and the Forest, Ecology and Environment Department of the Union Territory of Ladakh. Data on climate variability and disaster events came from the District Disaster Management Authority (DDMA) in Kargil and Drass. National datasets, such as the Census of India (2011) and reports from the National Sample Survey Office, were referenced for demographic and socio-economic baselines. Academic literature, books, research papers, government policy briefs, and journal articles on CPR governance, political ecology, and livelihood resilience also contributed important theoretical and comparative perspectives.

### 3.4.3 Population of the Study

The study population includes the households and residents of five border villages in the Drass and Kargil tehsils of Kargil district in the Union Territory of Ladakh—Darchik, Hardas, Kaksar, Mushkoo, and Shilikchay. These villages were chosen for their geographic closeness to the Line of Control (LoC), their strong dependence on Common Property Resources (CPRs) like alpine pastures, glacial water channels, and community forests, and their experiences with militarization, resource-related conflicts, and climate vulnerability. The total household population of these villages serves as the sampling frame for this study. According to the District Statistics & Evaluation Office in Kargil (2023–2024), the combined household population of these villages is a significant part of the resource-dependent agro-pastoral communities in the region. These households were seen as suitable units for analysis because CPR use, governance interactions, and livelihood dependence are mainly experienced and negotiated at the household level rather than individually.

Additionally, institutional representatives, such as traditional leaders (Goba and Chhurpon), panchayat members, Union Territory administrative officers, and military authorities involved with communities regarding land and resource access, were included as secondary population categories for qualitative inquiry. Including both community members and institutional stakeholders gives a complete view of governance dynamics, power imbalances, and political negotiation processes affecting CPR management in border areas. Therefore, the selected population reflects both experiential and structural perspectives, supporting the study's goal of analyzing CPR governance and engagement politics within a complex socio-ecological and geopolitical landscape.

### 3.4.4 Sample Design

The study uses a multi-stage sampling design to ensure systematic and representative sampling of study units for the analysis of governance, politics of engagement, and community participation in the management of Common Property Resources (CPRs) in the border villages of Ladakh. The multi-stage design was used to account for the spatial, administrative, and socio-economic diversity of settlements along the Line of Control (LoC). The first stage of the study involved the selection of study blocks. Among the blocks that make up the border region of Kargil district, the Drass and Kargil blocks were purposively selected due to their strategic location near the LoC, the large population that is dependent on CPRs like alpine pasture, glacial irrigation channels, forests, and medicinal plant habitats, and their increased vulnerability to security restrictions, climate change, and governance uncertainties. The

selection of these two blocks creates a suitable context for understanding CPR governance in a militarized and climatically vulnerable border setting.

In the second stage, the selection of villages was carried out. A total of 34 border villages, which are situated in the two selected blocks, were identified as the sampling frame. From the sampling frame, five villages were selected to ensure representative participation and to reflect the diversity of frontline border villages. The selection was made on the basis of their direct vulnerability to conflict dynamics, proximity to the Line of Control (LoC), the presence of security infrastructure, and the extent of military-imposed land-use restrictions that shape the accessibility of Common Property Resources (CPRs). These factors ensured that villages in which the challenges of governance, livelihood, and politics of engagement are most clearly manifested are selected. The households in the five selected villages constituted the ultimate sampling units. The total number of households in the five selected villages, as per the village records and Census of India (2011), is 667. The sample size was determined by Cochran's formula for finite population with 95% confidence level, 5% margin of error, and 50% population proportion, which requires a sample size of 245 households.

$$\text{Unlimited population: } n = \frac{z^2 \times \hat{p}(1-\hat{p})}{\varepsilon^2}$$

$$\text{Finite population: } n' = \frac{n}{1+\frac{z^2 \times \hat{p}(1-\hat{p})}{\varepsilon^2 N}}$$

Where, Confidence Level (95%), that is the z score of 1.96

ε is the margin of error (5% or 0.05)

N is the population size (996)

$\hat{p}$ is the population proportion (50% or 0.5)

**Table 3.2 Sample Size**

| Sl. No | Name of Village | No. of Households (Population of the Study)* | Sample Estimated |
|---|---|---|---|
| 1 | Hardas | 223 | 86 |
| 2 | Derchik | 85 | 27 |
| 3 | Shilikchey | 134 | 49 |
| 4 | Kaksar | 147 | 54 |
| 5 | Mushkoo | 78 | 29 |
| **Total** | | **667** | **245** |

** Census of India, 2011*

The last administration of the sample employed systematic random sampling in each village, choosing households based on fixed intervals calculated by dividing the village list of households by the sample size allocated.

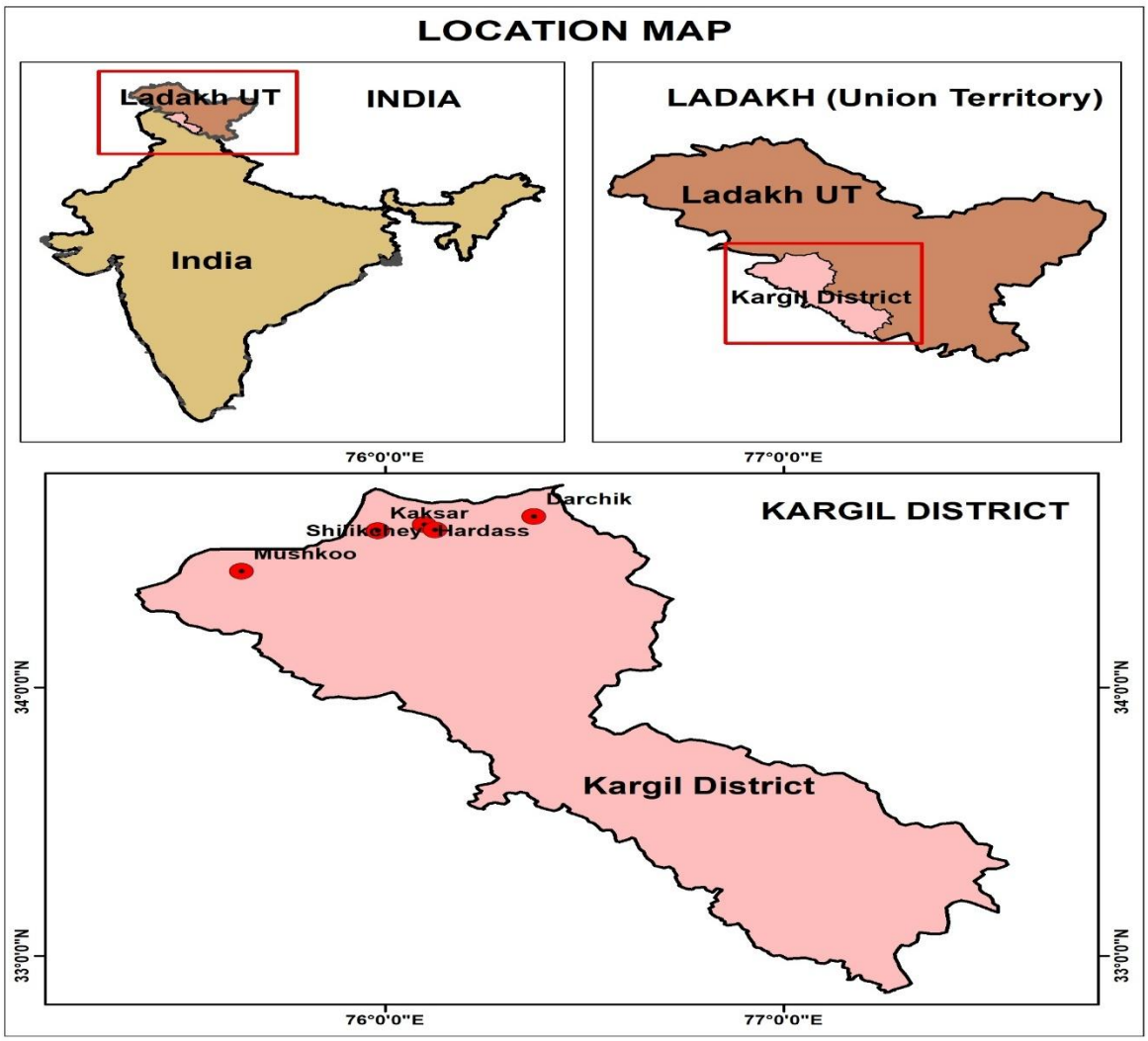
### 3.4.5 Study Area

The present study is set in the border-region of the Kargil district, in the Union Territory of Ladakh, India. Kargil lies in the rugged trans-Himalayan highlands, characterized by high-altitude terrain, arid climate, sparse vegetation, and a fragile ecology. The district shares a significant stretch of the Line of Control (LoC), making it one of the most geopolitically sensitive and strategically important regions in the country. Settlements in Kargil are often isolated, with limited arable land, extreme winters, and a strong dependence on communal natural resources such as alpine pastures, glacial water channels, community forests, and seasonal grazing lands for agro-pastoral livelihoods.

The selection of Kargil district as the study area is grounded in its unique geopolitical, ecological, and socio-economic significance, which makes it an appropriate setting for examining the governance and politics of engagement surrounding Common Property Resources (CPRs) in borderland environments. Kargil is one of the most strategically sensitive regions in the Union Territory of Ladakh, situated adjacent to the Line of Control (LoC) between India and Pakistan. This positioning exposes communities to militarization, border surveillance, restricted mobility, and conflict-induced uncertainties that shape access to land and shared natural resources. The interactions between local communities, administrative authorities, and military forces create complex governance dynamics that directly align with the objectives of this research, which aims to understand how institutional power, participation, and negotiation influence CPR utilization and sustainability outcomes in militarized contexts.

Furthermore, Kargil district is characterized by a high dependency on CPR-based agro-pastoral livelihoods because of its trans-Himalayan terrain, limited cultivable private land, and reliance on common grazing pastures, glacial irrigation channels, forests, and medicinal plant reserves. Ecological fragility, rapid climatic variability, glacier retreat, and diminishing pastureland intensify livelihood vulnerability, making the governance of CPRs critical for community survival. The region has also undergone significant institutional transformation after the abrogation of Article 370 and the creation of Ladakh as a Union Territory in 2019. These changes have altered governance structures and the legitimacy of traditional institutions such as the Goba and Chhurpon, creating contestations over resource rights, decision-making authority, and community representation. The district therefore provides a rich empirical context to analyze institutional pluralism, governance fragmentation, and political ecology in practice.

**Figure 3.2 Study Area- Location Map**




*Source: Prepared by the Author Based on Field Visit*

Within Kargil district, the villages of Hardas, Darchik, Shilikchay, Kaksar, and Mushkoo were selected as sample villages because they represent frontline border settlements that are directly influenced by conflict dynamics, security infrastructure, and military land-use restrictions. Their proximity to the LoC subjects residents to fluctuating territorial control, periodic shelling threats, and negotiations with security forces for grazing and resource access, exemplifying the intersection of security imperatives and livelihood needs. These villages also exhibit high dependence on CPRs, yet differ in terms of demographic composition, social identity groups (Balti, Purig, Shina, Dard), institutional strength, and exposure to climatic and political pressures. This heterogeneity supports analytical comparison across varied governance and ecological conditions rather than a uniform settlement structure. Additionally, the selected villages gives a valuable opportunity to empirically study institutional bricolage, where traditional authorities, elected panchayat institutions, and military and Union Territory administrative actors co-manage resource governance. Their selection was also informed by practical field feasibility under military access regulations and by ensuring sufficient population size for quantitative sampling.

#### 3.4.5.1 Profile of Selected Villages

The study was conducted in five strategically located border villages Hardass, Shilikchay, Mushkoo, Kaksar, and Darchik situated within the Kargil district of Ladakh. These villages represent diverse ecological settings, demographic compositions, livelihood patterns, and degrees of exposure to border militarization and governance complexities. They were selected to provide a comparative understanding of how geopolitical pressures, ecological fragility, and institutional arrangements shape Common Property Resource (CPR) governance and community livelihoods. All five villages lie within close proximity to the Line of Control (LoC), and thus experience restrictions on land use, military presence, and high dependency on shared natural resources such as pastures, glacial irrigation channels, forests, and river systems.

**Hardass Village**

Hardass is located approximately seven kilometers north of Kargil town along the Srinagar–Leh National Highway (NH-1D), forming a semi-urban transitional zone within the Suru Valley. Positioned at an elevation of about 2,700 meters on the banks of the Suru River, Hardass benefits from superior infrastructural access compared to more remote settlements. With a population of around 1,200 residents across 190 households (Census of India, 2011), the village sustains a mixed agrarian–service economy. While barley, wheat, and peas remain staple crops, many households derive income from government jobs, trade, transport services,

and seasonal wage labor in nearby urban centers. Governance in Hardass integrates both modern and traditional institutions: the Gram Panchayat collaborates with LAHDC, while customary bodies such as the Lambardar and Anjuman-e-Jammat continue to play influential roles in community coordination and CPR management. The rotational distribution of irrigation water from the Suru River is regulated by the Churpon. Proximity to military establishments contributes to employment opportunities and security, yet expanding commercialization and land conversion threaten traditional governance arrangements and CPR sustainability.

**Shilikchay Village**

Shilikchay is situated about 12 kilometers southeast of Kargil town, set within a narrow valley dependent entirely on glacial meltwater systems for irrigation. Located at an altitude of approximately 2,850 meters, the village supports around 1,000 residents in 160 households. Agriculture is the primary livelihood, supplemented by livestock rearing and seasonal migration-based wage labor. Cultural and governance norms remain strong, with the Panchayat supported by traditional leaders such as the Lambardar and the Anjuman. Water distribution is overseen by Churpons, who enforce well-established customary rules rooted in collective decision-making. CPR governance in Shilikchay is considered one of the most structurally organized, featuring rotational grazing, community-maintained irrigation channels, and penalties for rule violations. Basic infrastructure includes a primary school, a health sub-centre, solar power provision, and partial road connectivity, with seasonal support from the Indian Army in road repairs and winter logistics. Shilikchay exemplifies adaptive, community-driven resource governance within a fragile ecological environment.

**Mushkoo Village**

Located about 20 kilometers from Kargil, Mushkoo is positioned in a narrow side valley of the Suru Valley at approximately 3,000 meters altitude. The village gained prominence during the 1999 Kargil conflict, during which portions of its grazing lands and agricultural fields became restricted zones. Mushkoo has around 1,100 residents across 170 households, with livelihoods rooted in small-scale agriculture and livestock rearing, supplemented by employment with the Indian Army as porters, laborers, and drivers. Governance is characterized by active collaboration between the Panchayat, traditional leaders such as the Lambardar, and ongoing welfare initiatives under Operation Sadbhavana. Mushkoo's CPR resources particularly pastures and irrigation channels are maintained collectively, although access restrictions persist due to security sensitivities. Despite

institutional disruption after the war, the community has proved resilience through collective irrigation revival, fodder storage systems, and women-led economic initiatives under NRLM. The village symbolizes the coexistence of dependency on military support and enduring community resource management.

**Kaksar Village**

Kaksar is located roughly 15 kilometers north of Kargil along the Kargil–Batalik road at an altitude of around 3,200 meters. Positioned on steep terrain near the LoC, Kaksar is among the most forward and heavily militarized settlements in the region. With a population of about 950 individuals across 150 households, the community faces significant land scarcity and intensive security regulations. While agriculture and livestock rearing continue as supplementary livelihood activities, restricted access to forest and pastureland means many residents rely on military-related employment and casual wage labor. Governance functions through a dual system whereby the Panchayat and Lambardar work in coordination with the Indian Army for infrastructure, welfare programs, and emergency logistics. Pasture sharing and modified grazing routes operate under rotational joint agreements with neighbouring villages due to restricted zones. Kaksar's social cohesion and adaptive strategies show strong community response to external pressures but highlight challenges such as shrinking CPR access and limited market opportunities.

**Darchik Village**

Darchik lies on the banks of the Indus River in the Batalik sector, approximately 65 kilometers from Kargil, at an elevation of about 2,750 meters. It is predominantly inhabited by the Brokpa (Dardic) community, known for their rich cultural heritage, linguistic identity, and horticultural specialization. With around 1,700 residents in 220 households, Darchik has the largest population among the study villages. The economy is diversified, combining orchard-based horticulture, agriculture, livestock rearing, tourism services, weaving, and seasonal employment in Leh and Srinagar. Governance integrates a formal Panchayat and an influential Brokpa Council, which plays a vital role in conflict resolution and cultural preservation. CPR resources including irrigation channels, orchards, communal pastures, and riverbank ecological buffers are managed collectively under traditional rules emphasizing sustainability and cultural taboos against resource overuse. Tourism and cultural heritage initiatives have improved infrastructure under LAHDC and Army goodwill programs; however, rising tourist activity generates pressure on water resources and waste systems, necessitating proactive planning and CPR-management reforms.

### 3.4.6 Data Collection Methods

Primary data for the study were collected through a detailed household survey conducted during the year 2025 across the five selected border villages of Kargil district. A structured questionnaire served as the main research instrument and was designed to capture information relevant to the socio-economic characteristics of households, patterns of Common Property Resource (CPR) utilization, governance experiences, and perceived environmental and geopolitical threats. The questionnaire was administered through face-to-face interviews, enabling accurate response collection and clarification of locally specific terms within a multilingual context.

The survey instrument included multiple sections addressing diverse dimensions of the research objectives. The socio-economic profile section collected data on household landholding size, education level, primary occupation, household size, and income category. Resource-use–related questions examined the frequency, purpose, and seasonal variation of CPR utilization, including access to pasturelands, irrigation channels, forests, and water sources. Governance-related items explored perceptions of institutional effectiveness, trust in formal and traditional authorities, community participation in decision-making processes, and interactions with security forces and administrative bodies. The Threat Perception component measured respondents' assessments of climate change impacts, environmental degradation, border conflicts, and military restrictions affecting livelihood activities and resource access.

The instrument employed a combination of measurement scales: five-point Likert scales (ranging from 1 = Strongly Disagree to 5 = Strongly Agree) to record perceptions and attitudes related to governance, conflict, and environmental risks; binary Yes/No items to assess resource availability and access; and ordinal categories for ranking the importance or severity of specific issues. This format enabled both quantitative modeling and qualitative interpretation of community responses. The structured survey approach ensured systematic and comparable data collection across households while enabling the construction of composite indices such as the Utilization Index of CPRs, the Politics of Engagement Index, and the Threat Perception Index.

### 3.4.7 Analytical Techniques and Statistical Tools

The study adopted a quantitative-dominant mixed-methods analytical framework to examine the relationships between livelihood assets, political engagement, threat perceptions, and the sustainability of Common Property Resources (CPRs) in border villages of Ladakh. The analytical process was structured in three sequential stages: descriptive statistical analysis, composite index construction, and inferential statistical modeling, enabling both exploratory findings and empirical hypothesis testing.

#### 3.4.7.1 Data Processing and Standardization

Following data collection, responses from the household survey (N = 245) were cleaned, coded, and entered into SPSS for statistical analysis. Qualitative responses measured on Likert scales were assigned numerical values, while categorical and binary responses were converted into appropriate dummy variables. Because the study involved variables measured on different metric scales including percentages, binary indicators, ordinal categories, and 1–5 Likert ratings Min-Max Normalization was applied to standardize all indicators on a uniform scale from 0 to 1, ensuring comparability across dimensions. The normalization formula applied was:

$$X'=(X-Xmin)/(Xmax-Xmin)$$

#### 3.4.7.2 Composite Index Construction

To operationalize complex theoretical constructs, four composite indices were developed: Utilization Index of CPRs, Politics of Engagement Index (PEI), Threat Perception Index (TPI), and Sustainability Index (SI). The Utilization Index served as the primary dependent variable, representing the intensity and frequency of household reliance on CPRs. The Politics of Engagement Index measured power relationships, institutional interactions, and community participation, aggregated from sixteen variables across five thematic dimensions. The Threat Perception Index captured household perceptions of ecological and geopolitical risks using binary and Likert-based severity ratings. The Sustainability Index reflected the long-term resilience of the socio-ecological system, comprising ecological, governance, and collective action indicators. Internal reliability of multi-item constructs was tested through Cronbach's Alpha to validate measurement consistency.

#### 3.4.7.3 Statistical Techniques

A range of descriptive and inferential statistical tools were employed to analyze patterns and test hypotheses. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to profile socio-economic characteristics, CPR availability, and the severity of perceived threats. One-way Analysis of Variance (ANOVA) was applied to compare mean scores across villages, community groups, and education levels, identifying spatial and social heterogeneity in CPR utilization and political engagement. Independent sample t-tests were performed to assess differences between administrative regions (Drass vs. Kargil) and household types (male- vs. female-headed). Chi-square tests were used to examine associations between categorical variables such as occupation group and village location.

Inferential modeling was conducted using both Pearson correlation and multiple linear regression analysis. Correlation analysis assessed the strength and direction of relationships between variables such as landholding size and CPR utilization or PEI dimensions and governance perceptions. Two regression models were constructed: the first analyzed the influence of PEI dimensions on governance perception; the second tested the effects of TPI, PEI, governance effectiveness, and enforcement on CPR utilization. The regression model followed the specification:

$$Y=\beta_0+\beta_1X_1+\beta_2X_2+...+\epsilon$$

Diagnostic procedures, including Variance Inflation Factor (VIF) for multicollinearity and Durbin-Watson statistics for autocorrelation, were applied to ensure model validity.

The analytical framework thus integrates descriptive profiling, index-based measurement of theoretical constructs, and inferential statistical testing to evaluate how livelihood assets, political power relations, and threat perceptions shape CPR governance and sustainability outcomes in militarized border environments.

## 3.5 Conclusion

This chapter has discussed the theoretical underpinnings and methodological approach that inform the empirical analysis of Common Property Resource (CPR) governance and the politics of engagement in the border villages of Ladakh. By combining the Institutional Analysis and Development (IAD) Framework, the Sustainable Livelihoods Framework (SLF), Political Ecology, and the Politics of Engagement framework, this chapter has developed a broadened conceptual framework that encompasses the complex socio-ecological and geopolitical processes that are shaping resource use, institutional power, and community

participation in a militarized frontier setting. This chapter has also explained the research design and analysis approach used in this study, including the sampling approach, data gathering tools, definition of variables, and quantitative and qualitative analysis methods. The design of the methods enables triangulation between quantitative data and community stories, thus ensuring the empirical validity and contextual richness of the findings. The construction of composite indices: Utilization Index, Politics of Engagement Index (PEI), Threat Perception Index (TPI), and Sustainability Index enables systematic quantification and cross-village comparison.

# CHAPTER IV

# COMMON PROPERTY RESOURCES IN BORDER VILLAGES OF LADAKH: INSTITUTIONAL AND POLITICAL SETTING


4.1 Introduction
4.2 Physical & Environmental Setting
4.2.2 Climate & Ecology
4.2.3 Natural Resources & CPRs
4.2.4 Climate Vulnerability
4.3 Socio-Economic Profile
4.4 Institutional Framework
4.5 Politics & Power Relations
4.6 Threats to CPRs
4.7 Sustainability & Equity
4.8 Conclusion

# CHAPTER IV
# COMMON PROPERTY RESOURCES IN BORDER VILLAGES OF LADAKH: INSTITUTIONAL AND POLITICAL SETTING

## 4.1 Introduction

The management of Common Property Resources (CPRs) in border regions like Ladakh involves various environmental challenges, diverse institutions, social and political factors, and livelihood needs. CPRs, including pastures, forests, water bodies, and community lands, are essential for rural livelihoods in fragile mountain ecosystems (Ostrom, 1990; Baland & Platteau, 1996). In the high-altitude trans-Himalayan region of Ladakh, where the delicate environment and remote location limit other economic options, local resource systems have historically been crucial for survival and community bonding (Jodha, 1992; Singh, 1998). The harsh cold desert climate, marked by low rainfall, brief growing seasons, and frequent resource shortages, requires strong community institutions for effective resource management and fair distribution (Goodall, 2004; Ahmad, 2019).

Ladakh's border villages offer a distinct social, political, and ecological setting, where resource governance connects with geopolitical factors and military presence. The region's closeness to international borders with China and Pakistan makes it strategically important but also administratively limited, with ongoing restrictions on movement and access (van Beek, 2014; Bose, 2017). The growth of military facilities, tourism, and changes in administration since Ladakh became a Union Territory in 2019 have altered traditional resource use and authority (Aggarwal, 2020; Sheikh, 2021). Historically, governance of CPRs in Ladakh relied on traditional roles like the goba (village headman) and monastic leaders, who managed access rules, conflict resolution, and resource sharing (Norberg-Hodge, 1991; Ahmad, 2019). Today, these systems often compete with formal administrative ones, resulting in overlapping authority and changing governance practices.

The livelihoods of border communities depend closely on the management and availability of CPRs. Activities like pastoralism, agriculture, and forestry rely on shared access to common pastures, water channels, and alpine meadows (Goldstein & Beall, 1991; Goodall, 2004). However, rising population pressures, overgrazing, and climate-related changes such as melting glaciers and water shortages have increased the vulnerability of these resources (Negi

& Gadgil, 2002; Bajracharya et al., 2015). Therefore, ensuring the sustainability of CPRs in Ladakh now relies not just on environmental stability but also on institutional flexibility and participatory governance. Recent studies show that inclusive governance, trust, and local involvement are critical for effective CPR management, especially in ecologically sensitive and politically complex regions (Agrawal, 2001; Meinzen-Dick & DiGregorio, 2004).

Given these connected issues, this chapter offers the background needed to understand the governance, politics, and community involvement regarding Common Property Resources (CPRs) in Ladakh's border villages. It details the environmental context, socio-economic features, and institutional setups that shape CPR systems in these areas. This chapter serves as the groundwork for the empirical analysis in the next chapters, which will examine the dynamics of participation, equity, and sustainability in CPR governance.

## 4.2 Physical and Environmental Setting

The physical and environmental features of Ladakh establish the ecological basis for how Common Property Resources (CPRs) are managed and used. Ladakh is located in the northernmost part of India, nestled between the Greater Himalayas and the Karakoram Range. This region is one of the highest inhabited plateaus globally, with altitudes ranging from 2,900 to over 7,500 meters above sea level (Goodall, 2004; Sheikh, 2021). The area's rugged landscape, extreme weather, and delicate ecosystems significantly affect settlement patterns, livelihoods, and resource management. Being part of the cold desert zone of the trans-Himalayas, Ladakh experiences long, harsh winters with temperatures dropping below –30°C and short summers that provide only a limited growing season (Norberg-Hodge, 1991). These environmental conditions make access to productive land, water, and grazing areas essential for community survival. Communities often manage these resources collectively through traditional CPR systems.

Ladakh's ecological fragility increases due to its dry conditions, sparse vegetation, and reliance on glacial meltwater. Annual rainfall averages less than 100 millimeters in many parts, making the region dependent on streams fed by snowmelt and irrigation channels known as yuras and zings (Bhasin, 2012; Aggarwal, 2020). The limited and seasonal water resources have historically required collective management practices. Communities regulate distribution, maintenance, and usage through customary norms and local institutions (Jodha, 1992; Ahmad, 2019). The region's geomorphology, which includes high mountain passes, river valleys like

the Indus and Shyok, and vast grasslands, creates spatial diversity in resource availability. This diversity impacts how communities interact with their commons.

Ladakh's ecosystems are also experiencing rapid changes due to climate change and human activities. Glacial retreat, more frequent flash floods, and soil erosion disrupt traditional water management systems and threaten agricultural sustainability (Bajracharya et al., 2015; Negi & Gadgil, 2002). Additionally, new economic activities such as tourism, military expansion, and infrastructure projects have increased pressure on delicate pastures and alpine commons (van Beek, 2014; Bose, 2017). These developments heighten competition for limited natural resources, which often results in governance issues and the need for institutional adaptations. In this context, the environment of Ladakh is not just a backdrop but a key factor in how CPRs are governed, accessed, and sustained.

Within this larger ecological and geographical framework, the Kargil district serves as the focus of the current study. This district holds a unique place in Ladakh's environmental landscape. Located in the western part of the Union Territory, Kargil lies between latitudes 34° and 36° North and longitudes 75° and 77° East, bordering Pakistan-administered areas to the west and adjacent to the Line of Control (LoC). Covering about 14,036 square kilometers, Kargil features steep mountains, narrow valleys, and scattered settlements along river basins. Major rivers, such as the Suru, Drass, Wakha, and Indus, flow through the district, providing essential irrigation and drinking water. The area's topography shows elevations that range from 2,700 meters in valley bottoms to over 7,000 meters in high peaks such as the Nun-Kun massif, making it one of the most varied regions in the Trans-Himalayan zone (ICIMOD, 2020).

Kargil's climate reflects the broader cold-arid conditions of Ladakh. It has long, severe winters and short, mild summers. The district stays cut off from the rest of India for nearly six months each year due to heavy snowfall over mountain passes like Zoji La. In Drass, temperatures can drop to –40°C, making it one of the coldest inhabited places in the world. Summer temperatures can reach around 25°C. With precipitation averaging below 200 mm annually, mostly as snow, these climatic challenges, combined with thin soils and limited vegetation, make agriculture dependent on glacial meltwater and community-managed irrigation systems like kul and yura (Norboo et al., 2019).

Natural vegetation in Kargil is sparse and mainly found in river valleys, where willows, poplars, seabuckthorn, and wild grasses grow. The district's pastoral ecosystem supports nomadic and semi-nomadic herders who depend on vast rangelands, which are crucial

for livestock rearing. However, issues such as overgrazing, tourism expansion, and military activities strain these delicate ecological areas (Tiwari et al., 2021). The Suru and Drass valleys support short-cycle crops like barley, wheat, peas, and potatoes, while higher elevations primarily rely on yak, sheep, and goat herding.

Kargil's environmental fragility worsens due to its strategic location along the border, where ecological management intersects with geopolitical and defense concerns. Infrastructure projects, including road widening and defense construction, have resulted in soil erosion, loss of vegetation, and habitat fragmentation. Additionally, climate change, shown through glacial retreat and irregular rainfall, poses serious threats to the district's water and agricultural systems (ICIMOD, 2020). Despite these challenges, local communities have developed adaptive and collective practices such as rotational grazing, communal irrigation management, and traditional land-sharing, reflecting resilience and ecological knowledge built over generations.

Thus, the physical and environmental conditions of Kargil shape both the challenges and opportunities for livelihoods and CPR governance. The district's cold-arid ecosystem, mountainous landscape, and reliance on shared natural resources underscore the importance of community-based management institutions. Focusing the study on Kargil allows for an in-depth investigation of how environmental vulnerability, border dynamics, and traditional governance influence the sustainability of Common Property Resources in the Trans-Himalayan context of Ladakh.

### 4.2.1 Geographical Location and Physiography

The Kargil district is located in the western part of the Union Territory of Ladakh. It holds a strategic and ecologically sensitive position in the Trans-Himalayan region of northern India. The district sits between latitudes 34° and 36° North and longitudes 75° and 77° East. It is bordered by Pakistan-administered territories to the west, Leh district to the east, Himachal Pradesh to the south, and the Union Territory of Jammu and Kashmir to the southwest. Covering about 14,036 square kilometers, it makes up nearly 47 percent of Ladakh's total area (ICIMOD, 2020). Kargil's location along the Line of Control (LoC) gives it significant geopolitical importance. Its mountainous terrain and fragile ecosystem make it a vital area for studying resource use and community adaptation in borderland settings.

Geographically, Kargil is part of the Trans-Himalayan high mountain system, situated between the Greater Himalayas to the south and the Zanskar and Karakoram ranges to the

north. The region features a rugged landscape with steep mountain slopes, narrow valleys, glacial formations, and high-altitude plateaus. Elevations range from about 2,700 meters above sea level in the lower valleys like the Suru and Wakha rivers to over 7,000 meters at the Nun-Kun massif, one of the highest peaks in the Indian Himalayas. This significant change in altitude creates sharp microclimatic differences, affecting where people settle, how they cultivate land, and how they use pastures across the district.

The river valleys of Kargil, including the Suru, Drass, Wakha, and Indus, are the main areas for human habitation and farming. These valleys, shaped by glacial and flowing water processes, offer limited arable land amid large stretches of barren and rocky terrain. The Suru River originates from the Panzella Glacier and flows northward through Kargil town before joining the Indus near Khalsi. Its banks are home to some of the most densely populated and agriculturally productive parts of the district. In contrast, the Drass Valley is known for its extremely cold climate and narrow areas of cultivable land.

Kargil's varied geography leads to a mix of ecological zones, from irrigated valley bottoms to alpine pastures and snow-covered peaks. These zones not only influence the distribution of natural resources but also shape how Common Property Resources (CPR) are managed. High-altitude rangelands and alpine meadows are managed collectively for grazing. In contrast, irrigated areas in the valleys are governed by traditional water-sharing practices. This connection between geography, ecology, and community actions highlights how the district's physical landscape relates to its economic systems.

Another notable aspect of Kargil’s geography is its geological makeup, which consists mainly of sedimentary and metamorphic rocks interspersed with glacial moraines and alluvial deposits. The area shows active geomorphological processes, such as soil erosion, landslides, and permafrost formation, which impact land stability and water flow. These natural processes, coupled with sparse vegetation and shallow soil, limit cultivable land to less than 1 percent of the total area (ICIMOD, 2020). Consequently, much of Kargil is classified as barren, snow-covered, or pasture land, which significantly affects local livelihood strategies and reliance on CPR.

The settlement pattern in Kargil mirrors its geography. Villages are typically found along river valleys and lower mountain slopes, where water is available and soil fertility allows for farming. The higher slopes and plateaus are used seasonally for grazing livestock like yaks, sheep, and goats. Accessibility is often limited by steep gradients and poor road conditions,

especially in winter when snow blocks mountain passes like Zoji La, isolating the district from the rest of India.

### 4.2.2 Climate and Ecological Characteristics

Kargil's climate is mostly cold-arid, shaped by its high-altitude location in the rain-shadow of the Greater Himalayas. The surrounding mountain ranges block monsoonal currents from the Indian Ocean, leading to very low precipitation and long, harsh winters. The district experiences cold seasons lasting nearly seven months, with heavy snowfall isolating it from the rest of India from November to May. Temperature extremes are common. Winters in places like Drass can reach minimums around –40°C, making it one of the coldest inhabited regions globally. Summers are short and mild, with maximum temperatures rarely exceeding 25°C (ICIMOD, 2020). The mean annual precipitation is less than 200 millimeters, mostly falling as snow, underscoring the district's reliance on glacial meltwater for farming and domestic needs.

These harsh climate conditions create significant challenges for farming and settlement patterns. The growing season lasts only about four to five months, from May to September, when all agricultural, pastoral, and construction activities occur. The community's dependence on glacier-fed irrigation systems, known locally as kul, yura, and zing, is vital for supporting crops and livestock. Rapid snowmelt during the brief summers replenishes streams and rivers that are essential for both irrigation and drinking water. However, variations in snowfall and glacier retreat due to climate change have led to inconsistent water availability, presenting new obstacles for local livelihoods (Bajracharya et al., 2015; Norboo et al., 2019).

Ecologically, Kargil features a unique high-altitude desert ecosystem with sparse vegetation, thin soils, and limited biological productivity. The area's natural vegetation is primarily xerophytic, adapted to low moisture and wide temperature fluctuations. Common species include Salix alba (willow), Populus nigra (poplar), Hippophae rhamnoides (seabuckthorn), and various alpine grasses and shrubs (Tiwari et al., 2021). Vegetation cover mainly occurs in river valleys and irrigated lands, while higher altitudes feature alpine meadows that are crucial Common Property Resources (CPRs) for grazing. Kargil's rangelands are important for the pastoral economy, providing feed for sheep, goats, yaks, and dzos (yak-cow hybrids), which are primary sources of income and sustenance for many households in remote villages.

Kargil's animal diversity reflects its transitional location between the Palearctic and Oriental biogeographic zones. The area is home to species adapted to cold desert ecosystems,

including the Himalayan ibex (Capra sibirica), snow leopard (Panthera uncia), Tibetan wolf (Canis lupus chanco), and various migratory birds that inhabit the wetlands and riverbanks during summer (ICIMOD, 2020; WWF-India, 2019). However, increasing human pressures such as road construction, defense infrastructure, and unregulated tourism threaten habitats and disrupt wildlife corridors.

From an ecological perspective, Kargil is highly fragile and vulnerable to climate changes and human actions. Steep mountain slopes are at risk of soil erosion, landslides, and flash floods, especially during sudden glacial melt or unexpected rainfall. The rapid melting of glaciers and changing precipitation patterns linked to global warming are upsetting the region's hydrological balance (Negi & Gadgil, 2002; Aggarwal, 2020). These changes endanger the sustainability of water-intensive crops like barley and peas, affecting food security for rural communities that depend on them.

The relationship between climate, ecology, and human adaptation is key to understanding resource management in Kargil. Communities have traditionally developed collective strategies, such as rotational grazing, seasonal migration, and community-based water management, to address climate uncertainties. Local ecological knowledge embedded in traditional roles, such as the Goba (village head) system, informs decisions about land use, irrigation timing, and pasture rotation. However, ongoing climate changes and development pressures are pushing these traditional systems to their limits, increasing stress on Common Property Resources and leading to new socio-ecological conflicts.

### 4.2.3 Natural Resource Base and Common Property Resources

Kargil's natural resource base is shaped by its status as a high-altitude cold desert, leading to significant scarcity and vulnerability of essential resources (RGICS, 2024). The extreme environmental challenges require collective management, making these resources crucial Common Property Resources (CPRs) that rural communities, particularly in border areas, depend on for survival (Askfilo, 2024). This resource base creates governance challenges, as access rights need to be collectively discussed amid geopolitical restrictions and ecological risks (Ladakh-Tourism.net, 2024).

In a region with very low rainfall (an average annual of 26 CM in Kargil), water from glacier melt is the most critical CPR. Agriculture relies entirely on controlled irrigation (Kargil District Administration, 2024; Statistical Handbook, 2018-19). Nearly all net cropped areas

depend on irrigation, highlighting a nearly total reliance on managed water distribution (Statistical Handbook, 2018-19; Statistical Handbook, 2022-23):

- Irrigation Sources: Villages primarily rely on collectively managed river diversions, streams, and canals for irrigation (Village Amenity Data, 2011). Canals are specifically noted as the main irrigation source.
- Traditional Infrastructure (Zings and Khuls): Glacial meltwater is managed through sophisticated traditional systems. Water harvesting structures known as Zings are small tanks that collect melted water. This water is funnelled through complex networks of high-altitude canals, called khuls, which are vital cultural lifelines that support community resilience.

The effective functioning of these water systems is dependent on local institutions. The distribution of water is overseen by a designated village water official, the churpun, who ensures that the limited supply is shared equitably among households. Due to the geopolitical challenges and remoteness, the management of water resources is crucial for livelihood stabilization (PHE Department, 2024). The government has initiated programs to develop an irrigation master plan, aiming to improve infrastructure and conservation.

**Table 4.1 Irrigated Land Area in Kargil District (in Hectares)**

| Year | Net Area Irrigated (Ha) | Gross Area Irrigated (Ha) | Primary Source of Irrigation |
|---|---|---|---|
| 2017-18 | 11,237 | 11,268 | Canal, Springs/tanks, Others |
| 2020-21 | 11,754.2 | 11,754.2 | N/A |
| 2022-23 | 11,754.2 | 11,754.2 | Canal, Springs/tanks, Others |

*Source: District statistics & Evaluation Office Kargil, 2023-24*

Grazing lands constitute an indispensable form of Common Property Resources (CPRs), directly supporting the pastoral economy that is central to rural livelihoods in the region. The dependence on livestock such as cattle, sheep, goats, and yaks is significantly high, reflecting the economic and subsistence importance of pastoral activities. According to official statistics, the district reported a total livestock population of 391,582 heads in 2013–14 (Statistical Handbook, 2012–13), highlighting the critical role of grazing resources in sustaining the local agrarian and pastoral economy.

The nature of pastures in the region is shaped by its unique geographical and climatic conditions. The high-altitude areas north of the Zanskar range and in the Karakoram are characterized by alpine meadows, which serve as vital summer grazing grounds for both local and migratory pastoral communities. These alpine pastures provide essential fodder during the limited growing season and support the seasonal movement of livestock. Pastoralism in the Trans-Himalayan region, particularly in Zanskar, follows a traditional system of short-distance vertical transhumance, wherein livestock are moved to higher alpine pasturelands during summer in response to the short cropping season in lower elevations. This adaptive strategy enables optimal utilization of available grazing resources while maintaining ecological balance.

The governance and management of grazing commons have historically been rooted in traditional institutional arrangements. Grazing management largely operates through informal group tenure systems, which regulate access and ensure equitable distribution of pasture resources. In areas near settlements, the Lorapa system played a crucial role in regulating grazing activities. Under this system, annually selected officials were responsible for enforcing restrictions on free grazing during the critical agricultural period from March/April to August/September, thereby protecting cultivated lands from livestock damage. However, in border villages, access to grazing commons is significantly influenced by geopolitical factors. Military-imposed buffer zones near the Line of Actual Control (LAC) restrict access to traditional pasturelands, sometimes creating exclusion zones extending up to two kilometers on both sides. This geopolitical exclusion has resulted in the loss of access to rich grazing areas, forcing pastoralists to concentrate livestock on limited accessible commons. Consequently, this has led to overgrazing, ecological stress, and degradation of these fragile and environmentally sensitive pasture ecosystems.

Forest resources in Kargil are generally scarce due to the region's cold desert climate, which limits natural forest growth. This scarcity enhances the importance of available wood resources, particularly for meeting household energy needs. Fuelwood remains the primary source of energy for heating and cooking, especially in extremely cold areas such as Drass, where alternative energy sources are limited. Due to insufficient local forest cover, many households depend on purchasing fuelwood, increasing their economic burden. In response to this scarcity, afforestation initiatives have focused on planting hardy species such as Willow and Poplar on community and state lands. These species are well adapted to local climatic conditions and are commonly integrated into agroforestry systems, providing multiple benefits

including timber, fuel, and fodder. These planted resources are often treated as CPRs and are managed collectively by local communities. However, efforts to expand forest cover through plantation programs face administrative constraints, particularly in acquiring wastelands for afforestation. Existing grazing rights held by local communities often complicate land allocation, creating institutional and governance challenges in balancing afforestation goals with traditional pastoral livelihoods.

**Table 4.2 Land Utilization Pattern, Kargil District (in Hectares)**

| Land Classification | Area (Ha) | Reference Year* |
|---|---|---|
| Reporting Area (000 Ha) | 19,000 | 2011 Census |
| Forest Area (Sq. Kms) | 8.25 | 2022-23 |
| Net Area Sown (000 Ha) | 9.54 | 2001 Census |
| Cultivable Waste Land (Hectares) | 7789.17 | 2019-20 |

*Source: **

Wetlands and medicinal plants represent specialized ecological niches that function as important common property resources (CPRs), contributing significantly to both environmental sustainability and local livelihoods. High-altitude wetlands are found in regions such as Changthang in Ladakh and around Rungdum in Kargil district. These wetlands are ecologically fragile but play a crucial role in maintaining biodiversity and supporting pastoral activities. The areas surrounding wetlands provide valuable grazing grounds for livestock, particularly during specific seasons when other grazing areas may be less productive. In addition to their ecological importance, wetlands also contribute to water regulation and serve as habitats for various plant and animal species. However, these sensitive ecosystems are increasingly threatened by human pressures, especially due to rising tourism, infrastructure development, and associated environmental disturbances, which pose risks to their long-term sustainability.

The region is also rich in medicinal plant biodiversity, with approximately 400 species identified in Kargil district. These medicinal plants have traditionally been an integral part of local healthcare systems, forming the basis of indigenous healing practices and traditional knowledge. Beyond their cultural and medicinal value, these plants also hold significant economic potential, as they can be cultivated and marketed for pharmaceutical and herbal industries. Recognizing their importance, efforts are being made to conserve and promote the sustainable use of medicinal plants through coordinated initiatives involving government

agencies and local communities. These initiatives focus on conservation, cultivation, and awareness programs, ensuring that medicinal plant resources are preserved while also providing livelihood opportunities. As shared natural resources, medicinal plants are treated as collective assets, reinforcing their status as CPRs and highlighting the importance of community participation in their management and sustainable utilization.

The economic and ecological system is built around the district's hydrography, fed primarily by glacial melt. The major arteries, including the Suru, Dras, and Zanskar rivers (tributaries of the Indus), form the economic backbone for settlement and agriculture. The necessity of diverting and distributing this glacial meltwater, often across significant distances and elevations, necessitates the maintenance of complex collective infrastructure, specifically traditional irrigation channels (*zing*), which constitute the most vital water CPRs.

**Table 4.3 Physiographic Profile and Resource Nexus of Key Sub-regions**

| Sub-Region/Tehsil | Primary River/ Valley System | Approximate Altitude (m/ft) | Dominant Terrain/ Physiography | Resource Linkage to CPRs |
|---|---|---|---|---|
| Kargil Town/Main Tehsil | Suru River Valley | 2,676 m (8,780 ft) | Alluvial fans; main district center; limited natural forest cover. | Primary agriculture base (horticulture); collective maintenance of vital, elaborate irrigation systems (water CPRs). |
| Drass Valley (LoC Sector) | Dras River | 3,300 m (10,800 ft) | Glaciated terrain, known for extreme cold; limited arable land. | Essential high-altitude *dhoks* (seasonal pastures) for pastoralism; grazing access directly constrained by geopolitical demarcation. |
| Zanskar Tehsil | Zanskar River Valley (Padum admin center) | 3,500 m (11,500 ft) | Isolated Trans-Himalayan interior; harsh winters$30^0$C; high degree of isolation. | Long-distance transhumant pastoralism (Pashmina, livestock) requiring intensive collective management of remote pastures. |
| Batalik Sector | Indus River Valley | 2,754 m (9,035 ft) | Narrow river gorge; strategic significance due to LoC proximity. | Limited arable land; resource access often monitored and impacted by military presence and security zoning. |

*Source: District statistics & Evaluation Office Kargil, 2023-24*

The vulnerability of these water CPRs is exacerbated by climate change. As ecological studies indicate accelerated glacial retreat and unstable hydrological patterns, the reliable timing and volume of meltwater the foundation of traditional resource calendars are being destabilized. This environmental shift acts as a significant multiplier on existing scarcity, intensifying inter-village conflicts over declining water resources and placing severe stress on the adaptability and equity of local CPR governance mechanisms. Given that agriculture is already severely constrained by minimal rainfall, degraded soil, and short growing seasons, and irrigation covers nearly the entire net and gross area sown (11,237 Ha net irrigated versus 11,454 Ha gross area sown, according to 2013-14/2017-18 data cited in the administrative profile), water control is the critical issue determining livelihood stability.

### 4.2.4 Environmental Challenges and Climate Vulnerability

The governance and politics of Common Property Resources (CPRs) in Ladakh's border regions are inextricably linked to a fragile high-altitude environment that is now under severe strain from climate change and resultant ecological challenges (RGICS, 2024; Roundglass Sustain, 2025). These environmental pressures exacerbate the natural scarcity of resources, creating acute vulnerability in local livelihoods and intensifying potential conflicts over diminishing commons (Sonam Wangchuk, 2024).

Glacial Retreat and Water Scarcity: The existence of settled agriculture and pastoralism in Kargil, a high-altitude cold desert, relies almost entirely on meltwater from mountain glaciers, making water resources highly sensitive to global warming (Ladakh-Tourism.net, 2024; RGICS, 2024).

Temporal analyses confirm an accelerated retreat of glaciers in the key resource valleys supplying Kargil. The Parkachik Glacier in the Suru basin, a critical water source for the district, has shown a significant increase in its retreat rate from an average of two meters per year (1971–1999) to 20 meters per year between 2015 and 2021 (Mongabay, 2023). Consistent reduction in the mass balance of 75 glaciers in the Suru basin has also been reported (Shukla et al., 2020a, b).

The retreat and destabilization of glaciers translate directly into acute water scarcity, challenging traditional resource management systems:

**Destabilized Water Flow**

Rising winter and spring temperatures cause rapid, early meltwater runoff and earlier peak river discharge (Kumar & Yangchan, 2021). This erratic timing disrupts the predictable flow needed for the traditional *khul* (canal) irrigation systems and leaves communities vulnerable during the late-season dry periods, placing stress on farming (Namgyal Lhamo, 2024).

**Increased Flood Risk**

Accelerated glacial melting and the potential formation of glacial lakes heighten the risk of Glacial Lake Outburst Floods (GLOFs), which can destroy downstream human and agricultural infrastructure, including the intricate irrigation channels crucial for survival (Mongabay, 2023; Roundglass Sustain, 2025).

**Existential Threat to Agriculture**

Given that the net area irrigated (11,754.2 hectares in 2022-23) essentially equals the gross area sown, agriculture remains entirely dependent on managed water supplies (Statistical Handbook, 2022-23). Climate-induced water instability acts as the primary threat to this agrarian backbone (IMC, 2025).

The high-altitude cold desert climate naturally predisposes Kargil to land vulnerability, a situation now aggravated by climatic shifts and unsustainable pressure on common lands (IITM, 2024).

**1. Extent of Degradation**

Land degradation is a major environmental concern in Ladakh, significantly affecting the sustainability of natural resources and livelihoods. At the regional scale, data indicates that approximately 42.31 percent of Ladakh's total geographical area is classified as degraded and deserted (ISRO Data, 2003–05). This highlights the fragile ecological conditions prevailing in the region, where harsh climatic factors, limited vegetation cover, and human pressures contribute to land deterioration. Moreover, the extent of land degradation has increased by more than 3 percent since 2003–05, indicating a worsening trend. This progressive degradation poses serious challenges for agriculture, grazing, and overall ecosystem stability, further constraining the availability and productivity of common property resources.

Soil erosion is one of the primary drivers of land degradation in the region. The soil in Ladakh is typically thin, sandy, and porous, making it highly vulnerable to erosion by natural forces (Demenge, 2006). Both water and wind erosion contribute significantly to soil loss and declining land productivity. Water erosion alone affects approximately 24.6 percent of the total growing area, largely due to runoff during snowmelt and limited precipitation events. In addition, wind erosion impacts about 6.1 percent of the area, particularly in exposed and vegetation-scarce zones where strong winds remove the topsoil (NBSS & LUP, 2007). The combined effects of water and wind erosion reduce soil fertility, limit agricultural potential, and contribute to the overall degradation of land resources, thereby affecting the livelihoods of communities dependent on these fragile ecosystems.

**2. Degradation of Pasturelands (Grazing Commons):**

The land used for vital Common Property pastoral activities is under intense pressure. Overgrazing has emerged as a significant factor contributing to land degradation and the declining quality of common grazing resources in the region. The area classified as permanent pastures and grazing lands has remained largely stagnant over time, despite a substantial and growing livestock population. For instance, the combined number of sheep and goats alone reached 281,116 in 2021–22, reflecting the continued dependence of local communities on pastoral livelihoods. This imbalance between the limited availability of grazing land and increasing livestock numbers has intensified pressure on fragile ecosystems. Additionally, changing livestock production trends, including higher livestock densities and intensified grazing practices (Bhatnagar et al., 2006), have accelerated the degradation of high-elevation grasslands and alpine meadows. These ecologically sensitive areas, which require long recovery periods due to harsh climatic conditions, are particularly vulnerable to overuse, resulting in reduced vegetation cover, soil erosion, and declining pasture productivity (Bhasin, 2012).

Land degradation has also had a direct impact on cultivable land, further constraining agricultural sustainability. The extent of fallow land and culturable wasteland has declined significantly, with reductions of over 35 percent and 3 percent, respectively, between 1966–67 and 2004–05. This decline limits the availability of land that could otherwise be restored and brought under cultivation in the future, thereby increasing pressure on the remaining arable lands and common property resources. As soil quality deteriorates due to erosion and overuse, agricultural productivity has become increasingly dependent on external inputs. In particular,

the use of chemical fertilizers has increased as farmers attempt to compensate for declining soil fertility and maintain crop yields (RGICS, 2024). While fertilizers provide short-term productivity gains, their increased reliance reflects the underlying degradation of soil health and highlights the growing vulnerability of the agricultural system to environmental stress and resource constraints.

These environmental challenges translate into heightened livelihood risks for border communities (Ladakh, 2024). Livelihood stress in the region has intensified due to the combined effects of environmental degradation, geopolitical constraints, and limited natural resource availability. Shrinking pastures, resulting from both ecological degradation and restricted access to traditional grazing lands due to geopolitical tensions, have significantly affected pastoral activities. At the same time, agriculture remains highly vulnerable due to fragile soil conditions, limited cultivable land, and harsh climatic factors. The scarcity of forest resources, as highlighted by the Forest Department (2024), further exacerbates livelihood challenges, particularly because local communities depend on wood for fuel, fodder, and other essential needs. These cumulative pressures have made traditional agro-pastoral livelihoods increasingly difficult to sustain, accelerating a gradual shift away from these long-established practices toward alternative livelihood strategies (SNU, 2023).

The region is also becoming increasingly vulnerable to extreme weather events, which further threaten both livelihoods and ecological stability. Events such as cloudbursts and flash floods have caused significant damage to agricultural land, infrastructure, and human settlements. These disasters not only result in immediate economic losses but also have long-term impacts on soil fertility, land productivity, and overall environmental resilience. Historical instances of such extreme events have led to widespread destruction and loss of life, highlighting the growing risks associated with climate variability and environmental fragility in the region (Gupta et al., 2012; Roundglass Sustain, 2025). The increasing frequency and intensity of such events add to the uncertainty faced by local communities, making sustainable resource management more challenging.

In response to these ecological and livelihood threats, there has been a growing demand among local communities for stronger institutional and legal protections. The perceived risks to the fragile environment, combined with concerns over the erosion of traditional rights and livelihoods, have led to widespread public mobilization and protests. Local populations have been advocating for the implementation of constitutional safeguards

that would provide greater protection to the region's land, environment, and cultural heritage. These demands include greater autonomy over land use and agricultural decisions, enabling communities to manage their resources in a way that aligns with their traditional practices and ecological realities. Such movements, supported by prominent local voices including Sonam Wangchuk (2024), reflect the urgent need to balance development, environmental conservation, and the protection of traditional livelihood systems.

**Table 4.4 Climate-Induced Threats and Ecological Impacts**

| Environmental Challenge | Causal Factor(s) | Observed Physical Impact | Impact on CPRs & Livelihood |
|---|---|---|---|
| **Glacial Retreat** | Rising temperatures (winter/spring), global warming | Glacier retreat rate increased significantly (e.g., Parkachik Glacier, 20 m/year) | Destabilization of meltwater supply, early peak discharge, threatening irrigated agriculture. |
| **Water Scarcity** | Erratic precipitation, rapid melt runoff, lack of storage | Earlier depletion of water sources during the dry season; failure of predictable *khul* flow. | Acute stress on managed irrigation systems; increased inter-community conflicts over water allocation. |
| **Land Degradation / Desertification** | Climatic change, high grazing pressure (overstocking) | 42.31% of Ladakh's area degraded/deserted; extensive soil erosion (24.6% water erosion). | Degradation of grazing commons; reduced cultivable land and increased dependence on inputs. |
| **Extreme Events** | Shifting weather patterns (climate change) | Increased frequency of cloud bursts, flash floods, and landslides. | Destruction of key infrastructure (canals, roads, homes) and loss of life; higher vulnerability to economic shocks. |

*Source: District statistics & Evaluation Office Kargil, Various Years*

## 4.3 Socio-Economic Profile of Border Villages

The socio-economic profile of the border villages in the Union Territory of Ladakh is critically shaped by their isolation, inherent resource scarcity, and a traditional dependence on agro-pastoralism. The dynamics of Common Property Resources (CPRs) governance are deeply influenced by this profile, particularly by demographic features, the structure of livelihood systems, and the recent institutional changes following the 2019 Union Territory (UT) restructuring.

### 4.3.1 Demographic Features and Settlement Patterns

Kargil district's demographic structure reflects a sparse but highly clustered population pattern typical of high-altitude deserts. The total population of the district was 140,802 as per the 2011 Census, with the overwhelming majority (124,464 souls) residing in rural areas. This rural population is concentrated in the narrow river valleys, contrasting sharply with the overall sparse population density of approximately 10 inhabitants per square kilometer.

Remoteness and Distribution: Isolation is a defining characteristic, particularly for critical border blocks. Zanskar, situated in the interior of the Trans-Himalaya, is considered the most isolated part of the region, with a small population of 11,653 souls concentrated in narrow, high-altitude settlements. Blocks along the Line of Control (LoC) such as Drass and Taisuru, despite their strategic importance, also experience significant remoteness, which severely limits administrative reach and forces communities to rely on traditional self-governance for survival.

**Table 4.5 Demographic Profile of Kargil Border Blocks (2011 Census Data)**

| Block (Representative Border Area) | Total Population | Households (No.) | Approx. Sex Ratio (Females per 1000 Males) | Literacy Rate (%) (District Total) |
|---|---|---|---|---|
| Drass (High Altitude) | 21988 | 3217 | 493 | 71.34 |
| Zanskar (Remote Interior) | 11653 | 1729 | 989 | 71.34 |
| Taisuru (Suru Valley Border) | 10059 | 1582 | 946 | 71.34 |
| Shakar-Chiktan (Border Region) | 11233 | 1776 | 913 | 71.34 |
| **District Total** | **140802** | **18338** | **810** | **71.34** |

*Note: Literacy data reflects the District Total. Sex Ratio is calculated from block-wise male/female figures available in the source documents. Source: District statistics & Evaluation Office Kargil, 2023-24*

### 4.3.2 Common Property Resources (CPRs) in Border Villages

The Common Property Resources (CPRs) in Kargil encompass a diverse range of community-managed assets that are essential for sustaining local livelihoods and maintaining ecological balance. Given the region’s cold-arid environment and dependence on collective resource systems, these CPRs can be broadly classified into four major categories: pasturelands, water resources, forest and shrublands, and communal lands or wastelands. Each type represents a distinct mode of community interaction with the natural environment,

governed by traditional institutions, participatory frameworks, and, increasingly, state interventions.

**Pasturelands (Yulsa)**

Pasturelands represent the most extensive and economically significant form of CPRs in Kargil. Located between altitudes of approximately 3,000 to 4,500 meters, these alpine meadows serve as vital grazing areas for livestock such as sheep, goats, yaks, and dzos during the short summer season from May to September. Access to these pastures is determined through customary rights based on lineage, village membership, or negotiated inter-village arrangements. Historically, grazing rights have been regulated through mutual agreements and rotational systems that ensure equitable use and prevent degradation. However, changing climatic patterns, increasing livestock pressure, and reduced vegetation cover have intensified stress on these fragile ecosystems, leading to declining pasture productivity and emerging conflicts over access.

**Water Resources (Irrigation Kuls and Streams)**

Water is perhaps the most critical and contested common resource in Kargil's high-altitude desert environment. Agriculture depends almost entirely on the diversion of glacial meltwater through traditional irrigation systems known as *kuls* or channels. These irrigation structures are communally constructed and maintained under the supervision of *Churpons*—village-appointed water managers who organize the cleaning, repair, and distribution of water. Allocation of irrigation water follows rotational systems, locally termed the *zho*, to ensure equitable access among households. The cooperative management of these water systems reflects deeply rooted traditions of collective action and reciprocity, often cited as a model of effective community-based governance (Ostrom, 1990).

**Forest and Shrublands**

Although the district's natural forest cover is sparse due to its altitude and aridity, riverbanks and irrigated pockets support stands of willow, poplar, seabuckthorn, and wild grasses. These areas serve as important communal sources of fodder, fuelwood, and construction material. Access to such resources is collectively regulated through local committees or the *Anjuman* (village elders' council), which establishes rules to prevent overharvesting. In recent years, reforestation efforts under the Border Area Development Programme (BADP) and initiatives by the Ladakh Autonomous Hill Development Council (LAHDC) have integrated community participation into formal forestry programs. These

interventions have redefined traditional stewardship, merging local ecological knowledge with state-led conservation strategies.

**Communal Lands and Wastelands**

Each village in Kargil maintains common open lands used for multiple purposes such as crop threshing, storage of fodder, drying of produce, and temporary shelters for herders during transhumance. These areas also serve as crucial buffer zones during environmental emergencies like floods, landslides, or road closures. While such lands are officially classified as government property, local customs recognize community usage rights, which are respected by both village institutions and administrative authorities. Their flexible use and informal governance make them an essential part of the rural resource mosaic, providing resilience in times of ecological or economic stress.

The management of CPRs in Kargil reflects a complex interplay between customary governance, participatory democracy, and state or military involvement.

- Customary Systems: Traditionally, CPRs were administered through village assemblies led by informal authorities such as the *Lambardar* and *Churpon*. Decisions on resource allocation, maintenance, and conflict resolution were made through consensus, with rules preserved in oral traditions. Breaches of community norms—such as unauthorized grazing or water theft—were typically addressed through social sanctions or community labor penalties, reinforcing collective accountability.
- Participatory Governance under Panchayati Raj: The extension of Panchayati Raj Institutions (PRIs) to Ladakh introduced a semi-formal governance layer over traditional systems. The *Gram Sabha* now holds the legal mandate to approve decisions concerning irrigation schedules, forest protection, and land use. Yet, in practice, remote villages continue to rely heavily on customary mechanisms, as administrative oversight remains limited and local trust in traditional institutions persists.
- State and Military Interventions: Governmental bodies such as the LAHDC Kargil and the Department of Rural Development play a vital role in supporting CPR-related infrastructure projects, including check dams, water storage systems, and pasture rehabilitation schemes. Additionally, the Indian Army, through initiatives under *Operation Sadbhavana*, contributes to maintaining irrigation channels, constructing community bridges, and promoting plantation drives. While these interventions have strengthened resource infrastructure, they have also introduced new governance

dynamics by shifting certain decision-making powers from local institutions to external actors.

### 4.3.3 Livelihood Systems and Dependence on CPRs

Rural livelihoods in Kargil are founded on a closely integrated traditional agro-pastoral model, which has historically accounted for approximately 84.65% of the region's economy.

**Agro-Pastoral Livelihood**

Agriculture remains the principal livelihood for approximately 95% of the rural population. Farming is restricted to the short summer season (May to September) and relies heavily on subsistence crops like Grim (Naked Barley) and wheat. Pastoralism is equally vital, utilizing livestock such as cattle, sheep, goats, yaks, and dzos. Traditional transhumance, particularly the vertical movement of livestock to exploit vast alpine pastures, is practiced in high-altitude zones like Zanskar. High-value Pashmina wool production in the Changthang region supports thousands of herders.

**Emerging Economic Drivers**

In recent decades, the regional economy has undergone a significant structural transition, with increasing dominance of the tertiary sector alongside traditional agro-pastoral activities. This shift reflects broader changes in livelihood patterns, driven by emerging service-based opportunities, market integration, and growing external demand. While agriculture and pastoralism continue to play an important role, the expansion of service-oriented sectors has created alternative income sources, contributing to livelihood diversification and reducing exclusive dependence on natural resources.

Tourism has emerged as one of the most important components of this structural transformation. Since the region was opened to tourism in 1974, the sector has grown steadily, becoming a crucial source of revenue generation and employment. Tourism-related activities, including the establishment of accommodation units such as guesthouses and homestays in areas like Drass and Zanskar, have provided households with valuable supplementary income. This has not only enhanced household economic resilience but also encouraged local entrepreneurship and infrastructure development. Tourism has thus become an important means of integrating the local economy with national and global markets, while also supporting livelihoods in geographically remote and ecologically fragile areas.

Market linkages have also strengthened due to the presence of Indian Army bases in the region, which provide a stable and reliable cash market for locally produced agricultural goods. The demand from army establishments, particularly for fresh vegetables and other food supplies, has encouraged farmers to diversify their cropping patterns away from traditional subsistence farming toward more market-oriented production. This transition has enabled farmers to generate higher incomes and participate more actively in the cash economy, although it has also increased their exposure to market fluctuations and changing demand conditions.

In addition, handicraft production represents another important component of the emerging service and livelihood economy. Traditional handicrafts such as handwoven woolen products and Namda rugs are produced using locally available raw materials, particularly wool from sheep and yaks. These handicrafts reflect the region's cultural heritage while also providing income-generating opportunities for households. The sector offers demand-based employment, especially for rural households and women, contributing to livelihood diversification and economic sustainability. By combining traditional skills with market demand, handicraft production helps preserve indigenous knowledge while supporting the transition toward a more diversified and service-oriented economic structure.

**Table 4.6 Kargil District Workforce and Traditional Reliance (2011 Census)**

| Occupation Category | Number of Workers (2011 Census) | Proportion of Workforce (Approx.) | Traditional Economic Contribution |
|---|---|---|---|
| Total Main Workers | 28941 | 55.8% | N/A |
| Total Marginal Workers | 22932 | 44.2% | N/A |
| Marginal Cultivators | 6432 | 12.4% | Direct Land/Water CPR dependence |
| Marginal Agricultural Laborers | 3239 | 6.2% | Direct Land/Water CPR dependence |
| Primary Sector (Historical) | N/A | ~84.65% of regional economy | Very High Reliance |

*Source: District statistics & Evaluation Office Kargil, 2023-24*

### 4.3.4 Role of CPRs in Household Economy and Community Survival

The extreme climatic conditions and limited private resources in border villages amplify the essential role of CPRs in ensuring household food security and survival.

CPRs provide crucial non-market goods, notably fuel and fodder. Nationally, studies indicate that 45% of rural households rely on CPRs for fuelwood collection, which accounts for 58% of the total value collected from these resources. In exceptionally cold border zones like Drass, fuelwood is the major energy source for heating and cooking, making local woodlots and meager forest resources indispensable CPRs. Traditional institutions govern the equitable distribution of scarce CPRs, ensuring community resilience:

Water Allocation (Churpun System): In a water-scarce environment, the meticulous management of glacier meltwater through communal irrigation channels (khuls) and storage tanks (Zings) is vital,. The churpun, a locally appointed water official, is responsible for ensuring the equitable distribution of this limited supply among households according to customary laws.

Grazing Regulation (Lorapa System): The Lorapa system, enforced by annually selected officials, regulates free grazing of livestock on village pastures near fields during the crucial cropping season (March/April to August/September) to prevent crop damage. Disputes related to resource use are traditionally settled by the goba (village headman).

**Table 4.7 Livestock Composition and Resource Dependence**

| Livestock Type (District Totals) | Magnitude (Heads) | Primary CPR Dependence |
|---|---|---|
| Total Livestock (All Types, 2013-14) | 391582 | Pasturelands, Fodder (Private/Common) |
| Cattle (2013-14) | 66137 | Alpine Pastures, Fodder |
| Sheep (2013-14) | 183247 | High-Altitude Grazing Commons |
| Goats (2013-14) | 117427 | High-Altitude Grazing Commons (Pashmina) |
| Zo/Zomo & Yaks (2013-14) | 16608 | Alpine Meadows, Remote Pasture |

*Source: District statistics & Evaluation Office Kargil, 2023-24*

### 4.3.5 Economic Transitions and Emerging Livelihood Alternatives

Economic life in border villages is rapidly moving from a primary subsistence base to a mixed, market-integrated economy. The increasing flow of capital and external demand accelerates diversification:

- Horticulture and Trade: Apricot cultivation is a major source of economic growth, with fresh and dried fruits being sold outside the territory.
- Service and Employment: Non-agricultural income is sought through tourism services, army-related contract work, and government employment. Employment initiatives are

specifically focused on skill development for ex-servicemen, often in new sectors like renewable energy.

- Central Schemes: Post-2019, focused central schemes like the Vibrant Villages Programme (VVP) target specific border villages (35 in Ladakh UT) for broad development, including promoting skill development, entrepreneurship, and market linkages for local products.

**Table 4.8 Key Socio-Economic Indicators (Kargil District Summary)**

| Indicator | Value (Pre-UT Period, ~2011-2015) | Implication for CPR Governance |
|---|---|---|
| Average Household Size (2011) | 7.6 persons | High labor demand/high resource pressure |
| Average Landholding Size (Ha) (1995-97) | 0.76 Ha | Highly fragmented holdings increase CPR dependence |
| Households Dependent on Fuelwood from CPRs (%) | ~45% (National rural average) | High dependence on woodlots/forests for subsistence energy |
| Literacy Rate (%) (2011) | 71.34% | Supports community participation in development |
| Total Bank Deposits (Rs. in Lakhs) | 82818.00 (2014-15) | Reflects pre-transition financial activity |

*Source: 2011 Census and Financial Data*

The transition of Ladakh to a Union Territory (UT) in October 2019 marked a pivotal shift in the political and economic environment of the border villages, moving the focus of resource governance from regional autonomy to centralized control. The most significant impact has been institutional. As a UT without a legislature, Ladakh is now directly governed by the Central Government through the Lieutenant Governor. This has led to a perceived erosion of agency for the locally elected Ladakh Autonomous Hill Development Council (LAHDC), which previously enjoyed greater autonomy under the former State of Jammu and Kashmir. This institutional shift creates political anxiety, manifesting in widespread demands particularly the inclusion of Ladakh under the Sixth Schedule of the Constitution to ensure local democratic control over decisions regarding land, forests, and other natural resources (CPRs).

Economically, the post-2019 period shows an accelerated drive towards integration and diversification:

Capital Inflow: Banking data from the pre- and post-UT era (comparing 2014-15 to 2019-20) indicates a substantial increase in financial activity, suggesting greater capital inflow and economic dynamism.

Strategic Development: Central schemes like the Vibrant Villages Programme (VVP), targeting 35 villages in Ladakh UT, reveal a direct focus on border infrastructure, livelihood generation, and market integration. This centralized development aims to counter youth outmigration and incentivize populations to remain in strategic areas.

Increased Resource Competition: The push for infrastructure development, industrial policy, and land use changes under central governance risks overriding customary land rights and increasing resource conflicts. The fragility of the environment, coupled with the pressure from tourism and military expansion, means that the governance of CPRs is now increasingly mediated by the state's security and development mandates, rather than solely by local customary institutions.

## 4.4 Institutional Framework for CPR Governance

The governance of Common Property Resources (CPRs) in Kargil's villages functions through a multi-layered institutional framework that blends traditional, local, and formal administrative systems. At the village level, institutions such as the *Lambardar* act as custodians of community lands and mediators in disputes, while *Churpons* manage the equitable distribution of irrigation water. Bodies like the *Anjuman/Jammat Committees* oversee social regulation and increasingly contribute to environmental stewardship, and emerging *Pasture Committees* regulate grazing practices under participatory schemes introduced by the LAHDC. Formal governance is exercised through the *Gram Panchayat* and *Sarpanch*, who oversee land and water use planning, supported by the *Patwari* responsible for maintaining land and pasture records, and the *Block Development Officer (BDO)*, who coordinates CPR-related programs under initiatives such as MGNREGA and BADP. Together, these overlapping institutions ensure both customary continuity and administrative accountability in the management of shared natural resources.

### 4.4.1 Traditional and Customary Institutions (Role of goba, village councils, monastic institutions)

For centuries, traditional institutions have provided the essential local mechanism for allocating scarce resources, mediating conflicts, and ensuring collective survival in the isolated, ecologically fragile cold desert environment of Kargil (Ladon et al., 2023).

The Goba (Village Headman) System: The goba is the central figure in traditional village governance. This elected or appointed leader oversees village matters through established custodials laws (thims) and resolves internal disputes. The goba system monitors

the efficiency of other resource management institutions and plays a vital role in communicating collective decisions, formulated in village meetings (yulpa), to external agencies. Disputes related to the customary laws governing internal order and resource use are settled by the goba and the village priest.

Water Management Officials (Churpun): Given the absolute reliance on glacial meltwater for agriculture, the most crucial traditional function is the management of hydrographic CPRs like khuls (canals) and Zings (small storage tanks). The churpun, a dedicated village water official, is responsible for ensuring the equitable distribution of the limited water supply to all member households. This system manages the timing of flow from the glaciers and enforces maintenance norms, requiring mandatory collective labor from the community members.

Grazing Regulation Officials (Lorapa): The allocation and protection of grazing commons near settlements are governed by the Lorapa system. These officials are typically selected annually to enforce regulations, specifically restricting free grazing of livestock (yaks, dzos, and cows) during the critical cropping season (March/April to August/September). Disputes involving the lorapas are settled by the goba.

Monastic Institutions: Particularly in Buddhist-dominated areas like Zanskar, monasteries and religious figures historically held significant social and institutional authority, often playing a role in regulating seasonal resource use, land allocation, and ethical conduct related to natural resource exploitation.

Despite their historical efficacy, these traditional systems face severe threat and institutional weakening due to the imposition of modern systems, such as the Panchayati Raj system, and the external pressures of land use change.

### 4.4.2 Community-Based Management

The operational success of CPRs rests on well-defined local norms of use, maintenance, and exclusion, primarily revolving around the fragile water and limited pasture resources. Resource management practices are founded on locally evolved rules (*thims*) that define:

1. Access and Exclusion: Rules dictate which households (*yulpa*) are entitled to use specific CPRs and establish boundaries for common land use, such as the timing of access to alpine meadows.

2. Maintenance Contribution: Collective labor for maintaining water channels (*khuls*) is mandatory, ensuring the infrastructure necessary for water security remains functional after the winter thaw.
3. Grazing Schedules: Strict seasonal schedules are implemented to manage the movement of livestock, preventing overgrazing near crop fields during the short growing season.

Sanctions for non-compliance are enforced by the *goba* and village councils, ensuring collective action and mutual exchange necessary for survival. These communal arrangements compel cooperation, recognized as necessary for the sustainability of resources in the rugged, remote terrain. This localized, customary governance is being undermined by modern pressures. The decline in fallow land and cultivable wasteland reduces the land available for rotation, increasing pressure on remaining pastures. Furthermore, youth outmigration due to emerging market and employment opportunities weakens the labor pool available for collective maintenance tasks, leading to the institutional weakening of these systems.

### 4.4.3 Formal Administrative and Governmental Structures

Formal administrative structures, inherited largely from the erstwhile Jammu and Kashmir State, operate concurrently with and often compete against the traditional institutions.

The introduction of Panchayati Raj Institutions (PRIs) has significantly altered the institutional landscape of local governance, creating both opportunities and challenges in the management of common property resources (CPRs). The Panchayati Raj system established elected local self-governance bodies at the village level, known as Panchayats, with statutory authority over development planning and local resource management. However, this formal system often overlaps with and conflicts with traditional governance structures, particularly the authority of the goba, who has historically played a central role in regulating access to land, water, and grazing resources. This administrative duality has led to overlapping jurisdictions, where the legal authority of Panchayats sometimes clashes with customary practices and traditional leadership. In Kargil district, there are 95 Panchayats governing 127 villages, indicating a complex and fragmented administrative structure. This numerical and institutional fragmentation can complicate decision-making processes and weaken the coherence of resource governance at the community level.

The district administration, consisting of the Deputy Commissioner, Tehsil offices, and Block-level authorities, holds formal legal and regulatory control over land administration, revenue management, and public infrastructure development. These institutions are responsible for implementing government policies and development programs, including those related to agriculture, rural development, and natural resource management. However, development initiatives implemented by district authorities have often been criticized for adopting a top-down approach, with limited integration of local knowledge and traditional management systems. Many programs have relied heavily on external assistance, subsidies, or grant-based support, which, while beneficial in the short term, have sometimes undermined the self-reliance, reciprocal exchange, and collective responsibility that characterize traditional agro-pastoral systems. This has created tensions between formal administrative interventions and locally evolved sustainable resource management practices.

**Table 4.9 Institutional Density and Administrative Reach (Kargil District, Pre-UT Era)**

| Administrative Tier/Block | Number of Panchayats (2011 Census) | Total Villages (2011 Census) | Villages per Panchayat (Approx.) | Administrative Challenges |
|---|---|---|---|---|
| Kargil Block | 20 | 22 | 1.1 | High concentration/Urban mix |
| Drass Block (Border) | 14 | 20 | 1.4 | High altitude, long distance, seasonal accessibility |
| Zanskar Block (Remote) | 9 | 18 | 2.0 | Extreme remoteness, geographic isolation |
| Shakar Chiktan (Border) | 9 | 11 | 1.2 | Border proximity and access constraints |
| District Total | 95 | 129 | 1.35 | Significant rural dispersion and dual governance challenges |

*Note: The number of blocks and sub-divisions decreased post-2019, indicating administrative restructuring that impacted the density figures: Source: District statistics & Evaluation Office Kargil, 2023-24*

The Forest and Revenue Departments also play a crucial role in shaping the governance of land and natural resources, particularly through their legal authority over forest land and state land. These departments often classify communal grazing areas, forests, and woodlots as state-owned property, thereby bringing them under formal government control. This classification can conflict with the traditional perception of these resources as community-owned CPRs, historically managed through customary institutions and collective norms. The

Forest Department is actively involved in afforestation and land management initiatives, aiming to enhance forest cover and ecological sustainability. However, such efforts often face challenges in acquiring land, especially wastelands, due to existing grazing rights and customary claims held by local communities. This situation creates a persistent tension between formal legal frameworks and customary land use systems, highlighting the broader conflict between statutory governance and traditional resource management in the region.

### 4.4.4 Institutional Changes after Union Territory (UT) Formation

The creation of the Union Territory (UT) of Ladakh in October 2019 marked a major institutional transformation, fundamentally altering the governance framework of common property resources (CPRs). This transition shifted Ladakh from a region with a degree of political autonomy under the former state of Jammu and Kashmir to a centrally administered territory governed directly by the Central Government. The establishment of direct rule through the Lieutenant Governor, without an elected legislative assembly, significantly centralized administrative authority. This restructuring has been widely perceived by local leaders and communities as a reduction in political autonomy and public participation in decision-making processes. In particular, the elected Ladakh Autonomous Hill Development Council (LAHDC), which previously played an important role in regional governance and development planning, is now viewed as having a diminished influence in shaping policies related to land, agriculture, and natural resource management. As a result, many local stakeholders feel a sense of political dispossession and reduced agency over the governance of their land and livelihoods.

This shift in administrative authority has had important implications for land governance and policy control, especially concerning CPRs. With the UT formation, several central laws and policy frameworks became directly applicable to Ladakh, introducing new regulatory and institutional dynamics. Proposed land and industrial policies under the new administrative structure, along with the removal of earlier restrictions on land leasing to non-permanent residents, have raised concerns among local communities about the security of customary land tenure systems. These changes have generated uncertainty regarding who ultimately controls access to and decision-making over forests, grazing lands, and other community-managed resources. In addition, the government has introduced centrally designed development initiatives such as the Vibrant Villages Programme (VVP), which focuses on infrastructure development, livelihood enhancement, and entrepreneurship in selected border villages. While such programs aim to address developmental challenges and strengthen border

communities, their implementation is closely aligned with national security priorities and centralized planning processes. Similarly, agricultural schemes such as the Paramparagat Krishi Vikas Yojana (PKVY) and Per Drop More Crop (PDMC) introduce new approaches to soil and water management that rely on modern technical interventions. Although these schemes promote resource efficiency and agricultural productivity, they may also bypass or weaken traditional resource management systems, such as the churpun system of community-based water governance, which has historically ensured equitable and sustainable water distribution.

**Table 4.10 Institutional Functions and Shifts (Pre- and Post-2019 UT Formation)**

| Institutional Sphere | Key Function in CPR Governance (Pre-2019) | Institutional Change (Post-2019) | Implication for Politics of Engagement |
|---|---|---|---|
| **Traditional Authority** (*Goba, Churpun, Lorapa*) | Local conflict resolution; equitable water distribution; pastoral regulation via customary law (*thims*). | Authority challenged/weakened by formal administration and outmigration of youth/labor. | Increased tension between customary rules and formal law/market pressures. |
| **Regional/Local Elected Body** (LAHDC) | Significant autonomy in policy, land, and budget decisions. | Reduced to a body with less legislative/policy agency; perceived political dispossession. | Heightened local demand for constitutional protection (Sixth Schedule) and autonomy over CPRs. |
| **Central/UT Administration** (Govt. Depts.) | Standard district administration; limited regional focus programs. | Direct central rule (LG); increased focus on strategic development (VVP) and major schemes. | Introduction of centralized development mandates; risk of overriding customary land use and acquisition for security/infrastructure. |
| **CPRs Management Focus** | Mitigation of natural scarcity (water/fodder) through collective action. | Mitigation of political scarcity (restricted grazing land, land acquisition) and climate stress through top-down schemes. | Conflicts shifted from purely inter-community resource disputes to State-Community conflicts over land and policy control. |

*Source: Ladakh Administration. (2021). Livelihoods in Transition*

The evolving institutional environment has intensified competition and conflict between traditional governance systems and formal state institutions. Traditional resource management practices, which were designed to regulate access and ensure sustainability under

conditions of natural scarcity, are now increasingly challenged by externally imposed political and administrative constraints. For example, military-imposed restricted zones and infrastructure expansion have limited access to traditional grazing lands, creating new forms of institutional and spatial exclusion. At the same time, the reduced authority of the LAHDC has limited the capacity of local political institutions to effectively represent community concerns and mediate resource-related conflicts. Issues such as tourism-related environmental stress, infrastructure expansion, and land use changes are now largely governed through centralized administrative channels, which may not fully reflect local priorities and ecological realities. This has contributed to growing dissatisfaction among local populations and has led to public mobilization and protests demanding constitutional safeguards and greater local control over land and natural resources.

## 4.5 Politics and Power Relations in Border Resource Governance

The governance of Common Property Resources (CPRs) in Ladakh's border villages is less a matter of pure ecological management and more a negotiation of power mediated by geopolitics, the permanent military presence, and a shifting administrative system. The constraints on CPR access, the patterns of engagement, and the resulting conflicts are fundamentally determined by the interface between the local community and the powerful external actors who control the strategic system.

### 4.5.1 Geopolitical Significance of Ladakh's Border Villages

Kargil district's geography dictates its immense geopolitical sensitivity, placing it at the nexus of multiple territorial disputes.

Frontier Location: The district shares a sensitive, non-legally recognized military boundary, the Line of Control (LoC), with Pakistan-administered Gilgit–Baltistan to the north, established after the 1971 Indo-Pakistani War. Critical border areas, including Drass, Mushkoh Valley, and Batalik, were flashpoints during the 1999 Kargil conflict, ensuring continuous strategic attention and military deployment.

Strategic Vulnerability: The LoC is militarily demarcated up to point NJ9842, beyond which lies the Siachen Glacier region, a contentious area. Further east, the region shares a border with China (Line of Actual Control or LAC). This frontier position means that the high-altitude peaks and glaciated ridges are not just geographic features but determinants of military strategy.

Logistical Importance: Kargil town is a crucial logistical node situated on National Highway 1D, connecting Srinagar to Leh. This strategic connectivity ensures that infrastructure development and land use are heavily prioritized for national security needs, often overshadowing local civil development interests.

### 4.5.2 Military Presence and its Interface with Local Communities

The permanent and extensive military presence in the region has profoundly reshaped the local political economy, creating a complex system of both dependency and restriction that directly affects access to common property resources (CPRs). One of the most immediate and significant impacts is the institutionalized exclusion of local pastoral communities from their traditional grazing lands. Nomadic groups such as the Changpas, who have historically depended on seasonal access to high-altitude pastures, now face severe restrictions due to security measures implemented along sensitive border areas. Military buffer zones, sometimes extending up to two kilometers on both sides of the Line of Control (LoC), are designated as no-go areas for civilians. This enforced exclusion has reduced the availability of traditional grazing commons, forcing livestock to graze within smaller and more concentrated areas. As a result, grazing pressure on accessible pastures has intensified, leading to overgrazing, land degradation, and the weakening of long-established sustainable pastoral practices.

The military presence has also created a structural conflict between national security priorities and local livelihood needs. Border residents occupy a dual and often contradictory position within this system. On the one hand, they depend heavily on access to grazing lands, water, and other CPRs for their economic survival. On the other hand, they are viewed as strategically important populations, often described as the “first line of intelligence” in border defense, as demonstrated during the Kargil War. This strategic importance subjects local communities to heightened surveillance, restricted mobility, and increased monitoring of their activities, particularly in areas close to the border. These mobility restrictions disrupt traditional patterns of seasonal migration and resource use, undermining pastoral livelihoods that rely on flexible and open access to grazing areas. Thus, the military’s mandate to secure and control border regions directly conflicts with the livelihood requirements of pastoral communities, creating a persistent tension between security objectives and local economic survival.

At the same time, the military presence has introduced new forms of economic opportunity, creating a relationship of economic dependence alongside institutional restriction. The presence of large Army bases in the region generates consistent demand for locally

produced agricultural goods, including vegetables, fruits, and dairy products, providing farmers with a stable and reliable market. In addition, military installations create employment opportunities for local residents, including contractual work, skilled labor positions, and employment opportunities for ex-servicemen. These economic linkages have contributed to livelihood diversification and increased cash income for local communities. However, this dependence on military-related economic opportunities also creates a form of structural reliance on state institutions. While the military supports local economies through employment and market access, this dependence may limit the ability of communities to openly contest military restrictions on grazing lands and other CPRs. As a result, the military presence simultaneously functions as both a source of economic support and a constraint on traditional resource access, fundamentally reshaping the governance and use of common property resources in the region.

**Table 4.11 Geopolitical Factors and Resource Constraints in Border Blocks**

| Border Block | Geopolitical Proximity | Key Resource Conflict | Military/Strategic Role |
|---|---|---|---|
| **Drass** (LoC) | Westernmost edge of Ladakh (LoC) | Exclusion from Mushkoh Valley grazing areas; extreme cold exacerbates resource pressure. | Prominent site during the 1999 Kargil conflict; vital highway connectivity. |
| **Zanskar** (Interior) | Separated by Zanskar Range; access restricted by penzila pass. | High reliance on alpine pastures for short-distance transhumance pastoralism. | Extreme isolation necessitates heavy state investment in infrastructure/connectivity (roads, solar energy). |
| **Batalik Sector** (LoC) | Close to LoC; strategically sensitive Indus River valley. | Restrictions on movement and land use due to military base proximity. | Focal point of the 1999 Kargil War; critical strategic location between Kargil, Leh, and Baltistan. |

*Source: Ladakh Administration. (2021). Livelihoods in Transition*

### 4.5.3 Local Governance and Political Representation

The formal mechanisms of governance coexist uneasily with traditional local power structures, further complicated by the recent UT formation.

- Traditional Authority (Goba): Customary institutions, led by the *goba* (village headman), remain vital for local decision-making and CPR management, especially regarding the allocation of water (*churpun* system) and grazing rights (*lorapa* system). The *goba* and the village council ensure collective action through customary laws (*thims*), which are critical for the survival of the isolated communities.

- Formal Structures and Institutional Overlap: The Panchayati Raj Institutions (PRIs) introduced statutory self-governance at the village level, creating a dual governance structure where the elected Panchayat often conflicts with the customary authority of the *goba* over the same resources. Kargil district has 95 Panchayats overseeing 129 villages (as of 2011 Census), indicating a high density of formal administrative units vying for legitimacy and control.
- Political Dispossession Post-2019: Following the 2019 UT formation, the Ladakh Autonomous Hill Development Council (LAHDC) an elected body that previously enjoyed significant autonomy has seen its influence diluted under direct central rule. Local leaders perceive this as an erosion of people's agency in policy decisions, particularly those concerning land and resource allocation. This centralization has mobilized political awareness and mass protests demanding constitutional safeguards for local resource control (Sixth Schedule).

**Table 4.12 Administration and Governance Indicators**

| Indicator | Pre-UT (2013-14) | Post-UT (2019-20) | Change in Institutional Setup |
|---|---|---|---|
| No. of Sub-Divisions | 5 | 4 | Administrative reorganization |
| No. of Blocks | 20 | 15 | Administrative reorganization |
| Total Panchayats | 95 (2011 Census) | 98 (2020-21) | Increase in formal administrative units |
| Land Leasing Law | Prohibited for non-residents | Restrictions lifted on lease of land | Increased risk to CPRs/customary rights |

*Source: District statistics & Evaluation Office Kargil, 2023-24*

### 4.5.4 Interplay of Governance, Power, and Exclusion in CPR Access

Resource governance in Kargil reflects a complex interplay of power, authority, and exclusion, shaped by its strategic border location and evolving political-administrative frameworks. The governance system is defined by a hierarchy of authority that places the military mandate and central policy priorities above local decision-making. Within this structure, the chain of command typically follows a top-down order—Military Mandate → Union Territory Administration and Central Policy → Local Elected Bodies (LAHDC/Panchayats) → Traditional Institutions (Goba). This layered governance model ensures that the strategic and security needs of the Indian state often override local livelihoods and customary resource rights. As a result, herders and pastoralists, who historically depended on shared grazing pastures and community-managed water sources, face increasing exclusion from these traditional commons. The state’s strategic imperatives, particularly in sensitive

border zones, have redefined the scope of local governance, marginalizing traditional systems and weakening community control over Common Property Resources (CPRs).

The mechanisms of exclusion and conflict in Kargil are primarily rooted in the militarization of border lands. The establishment of 'no-go zones' and restricted areas for security reasons has transformed local land-use dynamics. Traditional disputes such as those over irrigation or grazing rights mediated by local institutions like the churpun have expanded into larger state community conflicts over restricted access to CPRs. These restrictions not only limit physical access but also diminish the socio-economic resilience of border households whose survival depends on seasonal migration, livestock rearing, and resource-sharing practices. The absence of adequate infrastructure and limited civil administrative engagement further exacerbate local vulnerabilities, creating a sense of neglect among communities that are simultaneously at the frontlines of both national security and environmental fragility.

**Table 4.13 Challenges to Equity and Sustainability in CPR Governance**

| Challenge Dimension | Mechanism of Impact | Consequence for CPRs & Governance |
|---|---|---|
| **Exclusionary Policy** | Military buffer zones and land acquisition | Loss of traditional grazing commons; forced overgrazing on remaining pastures. |
| **Institutional Overlap** | Panchayats vs. *Goba* system | Jurisdictional conflict over water/land management; weakened traditional authority. |
| **Political Centralization** | UT formation (direct rule) and new land laws | Erosion of LAHDC autonomy; local anxiety over centralized control of community land. |
| **Development Disparity** | Focus on tourism/army market linkages | Youth outmigration (loss of labor for CPR upkeep); new resource competition (water for tourism vs. irrigation). |

*Source: District statistics & Evaluation Office Kargil, 2023-24*

In terms of equity and participation, post-2019 administrative reforms and centralized development initiatives under the Union Territory framework have brought both opportunities and new risks. While these initiatives aim to modernize infrastructure and enhance economic activity, particularly in tourism and defense-related sectors, they often lack mechanisms to ensure inclusive benefit-sharing and community participation. Historical patterns of top-down development reliant on external grants and bureaucratic planning have tended to erode traditional systems of mutual aid, cooperation, and self-sufficiency that once governed CPR use. The challenge, therefore, lies in ensuring that development does not reproduce inequities or deepen dependence on state interventions at the cost of local governance autonomy. Recent local movements demanding constitutional and land protection emphasise the community's

desire to reclaim agency in resource decision-making. These movements represent a grassroots push to make governance more participatory, legitimate, and grounded in local realities, aligning with the study's objectives on equity, sustainability, and inclusiveness.

## 4.6 Emerging Threats to Common Property Resources

The governance of Common Property Resources (CPRs) in the border villages of Kargil is challenged by a synergy of environmental decay, escalating geopolitical control, and socio-economic shifts. These factors introduce new dimensions of scarcity and conflict, fundamentally threatening the sustainability of traditional agro-pastoral livelihoods. The challenges encountered by local communities are both internal (anthropogenic use pressure) and external (climate change and militarization).

### 4.6.1 Environmental and Climatic Threats

The fragile cold desert ecology of Ladakh faces existential threats primarily driven by climate change, directly impacting the water resources upon which all CPR governance is built.

#### Glacier Retreat and Water Instability

The entire agrarian and civil population relies on glacier meltwater for irrigation and survival, making glacial health a fundamental determinant of livelihood security (RGICS, 2024). Scientific data confirms an accelerated rate of glacial retreat in the Suru basin, a critical water supply region for Kargil. The Parkachik Glacier, saw its retreat rate increase significantly from an average of two meters per year (1971–1999) to 20 meters per year between 2015 and 2021. This acceleration leads to two major problems: erratic water availability and increased hazard risk. Rising winter and spring temperatures cause rapid, early meltwater runoff and peak river discharge, which disrupts the predictable flow timing needed for the traditional *khul* (canal) irrigation systems. This instability increases drought-like conditions in the crucial late-season periods, severely stressing traditional farming practices and escalating competition over remaining water CPRs.

#### Resource Depletion and Extreme Events

The high-altitude environment is prone to natural hazards, a vulnerability exacerbated by climate change. Increased frequency of extreme weather events, such as cloud bursts and flash floods, poses a threat to both natural habitats and human infrastructure. These sudden, high-intensity events can destroy agricultural lands, homes, and, critically, the intricate water infrastructure that forms the basis of water CPRs. The reliance on scarce natural resources like

fuelwood, particularly in extremely cold areas like Drass where forest resources are meager, places immense pressure on community woodlots and contributes to long-term resource depletion.

### 4.6.2 Anthropogenic and Institutional Threats

Threats generated by human activity and institutional failures compete with environmental stress to undermine the integrity of common lands.

**Overgrazing and Land Degradation**

While the district's permanent pastures and grazing lands have largely stagnated in area, the total livestock population, reported at over 391,582 heads in 2013-14, exerts continuous pressure on fragile high-elevation grasslands. The intensification of livestock production, coupled with the systemic loss of traditional grazing routes, forces a concentration of herding activities onto smaller permissible areas. This leads to the degradation of alpine meadows and scrublands, threatening their ecological carrying capacity. Furthermore, the area under land classes vital for community resource provision, such as miscellaneous tree crops, showed a significant declining trend of over 40% between 1966-67 and 2004-05.

**Tourism Pressure and Resource Conflicts**

The rapid growth of tourism, especially since the region opened in 1974, while providing economic diversification, exerts substantial pressure on the local resource base. Tourism-related activities, such as infrastructure development and high vehicle density, contribute to local environmental degradation and waste problems. Crucially, the resource-intensive nature of the tourism industry, requiring significant water and power, creates direct resource conflicts with agriculture and herding over the same finite CPRs.

**Institutional Weakening and Land-Use Conflicts**

Institutional shifts compound these pressures. Youth outmigration to pursue education or non-agricultural employment opportunities—a trend linked to economic transition—creates a significant labor shortage for maintaining labor-intensive CPR infrastructure, such as the communal irrigation channels. Additionally, the legal and administrative restructuring post-2019, including the lifting of some prohibitions on land leasing to non-permanent residents, generates anxiety over centralized land-use policies that could encroach upon community lands and customary resource rights.

### 4.6.3 Border Politics and Militarization Impacts

The strategic location of Kargil means that national security imperatives frequently override local resource governance, constituting a significant external threat to CPR sustainability.

**Restricted Access and Political Scarcity**

Border villages face chronic restricted access to ancestral grazing grounds due to military positioning and ongoing geopolitical disputes (Ladakh Administration, 2021; Baalnoi Academy, 2024). The creation of extensive military buffer zones along the LoC, often spanning up to 2 kilometers, effectively designates traditional pastures as no-go zones for nomadic pastoralists. This institutional exclusion generates political scarcity, forcing herders to overstock remaining areas and accelerating land degradation. This transforms traditional resource disputes into direct conflicts between the community and the state over land control and utilization.

**Resource Diversion and Infrastructure Strain**

The continuous military presence necessitates massive infrastructure development, which consumes land and places a heavy strain on local resources. The prioritization of strategic logistics and defense infrastructure often results in the minimal attention given to civil administration needs in remote border villages. The economic opportunities provided by the Army market and strategic development are juxtaposed with the constraints imposed by security zoning and land appropriation, creating a complex power dynamic where local livelihoods are subordinated to the national security mandate.

### 4.6.4 Community Perceptions of Threats and Adaptive Strategies

Border communities have revealed historical resilience through tightly knit CPR governance systems, but are now developing new strategies in response to these unprecedented multi-faceted threats.

**Adaptive Strategies and Resilience**

Traditional agro-pastoralism is proving resilient by providing a crucial buffer against external shocks. During the COVID-19 pandemic, the temporary halt in tourism severely impacted cash incomes, but traditional food storage and strong primary sector production provided temporary food security and buffer capacity. Local communities are actively engaged in new adaptive strategies, such as building rainwater harvesting structures and artificial

glaciers to compensate for glacial melt, and exploring new farming methods that require less water. The local horticulture sector, focusing on apricots and commercial crops, also enhances income stability against climate-related subsistence crop failure.

**Collective Responses and Assertions of Agency**

The mounting environmental and institutional threats have galvanized collective political responses. Large-scale public demonstrations have taken place, led by local political bodies, demanding constitutional safeguards (Sixth Schedule inclusion) and protection for the region's fragile ecology and local autonomy over land and agriculture decisions. This collective action represents the community's assertion of agency in the politics of engagement, representing a high degree of political awareness and a demand for inclusive governance mechanisms that safeguard their common resources against overriding central policies.

## 4.7 Sustainability and Equity Concerns

The sustainability and equity of Common Property Resources (CPRs) in Ladakh's border villages are precarious concerns, residing at the intersection of acute environmental scarcity, entrenched traditional hierarchies, and external geopolitical pressures. Ensuring the long-term viability of water and pasture resources (sustainability) while guaranteeing fair access across socio-economic strata (equity) is critical to community survival and the core objectives of this study.

Sustainability of CPRs hinges upon resource regeneration and conservation, both of which are threatened by climate volatility. The reliance on glacier meltwater the primary resource for agriculture is jeopardized by the confirmed rapid retreat of glaciers in the Suru basin, as evidenced by glaciers like Parkachik accelerating their retreat rate to 20 meters per year (Mongabay, 2023 ; Rana et al., 2023). This environmental depletion undermines the capacity for resource regeneration and creates severe water scarcity, necessitating major conservation efforts. Furthermore, the land base itself is stressed: the high density of livestock (over 391,582 total heads in 2013-14) concentrated on limited pasturelands leads to degradation and subsequent soil erosion, threatening the long-term viability of grazing commons (Bhasin, 2012; ResearchGate, 2016). Official data shows that land under valuable resources like miscellaneous tree crops has declined by over 40% (1966-67 to 2004-05), indicating a loss of resources crucial to village ecology and economy, compounding the sustainability crisis.

Equity and inclusiveness in resource access are complex in this setting, often mediated by pre-existing social structures and the introduction of external, non-community factors. While the formal demographic statistics show a high proportion of the population belonging to Scheduled Tribes (122,336 souls in 2011), which suggests a shared indigenous identity, resource access can still be non-equitable along traditional lines of hierarchy or village politics, although detailed social stratification data is limited. The traditional systems, such as the *churpun* governing water allocation and the *goba* resolving disputes, are inherently designed to promote equity in resource-sharing mechanisms and collective action, distributing the costs and benefits of CPR maintenance among all member households (Rainwaterharvesting.org, 2024). However, the introduction of modern administrative structures and market forces disrupts this fragile equity; the shift towards cash cropping (such as horticulture and specialized vegetables for the Army/tourism market) may grant preferential access to water or labor for wealthier households, potentially marginalizing subsistence farmers. Furthermore, women, who are traditionally responsible for fetching fuelwood, face exacerbated burdens due to the scarcity of meager forest resources in places like Drass, though access to cleaner energy like biogas could mitigate this dependency, promoting gender equity and environmental benefits.

Local communities exhibit strong resilience through local innovations and traditional knowledge that aim to ensure survival against both natural and anthropogenic threats. Adaptive strategies include building artificial glaciers and water reservoirs to cope with erratic glacial melt and compensate for the lack of natural storage capacity, thereby ensuring late-season water availability for irrigation (Kumar & Yangchan, 2021; Namgyal Lhamo, 2024). Traditional agro-pastoralism itself acts as an established coping mechanism, providing vital food security and economic buffers during external shocks like the COVID-19 pandemic, when tourism a major income source was halted (SNU, 2023). Community-led conservation efforts are also being encouraged for wild medicinal plants, of which an estimated 400 species grow in Kargil. This effort involves collective conservation for economic benefits, recognizing these as valued common resources (Rising Kashmir, 2024; LAHDC, 2024).

Future prospects for sustainable governance are tightly bound to institutional support and the political will to protect local autonomy. Post-2019, the institutional framework has become complex, with the emergence of centrally sponsored schemes like the Vibrant Villages Programme (VVP) focusing on strategic border village development and entrepreneurship. However, this centralized approach must address local concerns over the loss of political

control and institutional weakening of local bodies like the Ladakh Autonomous Hill Development Council (LAHDC) (PRS India, 2023). The community's collective response, marked by mass protests demanding Sixth Schedule protection to guarantee local governance over land and forests, signifies a high political awareness and a demand for a hybrid model where centralized development is balanced by decentralized control over CPRs (Sonam Wangchuk, 2024). This future institutional system must raise co-management of natural resources, blending traditional wisdom, decentralized control, and strategic financial investment to ensure that economic growth and national security do not compromise the fragile ecological and socio-economic base of the border villages.

## 4.8 Conclusion

This chapter shows the ecological, geographical, socio-economic, and institutional context of Kargil District. It emphasizes the complex connections that influence the management and governance of Common Property Resources (CPRs) in the border villages. The discussion shows that Kargil's physical and environmental features are shaped by its high-altitude cold desert ecosystem, which limits productive land and water availability. The reliance on glacial meltwater for irrigation through traditional systems like kuls and zings demonstrates the resourcefulness of local communities. These people have historically depended on collective management practices to maintain agriculture in one of the toughest terrains in the Himalayas. However, the rapid retreat of glaciers like the Parkachik Glacier—receding by nearly 20 meters each year—indicates increasing ecological vulnerability. This environmental stress, along with overgrazing and population growth, has heightened competition for limited natural resources, pushing traditional resource-use systems toward ecological and institutional weakness.

The socio-economic profile of the region shows a society in change. Historically reliant on agro-pastoral livelihoods that made up about 85 percent of the local economy, the people of Kargil are now increasingly involved in tourism, trade, and defense jobs. While these shifts have diversified income sources and improved household resilience, they have also brought new issues, including youth outmigration, dependence on the market, and a gradual weakening of traditional community-based management systems. These changes have altered the social structure of rural communities and shifted the balance between subsistence needs and market-driven goals.

In terms of institutions, the governance framework in Kargil's border villages features a mixed structure. It includes traditional authority, formal administrative bodies, and military oversight. The traditional leadership system, led by the goba and churpon, remains crucial in managing irrigation, pastures, and other CPRs through customary norms and group decisions. However, the establishment of Panchayati Raj Institutions and the transition to Union Territory (UT) status in 2019 have introduced new administrative layers and centralized control. While this has improved access to development funds and formal governance, it has also reduced the independence of local institutions like the Ladakh Autonomous Hill Development Council (LAHDC) and created overlaps in authority. Often, military priorities and security restrictions take precedence over local livelihood issues, especially in areas near the Line of Control (LoC), leading to the exclusion of herders and farmers from traditional grazing and resource-use areas.

The ecological vulnerability of Kargil, combined with the geopolitical challenges of a militarized border region, has created a unique governance environment. The mix of environmental scarcity, diverse institutions, and security concerns affects how local communities access, manage, and negotiate the use of shared resources. The five border villages of Hardass, Shilikchay, Mushkoo, Kaksar, and Darchik illustrate these interconnected dynamics and reflect the broader governance challenges in Ladakh's border ecology. Located within 5 to 15 kilometers of the LoC, these villages are not only areas of economic activity but also places where environmental, political, and administrative pressures converge most intensely. The background outlined in this chapter forms the basis for the later exploration of CPR governance and livelihood dynamics through empirical investigation. The next chapter will build on this foundation by presenting and analyzing primary data gathered from the selected villages.

# CHAPTER V

# AVAILABILITY, USE, AND GOVERNANCE OF COMMON PROPERTY RESOURCES IN LADAKH'S BORDER COMMUNITIES


5.1 Introduction

5.2 Respondent Profile

5.3 Types of CPRs

5.4 CPR Contribution to Livelihood

5.5 Hypothesis Testing

5.6 Conclusion

# CHAPTER V
# AVAILABILITY, USE, AND GOVERNANCE OF COMMON PROPERTY RESOURCES IN LADAKH'S BORDER COMMUNITIES

## 5.1 Introduction

Common Property Resources (CPRs) such as pastures, forests, water bodies, cultivable land, and medicinal plants play a critical role in sustaining rural livelihoods, particularly in geographically fragile and politically sensitive regions. In the border villages of the Union Territory of Ladakh, these resources are not merely economic assets but also integral to cultural practices, community identity, and social cohesion. The unique combination of harsh climatic conditions, limited arable land, and traditional pastoral and agro-pastoral lifestyles makes the dependence on CPRs especially pronounced. For many households, CPRs constitute a substantial portion of their livelihoods, providing fodder, fuelwood, irrigation, and medicinal resources, as well as supporting seasonal migration and income-generating activities.

The governance of CPRs in Ladakh has historically been shaped by local community institutions, religious authorities, and the administrative frameworks under the erstwhile Jammu and Kashmir state. With the reorganization of Ladakh as a Union Territory in 2019, governance mechanisms have undergone significant changes, introducing new acts and regulations while altering local control and access patterns. Simultaneously, the presence of the military and strategic border concerns adds another layer of complexity, influencing access, management, and decision-making related to CPRs.

The current chapter tries to examine the availability, use, and governance of CPRs in border villages of Ladakh, with particular attention to their contribution to household livelihoods and community survival strategies through a detailed household survey and qualitative interviews. It also explores the politics of engagement, including the roles of local councils, UT administration, military authorities, and civil society actors in shaping access, management, and sustainability of these resources. By integrating an understanding of resource dependence with governance structures and political dynamics, the chapter aims to provide a broad view of how CPRs function as both ecological and socio-political assets in the region.

## 5.2 Socio-Economic Profile of Respondents

This section presents a general overview of the demographic and socio-economic profile of the surveyed households. It examines key attributes including the age and gender of household heads, educational attainment, occupational patterns, household composition, landholding sizes, community affiliations, and practices such as seasonal migration. By analyzing these variables, it provides a foundational understanding of the social and economic context in which CPRs are accessed, utilized, and governed. This socio-economic perspective also helps to identify patterns of vulnerability, dependency, and agency among different community groups, setting the stage for subsequent analyses of CPR availability, use, and governance.

Table 5.1 presents the socio-geographic composition of the 245 surveyed households across the selected border villages in Ladakh. The distribution by revenue village indicates that the highest number of respondents were from Hardas (86 households, 35.1%), followed by Kaksar (54 households, 22.0%) and Shilikchay (49 households, 20.0%). The villages of Mushkoo and Darchik contributed 11.8% and 11.0% of respondents, respectively. At the tehsil level, the majority of respondents (218 households, 89.0%) belong to the Kargil tehsil, while only a small proportion (27 households, 11.0%) are from Drass. This indicates that the sample is predominantly drawn from Kargil, which is correspond to its higher population density and strategic importance in the context of border settlements. The community group distribution shows that nearly half of the respondents (120 households, 49.0%) identify as Balti, followed by Shina speakers (83 households, 33.9%). Smaller proportions of respondents belong to the Dard (12.7%) and Purig (4.5%) communities. This composition highlights the ethnic and cultural diversity of the region and provides an important contextual backdrop for analyzing access, use, and governance of common property resources, as community identity often influences traditional resource management practices, social norms, and engagement with local institutions.

**Table 5.1: Distribution of Respondents by Revenue Village, Tehsil, and Community Group**

| Variable | Category | Frequency | Percent |
|---|---|---|---|
| **Revenue Village** | Darchik | 27 | 11.0 |
| | Hardas | 86 | 35.1 |
| | Kaksar | 54 | 22.0 |
| | Mushkoo | 29 | 11.8 |
| | Shilikchay | 49 | 20.0 |
| **Theshsil** | Drass | 27 | 11.0 |
| | Kargil | 218 | 89.0 |
| **Community Group** | Balti, | 120 | 49.0 |
| | Dard | 31 | 12.7 |
| | Purig | 11 | 4.5 |
| | Shina | 83 | 33.9 |
| **Total** | | **245** | **100.0** |

*Source: Primary Survey, 2025*

Table 5.2 presents the socio-economic characteristics of the 245 surveyed households in Ladakh's border villages, covering gender, occupation, education, seasonal migration, and ration card status. The gender composition of household heads shows a pronounced male dominance, with 241 male heads (98.4%) and only 4 female heads (1.6%). This reflects the traditional patriarchal structure of rural and border communities in Ladakh, where males predominantly represent households in public and administrative matters. Regarding occupation, a significant portion of household heads (43.3%) are engaged as agricultural laborers, while cultivators account for 8.6% and ex-servicemen constitute 9.8% of the sample. Government employees make up 15.9%, reflecting the formal employment opportunities in the region. Smaller proportions are engaged in trade, self-employment, livestock, manufacturing, and casual labor. This distribution indicates a predominantly agrarian and labor-oriented economy, supplemented by government service and small-scale trading activities. The educational status of respondents shows that the majority have primary (41.2%) or secondary education (31.8%), while 22.4% have no formal education and only 4.5% have higher education. This suggests moderate literacy levels in the sample, which can influence awareness, resource management practices, and engagement with governance structures. Seasonal migration for grazing or work is reported by a small fraction of households (2.4%), indicating that most households rely on local resources for their livelihoods, though traditional pastoral practices persist in a limited manner. Finally, the ration card status highlights that 55.5% of households fall below the poverty line (BPL), 43.3% are above poverty line (APL), and a very

small proportion belong to the Antyodaya Anna Yojana (AAY) or Priority Household (PHH) categories.

**Table 5.2 Socio-Economic Profile of Respondents in Border Villages of Ladakh**

| Variable | Category | Frequency | Percent |
|---|---|---|---|
| Gender Status of Household Head | Female | 4 | 1.6 |
| | Male | 241 | 98.4 |
| Occupation of Household Heads | Agriculture Labour | 106 | 43.3 |
| | Casual labour | 7 | 2.9 |
| | Cultivator | 21 | 8.6 |
| | Ex-servicemen | 24 | 9.8 |
| | Goda | 3 | 1.2 |
| | Govt employee | 39 | 15.9 |
| | Livestock, Hunting, Fishing | 6 | 2.4 |
| | Manufacturing & Processing other than Household Sector | 11 | 4.5 |
| | Not Employed | 2 | .8 |
| | Private Sector Employee | 1 | .4 |
| | Retire govt. Employe | 6 | 2.4 |
| | Self-Employed | 3 | 1.2 |
| | Trade & Commerce | 15 | 6.1 |
| | Transport, Storage | 1 | .4 |
| Education Status | No formal | 55 | 22.4 |
| | Primary | 101 | 41.2 |
| | Secondary | 78 | 31.8 |
| | Higher | 11 | 4.5 |
| Seasonal migration for grazing or work | No | 239 | 97.6 |
| | Yes | 6 | 2.4 |
| Ration Card Status | Above Poverty Line (APL) | 106 | 43.3 |
| | Antyodaya Anna Yojana (AAY) – poorest of the poor | 2 | .8 |
| | Below Poverty Line (BPL) | 136 | 55.5 |
| | Priority Household (PHH) | 1 | .4 |
| **Total** | | **245** | **100.0** |

**Descriptive Statistics**

| Variable | N | Min. | Max. | Mean | SD |
|---|---|---|---|---|---|
| Respondent's Age (In Years) | 245 | 18.0 | 84.0 | 49.102 | 13.6006 |
| Household size | 245 | 1.0 | 45.0 | 7.151 | 3.6806 |
| Total landholding (Canal) | 245 | .0 | 25.0 | 3.908 | 3.9701 |

*Source: Primary Survey, 2025*

Table 5.2 indicates that a majority of households face economic vulnerability, underscoring their dependence on common property resources for subsistence and livelihood security. The descriptive statistics shows that, respondents' ages range from 18 to 84 years, with a mean age of 49.1 years, reflecting a mature population with substantial experience in local livelihoods and resource management. Household sizes vary from 1 to 45 members, with an average of 7.15, indicating the prevalence of large, extended family units typical in rural Ladakh. Landholdings range from 0 to 25 canals, with an average of 3.91 canals, showing relatively small land parcels per household, which is further increase reliance on common property resources for fodder, fuel, and cultivation.

Table 5.3 presents the distribution of respondents' occupations across the five surveyed revenue villages: Darchik, Hardas, Kaksar, Mushkoo, and Shilikchay. The data indicate that agricultural labor is the predominant occupation across all villages, accounting for 43.3% of respondents overall. This is particularly pronounced in Darchik (55.6%) and Mushkoo (51.7%), reflecting the heavy reliance on seasonal or casual agricultural work for livelihood. Government employment emerges as another significant occupation, especially in Kaksar (20.4%) and Mushkoo (20.7%), suggesting the importance of formal employment opportunities in supplementing traditional agrarian livelihoods. Ex-servicemen constitute 9.8% of respondents, with notable representation in Darchik (14.8%) and Hardas (14.0%), reflecting the historical significance of military service in border communities. Cultivators account for 8.6% overall, with higher proportions in Kaksar (18.5%), indicating localized agricultural production in certain villages. Other occupations such as trade and commerce (6.1%), manufacturing and processing (4.5%), and livestock, hunting, and fishing (2.4%) contribute modestly to the local economy. Very small percentages are involved in casual labor, self-employment, private sector employment, or remain unemployed. Some unique occupations, like Goda (herders), are concentrated in Darchik (11.1%) but absent in most other villages, reflecting localized traditional practices. The Chi-square test ($\chi^2 = 114.821$, $df = 52$, $p = 0.000$) indicates a statistically significant association between occupation and revenue village, suggesting that livelihood patterns are influenced by geographic and local environmental conditions, resource availability, and historical settlement patterns. It demonstrates the predominance of agrarian and labor-oriented livelihoods in Ladakh's border villages while highlighting variations across villages due to socio-economic, geographic, and cultural factors.

**Table 5.3 Distribution of Respondents' Occupation across Revenue Villages in Border Areas of Ladakh**

| Occupation | | Revenue Village | | | | | Total |
|---|---|---|---|---|---|---|---|
| | | Darchik | Hardas | Kaksar | Mushkoo | Shilikchay | |
| Agriculture Labour | N | 15 | 36 | 23 | 15 | 17 | 106 |
| | % | 55.6 | 41.9 | 42.6 | 51.7 | 34.7 | 43.3 |
| Casual labour | N | 0 | 5 | 1 | 0 | 1 | 7 |
| | % | 0.0 | 5.8 | 1.9 | 0.0 | 2.0 | 2.9 |
| Cultivator | N | 1 | 4 | 10 | 2 | 4 | 21 |
| | % | 3.7 | 4.7 | 18.5 | 6.9 | 8.2 | 8.6 |
| Ex-servicemen | N | 4 | 12 | 6 | 2 | 0 | 24 |
| | % | 14.8 | 14.0 | 11.1 | 6.9 | 0.0 | 9.8 |
| Goda | N | 3 | 0 | 0 | 0 | 0 | 3 |
| | % | 11.1 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 |
| Govt employee | N | 2 | 15 | 11 | 6 | 5 | 39 |
| | % | 7.4 | 17.4 | 20.4 | 20.7 | 10.2 | 15.9 |
| Livestock, Hunting, Fishing | N | 0 | 1 | 0 | 2 | 3 | 6 |
| | % | 0.0 | 1.2 | 0.0 | 6.9 | 6.1 | 2.4 |
| Manufacturing & Processing other than Household Sector | N | 0 | 2 | 0 | 0 | 9 | 11 |
| | % | 0.0 | 2.3 | 0.0 | 0.0 | 18.4 | 4.5 |
| Not Employed | N | 0 | 2 | 0 | 0 | 0 | 2 |
| | % | 0.0 | 2.3 | 0.0 | 0.0 | 0.0 | 0.8 |
| Private Sector Employee | N | 0 | 1 | 0 | 0 | 0 | 1 |
| | % | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 | 0.4 |
| Retire govt. Employe | N | 0 | 0 | 3 | 2 | 1 | 6 |
| | % | 0.0 | 0.0 | 5.6 | 6.9 | 2.0 | 2.4 |
| Self-Employed | N | 0 | 2 | 0 | 0 | 1 | 3 |
| | % | 0.0 | 2.3 | 0.0 | 0.0 | 2.0 | 1.2 |
| Trade & Commerce | N | 2 | 6 | 0 | 0 | 7 | 15 |
| | % | 7.4 | 7.0 | 0.0 | 0.0 | 14.3 | 6.1 |
| Transport, Storage | N | 0 | 0 | 0 | 0 | 1 | 1 |
| | % | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.4 |
| Total | N | 27 | 86 | 54 | 29 | 49 | 245 |
| | % | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| **Chi-Square Test** | | 114.821 (52), p=0.000 | | | | | |

*Note: Percent within Column: Source: Primary Survey, 2025*

Table 5.4 presents the socio-economic characteristics of respondents in the border villages of Darchik, Hardas, Kaksar, Mushkoo, and Shilikchay. The data highlight significant

variations in educational attainment, mobility patterns, and economic status, which together shape the livelihood strategies and social differentiation within these frontier communities. The educational profile of household heads indicates generally low levels of attainment, reflecting the historical isolation and infrastructural constraints of the region. Overall, 22.4 percent of respondents reported having no formal education, 41.2 percent had completed primary education, and 31.8 percent had attained secondary education, while only 4.5 percent had higher education. Village-level differences are notable: Darchik has the highest proportion of respondents without formal education (74.1%), reflecting limited access to schooling facilities, whereas Mushkoo has the highest share of respondents with primary education (69.0%), suggesting comparatively better access to basic education. Hardas and Kaksar show a gradual improvement in literacy with more respondents having completed primary and secondary education. The Chi-square test ($\chi^2 = 61.338$, df = 12, p = 0.000) confirms a statistically significant association between education level and village location, indicating that remoteness and local infrastructure continue to influence educational outcomes.

Seasonal migration, a traditional livelihood strategy linked to grazing and wage labor, appears to have significantly declined. The findings reveal that 97.6 percent of households reported no seasonal migration, and only 2.4 percent engaged in such movement. Interestingly, all migrating households belong to Shilikchay (12.2%), reflecting the persistence of transhumant pastoralism in that area. The other villages Darchik, Hardas, Kaksar, and Mushkoo reported no migration at all, suggesting an increasing shift toward sedentarization due to restricted access to pastures, changing employment patterns, and military-imposed movement limitations near border zones. The Chi-square test ($\chi^2 = 24.603$, df = 4, p = 0.000) indicates that this variation is statistically significant, implying that migration practices differ across locations depending on ecological and socio-political conditions.

The distribution of ration card status, which serves as a proxy for economic well-being, reveals a predominance of Below Poverty Line (BPL) households (55.5%), while 43.3 percent belong to Above Poverty Line (APL) categories. A very small fraction of households are covered under the Antyodaya Anna Yojana (AAY) and Priority Household (PHH) schemes. The high concentration of BPL households in Shilikchay (69.4%) and Hardas (55.8%) points to persistent poverty and limited livelihood diversification. Darchik and Kaksar show a relatively balanced APL–BPL distribution, suggesting some income variation within these communities. The Chi-square test ($\chi^2 = 10.374$, df = 15, p = 0.583) shows no significant

relationship between ration card status and village, indicating that economic vulnerability is a widespread feature across all surveyed locations.

**Table 5.4 Educational Status, Seasonal Migration, and Economic Classification of Households across Border Villages of Ladakh**

| Variable | Category | | Revenue Village | | | | | Total | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Darchik | Hardas | Kaksar | Mushkoo | Shilikchay | | |
| Education level of household head | No formal | N | 20 | 21 | 5 | 0 | 9 | 55 | 61.338 (12), p=0.000 |
| | | % | 74.1 | 24.4 | 9.3 | 0.0 | 18.4 | 22.4 | |
| | Primary | N | 5 | 33 | 25 | 20 | 18 | 101 | |
| | | % | 18.5 | 38.4 | 46.3 | 69.0 | 36.7 | 41.2 | |
| | Secondary | N | 2 | 28 | 21 | 8 | 19 | 78 | |
| | | % | 7.4 | 32.6 | 38.9 | 27.6 | 38.8 | 31.8 | |
| | Higher | N | 0 | 4 | 3 | 1 | 3 | 11 | |
| | | % | 0.0 | 4.7 | 5.6 | 3.4 | 6.1 | 4.5 | |
| | Total | N | 27 | 86 | 54 | 29 | 49 | 245 | |
| | | % | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | |
| Seasonal migration for grazing or work | No | N | 27 | 86 | 54 | 29 | 43 | 239 | 24.603 (4), p=0.000 |
| | | % | 100.0 | 100.0 | 100.0 | 100.0 | 87.8 | 97.6 | |
| | Yes | N | 0 | 0 | 0 | 0 | 6 | 6 | |
| | | % | 0.0 | 0.0 | 0.0 | 0.0 | 12.2 | 2.4 | |
| | Total | N | 27 | 86 | 54 | 29 | 49 | 245 | |
| | | % | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | |
| Ration card Status | APL | N | 14 | 36 | 28 | 14 | 14 | 106 | 10.374 (15), p=0.583 |
| | | % | 51.9 | 41.9 | 51.9 | 48.3 | 28.6 | 43.3 | |
| | AAY | N | 0 | 1 | 0 | 0 | 1 | 2 | |
| | | % | 0.0 | 1.2 | 0.0 | 0.0 | 2.0 | 0.8 | |
| | BPL | N | 13 | 48 | 26 | 15 | 34 | 136 | |
| | | % | 48.1 | 55.8 | 48.1 | 51.7 | 69.4 | 55.5 | |
| | PHH | N | 0 | 1 | 0 | 0 | 0 | 1 | |
| | | % | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 | 0.4 | |
| | Total | N | 27 | 86 | 54 | 29 | 49 | 245 | |
| | | % | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | |

*Note: Percent within Column: Source: Primary Survey, 2025*

These findings reveals that low education levels, minimal seasonal mobility, and high poverty rates characterize the socio-economic fabric of Ladakh's border villages. These factors support livelihood dependence on limited local resources and public welfare provisions. The persistence of poverty, coupled with low human capital development, underlines the need for integrated policies that improve educational access, promote sustainable employment, and

strengthen resilience among border communities dependent on fragile common property resources.

## 5.3 Types and Usages of Common Property Resources

Common Property Resources (CPRs) form the ecological and economic backbone of rural livelihoods in Ladakh's border villages. In regions characterized by harsh climatic conditions, limited cultivable land, and fragile ecosystems, these shared resources such as pastures, forests, water bodies, grazing lands, and medicinal plant areas serve as crucial assets for sustaining both household and community-level survival. The collective use and management of CPRs have historically underpinned the socio-economic structure of mountain communities, supporting agriculture, livestock rearing, fuel and fodder collection, and seasonal migration.

In Ladakh's unique high-altitude setting, CPRs assume a significance that extends beyond material benefits. They are embedded in social and cultural practices, shaping community cooperation, customary institutions, and local governance systems. The dependency on these resources is particularly pronounced among economically weaker and land-constrained households, for whom CPRs provide essential goods such as fuelwood, grazing land, irrigation water, and non-timber forest products. As observed by Jodha (1990) and Chopra and Gulati (2001), the accessibility and equitable management of CPRs are vital for rural resilience, especially in ecologically marginal regions where alternative livelihood options are scarce. This section examines the various types of CPRs available across the selected border villages and analyses their usage patterns, community dependence, and functional roles in household livelihoods to capture how these shared resources are utilized, managed, and valued by local populations.

Table 5.5 presents the distribution of various types of Common Property Resources (CPRs) available in the surveyed border villages of Ladakh. The data reveal that a wide range of CPRs both natural and socio-cultural form the foundation of local livelihoods and community life. The most frequently reported CPRs include water resources (92.65%), religious and cultural commons (90.20%), and pastures (80.82%), underscoring the centrality of these resources in sustaining the ecological, economic, and cultural fabric of border communities.

The predominance of water resources reflects their indispensable role in a cold desert environment where water scarcity remains a persistent challenge. Glacial streams, community-managed irrigation channels (kul or yura), and natural springs are vital for agriculture, livestock, and domestic needs. Similarly, the high percentage of religious and cultural commons highlights the deep integration of spirituality and social cohesion in community spaces such as monasteries, mosques, stupas, and village prayer grounds, which often double as venues for collective decision-making and social events.

Pastures, reported by 80.82 percent of respondents, are another critical CPR type, supporting livestock-based livelihoods central to the traditional agro-pastoral economy of Ladakh. The availability of cultivable land (73.47%) as a shared or partially managed resource indicates the persistence of community involvement in agricultural management, particularly in irrigated pockets of valley villages. Forests (43.67%) and medicinal plants (50.61%) contribute significantly to household subsistence by providing fuelwood, timber, herbs, and non-timber forest products, even though forest cover in Ladakh is limited due to the arid climate. The moderate presence of community storage facilities (55.51%) used for grain, fodder, or communal tools illustrates localized forms of resource pooling and collective risk management. The relatively lower reporting of rock and mineral resources (64.08%) and other CPRs (30.20%) indicates that such resources are either geographically restricted or less directly integrated into household livelihoods. However, in some villages, rocky terrains and barren lands are utilized for limited quarrying or as grazing pathways, reflecting adaptive resource use in a fragile environment.

It shows that CPRs in Ladakh's border villages are multidimensional serving ecological, economic, and socio-cultural purposes. The dominance of water, pasture, and cultural commons suggests that resource governance extends beyond material needs to encompass community identity and heritage. These findings highlight the intricate balance between ecological dependency and social organization in high-altitude border communities, where the sustainability of CPRs is directly tied to the resilience of livelihoods and the preservation of communal traditions.

**Table 5.5 Availability of Common Property Resources (CPRs) in Border Villages of Ladakh**

| Available CPRs | Frequency | Percent |
|---|---|---|
| Pastures | 198 | 80.82 |
| Water Resources | 227 | 92.65 |
| Forests | 107 | 43.67 |
| Cultivable land | 180 | 73.47 |
| Medicinal plants | 124 | 50.61 |
| Community storage | 136 | 55.51 |
| Religious & Cultural Commons | 221 | 90.20 |
| Rock | 157 | 64.08 |
| Others | 74 | 30.20 |

*Source: Primary Survey, 2025*

Table 5.6 presents the distribution of different types of Common Property Resources (CPRs) across the five surveyed border villages Darchik, Hardas, Kaksar, Mushkoo, and Shilikchay. The data reveal distinct spatial variations in the availability and types of CPRs, reflecting the diverse ecological and socio-cultural settings of these high-altitude settlements. While certain CPRs such as water resources and religious or cultural commons are widely available, others like forests and medicinal plants are concentrated in specific villages due to variations in terrain, vegetation, and land-use patterns.

Water resources emerge as the most universally available CPR, reported by almost all households across the villages. Hardas (33.5%) and Kaksar (23.8%) show particularly high representation, indicating their proximity to glacial streams and irrigation networks that sustain agriculture and household needs. Similarly, religious and cultural commons, which include monasteries, mosques, stupas, and community prayer sites, are extensively present in all villages, with the highest proportions in Hardas (34.8%) and Kaksar (24.4%). This highlights the embedded role of spiritual and cultural spaces in maintaining community cohesion and local governance in the border context.

Pastures vital for livestock rearing and traditional transhumant livelihoods are widely reported in Hardas (39.9%), Kaksar (27.3%), and Shilikchay (18.7%), while absent in Darchik. This absence suggests limited grazing land in Darchik's terrain or restricted access due to proximity to sensitive border zones. Cultivable land, another key CPR, is most prevalent in Hardas (35.6%) and Kaksar (28.9%), confirming their relative agricultural potential compared to other villages where arable land is scarce.

Forests and medicinal plants show notable geographic concentration. Forests are predominantly found in Kaksar (50.5%), while Darchik (24.3%) and Hardas (17.8%) have smaller forest patches. This uneven distribution reflects the ecological variation across villages, where vegetation cover and altitude influence resource availability. Similarly, medicinal plants are most abundant in Kaksar (43.5%) and Darchik (21.8%), aligning with their location in ecologically rich but fragile zones that support alpine flora traditionally used in local healthcare systems.

**Table 5.6 Distribution of Available Common Property Resources (CPRs) across Border Villages of Ladakh**

| Available CPRs | | Revenue Village | | | | | Total |
|---|---|---|---|---|---|---|---|
| | | Darchik | Hardas | Kaksar | Mushkoo | Shilikchay | |
| Pastures | N | 0 | 79 | 54 | 28 | 37 | 198 |
| | % | 0.0 | 39.9 | 27.3 | 14.1 | 18.7 | 100.0 |
| Water Resources | N | 27 | 76 | 54 | 28 | 42 | 227 |
| | % | 11.9 | 33.5 | 23.8 | 12.3 | 18.5 | 100.0 |
| Forests | N | 26 | 19 | 54 | 1 | 7 | 107 |
| | % | 24.3 | 17.8 | 50.5 | 0.9 | 6.5 | 100.0 |
| Cultivable land | N | 25 | 64 | 52 | 15 | 24 | 180 |
| | % | 13.9 | 35.6 | 28.9 | 8.3 | 13.3 | 100.0 |
| Medicinal plants | N | 27 | 22 | 54 | 3 | 18 | 124 |
| | % | 21.8 | 17.7 | 43.5 | 2.4 | 14.5 | 100.0 |
| Community storage | N | 9 | 53 | 54 | 8 | 12 | 136 |
| | % | 6.6 | 39.0 | 39.7 | 5.9 | 8.8 | 100.0 |
| Religious & Cultural Commons | N | 27 | 77 | 54 | 28 | 35 | 221 |
| | % | 12.2 | 34.8 | 24.4 | 12.7 | 15.8 | 100.0 |
| Rock | N | 26 | 41 | 54 | 28 | 8 | 157 |
| | % | 16.6 | 26.1 | 34.4 | 17.8 | 5.1 | 100.0 |
| Others | N | 4 | 37 | 22 | 9 | 2 | 74 |
| | % | 5.4 | 50.0 | 29.7 | 12.2 | 2.7 | 100.0 |

*Source: Primary Survey, 2025*

Community storage facilities, which include grain houses, fodder sheds, and tool repositories, are most commonly available in Hardas (39.0%) and Kaksar (39.7%), indicating higher levels of collective organization and community resource management. The availability of rock-based CPRs, including stone quarries and barren lands used for construction or grazing, is also significant in Kaksar (34.4%) and Mushkoo (17.8%), while much lower in Shilikchay

(5.1%). "Other" CPRs, including minor common assets such as fuel collection points and temporary shelters, are mainly concentrated in Hardas (50.0%) and Kaksar (29.7%).

The distribution pattern illustrates that Kaksar and Hardas are the most resource-diverse villages, with a wide range of CPRs supporting both agricultural and non-agricultural livelihoods. In contrast, Darchik and Shilikchay display relatively limited resource diversity, influenced by topographical constraints and restricted accessibility near the border. The findings emphasise the strong ecological heterogeneity of Ladakh's border regions and the continued dependence of households on collectively managed resources for livelihood sustainability, cultural continuity, and community resilience.

Table 5.7 presents the frequency of usage of various Common Property Resources (CPRs) among households in the border villages of Ladakh. The data highlight the extent to which different CPRs are integrated into the daily, seasonal, and occasional livelihood patterns of the respondents. The usage intensity varies significantly across resource types, reflecting differences in their availability, accessibility, and relevance to local subsistence practices in Ladakh's fragile mountain ecosystem. Water resources stand out as the most frequently used CPR, with over 90 percent of respondents using them daily. This high dependency underscores the centrality of water for drinking, irrigation, and livestock rearing in the arid trans-Himalayan landscape, where glacial meltwater and streams are critical for sustaining both households and agriculture. The limited percentage of respondents reporting seasonal or rare use of water resources reflects the near-universal necessity of this resource in daily life.

Religious and cultural commons also record very high daily usage (83.27%), emphasizing their continued significance in the social and spiritual fabric of these border communities. These spaces monasteries, mosques, prayer sites, and community halls serve not only as places of worship but also as focal points for collective gatherings, decision-making, and cultural preservation. The consistent use of such commons suggests that religious and cultural life remains deeply intertwined with the community's identity and resilience in remote areas. Pastures and cultivable land exhibit a predominantly seasonal usage pattern, with 68.57 percent and 77.55 percent of respondents, respectively, depending on these resources during specific agricultural or grazing periods. This reflects the seasonal rhythm of Ladakh's agrarian-livestock economy, where agricultural activities and grazing follow climatic cycles. However, about 11 percent of respondents use pastures daily, particularly those engaged in livestock herding, indicating their vital role in livelihood sustenance for pastoral households.

**Table 5.7 Frequency of Usage of Common Property Resources (CPRs)**

| CPRs | Frequency of Usage | N | % |
|---|---|---|---|
| Pastures | Never/ Not Available | 37 | 15.102 |
| | Rarely | 13 | 5.306 |
| | Seasonally | 168 | 68.571 |
| | Weekly | 0 | 0.000 |
| | Daily | 27 | 11.020 |
| Water Resources | Never/ Not Available | 5 | 2.041 |
| | Rarely | 1 | 0.408 |
| | Seasonally | 7 | 2.857 |
| | Weekly | 10 | 4.082 |
| | Daily | 222 | 90.612 |
| Forests | Never/ Not Available | 173 | 70.612 |
| | Rarely | 43 | 17.551 |
| | Seasonally | 24 | 9.796 |
| | Weekly | 1 | 0.408 |
| | Daily | 4 | 1.633 |
| Cultivable land | Never/ Not Available | 24 | 9.796 |
| | Rarely | 6 | 2.449 |
| | Seasonally | 190 | 77.551 |
| | Weekly | 5 | 2.041 |
| | Daily | 20 | 8.163 |
| Medicinal plants | Never/ Not Available | 98 | 40.000 |
| | Rarely | 40 | 16.327 |
| | Seasonally | 98 | 40.000 |
| | Weekly | 1 | 0.408 |
| | Daily | 8 | 3.265 |
| Community storage | Never/ Not Available | 66 | 26.939 |
| | Rarely | 9 | 3.673 |
| | Seasonally | 111 | 45.306 |
| | Weekly | 16 | 6.531 |
| | Daily | 43 | 17.551 |
| Religious & Cultural Commons | Never/ Not Available | 18 | 7.347 |
| | Rarely | 3 | 1.224 |
| | Seasonally | 14 | 5.714 |
| | Weekly | 6 | 2.449 |
| | Daily | 204 | 83.265 |
| Others | Never/ Not Available | 148 | 60.408 |
| | Rarely | 8 | 3.265 |
| | Seasonally | 85 | 34.694 |
| | Weekly | 0 | 0.000 |
| | Daily | 4 | 1.633 |

*Source: Primary Survey, 2025*

Forests and medicinal plants show comparatively low and irregular usage, largely due to limited forest cover and the restricted distribution of medicinal flora in high-altitude zones. Around 70.61 percent of respondents reported forests as unavailable or unused, while 40

percent of respondents indicated non-availability of medicinal plants. Nonetheless, 40 percent reported seasonal use of medicinal plants, suggesting continued traditional knowledge and reliance on herbal remedies during specific seasons when such plants are accessible.

Community storage facilities, which include grain houses, tool sheds, and shared warehouses, are used seasonally by 45.31 percent and daily by 17.55 percent of respondents. This pattern reflects their role in agricultural cycles storing fodder, seeds, and harvests as well as in maintaining community-level food security and emergency reserves. The presence of weekly and daily usage points to the institutionalization of cooperative resource sharing and traditional systems of collective management. The category "Others," which includes minor commons like temporary shelters, gathering points, or fuel collection zones, exhibits low frequency of use, with 60.41 percent of respondents reporting them as unavailable or unused. Only a small fraction (34.69%) use such resources seasonally, likely for purposes such as collecting fuelwood or storing seasonal equipment.

The pattern of CPR usage in Ladakh's border villages reveals a clear distinction between daily-use resources (like water and religious commons) and seasonally-dependent resources (like pastures, cultivable land, and storage facilities). The findings highlight the adaptive livelihood strategies of these communities, who balance between immediate household needs and seasonal dependence on collective natural assets.

Table 5.8 presents the analysis of variance (ANOVA) results comparing the mean usage levels of various Common Property Resources (CPRs) across the five surveyed revenue villages Darchik, Hardas, Kaksar, Mushkoo, and Shilikchay. The CPRs considered include pastures, water resources, forests, cultivable land, medicinal plants, community storage facilities, religious and cultural commons, and other locally significant resources. The mean usage values are measured on a five-point scale (1 = Never, 2 = Rarely, 3 = Seasona67lly, 4 = Weekly, 5 = Daily), reflecting how frequently households depend on each resource. The ANOVA results and significance levels help to identify whether the differences in CPR usage across villages are statistically meaningful.

The findings reveal significant spatial variation in the use of most CPRs, indicating that dependence on common resources is shaped by local ecological, social, and infrastructural conditions. The only exception is cultivable land ($F = 0.683$, $p = 0.604$), where no significant variation exists, implying relatively uniform usage patterns across all villages. This consistency

reflects the widespread reliance on agriculture as a key livelihood activity throughout the surveyed region, despite differences in terrain and resource endowment. For pastures, a highly significant difference is observed ($F = 36.971$, $p = 0.000$). The mean usage ranges from 1.22 in Darchik, showing minimal or no utilization, to 3.61 in Shilikchay, indicating seasonal or more frequent dependence. This variation suggests that pastoral activities are more common in villages like Shilikchay, Mushkoo, and Kaksar, which have relatively better grazing lands and livestock-based livelihoods, while Darchik shows limited access to or dependence on such resources. Water resources exhibit consistently high mean usage across all villages, with Kaksar and Mushkoo recording perfect or near-perfect daily use (means = 5.00 and 4.97, respectively). The significant F-value (5.116, $p = 0.001$) suggests minor but notable differences, likely reflecting variations in water accessibility, storage infrastructure, and irrigation needs. The overall mean of 4.81 underscores that water is a universally vital resource in the region, essential for both household and agricultural activities. For forest resources, the ANOVA result ($F = 9.101$, $p = 0.000$) indicates significant inter-village differences. Darchik (mean = 2.11) demonstrates the highest usage, implying a greater dependence on forests for fuelwood, fodder, and minor forest produce. In contrast, Kaksar (1.09) and Mushkoo (1.34) show limited forest utilization, consistent with their ecological setting, where forest cover is sparse or absent. The usage of medicinal plants also varies significantly ($F = 41.883$, $p = 0.000$). Darchik and Kaksar display higher means (3.00 and 2.94), indicating a stronger tradition of using locally available herbal resources. Meanwhile, Mushkoo (1.14) and Hardas (1.58) show low dependence, possibly due to lesser availability of medicinal flora or a declining reliance on indigenous healing practices. For community storage, substantial differences exist across villages ($F = 18.434$, $p = 0.000$). Hardas (mean = 3.50) and Kaksar (3.11) have higher mean usage, suggesting the presence of functioning community granaries or collective resource facilities. Conversely, Darchik (1.48) records lower mean usage, which may reflect limited infrastructure or a greater reliance on private storage arrangements. The religious and cultural commons important social assets in Ladakh's traditional community structure also show significant variation ($F = 17.239$, $p = 0.000$). Usage is almost daily in Mushkoo (mean = 5.00) and Kaksar (4.87), highlighting the vibrant cultural and spiritual life in these villages. However, Shilikchay (3.47) shows lower engagement, possibly due to a more dispersed settlement pattern or smaller communal institutions.

**Table 5.8 Mean Usage of Common Property Resources (CPRs) across Revenue Villages**

| CPRs | Revenue Village | N | Mean Usage | SD | Std. Error | ANOVA |
|---|---|---|---|---|---|---|
| Pastures | Darchik | 27 | 1.22 | .506 | .097 | F (4,240)= 36.971, p=0.000 |
| | Hardas | 86 | 2.87 | .549 | .059 | |
| | Kaksar | 54 | 2.94 | .231 | .031 | |
| | Mushkoo | 29 | 2.97 | .186 | .034 | |
| | Shilikchay | 49 | 3.61 | 1.631 | .233 | |
| | Total | 245 | 2.87 | 1.041 | .067 | |
| Water Resources | Darchik | 27 | 4.56 | .847 | .163 | F (4,240)= 5.116, p=0.001 |
| | Hardas | 86 | 4.88 | .518 | .056 | |
| | Kaksar | 54 | 5.00 | .000 | .000 | |
| | Mushkoo | 29 | 4.97 | .186 | .034 | |
| | Shilikchay | 49 | 4.51 | 1.175 | .168 | |
| | Total | 245 | 4.81 | .695 | .044 | |
| Forests | Darchik | 27 | 2.11 | 1.013 | .195 | F (4,240)= 9.101, p=0.000 |
| | Hardas | 86 | 1.38 | .654 | .071 | |
| | Kaksar | 54 | 1.09 | .401 | .055 | |
| | Mushkoo | 29 | 1.34 | .484 | .090 | |
| | Shilikchay | 49 | 1.65 | 1.147 | .164 | |
| | Total | 245 | 1.45 | .816 | .052 | |
| Cultivable land | Darchik | 27 | 3.00 | .000 | .000 | F (4,240)= 0.683, p=0.604 |
| | Hardas | 86 | 2.92 | .558 | .060 | |
| | Kaksar | 54 | 3.00 | .389 | .053 | |
| | Mushkoo | 29 | 3.17 | .711 | .132 | |
| | Shilikchay | 49 | 2.86 | 1.683 | .240 | |
| | Total | 245 | 2.96 | .875 | .056 | |
| Medicinal plants | Darchik | 27 | 3.00 | .000 | .000 | F (4,240)= 41.883, p=0.000 |
| | Hardas | 86 | 1.58 | .759 | .082 | |
| | Kaksar | 54 | 2.94 | .302 | .041 | |
| | Mushkoo | 29 | 1.14 | .351 | .065 | |
| | Shilikchay | 49 | 2.18 | 1.453 | .208 | |
| | Total | 245 | 2.11 | 1.050 | .067 | |
| Community storage | Darchik | 27 | 1.48 | .849 | .163 | F (4,240)= 18.434, p=0.000 |
| | Hardas | 86 | 3.50 | 1.156 | .125 | |
| | Kaksar | 54 | 3.11 | .462 | .063 | |
| | Mushkoo | 29 | 2.31 | 1.583 | .294 | |
| | Shilikchay | 49 | 2.45 | 1.672 | .239 | |
| | Total | 245 | 2.84 | 1.365 | .087 | |
| Religious & Cultural Commons | Darchik | 27 | 4.85 | .534 | .103 | F (4,240)= 17.239, p=0.000 |
| | Hardas | 86 | 4.66 | .928 | .100 | |
| | Kaksar | 54 | 4.87 | .436 | .059 | |
| | Mushkoo | 29 | 5.00 | .000 | .000 | |
| | Shilikchay | 49 | 3.47 | 1.827 | .261 | |
| | Total | 245 | 4.53 | 1.151 | .074 | |
| Others | Darchik | 27 | 3.07 | .385 | .074 | F (4,240)= 106.358, p=0.000 |
| | Hardas | 86 | 1.33 | .758 | .082 | |
| | Kaksar | 54 | 2.89 | .572 | .078 | |
| | Mushkoo | 29 | 1.14 | .743 | .138 | |
| | Shilikchay | 49 | 1.08 | .400 | .057 | |
| | Total | 245 | 1.79 | 1.029 | .066 | |

*Note: 1-Never, 2- Rarely, 3, Seasonally, 4- Weekly, 5- Daily; Source: Primary Survey, 2025*

The category of "Other" CPRs (such as rocks, communal land patches, or localized natural resources) shows the most pronounced variation ($F = 106.358$, $p = 0.000$). The mean usage is highest in Darchik (3.07) and Kaksar (2.89), suggesting local dependence on specialized or unique resources. Villages such as Hardas, Mushkoo, and Shilikchay report considerably lower usage (means around 1.1–1.3), indicating either limited resource diversity or alternative livelihood adaptations. These results confirm that the usage of CPRs is not uniform across the surveyed villages. Ecological diversity, cultural practices, infrastructural availability, and livelihood orientation significantly influence the intensity and type of CPR utilization. Villages like Kaksar and Mushkoo exhibit higher dependence on multiple CPRs, reflecting stronger integration between natural resource use and daily livelihoods, while Darchik and Shilikchay display selective usage patterns shaped by their environmental and socio-economic contexts. These findings emphasise the need for localized CPR management strategies that account for spatial disparities and promote sustainable, community-driven resource governance in the fragile mountain ecosystems of Ladakh.

## 5.4 Contribution of CPRs to Household Livelihoods

Common Property Resources (CPRs) form an indispensable part of household livelihoods in the border villages of Ladakh, where environmental constraints, limited arable land, and harsh climatic conditions restrict private resource availability. In such fragile ecosystems, CPRs such as pastures, forests, water sources, community storage facilities, and religious or cultural commons provide essential support for both subsistence and income-generating activities. They not only supply critical resources like fodder, fuelwood, medicinal plants, and irrigation water but also sustain livestock rearing, traditional crafts, and seasonal migration practices that define the socio-economic fabric of rural Ladakh.

Table 5.9 presents respondents' ranking of the importance of Common Property Resources (CPRs) for their household livelihoods across five revenue villages in Ladakh. The mean values indicate a high perceived importance of CPRs overall, with an aggregate mean of 4.318 out of 5, reflecting that households consider these resources crucial for their day-to-day survival and livelihood activities. A closer look at village-level differences shows significant variation. In Kaksar, households rated CPRs as maximally important, with a mean score of 5.00, suggesting complete reliance or strong cultural and economic attachment to these resources. Mushkoo and Hardas also exhibit high mean scores of 4.931 and 4.547, respectively, indicating substantial dependence, while Shilikchay, with a mean of 4.082, reflects slightly lower but still strong importance. Darchik stands out with a considerably lower mean of 2.000,

implying that households there either have alternative livelihood options or less access to CPRs compared to other villages. The ANOVA result (F(4,240) = 103.805, p = 0.000) confirms that the differences in perceived importance among villages are statistically significant, indicating that geographic location, resource availability, and livelihood strategies influence how communities value CPRs. These findings highlight the heterogeneity in dependence on CPRs within border villages of Ladakh, highlighting the need for location-specific management and governance strategies that recognize varying community reliance on shared resources.

**Table 5.9 Perceived Importance of Common Property Resources (CPRs) Across Revenue Villages**

| CPRs | N | Mean | Std. Deviation | Std. Error |
|---|---|---|---|---|
| Darchik | 27 | **2.000** | .3922 | .0755 |
| Hardas | 86 | **4.547** | .7770 | .0838 |
| Kaksar | 54 | **5.000** | .0000 | .0000 |
| Mushkoo | 29 | **4.931** | .2579 | .0479 |
| Shilikchay | 49 | **4.082** | 1.0376 | .1482 |
| **Total** | **245** | **4.318** | **1.1036** | **.0705** |
| **ANOVA** | | | | **F (4,240)= 103.805, p=0.000** |

*Note: 5 = Most Important, 1 = Least Important; Source: Primary Survey, 2025*

Table 5.10 illustrates the approximate percentage of household livelihoods derived from Common Property Resources (CPRs) in the surveyed border villages of Ladakh. The overall mean dependence on CPRs is 76.59%, indicating that these resources contribute substantially to the livelihood strategies of most households in the region. Village-level variations are significant. In Kaksar and Mushkoo, households reported full dependence on CPRs, with a mean of 100%, highlighting complete reliance on these resources for sustenance and income-generating activities. Hardas also shows a very high mean dependence of 89.77%, suggesting CPRs are central to household livelihoods. Shilikchay demonstrates moderate dependence with an average of 55.82%, reflecting partial reliance likely supplemented by alternative livelihood sources. In contrast, Darchik shows minimal dependence at 0.37%, implying that households in this village either have limited access to CPRs or rely more on private resources and other livelihood options. The ANOVA result (F(4,240) = 92.244, p = 0.000) confirms that these differences across villages are statistically significant. This also highlights the heterogeneous nature of resource dependence in Ladakh's border villages, influenced by factors such as geographic location, availability of CPRs, socio-economic conditions, and traditional livelihood patterns.

**Table 5.10 Dependence of Household Livelihoods on Common Property Resources (CPRs) Across Revenue Villages (Approximate Percent)**

| CPRs | N | Mean Percent | Std. Deviation | Std. Error |
|---|---|---|---|---|
| Darchik | 27 | .370 | 1.9245 | .3704 |
| Hardas | 86 | 89.767 | 29.1841 | 3.1470 |
| Kaksar | 54 | 100.000 | .0000 | .0000 |
| Mushkoo | 29 | 100.000 | .0000 | .0000 |
| Shilikchay | 49 | 55.816 | 41.5224 | 5.9318 |
| **Total** | 245 | 76.592 | 40.1671 | 2.5662 |
| **ANOVA** | | | | **F (4,240)= 92.244, p=0.000** |

*Source: Primary Survey, 2025*

Table 5.11 presents the percentage of working household members who depend on Common Property Resources (CPRs) in the surveyed border villages of Ladakh. The overall mean dependence is 73.46%, indicating that a substantial portion of the labor force in these households relies on CPRs for their economic activities and sustenance. There is considerable variation across villages. Kaksar shows complete dependence (100%) of working members on CPRs, highlighting the centrality of these resources in employment and livelihood activities. Mushkoo also exhibits high dependence at 94.48%, while Hardas demonstrates slightly lower but still significant reliance at 86.78%. Shilikchay shows moderate dependence with 48.67%, suggesting the presence of alternative employment opportunities or lower access to CPRs. In contrast, Darchik reports minimal dependence (0.37%), reflecting either limited availability of CPRs or diversified livelihood strategies among working members. The ANOVA result ($F(4,240) = 92.244$, $p = 0.000$) confirms that these inter-village differences are statistically significant, indicating heterogeneous patterns of labor reliance on CPRs.

**Table 5.11 Percentage of Dependence of Working Household Members on Common Property Resources (CPRs) Across Revenue Villages**

| CPRs | N | Mean Percent | Std. Deviation | Std. Error |
|---|---|---|---|---|
| Darchik | 27 | .370 | 1.9245 | .3704 |
| Hardas | 86 | 86.779 | 33.0733 | 3.5664 |
| Kaksar | 54 | 100.000 | .0000 | .0000 |
| Mushkoo | 29 | 94.483 | 18.8199 | 3.4948 |
| Shilikchay | 49 | 48.673 | 39.7971 | 5.6853 |
| **Total** | 245 | 73.461 | 41.4622 | 2.6489 |
| **ANOVA** | | | | **F (4,240)= 80.592, p=0.000** |

*Source: Primary Survey, 2025*

Table 5.12 illustrates the extent to which households in the surveyed border villages of Ladakh earn direct income from Common Property Resources (CPRs). Overall, only 3.3% of households report generating direct income from CPRs, indicating that the majority of households primarily use these resources for subsistence rather than for monetary gain. The reliance on CPRs for direct income varies across villages. Shilikchay shows the highest proportion of households (12.2%) earning income from CPRs, while Hardas has a minimal proportion (2.3%). Darchik, Kaksar, and Mushkoo report no households earning direct income from CPRs, highlighting that in these villages CPRs are predominantly used for household consumption, livestock sustenance, or other non-commercial purposes. The Chi-square test ($\chi^2 = 16.462$, $p = 0.000$) confirms that the differences in earning direct income from CPRs across villages are statistically significant. This indicates that local ecological conditions, accessibility, and community practices influence whether CPRs are utilized for income generation. The findings suggest that while CPRs are vital for subsistence, they are largely underutilized as a source of direct economic revenue for households in these border communities.

**Table 5.12 Direct Income from Common Property Resources (CPRs) by Households Across Revenue Villages**

| Revenue Village | | Household earn any direct income from CPRs | | Total |
|---|---|---|---|---|
| | | No | Yes | |
| Darchik | N | 27 | 0 | 27 |
| | % | 100.0 | 0.0 | 100.0 |
| Hardas | N | 84 | 2 | 86 |
| | % | 97.7 | 2.3 | 100.0 |
| Kaksar | N | 54 | 0 | 54 |
| | % | 100.0 | 0.0 | 100.0 |
| Mushkoo | N | 29 | 0 | 29 |
| | % | 100.0 | 0.0 | 100.0 |
| Shilikchay | N | 43 | 6 | 49 |
| | % | 87.8 | 12.2 | 100.0 |
| Total | N | 237 | 8 | 245 |
| | % | 96.7 | 3.3 | 100.0 |
| Chi-Square | | 16.462 (4), p=0.000 | | |

*Note; Percent within Village; Source: Primary Survey, 2025*

Table 5.13 presents the perceptions of households regarding the significance of Common Property Resources (CPRs) in sustaining their livelihoods. The mean score of 3.869

(SD = 1.423) for the statement "CPRs are essential for my household's survival and livelihood" indicates that most respondents recognize CPRs as vital to daily life. The highest mean, 3.906 (SD = 1.410), for the perception that "My household would face serious difficulties if CPRs were degraded or lost," further reinforces the critical role of CPRs in household resilience and survival strategies. Households largely disagreed with the notion that "Even without CPRs, my household could manage equally well" (Mean = 2.849, SD = 1.224), suggesting limited alternative sources of support and highlighting their dependence on communal resources. The perception of increased dependency over the last decade (Mean = 3.253, SD = 1.432) reflects trends of rising reliance on CPRs due to environmental, economic, or social pressures. Additionally, the mean of 3.718 (SD = 1.442) for the statement "Among all resources available, CPRs are more important than private resources" indicates that respondents place higher value on shared communal resources than on private assets. It illustrates that households in the surveyed border villages view CPRs as indispensable, both as a direct source of livelihood and as a buffer against vulnerabilities, emphasizing their ecological, social, and economic importance in the region.

**Table 5.13 Household Perceptions on the Importance of Common Property Resources**

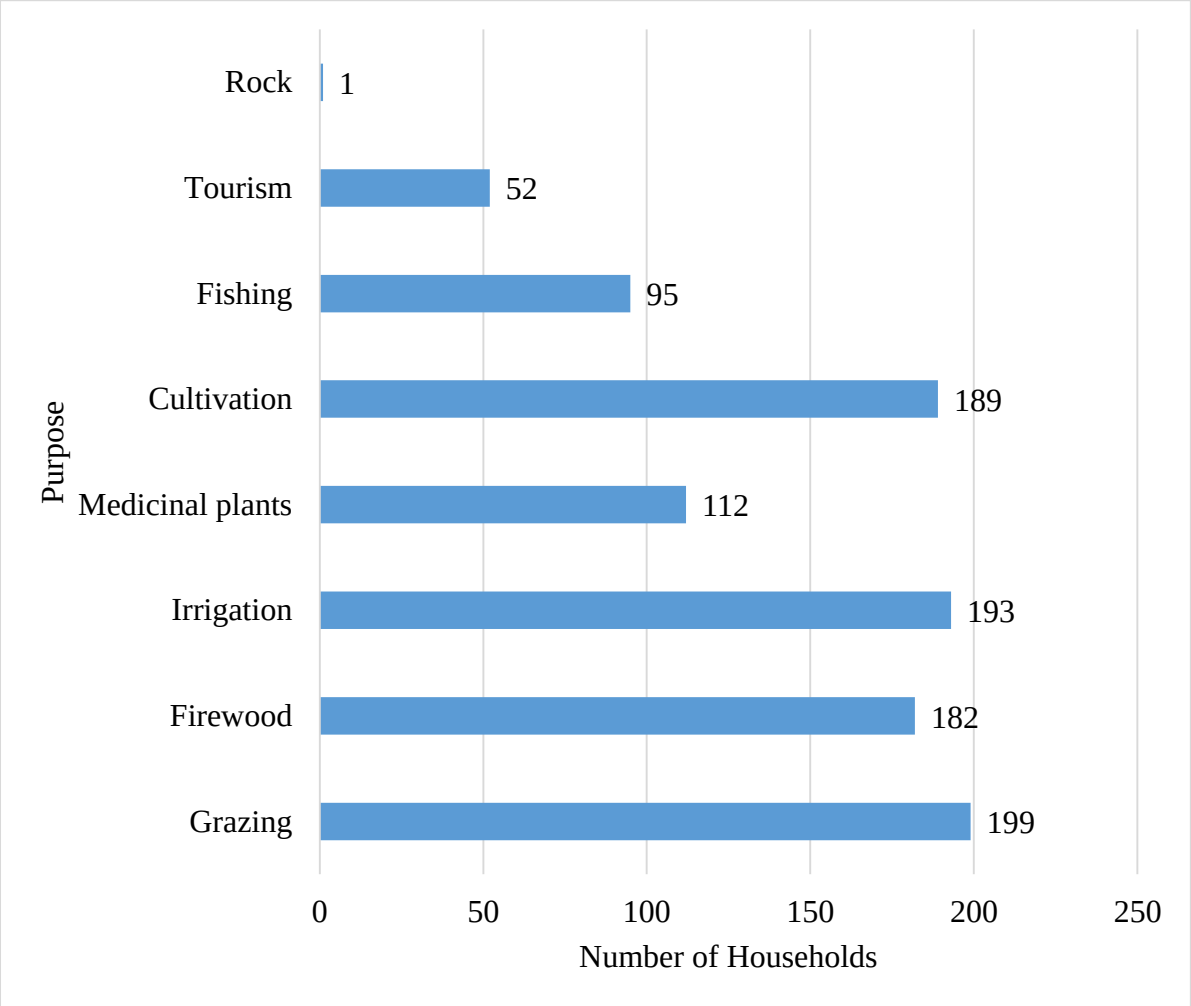
| Perceptions | N | Min. | Max. | Mean | SD |
|---|---|---|---|---|---|
| CPRs are essential for my household's survival and livelihood | 245 | 1.0 | 5.0 | 3.869 | 1.4226 |
| Even without CPRs, my household could manage equally well | 245 | 1.0 | 5.0 | 2.849 | 1.2238 |
| Over the last 10 years, my household has become more dependent on CPRs | 245 | 1.0 | 5.0 | 3.253 | 1.4319 |
| My household would face serious difficulties if CPRs were degraded or lost | 245 | 1.0 | 5.0 | 3.906 | 1.4096 |
| Among all resources available, CPRs are more important than private resources. | 245 | 1.0 | 5.0 | 3.718 | 1.4423 |

*Note: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree; Source: Primary Survey, 2025*

Figure 5.1 presents the frequency and percentage of households using Common Property Resources (CPRs) for various purposes. Grazing is the most common use, with 199 households (81.2%) relying on CPRs for livestock. Irrigation is also a major purpose, utilized

by 193 households (78.8%), followed closely by cultivation, which engages 189 households (77.1%). Firewood collection remains significant, with 182 households (74.3%) depending on CPRs to meet their daily energy needs. Medicinal plants are used by 112 households (45.7%), reflecting the importance of traditional knowledge and health practices. Fishing is practiced by 95 households (38.8%), primarily where water bodies are accessible. Tourism-related activities involve 52 households (21.2%), while rock collection is minimal, with only 1 household (0.4%) engaging in this activity. The data clearly show that CPRs serve multiple functions, supporting both livelihood needs and cultural practices. Most households depend on CPRs for subsistence and productive activities, highlighting their vital role in sustaining rural livelihoods in Ladakh's border villages.

**Figure 5.1 Purposes for Which Households Use Common Property Resources (CPRs)**




*Source: Primary Survey, 2025*

**Table 5.14 Distribution of Households by Purpose of Using Common Property Resources (CPRs) across Revenue Villages in Ladakh**

| Purpose of Use of CPRs | | Revenue Village | | | | |
|---|---|---|---|---|---|---|
| | | Darchik | Hardas | Kaksar | Mushkoo | Shilikchay |
| Grazing | N | 0 | 77 | 54 | 29 | 39 |
| | % | 0.0 | 89.5 | 100.0 | 100.0 | 81.3 |
| Firewood | N | 26 | 59 | 54 | 24 | 19 |
| | % | 96.3 | 68.6 | 100.0 | 82.8 | 39.6 |
| Irrigation | N | 27 | 63 | 54 | 22 | 27 |
| | % | 100.0 | 73.3 | 100.0 | 75.9 | 56.3 |
| Medicinal plants | N | 25 | 18 | 54 | 2 | 13 |
| | % | 92.6 | 20.9 | 100.0 | 6.9 | 27.1 |
| Cultivation | N | 26 | 65 | 53 | 15 | 30 |
| | % | 96.3 | 75.6 | 98.1 | 51.7 | 62.5 |
| Fishing | N | 3 | 23 | 52 | 9 | 8 |
| | % | 11.1 | 26.7 | 96.3 | 31.0 | 16.7 |
| Tourism | N | 25 | 6 | 8 | 7 | 6 |
| | % | 92.6 | 7.0 | 14.8 | 24.1 | 12.5 |
| Rock | N | 0 | 0 | 0 | 0 | 1 |
| | % | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 |
| Total | N | 27 | 86 | 54 | 29 | 48 |
| | % | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

*Note: Percent within Village; Source: Primary Survey, 2025*

Table 5.14 presents the distribution of households across revenue villages based on the purpose for which they utilize Common Property Resources (CPRs). Grazing is a primary activity in Kaksar and Mushkoo, where all households (100%) reported using CPRs for this purpose. Hardas also shows a high reliance on grazing (77 households, 89.5%), while in Shilikchay, 39 households (81.3%) depend on CPRs for livestock. Darchik households do not report grazing as a use of CPRs. Firewood collection is prominent in Darchik (26 households, 96.3%) and Kaksar (54 households, 100%), with a moderate presence in Hardas (59 households, 68.6%) and Mushkoo (24 households, 82.8%). Shilikchay shows lower dependence (19 households, 39.6%). Irrigation is widely supported by CPRs, with all households in Darchik and Kaksar (27 and 54 respectively) reporting its use, followed by Hardas (73.3%), Mushkoo (75.9%), and Shilikchay (56.3%). Cultivation is another significant activity, especially in Kaksar (53 households, 98.1%) and Darchik (26 households, 96.3%), while Hardas (65 households, 75.6%), Mushkoo (15 households, 51.7%), and Shilikchay (30 households, 62.5%) show varied levels of engagement. Medicinal plant collection is highly localized, with all households in Kaksar (100%) and most in Darchik (25 households, 92.6%)

utilizing CPRs, while Hardas (18 households, 20.9%) and Shilikchay (13 households, 27.1%) report lower usage. Fishing is largely reported in Kaksar (52 households, 96.3%) and to a lesser extent in Mushkoo (9 households, 31%) and Hardas (23 households, 26.7%). Tourism-related use of CPRs is limited, with Darchik reporting 25 households (92.6%) engaged, while other villages show much lower participation. Rock collection is negligible, reported only by one household in Shilikchay (2.1%). It highlights the heterogeneous nature of CPR usage across villages, reflecting differences in resource availability, livelihood practices, and ecological conditions. Grazing, irrigation, and cultivation emerge as the most widespread uses, while medicinal plants, fishing, and tourism are more context-specific, indicating the tailored role of CPRs in supporting household livelihoods.

Table 5.15 outlines the key parameters used to measure the utilization of Common Property Resources (CPRs) by households and the corresponding methods of standardization applied to ensure comparability across indicators. It includes five major dimensions: the perceived importance of CPRs for the household, the approximate percentage of household livelihood dependent on CPRs, the proportion of working members relying on CPRs, direct income earned from CPRs, and household perceptions regarding the role of CPRs in their survival and well-being. The importance of CPRs for the household is rated on a five-point scale (1 = least important, 5 = most important) and standardized using the min-max normalization method. Similarly, both the approximate percentage of household livelihood dependent on CPRs and the percentage of working members depending on CPRs are standardized using the same min-max approach, converting raw percentages into comparable scores. Direct income from CPRs is coded as a binary variable (No = 0, Yes = 1), which does not require further transformation. Household perceptions are captured through five statements reflecting dependence, vulnerability, and comparative importance of CPRs. The responses are averaged across all items and then standardized using the min-max formula. Frequency of CPR usage, originally coded on a scale from 1 (Never) to 5 (Daily), is first averaged across all CPR types for each household and then standardized. Finally, the Utilization Index of CPRs is computed as the unweighted average of all standardized parameters, providing a composite measure of CPR reliance and usage intensity at the household level. This approach ensures that each parameter contributes equally to the index, allowing a general assessment of CPR utilization patterns across the study villages.

**Table 5.15 Parameters and Standardization Methods for Constructing the Utilization Index of CPRs**

| Parameters | Response/ Sub variables/ Coding | Standardization |
|---|---|---|
| Importance of CPRs for household | 5 = Most Important, 1 = Least Important | (X-Min)/(Max-Min) |
| Approximate % of household livelihood that depends on CPRs | Percent | (X-Min)/(Max-Min) |
| Percentage of working members that depends on CPRs | Percent | (X-Min)/(Max-Min) |
| Household earn any direct income from CPRs | No=0, Yes=1 | No=0, Yes=1 |
| Household Perceptions on the Importance of Common Property Resources | • CPRs are essential for my household's survival and<br>• livelihood<br>• Even without CPRs, my household could manage equally<br>• well<br>• Over the last 10 years, my household has become more dependent on CPRs<br>• My household would face serious difficulties if CPRs were degraded or lost<br>• Among all resources available, CPRs are more important than private resources. | Average of All 5. Then (X-Min)/(Max-Min) |
| Frequency of Usage | 1-Never, 2- Rarely, 3, Seasonally, 4- Weekly, 5- Daily | Average of All CPRs Usage Frequency, then (X-Min)/(Max-Min) |
| **Utilization Index of CPRs** | **Average of All the parameters with Equal Weightage to all<br>Value Closer to 1 means High Utilization, Closer Zero Mean Lower Utilization** | |

*Source: Authors Definition for Comparison Purpose*

Table 5.16 presents the average Utilization Index of Common Property Resources (CPRs) across the five surveyed revenue villages. The Utilization Index, ranging from 0 to 1, is a composite measure capturing multiple dimensions of CPR use, including household dependence, frequency of usage, direct income, and perceptions regarding the importance of these resources. A value closer to 1 indicates high utilization of CPRs, whereas a value near 0 reflects low utilization. The data reveal substantial variation in CPR utilization across villages.

Mushkoo exhibits the highest mean utilization index at 0.8004, indicating intensive reliance on and frequent use of CPRs by households in this village. Kaksar follows with a mean of 0.7485, and Hardas records a moderately high utilization index of 0.6797. Shilikchay shows comparatively lower utilization (0.5549), while Darchik demonstrates minimal reliance on CPRs, with an average index of only 0.0286. The standard deviations suggest variability in utilization within villages. Shilikchay and Hardas display higher dispersion (.1982 and .1649, respectively), indicating heterogeneous reliance among households, whereas Kaksar and Mushkoo show more consistent usage patterns. The ANOVA result ($F(4,240) = 160.466$, $p = 0.000$) confirms that the differences in utilization indices among villages are statistically significant, highlighting how geographic, socio-economic, and resource availability factors shape CPR dependence in Ladakh's border communities. The findings emphasise the critical role of CPRs in villages like Mushkoo and Kaksar, where households heavily depend on these resources, whereas in Darchik, CPRs play a minimal role in household livelihoods.

**Table 5.16 Average Utilization Index of Common Property Resources by Revenue Village**

| Revenue Village | N | Mean Utilization Index of CPRs | Std. Deviation | Std. Error |
|---|---|---|---|---|
| Darchik | 27 | .0286 | .0117 | .0023 |
| Hardas | 86 | .6797 | .1649 | .0178 |
| Kaksar | 54 | .7485 | .0219 | .0030 |
| Mushkoo | 29 | .8004 | .0797 | .0148 |
| Shilikchay | 49 | .5549 | .1982 | .0283 |
| Total | 245 | .6124 | .2575 | .0165 |
| ANOVA | | F (4,240) =160.466, p=0.000 | | |

*Note: Value Closer to 1 means High Utilization, Closer Zero Mean Lower Utilization; Source: Primary Survey, 2025*

Table 5.17 illustrates the average Utilization Index of Common Property Resources (CPRs) across different community groups in the surveyed border villages of Ladakh. The data show marked differences in CPR utilization among community groups. The Shina community exhibits the highest mean utilization index at 0.767, indicating strong dependence on CPRs for household livelihood and daily needs. The Balti community follows with a moderately high utilization index of 0.670, suggesting considerable reliance. The Purig community records a mean index of 0.465, reflecting intermediate levels of CPR use, while the Dard community shows minimal utilization at 0.029, indicating very low dependence on these resources. Standard deviations indicate the extent of variation within each community group. The Purig community shows relatively high variability (0.212), suggesting that household reliance on

CPRs differs significantly among its members, whereas the Shina and Balti communities demonstrate more consistent utilization patterns. The ANOVA results (F(3,241) = 353.226, p = 0.000) confirm that the differences in CPR utilization among community groups are statistically significant, highlighting how cultural practices, livelihood strategies, and access to resources influence the role of CPRs in sustaining household welfare. The findings underscore the heterogeneous dependence on CPRs across communities, with Shina and Balti households being the most reliant, and Dard households the least.

**Table 5.17 Average Utilization Index of Common Property Resources by Community Group**

| Community Group | N | Mean Utilization Index of CPRs | Std. Deviation | Std. Error |
|---|---|---|---|---|
| Balti, | 120 | .670 | .139 | .013 |
| Dard | 31 | .029 | .013 | .002 |
| Purig | 11 | .465 | .212 | .064 |
| Shina | 83 | .767 | .056 | .006 |
| Total | 245 | .612 | .258 | .016 |
| ANOVA | | F (3,241) =353.226, p=0.000 | | |

*Note: Value Closer to 1 means High Utilization, Closer Zero Mean Lower Utilization; Source: Primary Survey, 2025*

Table 5.18 presents the average Utilization Index of Common Property Resources (CPRs) across households classified by their ration card status in the surveyed border villages of Ladakh. The data indicate that households under the Antyodaya Anna Yojana (AAY) – representing the poorest of the poor – have the highest mean utilization index of 0.833, suggesting that these households rely heavily on CPRs for their livelihood and daily needs. Priority Households (PHH) show a high utilization index of 0.750, though the sample size is very small (n=1). Above Poverty Line (APL) households have a mean index of 0.619, while Below Poverty Line (BPL) households show a slightly lower mean index of 0.603, indicating moderate dependence on CPRs across these categories. The standard deviations reflect variability within each group, with the APL and BPL households showing similar levels of dispersion (0.266 and 0.252, respectively), implying some diversity in household reliance on CPRs. The ANOVA results (F(3,241) = 0.670, p = 0.571) suggest that differences in CPR utilization among households based on ration card status are not statistically significant. This indicates that, regardless of poverty classification, households in these border villages rely on CPRs at broadly comparable levels, highlighting the overall importance of these resources in sustaining livelihoods across socio-economic strata.

**Table 5.18 Average Utilization Index of Common Property Resources by Ration Card Status**

| Ration Card Status | N | Mean Utilization Index of CPRs | Std. Deviation | Std. Error |
|---|---|---|---|---|
| Above Poverty Line (APL) | 106 | .619 | .266 | .026 |
| Antyodaya Anna Yojana (AAY) – poorest of the poor | 2 | .833 | .079 | .056 |
| Below Poverty Line (BPL) | 136 | .603 | .252 | .022 |
| Priority Household (PHH) | 1 | .750 | | |
| Total | 245 | .612 | .258 | .016 |
| ANOVA | | F (3,241) =0.670, p=0.571 | | |

*Note: Value Closer to 1 means High Utilization, Closer Zero Mean Lower Utilization; Source: Primary Survey, 2025*

Table 5.19 presents the mean Utilization Index of Common Property Resources (CPRs) categorized by the education level of the household head in the surveyed border villages of Ladakh. It shows that households headed by individuals with no formal education have the lowest mean utilization index (0.430), indicating comparatively lower reliance on CPRs. Households headed by individuals with primary (0.654) and secondary education (0.689) exhibit higher utilization, reflecting greater engagement with CPRs in daily livelihood activities. Interestingly, households with higher education have a slightly lower mean utilization index (0.601) than those with secondary education, which may be influenced by the small sample size (n=11) in this category. The standard deviation highlights variation within each education group, with the no formal education group showing the greatest variability (SD = 0.340), suggesting diverse levels of dependence on CPRs within this segment. The ANOVA result ($F(3,241) = 14.343$, $p = 0.000$) indicates that the differences in CPR utilization among the education groups are statistically significant. This suggests that the education status of the household head plays a meaningful role in shaping the degree of CPR utilization, with higher literacy and education levels generally associated with greater use and management of common property resources in these communities.

**Table 5.19 Average Utilization Index of Common Property Resources by Education Status of Household Head**

| Education Status | N | Mean Utilization Index of CPRs | Std. Deviation | Std. Error |
|---|---|---|---|---|
| No formal | 55 | .430 | .340 | .046 |
| Primary | 101 | .654 | .226 | .022 |
| Secondary | 78 | .689 | .151 | .017 |
| Higher | 11 | .601 | .254 | .077 |
| Total | 245 | .612 | .258 | .016 |
| ANOVA | | F (3,241) =14.343, p=0.000 | | |

*Note: Value Closer to 1 means High Utilization, Closer Zero Mean Lower Utilization; Source: Primary Survey, 2025*

**Table 5.20 Correlation of Household Characteristics with Utilization Index of Common Property Resources**

| | | Utilization Index of CPRs |
|---|---|---|
| Total landholding (Canal) | Pearson Correlation | .320** |
| | Sig. (2-tailed) | .000 |
| | N | 245 |
| Respondent's Age (In Years) | Pearson Correlation | -.052 |
| | Sig. (2-tailed) | .417 |
| | N | 245 |
| Household size | Pearson Correlation | -.012 |
| | Sig. (2-tailed) | .846 |
| | N | 245 |

***. Correlation is significant at the 0.01 level (2-tailed); Source: Primary Survey, 2025*

Table 5.20 presents the Pearson correlation coefficients between key household characteristics total landholding, respondent's age, and household size and the Utilization Index of Common Property Resources (CPRs) in the surveyed border villages of Ladakh. It shows a significant positive correlation between total landholding and CPR utilization ($r = 0.320$, $p < 0.01$). This indicates that households with larger landholdings tend to use CPRs more intensively, likely because they have greater capacity to integrate CPRs such as pastures, cultivable land, and water resources into their agricultural and livelihood activities. In contrast, the correlation of respondent's age with CPR utilization is negative but not statistically significant ($r = -0.052$, $p = 0.417$), suggesting that age does not substantially influence how households engage with CPRs. Similarly, household size shows a very weak negative correlation ($r = -0.012$, $p = 0.846$), indicating that the number of household members has minimal impact on CPR utilization in these communities. These results highlight that among the demographic and economic variables considered, landholding size is the most influential

factor driving the utilization of CPRs, while age and household size appear to have negligible effects.

Table 5.21 presents the average Utilization Index of Common Property Resources (CPRs) disaggregated by the gender of household heads in the surveyed border villages of Ladakh. The results indicate that male-headed households have a slightly higher mean Utilization Index (0.614) compared to female-headed households (0.524). However, this difference is not statistically significant, as confirmed by the independent sample t-test ($t = -0.688$, $p = 0.492$). This suggests that gender of the household head does not have a significant influence on the level of CPR utilization in these communities. The findings imply that both male- and female-headed households engage with CPRs similarly, highlighting the widespread dependence on these resources across genders for livelihood and household needs in Ladakh's border villages.

**Table 5.21 Average Utilization Index of Common Property Resources by Gender of Household Head**

| Gender | N | Mean Utilization Index of CPRs | Std. Deviation | Std. Error |
|---|---|---|---|---|
| Female | 4 | .524 | .121 | .061 |
| Male | 241 | .614 | .259 | .017 |
| Total | 245 | .612 | .258 | .016 |
| Independent Sample t-test | | t (243) =-0.688, p=0.492 | | |

*Note: Value Closer to 1 means High Utilization, Closer Zero Mean Lower Utilization; Source: Primary Survey, 2025*

Table 5.22 shows the mean Utilization Index of Common Property Resources (CPRs) for households in the two tehsils of the surveyed border villages: Drass and Kargil. The results reveal that households in Drass have a significantly higher mean Utilization Index (0.797) compared to those in Kargil (0.590). This difference is statistically significant, as confirmed by the independent sample t-test ($t = 4.070$, $p = 0.000$), suggesting that tehsil location strongly influences the level of CPR utilization. The higher utilization in Drass could be attributed to factors such as greater reliance on CPRs due to limited access to private resources, specific local livelihood practices, or differences in the availability and quality of resources. In contrast, households in Kargil, despite their dependence on CPRs, show relatively lower utilization, indicating potential variations in resource distribution, livelihood strategies, or alternative income sources.

**Table 5.22 Average Utilization Index of Common Property Resources by Tehsil**

| Tehsil | N | Mean Utilization Index of CPRs | Std. Deviation | Std. Error |
|---|---|---|---|---|
| Drass | 27 | .797 | .081 | .016 |
| Kargil | 218 | .590 | .263 | .018 |
| Total | 245 | .612 | .258 | .016 |
| Independent Sample t-test | | t (243) =4.070, p=0.000 | | |

*Note: Value Closer to 1 means High Utilization, Closer Zero Mean Lower Utilization; Source: Primary Survey, 2025*

The analysis of the contribution of Common Property Resources (CPRs) to household livelihoods in the border villages of Ladakh demonstrates that these resources are central to the survival, sustenance, and well-being of local communities. Across all surveyed villages, a substantial proportion of households rely on CPRs for grazing, irrigation, firewood, cultivation, medicinal plants, and other livelihood activities, with usage patterns varying by village, community group, and socio-economic characteristics. The mean Utilization Index indicates high dependence in villages such as Kaksar and Mushkoo, while factors like education, landholding, and tehsil location significantly influence the extent of utilization. Although direct income from CPRs is limited, households perceive these resources as essential for day-to-day survival and long-term resilience, underscoring their role not only as economic assets but also as vital ecological and cultural safety nets. The findings collectively highlight that CPRs form an indispensable component of livelihood strategies, mediating both material sustenance and social stability in the region.

## 5.5 Hypothesis Testing

- H1: The availability, accessibility, and utilization of Common Property Resources (CPRs) significantly contribute to household livelihoods and socio-economic well-being in the border villages of Ladakh.

To examine the contribution of Common Property Resources (CPRs) to household livelihoods in the border villages of Ladakh, the study formulated the hypothesis that the availability, accessibility, and utilization of CPRs significantly influence household livelihoods. The analysis employed multiple statistical approaches, including correlation, ANOVA, and t-tests, to test this hypothesis across socio-economic and spatial variables. The dependent variable considered was the utilization index of CPRs, which incorporates frequency of use, livelihood dependence, income contribution, and household perceptions. Independent

variables included total landholding, household size, age, education status, community group, gender, tehsil, and ration card status.

Correlation analysis revealed a significant positive relationship between total landholding and utilization of CPRs ($r = 0.320$, $p < 0.01$), suggesting that households with larger landholdings are more likely to utilize CPRs effectively. In contrast, age and household size showed no significant correlation with CPR utilization, indicating that these demographic factors do not substantially influence the degree of resource use. Further, one-way ANOVA tests demonstrated significant differences in CPR utilization across education levels, revenue villages, and community groups. Households with primary and secondary education exhibited higher utilization compared to those with no formal education ($F(3,241) = 14.343$, $p = 0.000$). Significant variations were also observed across villages ($F(4,240) = 160.466$, $p = 0.000$) and community groups ($F(3,241) = 353.226$, $p = 0.000$), reflecting the influence of socio-spatial contexts on CPR use. T-tests highlighted that utilization was significantly higher in Drass tehsil compared to Kargil tehsil ($t(243) = 4.070$, $p = 0.000$), while differences between male and female-headed households were not statistically significant ($t(243) = -0.688$, $p = 0.492$). Similarly, ration card status did not show significant differences in CPR utilization ($F(3,241) = 0.670$, $p = 0.571$).

Analysis of livelihood dependence indicated that CPRs contribute substantially to household sustenance. On average, 76.6 percent of household livelihoods and 73.5 percent of working members' activities were linked to CPRs. Although direct income generation from CPRs was limited to only 3.3 percent of households, perceptions of importance were high, with households agreeing that CPRs are essential for survival and would pose serious difficulties if degraded. These findings underscore that CPRs primarily support indirect livelihood benefits through grazing, fuelwood, irrigation, cultivation, medicinal plants, and other resource uses.

The statistical evidence supports the alternative hypothesis that CPRs significantly contribute to household livelihoods in Ladakh's border villages. The degree of contribution varies according to landholding, education, community group, village, and tehsil, highlighting the socio-economic and ecological significance of CPRs in sustaining livelihoods in these fragile environments. The findings emphasize the need for policies that protect, manage, and sustainably utilize CPRs to ensure continued livelihood security for the local population.

## 5.6 Conclusion

The current chapter presented a detailed analysis of the socio-economic profile of households, the types and usage of common property resources (CPRs), and their contribution to livelihoods in the border villages of Ladakh. The findings highlight the intertwined nature of household characteristics, resource availability, utilization patterns, and livelihood dependence in a geographically and ecologically fragile context.

The socio-economic analysis revealed that the households in the study area are predominantly male-headed (98.4%), with agriculture laborers forming the largest occupational group (43.3%). Most household heads have primary or secondary education, and seasonal migration for grazing or work is limited, reflecting localized resource dependence. Household size averages around seven members, while total landholding is modest (mean 3.91 canals), emphasizing the reliance on CPRs for sustenance. The majority of households (55.5%) fall below the poverty line, indicating that CPRs play a crucial role in supplementing income, food security, and other livelihood needs. The distribution across revenue villages, tehsils, and community groups further underscores spatial and social heterogeneity in socio-economic conditions.

The study identified multiple types of CPRs available in the villages, including pastures, water resources, forests, cultivable land, medicinal plants, community storage facilities, religious and cultural commons, and rock resources. Water resources and religious/cultural commons are nearly universal, while forests and medicinal plants are more variably available. Usage frequency analysis shows that water resources and religious/cultural commons are heavily utilized on a daily basis, whereas pastures, cultivable land, and medicinal plants are used seasonally. ANOVA results indicate significant differences in utilization across villages for most CPRs, reflecting variations in availability, local management practices, and socio-cultural preferences.

The contribution of CPRs to household livelihoods is substantial. CPRs were ranked highly in importance for household sustenance, with utilization indices reflecting a strong reliance for grazing, irrigation, cultivation, firewood, medicinal plants, and, to a lesser extent, fishing and tourism. Although direct income generation from CPRs is limited (3.3% of households), indirect contributions to livelihood, employment, and subsistence are critical. Perception data highlights that households recognize CPRs as essential for survival, with significant dependency growth over the last decade.

The computed average utilization indices demonstrate variations across villages, tehsils, community groups, education levels, and landholding sizes. Shina and Balti communities, and villages such as Mushkoo and Kaksar, exhibit higher utilization compared to Dard and Darchik, reflecting differential access, cultural practices, and resource endowments. Education of household heads positively correlates with CPR utilization, indicating that awareness and knowledge influence sustainable use. Tehsil-level analysis shows higher utilization in Drass compared to Kargil, emphasizing spatial disparities in resource dependence. Correlation analysis confirms a significant positive relationship between total landholding and CPR utilization, while household size, gender, and age are not significant determinants. These results collectively affirm that CPRs are central to livelihoods and household well-being, particularly in areas with limited arable land and employment opportunities.

The chapter shows that CPRs in Ladakh's border villages are not only critical ecological assets but also socio-economic lifelines that support subsistence, enhance resilience, and maintain cultural identity. The utilization and dependency on CPRs are shaped by household socio-economic characteristics, community affiliation, village location, and tehsil, emphasizing the need for context-specific governance, management, and policy interventions.

# CHAPTER VI

# INSTITUTIONAL GOVERNANCE OF COMMON PROPERTY RESOURCES IN BORDER VILLAGES


6.1 Introduction

6.2 Institutional Background

6.3 Politics of Engagement

6.3.1 PEI Index

6.4 Hypothesis Testing

6.5 Conclusion

# CHAPTER VI
# INSTITUTIONAL GOVERNANCE OF COMMON PROPERTY RESOURCES IN BORDER VILLAGES

## 6.1 Introduction

The previous chapter examined the patterns of access, utilization, and contribution of Common Property Resources (CPRs) to household livelihoods, highlighting their indispensable role in sustaining the socio-economic fabric of border communities. The findings revealed that CPRs such as grazing lands, forests, water bodies, and community pastures continue to provide vital support to rural households, particularly those with limited private assets. Variations in the utilization of CPRs across villages, community groups, and socio-economic categories highlighted the deep interlinkages between resource use and local ecological as well as social contexts. However, the efficiency and equity of CPR utilization are often shaped not only by ecological factors but also by the institutional and governance structures that regulate access, management, and conservation.

Building upon these findings, the present chapter focuses on the institutional governance of CPRs in the border villages, where the governance is uniquely influenced by the coexistence of traditional community-based systems, formal administrative frameworks, and military or border-related controls. In such regions, resource management practices are deeply embedded within a complex web of customary norms, state regulations, and security imperatives, which collectively determine the sustainability and inclusiveness of resource governance. Traditional village institutions often continue to play a significant role in the allocation and maintenance of CPRs, while government departments, panchayats, and development agencies introduce formal mechanisms for regulation and conservation. Simultaneously, the strategic significance of border areas introduces another layer of control through the presence of the military, which can affect access, land use, and community interactions with the commons.

This chapter, therefore, tries to analyze the governance structures of CPRs with a particular focus on how these diverse institutional actors interact, complement, or conflict with each other in the management of common resources. It explores the role of customary authorities, the functioning of formal administrative bodies, and the influence of military and border politics in shaping local governance outcomes. Through this analysis, the chapter aims to reveal the nature of institutional pluralism in CPR governance and its implications for

resource sustainability, community participation, and livelihood security in the fragile socio-political environment of the border region.

## 6.2 Institutional Background of CPR Governance

The governance of Common Property Resources (CPRs) in the border villages of Kargil district operates within a complex mosaic of institutional arrangements that blend customary traditions, administrative interventions, and security-related controls. Historically, CPRs such as pastures, forests, water bodies, and common lands were managed through community-based norms and collective decision-making led by traditional village councils and local elders. These indigenous systems evolved from generations of interdependence and mutual trust, ensuring equitable access and sustainable use of shared resources. However, with the introduction of modern administrative structures, changing land tenure systems, and the growing influence of state institutions, the governance of CPRs has undergone significant transformation.

In the context of border regions, institutional arrangements are further shaped by the presence of military establishments and border politics, which influence accessibility, usage rights, and conservation practices. The dual influence of traditional and formal institutions often results in overlapping jurisdictions, coordination gaps, and variations in rule enforcement. Knowing the institutional background of CPR governance is therefore essential to comprehend how local communities negotiate authority, maintain customary practices, and adapt to external interventions.

Table 6.1 presents the distribution of respondents' perceptions regarding the governance and control of Common Property Resources (CPRs) before and after Ladakh's transition to Union Territory (UT) status in 2019. The findings reveal a significant institutional transformation in CPR management, highlighting the shift of authority from local and regional institutions to centralized administrative structures. Before 2019, the governance of CPRs in border villages exhibited a pluralistic pattern. Panchayats (35.9%) and the erstwhile Jammu and Kashmir (J&K) Government (35.5%) were identified as the principal managing authorities, reflecting a relatively balanced administrative arrangement between local self-governance and state control. Additionally, a notable 24.5 percent of respondents reported that village communities themselves played a central role in managing CPRs, indicating the persistence of traditional and community-based governance mechanisms. Only a small proportion (4.1%)

recognized the Hill Council as the primary authority, suggesting its limited influence at the village level during the pre-UT period.

However, since Ladakh became a Union Territory, the governance dynamics have altered considerably. A large majority of respondents (86.5%) reported that local control over CPRs has weakened, while only 1.6 percent perceived any strengthening of local governance. This perception highlights the growing centralization of authority and the marginalization of community-based decision-making structures in the post-UT context. Moreover, 7.8 percent of households felt that no major change had occurred, and 4.1 percent were uncertain about the governance shifts, possibly reflecting limited awareness or engagement in institutional affairs.

Under the current UT administrative setup, the Union Territory Administration now emerges as the dominant governing body, with 62.4 percent of respondents identifying it as the primary authority over CPRs. The Ladakh Autonomous Hill Development Council (LAHDC) and Village Councils are recognized by 18.4 percent and 18 percent of respondents respectively, suggesting that while some degree of decentralized participation persists, it remains secondary to the overarching control of the UT administration. The role of the military in CPR management appears minimal (1.2%), although its influence is indirect through land use restrictions and security-related regulations in border zones.

**Table 6.1 Shifts in Institutional Authority and Governance of Common Property Resources Before and After Ladakh's Union Territory Status**

| Shifts in Institutional Authority and Governance of CPRs | Category | Frequency | Percent |
|---|---|---|---|
| Before Ladakh became a UT in 2019: Primarily Controlled CPRs in Village | Hill Council | 10 | 4.1 |
| | J&K Government | 87 | 35.5 |
| | Panchayat | 88 | 35.9 |
| | Village community | 60 | 24.5 |
| Since 2019 (UT status), Changes in governance of CPRs | No change | 19 | 7.8 |
| | Not sure | 10 | 4.1 |
| | Strengthened local control | 4 | 1.6 |
| | Weakened local control | 212 | 86.5 |
| Current authority over CPRs in village under UT system | LAHDC | 45 | 18.4 |
| | Military | 3 | 1.2 |
| | UT Administration | 153 | 62.4 |
| | Village Council | 44 | 18.0 |
| Total | | 245 | 100.0 |

*Source: Primary Survey, 2025*

Table 6.2 illustrates the contemporary structure of governance and administrative practices influencing Common Property Resources (CPRs) in the border villages of Ladakh under the Union Territory (UT) administration. The data reveal a distinct pattern of centralized control, where bureaucratic and official mechanisms have increasingly replaced traditional, community-based forms of management. In terms of enforcement of CPR rules, more than half of the respondents (58.4%) identified UT officials as the primary enforcing authority, indicating a consolidation of administrative power at the territorial level. Nevertheless, village elders still play a notable role, with 37.6 percent acknowledging their involvement, which reflects the persistence of customary practices and traditional authority in local governance. Only a small fraction attributed enforcement responsibilities to LAHDC (2.0%) and the Revenue Department (2.0%), suggesting their limited operational role in daily resource management.

The impact of UT policies on access to CPRs shows a predominantly negative perception. About 44.5 percent of respondents reported no significant change, while 34.3 percent and 18.0 percent felt that access had somewhat or strongly decreased, respectively. This trend indicates that administrative restructuring under the UT regime have inadvertently restricted local use and autonomy over CPRs. Very few households perceived improvements only 3.2 percent reported an increase in access signifying widespread concern over diminishing community control. Regarding dispute resolution, the data demonstrate a bureaucratic dominance. UT officials (35.1%) and Revenue Departments (26.1%) are the leading institutions handling CPR-related conflicts, followed by village councils (24.9%). The involvement of traditional or religious authorities has nearly disappeared, with only negligible representation (less than 2%). This finding suggests that the formal administrative framework has largely absorbed the conflict resolution functions once managed at the community level.

Finally, when examining decision-making authority for CPR-related projects, an overwhelming 85.3 percent of respondents identified the UT Administration as the decisive actor, compared to only 14.7 percent who cited local community institutions. This indicates a clear shift away from participatory governance toward top-down policy implementation, reducing the scope for local voices in environmental and livelihood-related decisions. It highlights the institutional centralization and bureaucratic dominance that have emerged under the UT administration, often at the expense of traditional governance mechanisms and community participation in CPR management.

**Table 6.2 Administrative Enforcement, Policy Impact, and Institutional Decision-Making in CPR Governance under UT Administration**

| | Category | Frequency | Percent |
|---|---|---|---|
| Institutional Responsibility for Enforcement of CPR Rules | LAHDC | 5 | 2.0 |
| | Revenue department | 5 | 2.0 |
| | UT officials | 143 | 58.4 |
| | Village elders | 92 | 37.6 |
| Perceived Impact of UT Policies on Household Access to CPRs | No change in access | 109 | 44.5 |
| | Somewhat decreased | 84 | 34.3 |
| | Somewhat increased | 5 | 2.0 |
| | Strongly decreased | 44 | 18.0 |
| | Strongly increased | 3 | 1.2 |
| Institutional Mechanisms for CPR Dispute Resolution | Courts | 23 | 9.4 |
| | Family Heads | 4 | 1.6 |
| | Goba | 1 | .4 |
| | No dispute | 4 | 1.6 |
| | Religious leaders | 2 | .8 |
| | Revenue departments | 64 | 26.1 |
| | UT officials | 86 | 35.1 |
| | Village council | 61 | 24.9 |
| Authority in Decision-Making for CPR Development Projects | Local community institutions | 36 | 14.7 |
| | UT Administration | 209 | 85.3 |
| Total | | 245 | 100.0 |

*Source: Primary Survey, 2025*

Table 6.3 presents the perceptions of villagers regarding the institutional governance of Common Property Resources (CPRs) in border villages, focusing on three key aspects: trust in LAHDC as a protector of CPR rights, perceived administrative power of LAHDC, and the nature of agreements regulating CPR use. The first component, Community Trust in LAHDC as a Protector of CPR Rights, reveals a significant level of skepticism among respondents. Nearly half of the households (47.3%) reported that they do not trust LAHDC to protect CPR rights, while only 18.8% expressed complete trust. About a quarter (25.7%) indicated partial trust, and 8.2% were unsure. This highlights a critical gap between local expectations and administrative credibility, suggesting that LAHDC's legitimacy as a protector of community

resources is perceived as limited. The second component, Perceived Administrative Power of LAHDC in Managing CPRs, further highlights villagers' doubts about institutional efficacy. A majority (62.4%) of respondents felt that LAHDC lacks adequate power to manage CPRs effectively, 18.8% were uncertain, and only 18.8% believed that the administration has sufficient authority. This indicates that, despite formal institutional frameworks, villagers perceive a deficit in practical administrative control over resource governance, which could impact compliance, enforcement, and participatory decision-making. The third component, Nature of Agreements Governing Common Property Resource Use, shows the forms of institutional arrangements that regulate CPR access. Written agreements were the most common (46.1%), followed by combined written and oral agreements (31.0%), while 20.8% reported no formal agreements, and only 2.0% relied solely on oral arrangements. This mix of formal and informal governance mechanisms suggests that while formal rules exist, local traditions and informal practices continue to play a substantial role in CPR management. It illustrates that governance of CPRs in these border villages is shaped by limited trust in administrative institutions, perceived weaknesses in authority, and a combination of formal and informal agreements.

**Table 6.3 Community Trust, Administrative Authority, and Institutional Agreements in CPR Governance**

| Components | Category | Frequency | Percent |
|---|---|---|---|
| Community Trust in LAHDC as a Protector of CPR Rights | Don't know | 20 | 8.2 |
| | No | 116 | 47.3 |
| | Partially | 63 | 25.7 |
| | Yes completely | 46 | 18.8 |
| Perceived Administrative Power of LAHDC in Managing CPRs | No | 153 | 62.4 |
| | Not Sure | 46 | 18.8 |
| | Yes | 46 | 18.8 |
| Nature of Agreements Governing Common Property Resource Use | Both | 76 | 31.0 |
| | None | 51 | 20.8 |
| | Oral | 5 | 2.0 |
| | Written | 113 | 46.1 |
| Total | | 245 | 100.0 |

*Source: Primary Survey, 2025*

**Table 6.4 Participation, Inclusiveness, and Transparency in CPR Governance under UT Administration**

| Components | Category | Frequency | Percent |
|---|---|---|---|
| Community Participation in Decision-Making | Always | 11 | 4.5 |
| | Frequently | 24 | 9.8 |
| | Never | 97 | 39.6 |
| | Rarely | 37 | 15.1 |
| | Sometimes | 76 | 31.0 |
| Impact of Military Presence on CPR Access | Not Changed | 74 | 30.2 |
| | Changed | 171 | 69.8 |
| Involvement of Women and Youth in Governance | Not Involved | 196 | 80.0 |
| | Involved | 49 | 20.0 |
| Transparency of CPR Decisions | Completely | 5 | 2.0 |
| | Mostly | 46 | 18.8 |
| | Moderately | 43 | 17.6 |
| | Slightly | 41 | 16.7 |
| | Not at all | 110 | 44.9 |
| Total | | 245 | 100.0 |

*Source: Primary Survey, 2025*

Table 6.4 examines villagers' perceptions of participation, inclusiveness, and transparency in the governance of Common Property Resources (CPRs) under the Union Territory administration. The first component, Community Participation in Decision-Making, indicates a substantial gap between institutional intent and villagers' perception of engagement. Only 4.5% of respondents felt that their voices are "always" heard, and 9.8% indicated "frequently." In contrast, a significant proportion 39.6% reported that their voices are "never" considered, while 15.1% said "rarely," and 31% said "sometimes." This clearly reflects limited community involvement in formal decision-making processes, which could undermine the legitimacy and effectiveness of governance. The second component, Impact of Military Presence on CPR Access, shows that military activities have a pronounced effect on resource accessibility. A majority of respondents (69.8%) reported that CPR access has changed due to military presence, while only 30.2% felt there was no change. This highlights the influence of strategic and security considerations on the management and utilization of local resources in border villages. Involvement of Women and Youth in Governance, reveals that participation is highly skewed. Only 20% of respondents confirmed the involvement of women and youth in CPR governance, whereas a vast majority (80%) indicated their exclusion. This suggests that governance structures remain largely patriarchal and age-biased, limiting the inclusivity of

decision-making. With regards to transparency of CPR Decisions is found to be very low. Only 2% of respondents considered decision-making "completely" transparent, 18.8% "mostly" transparent, and 17.6% "moderately" transparent. A substantial proportion, 44.9%, reported that decisions are "not at all" transparent, highlighting serious deficiencies in accountability and openness in the governance system. So it reflects that CPR governance under the UT administration is characterized by limited participation, minimal inclusion of women and youth, restricted transparency, and considerable influence from military presence.

Table 6.5 presents the community's perception of changes in Common Property Resources (CPRs) over the past decade, along with reasons for these changes, inter-authority dynamics, and shifts in household dependency Considering, changes in CPR Availability, shows that a substantial majority (89%) of respondents perceive a decrease in CPR availability, while only 2% reported an increase and 9% indicated no change. This highlights a worrying trend of resource degradation over the past ten years, signaling environmental stress and overexploitation. For the Reasons for Decrease in CPR Availability, respondents identified multiple contributing factors. Military activity (77.1%), climate change (74.3%), and population pressure (73.4%) emerged as the leading causes of resource decline. Government restrictions (59.2%), tourism pressure (12.4%), and overgrazing (11%) were also noted, alongside other minor factors (19.3%). These findings indicate that CPR degradation is driven by a combination of natural, demographic, economic, and political pressures, reflecting the complex interplay of environmental and institutional factors in border villages. With regards to Inter-Authority Cooperation and Conflict, reveals weak coordination among governing bodies. Only 18.4% of respondents observed that authorities "mostly cooperate," while 13.1% reported "mostly conflict," and 24.1% said authorities "sometimes cooperate." A significant portion (33.9%) indicated "no interaction," and 10.6% were unsure. This fragmented governance framework exacerbate the challenges of CPR management, as overlapping authority and lack of cooperation reduce efficiency and hinder sustainable use. Finally, Change in Household Dependency on CPRs reflects the socio-economic impact of resource changes. While 40% of households reported no change in dependency, 26.5% indicated a "somewhat decreased" reliance, and 12.2% reported a "strongly decreased" dependency. Conversely, 14.7% noted a "somewhat increased" dependency, and 6.5% a "strongly increased" dependency, suggesting that despite declining resources, some households have become more reliant on CPRs, likely due to limited alternatives for livelihood and sustenance. Findings highlights the significant reduction in CPR availability, the multifaceted causes behind this

decline, weak coordination among governing authorities, and shifting household reliance on these resources.

**Table 6.5 Changes in CPR Availability, Management Conflicts, and Household Dependency Over the Last Decade**

| Components | Category | Frequency | Percent |
|---|---|---|---|
| Changes in CPR availability in last 10 years | Decrease | 218 | 89.0 |
| | Increase | 5 | 2.0 |
| | No Change | 22 | 9.0 |
| Reasons for Decrease in CPR Availability (N=218) | Climate change | 162 | 74.3 |
| | Overgrazing | 24 | 11.0 |
| | Population pressure | 160 | 73.4 |
| | Tourism | 27 | 12.4 |
| | Military activity | 168 | 77.1 |
| | Govt restrictions | 129 | 59.2 |
| | Others | 42 | 19.3 |
| Inter-Authority Cooperation and Conflict | Don’t know | 26 | 10.6 |
| | Mostly conflict | 32 | 13.1 |
| | Mostly cooperate | 45 | 18.4 |
| | No interaction | 83 | 33.9 |
| | Sometimes cooperate | 59 | 24.1 |
| Change in Household Dependency on CPRs over the last 10 years | No change | 98 | 40.0 |
| | Somewhat decreased | 65 | 26.5 |
| | Somewhat increased | 36 | 14.7 |
| | Strongly decreased | 30 | 12.2 |
| | Strongly increased | 16 | 6.5 |
| Total | | 245 | 100.0 |

*Source: Primary Survey, 2025*

Table 6.6 presents the community perceptions regarding institutional governance and management of Common Property Resources (CPRs) in border villages of Ladakh following the region’s transition to Union Territory status in 2019. Under Governance Changes Since UT Status, respondents generally rated improvements in CPR governance low, with mean scores ranging from 2.00 to 2.25 on a 5-point scale. This suggests that villagers perceive minimal improvement in the responsiveness, inclusivity, and transparency of CPR governance since the administrative shift. The relatively low mean indicates that despite the change in political-

administrative status, local voices have not significantly strengthened, and transparency in rules and policies remains limited.

With regards to the Role and Authority of Institutions component, the UT administration received the highest mean score (3.75), indicating that respondents acknowledge its capacity and resources to manage CPRs. The military was also rated moderately high (3.45), reflecting a recognition of its compliance with local CPR rights. However, traditional and community-based institutions such as Village Councils/Goba (2.70) and LAHDC (2.29) were perceived as less effective, highlighting a shift in authority away from local governance structures toward formal administrative bodies. Religious or traditional authorities were seen as moderately important (2.43) for ensuring fair CPR use.

For Enforcement and Trust, perceptions were mixed. The application of CPR rules fairly to all members had a relatively high mean (3.87), showing some confidence in rule enforcement. However, consistency of enforcement (2.30) and trust in LAHDC (2.87) were lower, suggesting gaps in community confidence in institutional oversight. Dispute resolution scored moderately high (3.64), indicating that while disputes are often addressed, enforcement and trust issues remain.

In terms of Participation and Inclusiveness in Governance, villagers expressed low to moderate perceptions of their own involvement (2.59), women and youth participation (2.48), transparency (2.28), and NGO engagement (1.92). This reflects limited community participation and inclusiveness in decision-making processes related to CPRs, pointing to a governance structure that is perceived as top-down and centralized.

Finally, the Perceptions of Change Over Time component shows that villagers see only slight improvements in inclusiveness (2.55) and accountability (2.42), and overall satisfaction with CPR governance is relatively low (2.40). This suggests that while some institutional mechanisms exist, community expectations regarding participatory and accountable governance are largely unmet. It highlights that although formal institutions like the UT administration possess resources and authority to manage CPRs, local community engagement, trust, and transparency remain limited. Traditional institutions and NGOs play only a marginal role, and villagers perceive the shift to UT governance as having minimal impact on improving the participatory and accountable management of CPRs in border villages.

**Table 6.6 Community Perceptions on Institutional Governance and Effectiveness of CPR Management Post-2019**

| | Statements | Min | Max | Mean | SD |
|---|---|---|---|---|---|
| Governance changes since UT status (post-2019) | Since Ladakh became a Union Territory, the governance of CPRs in my village has improved. | 1.0 | 5.0 | 2.15 | 1.23 |
| | The shift from J&K to UT administration has strengthened local voices in CPR management. | 1.0 | 5.0 | 2.01 | 1.25 |
| | The current UT administration is more responsive to villagers' needs regarding CPRs compared to the previous system. | 1.0 | 5.0 | 2.00 | 1.25 |
| | The creation of Ladakh UT has made CPR rules and policies more transparent. | 1.0 | 5.0 | 2.25 | 1.35 |
| Role and authority of institutions | The Village Council/Goba has adequate authority to manage CPRs effectively. | 1.0 | 5.0 | 2.70 | 1.64 |
| | LAHDC (Kargil/Leh) plays a positive role in protecting community rights over CPRs. | 1.0 | 5.0 | 2.29 | 1.13 |
| | The UT administration has sufficient power and resources to manage CPRs properly. | 1.0 | 5.0 | 3.75 | 1.35 |
| | The military presence respects local CPR rights and governance structures. | 1.0 | 5.0 | 3.45 | 1.11 |
| | Religious or traditional authorities are important for maintaining fair CPR usage. | 1.0 | 5.0 | 2.43 | 1.34 |
| Enforcement and trust | The rules governing CPR use are applied fairly to all community members. | 1.0 | 5.0 | 3.87 | 1.13 |
| | Villagers generally trust LAHDC as a protector of CPR rights. | 1.0 | 5.0 | 2.87 | 1.52 |
| | Enforcement of CPR rules is consistent and effective. | 1.0 | 5.0 | 2.30 | 1.20 |
| | Disputes over CPR use are resolved fairly under the current system. | 1.0 | 5.0 | 3.64 | 1.42 |
| Participation and inclusiveness in governance | Villagers feel their voices are heard in CPR-related decision-making. | 1.0 | 5.0 | 2.59 | 1.60 |
| | Women and youth have equal opportunities to participate in CPR governance. | 1.0 | 5.0 | 2.48 | 1.51 |
| | CPR governance meetings and decisions are conducted in a transparent manner. | 1.0 | 5.0 | 2.28 | 1.22 |
| | NGOs and civil society organizations strengthen community voice in CPR governance. | 1.0 | 5.0 | 1.92 | 1.26 |
| Perceptions of change over time | CPR governance in my village has become more inclusive. | 1.0 | 5.0 | 2.55 | 1.54 |
| | CPR governance has become more accountable. | 1.0 | 5.0 | 2.42 | 1.49 |
| | Overall, I am satisfied with how CPRs are governed in my village today. | 1.0 | 5.0 | 2.40 | 1.47 |

*Note: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree:*
*Source: Primary Survey, 2025*

Table 6.7 presents the average community perceptions of institutional governance and management of Common Property Resources (CPRs) across five revenue villages in Ladakh, covering five dimensions: Governance Changes Since UT Status, Role and Authority of Institutions, Enforcement and Trust, Participation and Inclusiveness, and Perceptions of Change Over Time. Each dimension is measured as the average of responses to multiple statements, and ANOVA results indicate statistically significant differences across villages in all dimensions (p=0.000).

Under Governance Changes Since UT Status, Mushkoo (mean = 2.91) and Shilikchay (2.73) reported relatively higher perceived improvements, while Darchik (1.00) and Kaksar (1.01) reported almost no improvement. This indicates that some villages perceive moderate positive effects from the administrative shift, while others, especially more remote or smaller villages, experience little change. For Role and Authority of Institutions, Mushkoo (3.23) and Shilikchay (3.22) rated institutional authority higher, reflecting stronger recognition of effective management by UT administration, LAHDC, and local governance bodies. Darchik (2.46) and Kaksar (2.61) perceived institutional roles as weaker, indicating variations in institutional effectiveness and reach across villages. In Enforcement and Trust, Kaksar (3.85) showed the highest confidence in fair rule enforcement and dispute resolution, whereas Darchik (2.84) and Mushkoo (3.02) reported moderate trust. These differences highlight local disparities in how consistent and reliable institutional enforcement is perceived to be. Participation and Inclusiveness scores were low in Darchik (1.00) and Kaksar (1.00), suggesting negligible involvement of villagers, women, and youth in CPR governance. Mushkoo (3.30) and Hardas (2.90) reported moderate participation, indicating that governance structures allowing community involvement are not uniform across villages. Lastly, in Perceptions of Change Over Time, Mushkoo (4.10) reflected the highest positive perception of improvements in accountability, inclusiveness, and overall satisfaction, whereas Darchik (1.00) and Kaksar (1.02) reported almost no positive change over the past decade. This shows that long-term satisfaction with CPR governance is highly uneven, strongly influenced by local context and possibly geographic or socio-political factors. It demonstrates that while some villages perceive improvements in governance, enforcement, and participation post-UT formation, others report minimal change. These variations highlight the uneven impact of institutional reforms.

**Table 6.7 Revenue Village-wise Community Perceptions on Institutional Governance and CPR Management Post-UT Status**

| Community Perceptions* | Revenue Villages | N | Mean | Std. Deviation | Std. Error | ANOVA |
|---|---|---|---|---|---|---|
| Governance changes since UT status | Darchik | 27 | 1.00 | 0.00 | 0.00 | F (4,240) = 51.499, p=0.000 |
| | Hardas | 86 | 2.50 | 1.12 | 0.12 | |
| | Kaksar | 54 | 1.01 | 0.06 | 0.01 | |
| | Mushkoo | 29 | 2.91 | 0.46 | 0.09 | |
| | Shilikchay | 49 | 2.73 | 1.12 | 0.16 | |
| | Total | 245 | 2.10 | 1.15 | 0.07 | |
| Role and authority of institutions | Darchik | 27 | 2.46 | 0.22 | 0.04 | F (4,240) = 10.813, p=0.000 |
| | Hardas | 86 | 2.99 | 0.65 | 0.07 | |
| | Kaksar | 54 | 2.61 | 0.17 | 0.02 | |
| | Mushkoo | 29 | 3.23 | 0.58 | 0.11 | |
| | Shilikchay | 49 | 3.22 | 1.07 | 0.15 | |
| | Total | 245 | 2.92 | 0.70 | 0.04 | |
| Enforcement and trust | Darchik | 27 | 2.84 | 0.37 | 0.07 | F (4,240) = 13.814, p=0.000 |
| | Hardas | 86 | 2.92 | 0.89 | 0.10 | |
| | Kaksar | 54 | 3.85 | 0.54 | 0.07 | |
| | Mushkoo | 29 | 3.02 | 0.45 | 0.08 | |
| | Shilikchay | 49 | 3.14 | 1.13 | 0.16 | |
| | Total | 245 | 3.17 | 0.88 | 0.06 | |
| Participation and inclusiveness | Darchik | 27 | 1.00 | 0.00 | 0.00 | F (4,240) = 98.899, p=0.000 |
| | Hardas | 86 | 2.90 | 0.89 | 0.10 | |
| | Kaksar | 54 | 1.00 | 0.00 | 0.00 | |
| | Mushkoo | 29 | 3.30 | 0.49 | 0.09 | |
| | Shilikchay | 49 | 2.89 | 1.08 | 0.15 | |
| | Total | 245 | 2.32 | 1.19 | 0.08 | |
| Perceptions of change over time | Darchik | 27 | 1.00 | 0.00 | 0.00 | F (4,240) = 80.988, p=0.000 |
| | Hardas | 86 | 2.90 | 1.22 | 0.13 | |
| | Kaksar | 54 | 1.02 | 0.09 | 0.01 | |
| | Mushkoo | 29 | 4.10 | 0.50 | 0.09 | |
| | Shilikchay | 49 | 3.09 | 1.26 | 0.18 | |
| | Total | 245 | 2.46 | 1.42 | 0.09 | |

** Averages of each statements come under the each dimensions: Source: Primary Survey, 2025*

Table 6.8 compares community perceptions of CPR governance across the two tehsils, Drass and Kargil, using independent sample t-tests to assess statistically significant differences. In terms of Governance Changes Since UT Status, Drass residents reported a significantly higher mean score (2.90) than Kargil (2.00), indicating that communities in Drass perceive a more positive change in governance after the UT formation ($t(75.54) = 7.425$, $p = 0.000$). For the Role and Authority of Institutions, Drass (3.24) also scored higher than Kargil (2.88),

showing that institutions in Drass are perceived as more effective and authoritative in managing CPRs (t(243) = 2.486, p = 0.014). In Enforcement and Trust, both tehsils reported comparable perceptions, with Drass at 3.06 and Kargil at 3.19; the difference was not statistically significant (t(59.20) = -1.240, p = 0.220), suggesting that trust and enforcement consistency are relatively uniform across tehsils. The Participation and Inclusiveness dimension highlights the most pronounced disparity: Drass scored 3.29 while Kargil scored only 2.20, indicating significantly higher community involvement in governance decisions in Drass (t(69.75) = 8.581, p = 0.000). This suggests that Drass villagers, including women and youth, are better integrated into decision-making processes than their Kargil counterparts. Lastly, in Perceptions of Change Over Time, Drass respondents reported the highest mean (4.07) compared to Kargil (2.26), showing a strong perception of positive changes in inclusiveness, accountability, and satisfaction over the past decade (t(87.70) = 13.593, p = 0.000). It reveals that Drass residents consistently perceive better governance, institutional effectiveness, and community participation compared to Kargil. These differences is reflect geographic, socio-political, and administrative factors that influence the effectiveness and responsiveness of CPR governance in border villages.

**Table 6.8 Community Perceptions of Institutional Governance of CPRs by Tehsil**

| Community Perceptions* | Tehsil | N | Mean | Std. Deviation | Std. Error | Independent Sample t-test |
|---|---|---|---|---|---|---|
| Governance changes since UT status | Drass | 27 | 2.90 | 0.47 | 0.09 | t (75.54)$^{\#}$= 7.425, p= 0.000 |
| | Kargil | 218 | 2.00 | 1.17 | 0.08 | |
| | Total | 245 | 2.10 | 1.15 | 0.07 | |
| Role and authority of institutions | Drass | 27 | 3.24 | 0.60 | 0.12 | t (243)= 2.486, p= 0.014 |
| | Kargil | 218 | 2.88 | 0.71 | 0.05 | |
| | Total | 245 | 2.92 | 0.70 | 0.04 | |
| Enforcement and trust | Drass | 27 | 3.06 | 0.44 | 0.08 | t (59.20) $^{\#}$= -1.240, p= 0.220 |
| | Kargil | 218 | 3.19 | 0.91 | 0.06 | |
| | Total | 245 | 3.17 | 0.88 | 0.06 | |
| Participation and inclusiveness | Drass | 27 | 3.29 | 0.51 | 0.10 | t (69.75) $^{\#}$= 8.581, p= 0.000 |
| | Kargil | 218 | 2.20 | 1.19 | 0.08 | |
| | Total | 245 | 2.32 | 1.19 | 0.08 | |
| Perceptions of change over time | Drass | 27 | 4.07 | 0.50 | 0.10 | t (87.70) $^{\#}$= 13.593, p= 0.000 |
| | Kargil | 218 | 2.26 | 1.37 | 0.09 | |
| | Total | 245 | 2.46 | 1.42 | 0.09 | |

** Averages of each statements come under the each dimensions: $^{\#}$ Equal variances not Assumed; Source: Primary Survey, 2025*

Table 6.9 presents the perceptions of CPR governance across four main ethnic communities: Balti, Dard, Purig, and Shina. Regarding Governance Changes Since UT Status, the Balti community reported the highest mean (2.66), followed by Purig (2.34) and Shina (1.68), while Dard respondents perceived no change (1.00). The ANOVA ($F(3,241) = 31.292$, $p = 0.000$) confirms that these differences are statistically significant. This indicates that Balti and Purig communities feel a positive shift in governance, whereas the Dard community does not perceive any improvement since the UT formation. In the Role and Authority of Institutions, Balti and Purig communities again scored higher (3.09 each) than Dard (2.48) and Shina (2.83). This suggests that Balti and Purig respondents perceive institutional authorities, including Village Council and LAHDC, as more capable and authoritative in managing CPRs compared to other communities (ANOVA $F(3,241) = 7.562$, $p = 0.000$). The Enforcement and Trust dimension shows that the Shina community has the highest mean score (3.56), indicating stronger confidence in rule enforcement and trust in institutions compared to Balti (3.01), Purig (2.91), and Dard (2.86). These differences are significant ($F(3,241) = 9.218$, $p = 0.000$), suggesting community-specific variations in trust and compliance perceptions.

For Participation and Inclusiveness, Balti respondents reported the highest involvement (2.98), followed by Purig (2.75) and Shina (1.80), while Dard respondents reported no participation (1.00). The ANOVA result ($F(3,241) = 48.529$, $p = 0.000$) highlights significant disparities in inclusiveness across communities, reflecting that some groups, particularly Dard and Shina, have limited engagement in governance processes.

Finally, in Perceptions of Change Over Time, the Balti community (3.05) perceived the most positive change, followed by Purig (2.76) and Shina (2.10), whereas the Dard community again reported no change (1.00). This indicates that the impact of the UT formation on inclusiveness, accountability, and satisfaction with CPR governance is uneven across ethnic groups ($F(3,241) = 25.849$, $p = 0.000$). It highlights substantial community-level differences in perceptions of governance, authority, trust, participation, and satisfaction. Balti and Purig communities generally report higher awareness, participation, and satisfaction with CPR governance, while Dard and Shina communities face challenges in institutional inclusion and governance recognition.

**Table 6.9 Community Perceptions of CPR Governance Across Different Ethnic Groups**

| Community Perceptions* | Community | N | Mean | Std. Deviation | Std. Error | ANOVA |
|---|---|---|---|---|---|---|
| Governance changes since UT status | Balti, | 120 | 2.66 | 1.12 | 0.10 | F (3,241) = 31.292, p=0.000 |
| | Dard | 31 | 1.00 | 0.00 | 0.00 | |
| | Purig | 11 | 2.34 | 0.89 | 0.27 | |
| | Shina | 83 | 1.68 | 0.95 | 0.10 | |
| | Total | 245 | 2.10 | 1.15 | 0.07 | |
| Role and authority of institutions | Balti, | 120 | 3.09 | 0.83 | 0.08 | F (3,241) = 7.562, p=0.000 |
| | Dard | 31 | 2.48 | 0.21 | 0.04 | |
| | Purig | 11 | 3.09 | 0.96 | 0.29 | |
| | Shina | 83 | 2.83 | 0.47 | 0.05 | |
| | Total | 245 | 2.92 | 0.70 | 0.04 | |
| Enforcement and trust | Balti, | 120 | 3.01 | 1.01 | 0.09 | F (3,241) = 9.218, p=0.000 |
| | Dard | 31 | 2.86 | 0.35 | 0.06 | |
| | Purig | 11 | 2.91 | 0.98 | 0.29 | |
| | Shina | 83 | 3.56 | 0.65 | 0.07 | |
| | Total | 245 | 3.17 | 0.88 | 0.06 | |
| Participation and inclusiveness | Balti, | 120 | 2.98 | 0.90 | 0.08 | F (3,241) = 48.529, p=0.000 |
| | Dard | 31 | 1.00 | 0.00 | 0.00 | |
| | Purig | 11 | 2.75 | 1.02 | 0.31 | |
| | Shina | 83 | 1.80 | 1.14 | 0.13 | |
| | Total | 245 | 2.32 | 1.19 | 0.08 | |
| Perceptions of change over time | Balti, | 120 | 3.05 | 1.22 | 0.11 | F (3,241) = 25.849, p=0.000 |
| | Dard | 31 | 1.00 | 0.00 | 0.00 | |
| | Purig | 11 | 2.76 | 0.92 | 0.28 | |
| | Shina | 83 | 2.10 | 1.51 | 0.17 | |
| | Total | 245 | 2.46 | 1.42 | 0.09 | |

** Averages of each statements come under the each dimensions: Source: Primary Survey, 2025*

Table 6.10 presents the perceptions of CPR governance across households categorized by their ration card status: Above Poverty Line (APL), Antyodaya Anna Yojana (AAY), Below Poverty Line (BPL), and Priority Household (PHH). Regarding Governance Changes Since UT Status, the mean scores indicate slight differences between APL (2.17) and BPL (2.04) households, with the very small AAY and PHH samples reporting higher (3.63) and lower (1.00) perceptions, respectively. The ANOVA result ($F(3,241) = 1.737$, $p = 0.160$) shows no statistically significant difference, suggesting that governance changes are perceived similarly across most socio-economic categories. In Role and Authority of Institutions, perceptions remain broadly similar across APL (2.96) and BPL (2.88) households, with AAY respondents reporting higher scores (4.00). However, the ANOVA ($F(3,241) = 2.052$, $p = 0.107$) again indicates no significant variation, implying that institutional authority is viewed consistently among households regardless of their ration card status. For Enforcement and Trust, significant

differences emerge (F(3,241) = 4.258, p = 0.006). APL households (mean = 3.37) perceive enforcement and trust more positively than BPL households (3.01), while AAY households report the highest confidence (4.00). This highlights that socio-economic status can influence perceptions of fairness and effectiveness in CPR rule enforcement. Participation and Inclusiveness scores vary modestly, with APL (2.43) and BPL (2.21) showing lower participation levels, whereas AAY respondents indicate higher involvement (4.00). The ANOVA (F(3,241) = 2.131, p = 0.097) shows these differences are not statistically significant, suggesting that participation levels are relatively uniform across most household groups. Finally, Perceptions of Change Over Time show minor differences between APL (2.53) and BPL (2.40), while AAY households perceive greater positive change (3.34).

**Table 6.10 Community Perceptions of CPR Governance by Household Ration Card Status**

| Community Perceptions* | Ration Card | N | Mean | Std. Deviation | Std. Error | ANOVA |
|---|---|---|---|---|---|---|
| Governance changes since UT status | APL | 106 | 2.17 | 1.18 | 0.11 | F (3,241) = 1.737, p=0.160 |
| | AAY | 2 | 3.63 | 0.18 | 0.13 | |
| | BPL | 136 | 2.04 | 1.12 | 0.10 | |
| | PHH | 1 | 1.00 | | | |
| | Total | 245 | 2.10 | 1.15 | 0.07 | |
| Role and authority of institutions | APL | 106 | 2.96 | 0.64 | 0.06 | F (3,241) = 2.052, p=0.107 |
| | AAY | 2 | 4.00 | 0.57 | 0.40 | |
| | BPL | 136 | 2.88 | 0.75 | 0.06 | |
| | PHH | 1 | 2.40 | | | |
| | Total | 245 | 2.92 | 0.70 | 0.04 | |
| Enforcement and trust | APL | 106 | 3.37 | 0.76 | 0.07 | F (3,241) = 4.258, p=0.006 |
| | AAY | 2 | 4.00 | 0.35 | 0.25 | |
| | BPL | 136 | 3.01 | 0.93 | 0.08 | |
| | PHH | 1 | 2.50 | | | |
| | Total | 245 | 3.17 | 0.88 | 0.06 | |
| Participation and inclusiveness | APL | 106 | 2.43 | 1.28 | 0.12 | F (3,241) = 2.131, p=0.097 |
| | AAY | 2 | 4.00 | 0.71 | 0.50 | |
| | BPL | 136 | 2.21 | 1.10 | 0.09 | |
| | PHH | 1 | 2.00 | | | |
| | Total | 245 | 2.32 | 1.19 | 0.08 | |
| Perceptions of change over time | APL | 106 | 2.53 | 1.44 | 0.14 | F (3,241) = 0.753, p=0.522 |
| | AAY | 2 | 3.34 | 1.89 | 1.34 | |
| | BPL | 136 | 2.40 | 1.41 | 0.12 | |
| | PHH | 1 | 1.00 | | | |
| | Total | 245 | 2.46 | 1.42 | 0.09 | |

** Averages of each statements come under the each dimensions: Source: Primary Survey, 2025*

The ANOVA (F(3,241) = 0.753, p = 0.522) confirms no significant variation among groups, indicating that long-term perceptions of governance evolution are largely similar across

socio-economic categories. It indicates that socio-economic status, as measured through ration card ownership, has limited impact on overall perceptions of CPR governance, except for enforcement and trust, where disparities are notable. This suggests that governance structures and institutional roles are generally perceived in a similar manner by most households, although the most disadvantaged (AAY) perceive greater improvements in authority and enforcement.

**Table 6.11 Correlation between Community Perceptions of CPR Governance and Utilization Index of CPRs**

| **Community Perceptions*** | | **Utilization of CPRs Index** |
|---|---|---|
| Governance changes since UT status | Pearson Correlation | .361** |
| | Sig. (2-tailed) | .000 |
| | N | 245 |
| Role and authority of institutions | Pearson Correlation | .281** |
| | Sig. (2-tailed) | .000 |
| | N | 245 |
| Enforcement and trust | Pearson Correlation | .277** |
| | Sig. (2-tailed) | .000 |
| | N | 245 |
| Participation and inclusiveness | Pearson Correlation | .389** |
| | Sig. (2-tailed) | .000 |
| | N | 245 |
| Perceptions of change over time | Pearson Correlation | .406** |
| | Sig. (2-tailed) | .000 |
| | N | 245 |

***. Correlation is significant at the 0.01 level (2-tailed). Source: Primary Survey, 2025*

Table 6.11 presents Pearson correlation coefficients measuring the relationship between community perceptions of CPR governance and the household-level Utilization Index of CPRs. All five governance dimensions show positive and statistically significant correlations at the 0.01 level, indicating that households with more favorable perceptions of governance are more likely to utilize CPRs effectively. Specifically, Perceptions of Change Over Time shows the strongest correlation (r = 0.406), suggesting that households satisfied with long-term governance improvements tend to depend more on CPRs. Participation and Inclusiveness (r = 0.389) and Governance Changes Since UT Status (r = 0.361) also demonstrate strong positive relationships with CPR utilization, highlighting that local engagement and perceived governance improvements directly enhance resource use. The Role and Authority of Institutions (r = 0.281) and Enforcement and Trust (r = 0.277) have moderate

but significant positive correlations, implying that institutional effectiveness and fairness in rule enforcement also contribute to higher utilization, though less strongly than overall perceptions of change and participation. It emphasizes that community perceptions of effective, inclusive, and trustworthy governance are positively associated with sustainable and active utilization of common property resources. This underlines the importance of institutional performance, participation, and accountability in promoting the use and conservation of CPRs in border villages.

Table 6.12 presents community perceptions of CPR governance across five key dimensions, disaggregated by the institution responsible for enforcing rules. The data clearly indicate that local or semi-local institutions LAHDC and village elders are perceived more positively by villagers compared to centralized UT officials, while the Revenue Department also scores well in certain dimensions. Regarding governance changes since UT status, households perceive the most improvement under LAHDC (Mean = 3.40) and village elders (Mean = 2.86), whereas UT officials are rated the lowest (Mean = 1.56). This suggests that localized institutions are considered more responsive and effective in implementing governance changes post-2019. For the role and authority of institutions, the Revenue Department (Mean = 3.32) and village elders (Mean = 3.10) are seen as more capable in managing CPRs effectively than UT officials (Mean = 2.79), highlighting the continued importance of traditional and semi-local governance structures. LAHDC is also positively perceived (Mean = 3.08), though with a smaller sample. In the enforcement and trust dimension, LAHDC and the Revenue Department lead (Mean = 3.45 each), indicating villagers trust local authorities in applying CPR rules fairly. UT officials (Mean = 3.23) and village elders (Mean = 3.06) follow closely, showing moderate confidence across all institutions. The participation and inclusiveness dimension shows the largest disparity: LAHDC (Mean = 3.45) and village elders (Mean = 3.26) are perceived to facilitate greater community involvement, while UT officials lag behind (Mean = 1.66), signaling limited engagement of villagers under centralized governance. Finally, perceptions of change over time are highest for village elders (Mean = 3.47) and LAHDC (Mean = 3.33), suggesting that localized governance is associated with positive long-term outcomes, whereas UT officials are again rated lowest (Mean = 1.74). It highlights a clear preference and trust for local governance structures in CPR management, emphasizing that community involvement, inclusivity, and trust are stronger where decision-making is closer to the local level. Centralized UT officials are perceived as less effective, especially in participatory and governance-change dimensions.

**Table 6.12 Community Perceptions of CPR Governance by Institutional Responsibility for Enforcement**

| Community Perceptions* | Institutional Responsibility for Enforcement of CPR Rules | N | Mean | SD | Std. Error | ANOVA |
|---|---|---|---|---|---|---|
| Governance changes since UT status | LAHDC | 5 | 3.40 | 1.07 | 0.48 | F (3,241) =38.426, p=0.160 |
| | Revenue department | 5 | 2.40 | 0.99 | 0.44 | |
| | UT officials | 143 | 1.56 | 1.01 | 0.08 | |
| | Village elders | 92 | 2.86 | 0.84 | 0.09 | |
| | Total | 245 | 2.10 | 1.15 | 0.07 | |
| Role and authority of institutions | LAHDC | 5 | 3.08 | 0.88 | 0.39 | F (3,241) = 4.648, p=0.004 |
| | Revenue department | 5 | 3.32 | 1.08 | 0.48 | |
| | UT officials | 143 | 2.79 | 0.66 | 0.06 | |
| | Village elders | 92 | 3.10 | 0.70 | 0.07 | |
| | Total | 245 | 2.92 | 0.70 | 0.04 | |
| Enforcement and trust | LAHDC | 5 | 3.45 | 0.84 | 0.37 | F (3,241) = 1.043, p=0.374 |
| | Revenue department | 5 | 3.45 | 0.65 | 0.29 | |
| | UT officials | 143 | 3.23 | 0.91 | 0.08 | |
| | Village elders | 92 | 3.06 | 0.83 | 0.09 | |
| | Total | 245 | 3.17 | 0.88 | 0.06 | |
| Participation and inclusiveness | LAHDC | 5 | 3.45 | 0.80 | 0.36 | F (3,241) = 62.429, p=0.000 |
| | Revenue department | 5 | 2.80 | 1.29 | 0.58 | |
| | UT officials | 143 | 1.66 | 1.04 | 0.09 | |
| | Village elders | 92 | 3.26 | 0.58 | 0.06 | |
| | Total | 245 | 2.32 | 1.19 | 0.08 | |
| Perceptions of change over time | LAHDC | 5 | 3.33 | 1.03 | 0.46 | F (3,241) = 45.113, p=0.000 |
| | Revenue department | 5 | 3.40 | 1.67 | 0.75 | |
| | UT officials | 143 | 1.74 | 1.26 | 0.11 | |
| | Village elders | 92 | 3.47 | 0.90 | 0.09 | |
| | Total | 245 | 2.46 | 1.42 | 0.09 | |

** Averages of each statements come under the each dimensions: Source: Primary Survey, 2025*

## 6.3 Politics of Engagement in CPRs

The preceding section examined the institutional framework governing CPRs in border villages of Ladakh, highlighting the roles and authority of various formal and informal institutions, including the Village Council (Goba), LAHDC, UT administration, military, and religious authorities. It gave a detailed information about how governance structures, rules, enforcement mechanisms, and institutional arrangements shape access to and management of CPRs. While these institutional arrangements establish the formal structure of resource governance, they do not operate in isolation. The actual management of CPRs is significantly influenced by political engagement, social hierarchies, and negotiation among multiple stakeholders. Building on the institutional background, the present section investigates into the

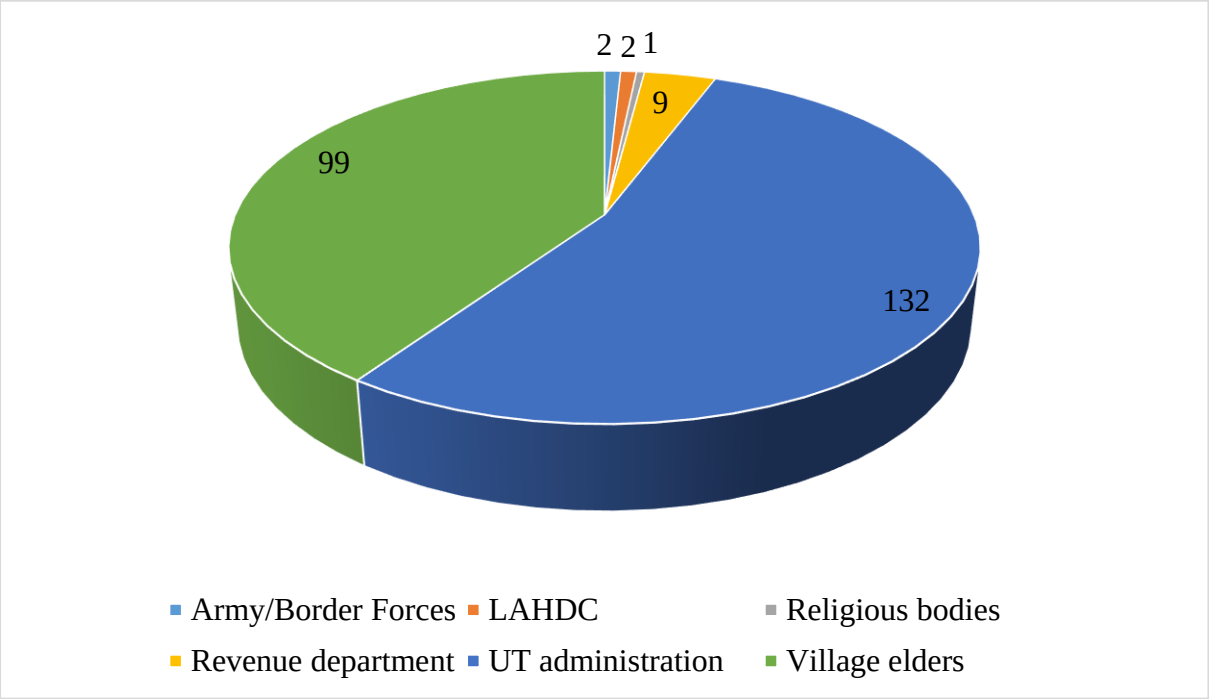
politics of engagement, examining how power, influence, and participation determine whose interests are represented, how decisions are made, and how conflicts over resources are resolved.

The governance and management of Common Property Resources (CPRs) are deeply intertwined with local politics, social hierarchies, and power relations. Access to, control over, and decision-making regarding CPRs are rarely neutral processes; they are shaped by the interests, influence, and engagement of multiple stakeholders, including village councils, traditional authorities, government agencies, and, increasingly, Union Territory (UT) administrators. In the context of Ladakh, the transition from a state to a Union Territory in 2019 introduced a new political and administrative framework that has affected how communities engage with CPRs.

Political engagement in CPR governance encompasses both formal and informal mechanisms. Formal engagement involves participation in village councils, LAHDC committees, or administrative consultations, whereas informal engagement reflects negotiations, lobbying, and influence exerted through traditional or social hierarchies. The distribution of power among these actors directly influences whose voices are heard, whose interests are prioritized, and how conflicts over resources are resolved.

Figure 6.1 presents the distribution of perceived influence over common property resource (CPR) decision-making in the surveyed villages. It shows that the UT administration is regarded as the most influential actor, cited by 53.9% (132) of respondents. This reflects the dominant role of the UT-level authorities in governing CPRs after the region attained Union Territory status. Following this, village elders are identified as key influencers by 40.4% (99) of respondents, highlighting the continued importance of traditional local governance structures in resource management. Other actors, such as the Revenue Department (3.7%), Army/Border Forces (0.8%), LAHDC (0.8%), and religious bodies (0.4%), are perceived to exert minimal influence in CPR decision-making. This distribution suggests a dual governance scenario where formal administrative structures (UT administration) coexist with traditional institutions (village elders), while other institutional actors play only a marginal role.

**Figure 6.1 Perceived Influence of Key Actors in CPR Decision-Making in Border Villages**




*Source: Primary Survey, 2025*

Table 6.13 details the perceived influence of different institutional actors over common property resource (CPR) decision-making across five revenue villages. The data show that the UT administration dominates CPR governance in most villages, accounting for 53.9% (132 out of 245) of the total responses. This is particularly pronounced in Darchik (96.3%) and Kaksar (96.3%), where the UT administration is overwhelmingly viewed as the primary decision-maker. Village elders emerge as another important actor, influencing 40.4% (99) of respondents overall, with significant authority in Hardas (73.3%) and Mushkoo (51.7%), demonstrating the persistence of traditional governance mechanisms alongside formal administrative structures. Other actors, such as the Revenue Department (3.7%), Army/Border Forces (0.8%), LAHDC (0.8%), and religious bodies (0.4%), play marginal roles, often limited to specific villages like Shilikchay or Mushkoo. The Chi-square test ($\chi^2 = 184.120$, df = 20, $p = 0.000$) indicates a statistically significant variation in the distribution of perceived influence across villages. This suggests that local context such as historical governance practices and community composition strongly shapes who is seen as influential in CPR decision-making. It highlights a dual-layered governance system, where formal UT administration exerts overarching authority, while traditional local actors retain meaningful influence in specific villages, reflecting the complexity of CPR governance in Ladakh's rural context.

**Table 6.13 Distribution of Key Actors Influencing CPR Decision-Making Across Revenue Villages**

| Key Actors in CPR Decision-Making | | Revenue Village | | | | | Total |
|---|---|---|---|---|---|---|---|
| | | Darchik | Hardas | Kaksar | Mushkoo | Shilikchay | |
| Army/ Border Forces | N | 0 | 0 | 0 | 0 | 2 | 2 |
| | % | 0.0 | 0.0 | 0.0 | 0.0 | 4.1 | 0.8 |
| LAHDC | N | 0 | 0 | 0 | 0 | 2 | 2 |
| | % | 0.0 | 0.0 | 0.0 | 0.0 | 4.1 | 0.8 |
| Religious bodies | N | 0 | 0 | 0 | 0 | 1 | 1 |
| | % | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 0.4 |
| Revenue department | N | 0 | 0 | 0 | 9 | 0 | 9 |
| | % | 0.0 | 0.0 | 0.0 | 31.0 | 0.0 | 3.7 |
| UT administration | N | 26 | 23 | 52 | 5 | 26 | 132 |
| | % | 96.3 | 26.7 | 96.3 | 17.2 | 53.1 | 53.9 |
| Village elders | N | 1 | 63 | 2 | 15 | 18 | 99 |
| | % | 3.7 | 73.3 | 3.7 | 51.7 | 36.7 | 40.4 |
| Total | N | 27 | 86 | 54 | 29 | 49 | 245 |
| | % | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Chi-Square | | 184.120 (20), p= 0.000 | | | | | |

*Note: Percent within Village; Source: Primary Survey, 2025*

The findings presented in Table 6.14 highlight a clear dominance of the UT administration in CPR decision-making. Over half of the respondents (53.9%) identified the UT administration as the most influential actor in local CPR governance, followed by village elders (40.4%). Only a negligible proportion attributed major influence to the revenue department (3.7%), army/border forces (0.8%), or LAHDC and religious bodies (each below 1%). This indicates that formal administrative structures have largely overshadowed traditional and local institutions in CPR-related decisions.

However, despite the UT administration's dominant role, perceptions of fairness in power distribution are notably low. A majority of respondents (57.1%) believe that power is not fairly distributed among key actors, while only 17.1% agree that it is. This reflects a sense of political imbalance and limited participatory governance at the grassroots level. When asked whether the UT administration adequately represents border villages in CPR matters, responses were largely critical. Nearly half (45.3%) of respondents said representation occurs only "sometimes," and 29.8% said "rarely." Only 14.6% felt that such representation occurs "always" or "frequently." This pattern suggests a gap between administrative control and local

representation, implying that while decisions is made centrally, they do not always align with local needs and perspectives. The frequency of official visits further reinforces this finding. Almost half of the respondents (45.3%) stated that officials "rarely" visit villages to discuss CPR issues, and another 28.6% said visits occur only "occasionally." Only 10.2% reported regular or frequent visits, whereas 15.9% claimed that officials never visit.

**Table 6.14 Distribution of Power and Institutional Engagement in CPR Decision-Making**

| Dimensions | Category | Frequency | Percent |
|---|---|---|---|
| Strongest authority influence in CPR decision-making in village | Army/Border Forces | 2 | .8 |
| | LAHDC | 2 | .8 |
| | Religious bodies | 1 | .4 |
| | Revenue department | 9 | 3.7 |
| | UT administration | 132 | 53.9 |
| | Village elders | 99 | 40.4 |
| Feel power is fairly distributed among these actors in CPR management? | No | 140 | 57.1 |
| | Not Sure | 63 | 25.7 |
| | Yes | 42 | 17.1 |
| Feel the UT administration represents the interests of border villages in CPR matters? | Always | 6 | 2.4 |
| | Frequently | 30 | 12.2 |
| | Never | 25 | 10.2 |
| | Rarely | 73 | 29.8 |
| | Sometimes | 111 | 45.3 |
| Frequency of officials from UT/LAHDC visit village to discuss CPRs | Frequently | 19 | 7.8 |
| | Never | 39 | 15.9 |
| | Occasionally | 70 | 28.6 |
| | Rarely | 111 | 45.3 |
| | Regularly | 6 | 2.4 |
| Total | | 245 | 100.0 |

*Source: Primary Survey, 2025*

This infrequent engagement signifies weak institutional outreach and limited community participation in policy implementation or dialogue regarding shared resources. The analysis of this dimension suggests that CPR governance in border villages remains highly centralized, with decision-making concentrated in the hands of the UT administration. The limited fairness in power sharing, inadequate representation, and infrequent administrative

engagement indicate a top-down governance model, where community voices and traditional institutions play only a marginal role.

Table 6.15 suggest that direct political involvement in CPR decision-making remains limited, yet its indirect influence through central policies is strongly felt. A large majority (88.6%) of respondents reported that no political parties or leaders are directly involved in CPR-related decisions, with only 11.4% acknowledging some form of political participation. This indicates that CPR governance in Ladakh is primarily administrative rather than partisan, though informal political networks still exert influence indirectly. Interestingly, since Ladakh's transformation into a Union Territory (UT) in 2019, over half of the respondents (52.7%) believe that political decisions from the central government have affected access to CPRs, while 29.8% disagreed and 17.6% were uncertain. This highlights the centralization of decision-making power and its tangible consequences for local resource access, particularly in areas with overlapping administrative and security considerations. The data reveal that although local politics appear subdued, national-level political directives significantly shape CPR governance outcomes. Political parties appear to avoid direct engagement with CPR issues during elections, as reflected by 94.3% of respondents reporting no use of CPR themes such as pasture rights, irrigation, or afforestation in campaign discourse. Only 5.7% observed any such political mobilization, suggesting that environmental and resource-based concerns remain peripheral in electoral agendas, despite their socio-economic importance to rural communities. When asked about the overall impact of political engagement on CPR governance, nearly half (49.8%) of respondents felt that the situation had worsened, while 45.3% perceived no change and only 4.9% noted an improvement. This overwhelmingly negative assessment reflects a growing disillusionment with political processes, where policy interventions are seen as disrupting traditional governance mechanisms or favoring external interests over local needs. While formal political participation in CPR management remains low, the political reorganization under the UT administration has had pronounced and often adverse effects on access and management outcomes. The findings suggest a disconnect between political structures and grassroots realities, with limited community-level empowerment despite heightened central political attention. Strengthening decentralized governance frameworks and integrating CPR issues into political discourse could help rebuild trust and ensure more equitable and context-sensitive resource management in Ladakh's border villages.

**Table 6.15 Political Involvement and Perceived Impacts on Common Property Resource (CPR) Governance**

| Dimensions | Category | Frequency | Percent |
|---|---|---|---|
| Are there political parties or leaders involved in CPR-related decisions? | No | 217 | 88.6 |
| | Yes | 28 | 11.4 |
| Since Ladakh became a UT (2019), have political decisions from the central government affected CPR access? | No | 73 | 29.8 |
| | Not Sure | 43 | 17.6 |
| | Yes | 129 | 52.7 |
| Have political parties used CPR issues (pasture rights, irrigation schemes, afforestation) during elections? | No | 231 | 94.3 |
| | Yes | 14 | 5.7 |
| Political engagement in CPRs has improved or worsened situation in your village? | Improved | 12 | 4.9 |
| | No change | 111 | 45.3 |
| | Worsened | 122 | 49.8 |
| Total | | 245 | 100.0 |

*Source: Primary Survey, 2025*

The results in Table 6.16 depict a localized but limitedly participatory governance environment for CPR management in the surveyed border villages. Representation in CPR-related meetings is dominated by traditional village headmen (Goba), cited by 51.0% of respondents, followed closely by elected councillors (42.9%). This suggests that both customary leadership and formal political representation play important, and perhaps overlapping, roles in CPR-related decision-making. In contrast, participation by religious leaders (3.3%) and youth groups (2.9%) remains minimal, indicating narrow inclusiveness and limited intergenerational or cross-sectional participation in governance. When asked whether villagers felt they had a political voice in CPR decision-making, over half (51.8%) of the respondents stated No, while 28.2% said Sometimes, and only 20.0% felt positively represented. This indicates a weak sense of empowerment and limited participatory space for ordinary villagers, possibly due to centralized decision-making under the Union Territory administration or institutional dominance by state and military actors in border management contexts. The perceived role of civil society organizations (CSOs) and NGOs in amplifying community voices is negligible only 1.2% acknowledged such support, while a striking 98.8% reported No involvement. This reflects an absence of organized community advocacy in CPR governance and highlights the institutional vacuum in mediating between local needs and policy interventions. Community consultation before administrative or external interventions in CPRs appears irregular and inconsistent. While 8.2% of respondents stated that consultations always occur and 12.7% noted they happen frequently, a much larger share reported never

(38.0%) or rarely (22.0%) being consulted. An additional 19.2% indicated consultations occur only sometimes. This uneven pattern indicates tokenistic participation, where communities are often informed or involved only after key decisions are made. The findings highlight a top-down governance model in CPR management where local voices are weakly institutionalized, consultation mechanisms are fragmented, and external agencies dominate decision-making.

**Table 6.16 Community Representation and Voice in Common Property Resource (CPR) Governance**

| Dimensions | Category | Frequency | Percent |
|---|---|---|---|
| Who usually represents your village in CPR-related meetings? | Elected councillor | 105 | 42.9 |
| | Religious leader | 8 | 3.3 |
| | Village headman (Goba) | 125 | 51.0 |
| | Youth group | 7 | 2.9 |
| Do villagers feel they have a political voice in CPR-related decisions? | No | 127 | 51.8 |
| | Sometimes | 69 | 28.2 |
| | Yes | 49 | 20.0 |
| Do NGOs or civil society organizations help amplify community's voice in CPR matters? | No | 242 | 98.8 |
| | Yes | 3 | 1.2 |
| Are community consultations organized before UT/Army/NGO interventions in CPRs? | Always | 20 | 8.2 |
| | Frequently | 31 | 12.7 |
| | Never | 93 | 38.0 |
| | Rarely | 54 | 22.0 |
| | Sometimes | 47 | 19.2 |
| Total | | 245 | 100.0 |

*Source: Primary Survey, 2025*

The findings in Table 6.17 reveal a complex but adaptive interface between the community and military authorities in the governance of Common Property Resources in border regions. While 23.7% of respondents reported that the Army or Border Security Forces have intervened in CPR management, a larger majority (76.3%) indicated no direct military intervention. However, the fact that nearly one-fourth of respondents experienced such involvement emphasises the strategic influence of military institutions in shaping access and control over local resources, particularly in border-sensitive and ecologically fragile zones. Interestingly, direct negotiation between villagers and the military appears to be a regularized practice, as reported by 75.5% of respondents. This high level of direct engagement suggests a pragmatic and informal negotiation system, possibly necessitated by the absence of clear administrative protocols in border areas. It indicates that resource access and usage often

depend on localized, situational dialogues rather than formal institutional mechanisms, reflecting the Army's de facto governance role in certain frontier regions.

**Table 6.17 Military Involvement and Conflict Resolution in Common Property Resource (CPR) Governance**

| Dimensions | Category | Frequency | Percent |
|---|---|---|---|
| Has the Army/Border Security ever intervened in CPR management? | No | 187 | 76.3 |
| | Yes | 58 | 23.7 |
| Do villagers negotiate directly with the military for CPR use | No | 60 | 24.5 |
| | Yes | 185 | 75.5 |
| How are political disputes over CPRs usually resolved? | No dispute | 54 | 22.0 |
| | Courts | 5 | 2.0 |
| | LAHDC | 7 | 2.9 |
| | Local negotiation | 112 | 45.7 |
| | Military arbitration | 1 | .4 |
| | UT administration | 66 | 26.9 |
| Feel the Army prioritizes its needs over villagers' rights in CPRs? | Always | 53 | 21.6 |
| | Frequently | 33 | 13.5 |
| | Never | 62 | 25.3 |
| | Rarely | 44 | 18.0 |
| | Sometimes | 53 | 21.6 |
| Total | | 245 | 100.0 |

*Source: Primary Survey, 2025*

Regarding conflict resolution mechanisms, the data show that local negotiation (45.7%) remains the dominant mode of resolving CPR-related disputes. This emphasizes the resilience and adaptability of community-led dispute management traditions. However, a significant proportion (26.9%) noted that disputes are settled through the UT administration, reflecting the emerging bureaucratic role in managing CPR conflicts post-UT reorganization. Very few respondents mentioned LAHDC (2.9%) or courts (2.0%), indicating that formal political or judicial channels are less frequently relied upon for resolving CPR disputes. The minimal role of military arbitration (0.4%) implies that while the Army is influential, it seldom acts as an overt adjudicator in local conflicts.

Perceptions of the Army's priorities vis-à-vis villagers' rights reveal a mixed but cautious sentiment. About 21.6% of respondents felt that the Army always prioritizes its needs over villagers' rights, and an equal 21.6% felt this occurs sometimes. Another 13.5% believed it happens frequently, whereas 18.0% thought it occurs rarely and 25.3% asserted never. This diversity of views indicates that while the Army's logistical and security imperatives

occasionally constrain community access to CPRs, its role is not perceived as uniformly exclusionary. Instead, it reflects a negotiated coexistence shaped by mutual dependence the Army relies on local cooperation for logistics and intelligence, while villagers depend on access permissions for grazing, forest use, and water. It portrays a hybrid governance structure in which formal state institutions, local negotiation practices, and military presence intersect in managing CPRs.

Table 6.18 reveal a perceived cultural and geopolitical imbalance in the governance of Common Property Resources in border villages of Ladakh. A majority of respondents (55.9%) felt that local cultural traditions such as Balti, Purig, and Shina customary practices are not adequately respected in existing CPR policies. This suggests that the transition to Union Territory (UT) administration and the expansion of bureaucratic or military oversight have marginalized indigenous governance norms that traditionally guided the management of pastures, forests, and water sources. A smaller segment (29.8%) believed that these cultural traditions are respected, while 14.3% felt they are sometimes considered. These findings indicate a selective recognition of traditional practices, possibly contingent upon the administrative or ecological relevance of specific CPR sites. The limited integration of local customs points to a policy gap between formal governance structures and community-based environmental knowledge systems, which historically maintained social harmony and ecological balance.

**Table 6.18 Cultural Traditions and Geopolitical Influences in Common Property Resource (CPR) Governance**

| Dimensions | Category | Frequency | Percent |
|---|---|---|---|
| Feel that local cultural traditions (Balti, Purig, Shina practices) are respected in CPR policies? | No | 137 | 55.9 |
| | Sometimes | 35 | 14.3 |
| | Yes | 73 | 29.8 |
| Border politics (India–Pakistan conflict, Army control) influence access to CPRs | Not at all | 6 | 2.4 |
| | Not Strongly | 9 | 3.7 |
| | Somewhat | 41 | 16.7 |
| | Strongly | 57 | 23.3 |
| | Very Strongly | 132 | 53.9 |
| Total | | 245 | 100.0 |

*Source: Primary Survey, 2025*

The second component of this dimension border politics and CPR access reveals an even more pronounced dynamic. More than half of the respondents (53.9%) reported that border politics very strongly influence access to CPRs, while another 23.3% indicated that the influence is strong. Together, this accounts for over three-fourths (77.2%) of respondents acknowledging significant geopolitical constraints on CPR access. Only a marginal proportion of respondents 16.7% "somewhat," 3.7% "not strongly," and 2.4% "not at all" felt that border politics have limited or no influence. This small group likely represents interior villages less exposed to direct military control or those with stable community–Army negotiation mechanisms.

### 6.3.1 Politics of Engagement Index (PEI)

To capture and compare the extent of community involvement, political representation, and institutional responsiveness in Common Property Resource (CPR) governance, a composite Politics of Engagement Index (PEI) was developed. The index provides a quantitative measure of the level and nature of political engagement among border village communities in CPR-related decision-making. The primary purpose of constructing the PEI was to enable comparative analysis across villages and respondent groups, highlighting variations in political inclusion and governance structures influencing CPR management.

The items selected for the index were drawn from the household survey, which focused on the Politics of Engagement in CPRs. Sixteen variables were chosen, covering key themes such as the distribution of decision-making power, the presence of political actors, representation in decision processes, responsiveness of institutions, and the influence of military or geopolitical factors on CPR access. These variables were conceptually grouped into five broad dimensions: (i) power and influence in CPR governance, (ii) political involvement and policy impact, (iii) community representation and participation, (iv) military–political interface, and (v) cultural and geopolitical context.

All variables were originally recorded on categorical or ordinal scales, and hence they were converted into numerical codes for quantitative analysis. A consistent direction of measurement was maintained, where higher scores indicated stronger political engagement or inclusiveness, and lower scores reflected weaker participation or exclusion.

**Table 6.19 Politics of Engagement Index (PEI): Coding and Conversion of Variables**

| Dimension | Questions | Coding Scheme | Standardization |
|---|---|---|---|
| Power and influence in CPR governance | Strongest authority influence in CPR decision-making in village | 1 = Village elders, 2 = LAHDC, 3 = Religious bodies, 4 = Revenue Dept, 5 = UT Administration, 6 = Military | 0= Local<br>1= External |
| | Fairness of Power Distribution | 1 = No, 2 = Not sure, 3 = Yes | (X-Min)/(Max-Min) |
| | UT Representation | 5 = Always, 4 = Frequently, 3 = Sometimes, 2 = Rarely, 1 = Never | (X-Min)/(Max-Min) |
| | Official Visits | 5 = Regularly, 4 = Frequently, 3 = Occasionally, 2 = Rarely, 1 = Never | (X-Min)/(Max-Min) |
| Political involvement and policy impact | Political Involvement | 2 = Yes, 1 = No | 0=No, 1=Yes |
| | Political parties used CPR issues | 2 = Yes, 1 = No | 0=No, 1=Yes |
| | Effect of Central Political Decisions | 3 = Yes, 2 = Not Sure, 1 = No | (X-Min)/(Max-Min) |
| Community representation and participation | Local Representation | 4 = Local Traditional (Goba), 3 = Elected Councillor, 2 = Religious/Youth, 1 = None | 1= Local Traditional (Goba), Others=0 |
| | Voice in Decisions | 3 = Yes, 2 = Sometimes, 1 = No | (X-Min)/(Max-Min) |
| | NGO Role | 2 = Yes, 1 = No | 0=No, 1=Yes |
| | Community Consultations | 5 = Always, 4 = Frequently, 3 = Sometimes, 2 = Rarely, 1 = Never | (X-Min)/(Max-Min) |
| Military–political interface | Army Involvement | 2 = Yes, 1 = No | 0=No, 1=Yes |
| | Negotiations with Military | 2 = Yes, 1 = No | 0=No, 1=Yes |
| | Army Prioritization | 5 = Always, 4 = Frequently, 3 = Sometimes, 2 = Rarely, 1 = Never | (X-Min)/(Max-Min) |
| Cultural and geopolitical | Respect for Culture | 3 = Yes, 2 = Sometimes, 1 = No | (X-Min)/(Max-Min) |
| | Border Politics | 5 = Very Strongly, 4 = Strongly, 3 = Somewhat, 2 = Not Strongly, 1 = Not at all | (X-Min)/(Max-Min) |

Following the coding process, all variables were standardized using the min–max normalization method to ensure comparability across different measurement scales. This method rescales each variable to a common range between 0 and 1, using the formula:

$$X' = \frac{X - X_{min}}{X_{max} - X_{min}}$$

where X′ represents the normalized score, X is the observed value, and $Xmin$ and $Xmax$ denote the minimum and maximum observed values for each variable. This approach preserves the original distribution of data while ensuring that all variables contribute proportionately to the composite index. The standardized variable scores were then aggregated using a simple additive approach to generate the Politics of Engagement Index (PEI) for each respondent. Each dimension contributed equally to the composite score, as preliminary testing with differential weights did not significantly improve the explanatory power of the index. The reliability of the selected variables was examined using Cronbach's Alpha, which confirmed acceptable internal consistency, indicating that the items collectively reflected a coherent construct of political engagement in CPR governance.

$$PEI = \frac{\sum_{i=1}^{n} Z_i}{n}$$

Where n represents the number of items included in the index.

Table 6.20 presents the descriptive statistics of the Politics of Engagement Index (PEI) along with its constituent dimensions, derived from the primary survey of households in Ladakh. The five dimensions capture distinct aspects of political engagement in the governance of Common Property Resources (CPRs), including the distribution of power and influence, policy involvement, community representation, military–political interactions, and cultural/geopolitical considerations.

The Power and Influence in CPR Governance dimension, with a mean score of 0.413, indicates that while some community members perceive a reasonable level of influence over CPR-related decisions, the overall control is moderately distributed, suggesting that administrative and bureaucratic actors hold significant authority. Political Involvement and Policy Impact shows a lower mean of 0.262, reflecting limited engagement of villagers in shaping policies and decisions at the higher administrative level. Similarly, Community Representation and Participation, with a mean of 0.298, indicates that local participation structures exist but are not fully inclusive or active across all surveyed villages.

In contrast, the Military–Political Interface dimension exhibits a relatively higher mean of 0.487, highlighting the significant role of military presence and intervention in CPR

management. This suggests that interactions with the military strongly influence access, use, and governance of resources in border villages. The Cultural and Geopolitical dimension has the highest mean at 0.588, pointing to the prominent role of local traditions, community identity, and border-related politics in shaping resource management practices.

The overall Politics of Engagement Index (PEI) has a mean value of 0.410, indicating a moderate level of political engagement across the surveyed communities. The relatively narrow standard deviation of 0.106 suggests that while there is some variation in engagement across households, the differences are not extreme. The results highlight that CPR governance in Ladakh is shaped by a combination of administrative authority, military involvement, and cultural-political considerations, with community-level participation and policy influence remaining relatively limited.

**Table 6.20 Descriptive Statistics of the Politics of Engagement Index (PEI) and Its Dimensions**

| Parameters | Min. | Max. | Mean | Std. Deviation |
|---|---|---|---|---|
| Power and influence in CPR governance | .00 | .94 | .4130 | .15591 |
| Political involvement and policy impact | .00 | 1.00 | .2619 | .22022 |
| Community representation and participation | .00 | .81 | .2977 | .22069 |
| Military–political interface | .00 | 1.00 | .4874 | .27512 |
| Cultural and geopolitical | .00 | 1.00 | .5878 | .21491 |
| **Politics of Engagement Index (PEI)** | **.15** | **.79** | **.4096** | **.10631** |

*Source: Primary Survey, 2025.*

Table 6.20 presents the Politics of Engagement Index (PEI) and its constituent dimensions across five revenue villages in Ladakh: Darchik, Hardas, Kaksar, Mushkoo, and Shilikchay. The dimension Power and Influence in CPR Governance shows moderate variation across villages, with Shilikchay (0.523) and Mushkoo (0.504) reporting higher perceived influence compared to Darchik (0.336) and Hardas (0.329). This indicates that in some villages, local actors or institutions are relatively more influential in CPR decision-making, while in others, administrative authority dominates. Political Involvement and Policy Impact has an overall lower mean (0.262), suggesting limited engagement of villagers in shaping policies and decisions. Interestingly, Mushkoo reports a very low mean (0.080), highlighting minimal participation in policy processes there. The Community Representation and Participation

dimension shows a stark contrast, with Kaksar reporting no participation (0.000), while Mushkoo (0.487) and Hardas (0.402) show relatively higher engagement. This suggests that the inclusiveness of CPR governance varies significantly among villages.

**Table 6.21 Politics of Engagement Index (PEI) and Its Dimensions by Revenue Villages**

| Parameters | Revenue Villages | N | Mean | Std. Deviation | Std. Error | ANOVA |
|---|---|---|---|---|---|---|
| Power and influence in CPR governance | Darchik | 27 | .336 | .089 | .017 | F (4,240) = 22.717, p=0.000 |
| | Hardas | 86 | .329 | .128 | .014 | |
| | Kaksar | 54 | .436 | .068 | .009 | |
| | Mushkoo | 29 | .504 | .195 | .036 | |
| | Shilikchay | 49 | .523 | .170 | .024 | |
| | Total | 245 | .413 | .156 | .010 | |
| Political involvement and policy impact | Darchik | 27 | .272 | .132 | .025 | F (4,240) = 10.113, p=0.000 |
| | Hardas | 86 | .227 | .241 | .026 | |
| | Kaksar | 54 | .327 | .045 | .006 | |
| | Mushkoo | 29 | .080 | .115 | .021 | |
| | Shilikchay | 49 | .354 | .298 | .043 | |
| | Total | 245 | .262 | .220 | .014 | |
| Community representation and participation | Darchik | 27 | .167 | .115 | .022 | F (4,240) = 113.190, p=0.000 |
| | Hardas | 86 | .402 | .134 | .014 | |
| | Kaksar | 54 | .000 | .000 | .000 | |
| | Mushkoo | 29 | .487 | .169 | .031 | |
| | Shilikchay | 49 | .403 | .174 | .025 | |
| | Total | 245 | .298 | .221 | .014 | |
| Military–political interface | Darchik | 27 | .944 | .139 | .027 | F (4,240) = 40.974, p=0.000 |
| | Hardas | 86 | .508 | .256 | .028 | |
| | Kaksar | 54 | .346 | .064 | .009 | |
| | Mushkoo | 29 | .471 | .163 | .030 | |
| | Shilikchay | 49 | .366 | .288 | .041 | |
| | Total | 245 | .487 | .275 | .018 | |
| Cultural and geopolitical | Darchik | 27 | .528 | .106 | .020 | F (4,240) = 6.343, p=0.000 |
| | Hardas | 86 | .613 | .235 | .025 | |
| | Kaksar | 54 | .500 | .000 | .000 | |
| | Mushkoo | 29 | .720 | .216 | .040 | |
| | Shilikchay | 49 | .594 | .286 | .041 | |
| | Total | 245 | .588 | .215 | .014 | |
| **Politics of Engagement Index (PEI)** | **Darchik** | **27** | **.449** | **.057** | **.011** | **F (4,240) = 16.235, p=0.000** |
| | **Hardas** | **86** | **.416** | **.105** | **.011** | |
| | **Kaksar** | **54** | **.322** | **.019** | **.003** | |
| | **Mushkoo** | **29** | **.453** | **.086** | **.016** | |
| | **Shilikchay** | **49** | **.448** | **.138** | **.020** | |
| | **Total** | **245** | **.410** | **.106** | **.007** | |

*Source: Primary Survey, 2025*

The Military–Political Interface dimension is highest in Darchik (0.944), reflecting strong military involvement and its influence on local CPR governance, while Kaksar (0.346)

reports comparatively minimal military interference. This indicates that border and strategic considerations shape access and control differently across villages. For Cultural and Geopolitical aspects, Mushkoo (0.720) and Hardas (0.613) show the highest engagement, reflecting that local traditions, identity, and border-related issues significantly influence governance in these villages. Finally, the overall PEI demonstrates moderate political engagement across all villages, with a total mean of 0.410. Darchik (0.449) and Mushkoo (0.453) report slightly higher levels, while Kaksar (0.322) shows the lowest engagement. The significant ANOVA results for all dimensions indicate that these differences across villages are statistically meaningful, highlighting the spatial heterogeneity of political engagement in CPR governance in Ladakh.

Table 6.22 compares the Politics of Engagement Index (PEI) and its dimensions between the tehsils of Drass and Kargil, highlighting variations in political engagement and influence in Common Property Resource (CPR) governance. The Power and Influence in CPR Governance dimension is higher in Drass (0.512) than in Kargil (0.401), indicating that villagers or local institutions in Drass perceive themselves to have greater influence over CPR decision-making. The t-test confirms this difference is statistically significant ($p = 0.007$). In contrast, Political Involvement and Policy Impact is significantly lower in Drass (0.086) compared to Kargil (0.284), suggesting limited participation in policy formulation at the central or UT level among Drass residents ($p < 0.001$). This reflect a more top-down approach in policy decisions affecting Drass. Community Representation and Participation also shows a marked difference, with Drass (0.486) exceeding Kargil (0.274), implying stronger local representation and involvement in CPR governance in Drass ($p < 0.001$). The Military–Political Interface dimension is similar across both tehsils (Drass 0.475, Kargil 0.489) and not statistically different ($p = 0.720$), indicating that military involvement and its influence on CPRs are consistent across the region. Cultural and Geopolitical considerations are stronger in Drass (0.731) than Kargil (0.570), reflecting that local customs, identity, and border-related dynamics have a greater perceived impact on CPR governance in Drass ($p < 0.001$). Finally, the overall Politics of Engagement Index (PEI) is moderately higher in Drass (0.458) than in Kargil (0.404), and the difference is statistically significant ($p = 0.011$). This suggests that, overall, political engagement in CPR governance is more pronounced in Drass, shaped by stronger local influence, higher cultural-geopolitical awareness, and more active community representation, despite lower participation in policy-level decisions.

**Table 6.22 Politics of Engagement Index (PEI) and Its Dimensions by Tehsil (Drass and Kargil)**

| Parameters | Tehsil | N | Mean | Std. Deviation | Std. Error | Independent Sample t-test |
|---|---|---|---|---|---|---|
| Power and influence in CPR governance | Drass | 27 | .512 | .191 | .037 | t (29.91)[#]= 2.902, p= 0.007 |
| | Kargil | 218 | .401 | .147 | .010 | |
| | Total | 245 | .413 | .156 | .010 | |
| Political involvement and policy impact | Drass | 27 | .086 | .117 | .022 | t (52.84)[#]= -7.314, p= 0.000 |
| | Kargil | 218 | .284 | .220 | .015 | |
| | Total | 245 | .262 | .220 | .014 | |
| Community representation and participation | Drass | 27 | .486 | .175 | .034 | t (34.41) [#]= -5.762, p= 0.000 |
| | Kargil | 218 | .274 | .215 | .015 | |
| | Total | 245 | .298 | .221 | .014 | |
| Military–political interface | Drass | 27 | .475 | .168 | .032 | t (47.29) [#]= -0.361, p= 0.720 |
| | Kargil | 218 | .489 | .286 | .019 | |
| | Total | 245 | .487 | .275 | .018 | |
| Cultural and geopolitical | Drass | 27 | .731 | .201 | .039 | t (243)= 3.783, p= 0.000 |
| | Kargil | 218 | .570 | .210 | .014 | |
| | Total | 245 | .588 | .215 | .014 | |
| Politics of Engagement Index (PEI) | Drass | 27 | .458 | .086 | .017 | t (243)= 2.547, p= 0.011 |
| | Kargil | 218 | .404 | .107 | .007 | |
| | Total | 245 | .410 | .106 | .007 | |

[#] *Equal variances not Assumed; Source: Primary Survey, 2025*

Table 6.23 presents the Politics of Engagement Index (PEI) and its constituent dimensions across four major communities Balti, Dard, Purig, and Shina in the study area. In the Power and Influence in CPR Governance dimension, Purig (0.477) and Shina (0.460) communities report higher perceived influence compared to Balti (0.394) and Dard (0.339), suggesting that members of Purig and Shina communities feel more empowered in local CPR decision-making (ANOVA p = 0.000). For Political Involvement and Policy Impact, the mean values are relatively similar across all communities, ranging from 0.241 (Shina) to 0.303 (Purig), and the differences are not statistically significant (p = 0.702). This indicates that while local influence varies, participation in broader policy-level decisions is generally low and comparable across communities. Community Representation and Participation shows a clear disparity: Balti (0.419) and Purig (0.313) communities experience higher representation, whereas Dard (0.165) and Shina (0.170) report limited participation in governance structures (ANOVA p = 0.000). The Military–Political Interface dimension exhibits significant variation, with Dard scoring very high (0.949), indicating strong military or border-related influence,

while Balti (0.448), Shina (0.390), and Purig (0.356) report comparatively lower influence (p = 0.000). This suggests that CPR access and governance in Dard are heavily shaped by military-political factors.

**Table 6.23 Politics of Engagement Index (PEI) and Its Dimensions Across Communities**

| Parameters | Community | N | Mean | Std. Deviation | Std. Error | ANOVA |
|---|---|---|---|---|---|---|
| Power and influence in CPR governance | Balti, | 120 | .394 | .175 | .016 | F (3,241) = 6.517, p=0.000 |
| | Dard | 31 | .339 | .084 | .015 | |
| | Purig | 11 | .477 | .151 | .046 | |
| | Shina | 83 | .460 | .131 | .014 | |
| | Total | 245 | .413 | .156 | .010 | |
| Political involvement and policy impact | Balti, | 120 | .268 | .274 | .025 | F (3,241) = 0.473, p=0.702 |
| | Dard | 31 | .280 | .125 | .022 | |
| | Purig | 11 | .303 | .267 | .080 | |
| | Shina | 83 | .241 | .141 | .015 | |
| | Total | 245 | .262 | .220 | .014 | |
| Community representation and participation | Balti, | 120 | .419 | .132 | .012 | F (3,241) = 35.663, p=0.000 |
| | Dard | 31 | .165 | .118 | .021 | |
| | Purig | 11 | .313 | .217 | .065 | |
| | Shina | 83 | .170 | .254 | .028 | |
| | Total | 245 | .298 | .221 | .014 | |
| Military–political interface | Balti, | 120 | .448 | .262 | .024 | F (3,241) = 58.405, p=0.000 |
| | Dard | 31 | .949 | .130 | .023 | |
| | Purig | 11 | .356 | .274 | .083 | |
| | Shina | 83 | .390 | .124 | .014 | |
| | Total | 245 | .487 | .275 | .018 | |
| Cultural and geopolitical | Balti, | 120 | .619 | .251 | .023 | F (3,241) = 2.307, p=0.077 |
| | Dard | 31 | .524 | .099 | .018 | |
| | Purig | 11 | .511 | .308 | .093 | |
| | Shina | 83 | .577 | .164 | .018 | |
| | Total | 245 | .588 | .215 | .014 | |
| Politics of Engagement Index (PEI) | Balti, | 120 | .429 | .120 | .011 | F (3,241) = 8.066, p=0.000 |
| | Dard | 31 | .451 | .055 | .010 | |
| | Purig | 11 | .392 | .125 | .038 | |
| | Shina | 83 | .368 | .082 | .009 | |
| | Total | 245 | .410 | .106 | .007 | |

*Source: Primary Survey, 2025*

The Cultural and Geopolitical dimension is moderately high across all communities, ranging from 0.511 (Purig) to 0.619 (Balti), but differences are not statistically significant (p = 0.077). This implies that local cultural traditions and geopolitical considerations play a relevant role in CPR governance for all communities, without sharp disparities. Finally, the overall Politics of Engagement Index (PEI) shows that Dard (0.451) and Balti (0.429) communities report higher political engagement, while Purig (0.392) and Shina (0.368) indicate

comparatively lower overall engagement in CPR governance. The ANOVA confirms that these differences are statistically significant (p = 0.000). It demonstrates that political engagement in CPR governance is community-specific, influenced by local power dynamics, military presence, and participatory structures, with Dard showing the strongest military-political interface and Balti exhibiting relatively higher overall engagement.

Table 6.24 examines the Politics of Engagement Index (PEI) and its component dimensions across different household economic categories, classified by ration card status: APL (Above Poverty Line), AAY (Antyodaya Anna Yojana), BPL (Below Poverty Line), and PHH (Priority Household) to explore potential differences in political engagement and governance of Common Property Resources (CPRs) based on household socio-economic status. In the Power and Influence in CPR Governance dimension, mean scores are relatively similar across APL (0.405), BPL (0.420), AAY (0.344), and PHH (0.375) households, indicating comparable perceptions of local influence in CPR governance regardless of economic category (ANOVA p = 0.793). For Political Involvement and Policy Impact, BPL households (0.292) report higher involvement compared to APL (0.223) and AAY (0.083), suggesting that economically marginalized groups perceive slightly more policy-related engagement; the differences are statistically significant (p = 0.014). PHH households report the highest mean (0.667), but this is based on a single observation. Community Representation and Participation shows minimal variation across APL (0.290) and BPL (0.299), while AAY (0.563) and PHH (0.500) households indicate relatively higher perceived representation, although the overall differences are not statistically significant (p = 0.277). The Military–Political Interface dimension shows higher scores for AAY (0.750) and PHH (0.833) households, suggesting stronger military or border-related influence in CPR governance for these groups, whereas APL (0.480) and BPL (0.487) households report moderate levels (p = 0.326). The Cultural and Geopolitical dimension is relatively consistent across most groups, with AAY (0.938) households showing the highest influence of cultural and geopolitical factors on CPR governance, followed by BPL (0.590) and APL (0.580) (ANOVA p = 0.092). Finally, the overall Politics of Engagement Index (PEI) reveals that AAY (0.535) and PHH (0.550) households perceive higher political engagement in CPR governance compared to APL (0.396) and BPL (0.417) households. The difference is marginally non-significant at the 0.05 level (p = 0.067), suggesting a trend where economically disadvantaged households perceive greater engagement in certain dimensions of CPR governance. It indicates that while basic power and participation are broadly similar across household categories, aspects like political

involvement, military interface, and cultural–geopolitical influence vary, highlighting nuanced differences in CPR governance perceptions along socio-economic lines.

**Table 6.24 Politics of Engagement Index (PEI) and Its Dimensions by Household Ration Card Status**

| Parameters | Ration Card | N | Mean | Std. Deviation | Std. Error | ANOVA |
|---|---|---|---|---|---|---|
| Power and influence in CPR governance | APL | 106 | .405 | .162 | .016 | F (3,241) = 0.345, p=0.793 |
| | AAY | 2 | .344 | .133 | .094 | |
| | BPL | 136 | .420 | .152 | .013 | |
| | PHH | 1 | .375 | | | |
| | Total | 245 | .413 | .156 | .010 | |
| Political involvement and policy impact | APL | 106 | .223 | .207 | .020 | F (3,241) = 3.591, p=0.014 |
| | AAY | 2 | .083 | .118 | .083 | |
| | BPL | 136 | .292 | .225 | .019 | |
| | PHH | 1 | .667 | | | |
| | Total | 245 | .262 | .220 | .014 | |
| Community representation and participation | APL | 106 | .290 | .230 | .022 | F (3,241) = 1.294, p=0.277 |
| | AAY | 2 | .563 | .000 | .000 | |
| | BPL | 136 | .299 | .214 | .018 | |
| | PHH | 1 | .500 | | | |
| | Total | 245 | .298 | .221 | .014 | |
| Military–political interface | APL | 106 | .480 | .265 | .026 | F (3,241) = 1.160, p=0.326 |
| | AAY | 2 | .750 | .354 | .250 | |
| | BPL | 136 | .487 | .281 | .024 | |
| | PHH | 1 | .833 | | | |
| | Total | 245 | .487 | .275 | .018 | |
| Cultural and geopolitical | APL | 106 | .580 | .198 | .019 | F (3,241) = 2.172, p=0.092 |
| | AAY | 2 | .938 | .088 | .063 | |
| | BPL | 136 | .590 | .225 | .019 | |
| | PHH | 1 | .375 | | | |
| | Total | 245 | .588 | .215 | .014 | |
| Politics of Engagement Index (PEI) | APL | 106 | .396 | .100 | .010 | F (3,241) = 2.412, p=0.067 |
| | AAY | 2 | .535 | .138 | .098 | |
| | BPL | 136 | .417 | .109 | .009 | |
| | PHH | 1 | .550 | | | |
| | Total | 245 | .410 | .106 | .007 | |

*Source: Primary Survey, 2025*

Table 6.25 presents the Pearson correlation coefficients between the dimensions of the Politics of Engagement Index (PEI) and the Utilization of Common Property Resources (CPRs) index. The aim is to examine whether political engagement, power distribution, and community representation influence the actual use of CPRs by households in the study area. The results indicate that Power and Influence in CPR Governance has a small positive correlation with CPR utilization (r = 0.085), but this relationship is not statistically significant

(p = 0.186), suggesting that perceptions of who holds power in CPR governance do not strongly impact how CPRs are accessed or used by the community. Political Involvement and Policy Impact shows a weak positive correlation (r = 0.141) that is statistically significant at the 0.05 level (p = 0.027). This implies that households perceiving higher involvement in policy processes are slightly more likely to utilize CPRs, highlighting the role of political engagement in facilitating access.

**Table 6.25 Correlation between Politics of Engagement Dimensions and Utilization of CPRs**

| Parameters | | Utilization of CPRs Index |
|---|---|---|
| Power and influence in CPR governance | Pearson Correlation | .085 |
| | Sig. (2-tailed) | .186 |
| | N | 245 |
| Political involvement and policy impact | Pearson Correlation | .141* |
| | Sig. (2-tailed) | .027 |
| | N | 245 |
| Community representation and participation | Pearson Correlation | -.240** |
| | Sig. (2-tailed) | .000 |
| | N | 245 |
| Military–political interface | Pearson Correlation | .033 |
| | Sig. (2-tailed) | .603 |
| | N | 245 |
| Cultural and geopolitical | Pearson Correlation | .079 |
| | Sig. (2-tailed) | .216 |
| | N | 245 |
| Politics of Engagement Index (PEI) | Pearson Correlation | .033 |
| | Sig. (2-tailed) | .605 |
| | N | 245 |

***. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed). Source: Primary Survey, 2025*

Interestingly, Community Representation and Participation exhibits a moderate negative correlation (r = -0.240, p < 0.01) with CPR utilization. This indicates that higher perceived participation does not necessarily translate into increased resource use; in fact, it reflect situations where more formalized or inclusive decision-making processes impose stricter rules on CPR access. The Military–Political Interface and Cultural and Geopolitical dimensions show very weak positive correlations with CPR utilization (r = 0.033 and r = 0.079 respectively) and are not statistically significant, suggesting that military presence or cultural–

geopolitical considerations do not directly determine household-level CPR usage. Finally, the overall Politics of Engagement Index (PEI) has a near-zero correlation with CPR utilization (r = 0.033, p = 0.605), indicating that when aggregated, political engagement as a composite measure does not significantly affect how communities use CPRs. The findings suggest that while specific aspects of political engagement, particularly policy involvement, can influence CPR utilization, broad perceptions of governance and power distribution alone do not guarantee increased resource access. Moreover, higher community participation is coincide with more regulated or restricted use, reflecting the complex interplay between governance processes and resource utilization.

To examine the influence of political engagement on the utilization of common property resources (CPRs) in Ladakh, a multiple linear regression model was employed. In this analysis, the Utilization of CPRs Index serves as the dependent variable, while the dimensions of the Politics of Engagement Index (PEI) namely, Power and Influence in CPR Governance, Political Involvement and Policy Impact, Community Representation and Participation, Military–Political Interface, and Cultural and Geopolitical Factors serve as independent variables. The regression model is specified as follows:

$$\textit{Utilization of CPRs} = \beta 0 + \beta 1(\textit{Power and Influence})i + \beta 2(\textit{Political Involvement})i + \beta 3(\textit{Community Participation})i + \beta 4(\textit{Military–Political Interface})i + \beta 5(\textit{Cultural and Geopolitical})i + \epsilon i$$

Utilization of CPRs represents the CPR use score for household

β0is the intercept, $\beta 1$to $\beta 5$ are the regression coefficients indicating the effect of each PEI dimension on CPR utilization, and $\epsilon i$ is the error term capturing unexplained variation.

The regression analysis was conducted to examine the effect of different dimensions of political engagement on the Utilization of CPRs Index. The model summary indicates an overall $R^2$ value of 0.298, which implies that about 29.8 percent of the variance in CPR utilization can be explained by the five dimensions of the Politics of Engagement Index (PEI). The adjusted $R^2$ of 0.284 accounts for the number of predictors in the model, confirming a reasonable level of explanatory power for this social science study. Additionally, the Durbin-Watson statistic of 2.575 suggests that there is no significant autocorrelation in the residuals. The ANOVA results indicate that the model is statistically significant (F = 20.333, p = 0.000), which means that collectively, the five predictors reliably explain the variation in the utilization of CPRs. This confirms that political engagement dimensions are meaningful factors in

understanding how communities access and use CPRs. The regression coefficients reveal nuanced relationships between the predictors and CPR utilization.

**Table 6.26 Regression Analysis of Politics of Engagement Dimensions on Utilization of CPRs**

| Model Summary | | | | |
|---|---|---|---|---|
| R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| .546 | .298 | .284 | .2179428 | 2.575 |

**ANOVA**

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Regression | 4.829 | 5 | .966 | 20.333 | .000 |
| Residual | 11.352 | 239 | .047 | | |
| Total | 16.181 | 244 | | | |

**Coefficients**

| | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics |
|---|---|---|---|---|---|---|
| | B | Std. Error | Beta | | | VIF |
| (Constant) | .666 | .064 | | 10.465 | .000 | |
| Power and influence in CPR governance | .109 | .094 | .066 | 1.163 | .246 | 1.104 |
| Political involvement and policy impact | -.030 | .068 | -.025 | -.438 | .661 | 1.149 |
| Community representation and participation | .118 | .068 | .101 | 1.743 | .083 | 1.151 |
| Military–political interface | -.475 | .052 | -.508 | -9.089 | .000 | 1.063 |
| Cultural and geopolitical | .180 | .069 | .150 | 2.606 | .010 | 1.135 |

*Note: Dependent variable- Utilization of CPRs Index; Source: Primary Survey, 2025*

The military–political interface has a strong negative and statistically significant effect (B = -0.475, β = -0.508, p = 0.000), suggesting that increased military involvement or overlap between military and political authorities reduces community access and utilization of CPRs. In contrast, cultural and geopolitical considerations show a positive and significant effect (B = 0.180, β = 0.150, p = 0.010), indicating that when local cultural practices and geopolitical

sensitivities are respected, CPR utilization tends to improve. Community representation and participation also has a positive effect (B = 0.118, β = 0.101) and is marginally significant (p = 0.083), implying that active engagement of community members in decision-making can modestly enhance access to CPRs. Other dimensions, such as power and influence in CPR governance (B = 0.109, p = 0.246) and political involvement and policy impact (B = -0.030, p = 0.661), are not statistically significant, indicating that these factors do not independently predict CPR utilization when considered alongside other dimensions in the model. The variance inflation factor (VIF) values for all predictors are below 2, suggesting that multicollinearity is not a concern in this analysis. These results highlight that while certain aspects of political engagement, such as community participation and respect for cultural traditions, positively influence CPR utilization, military presence and political-military dynamics can significantly constrain community access. The findings highlight the complex interplay between governance structures, political actors, and local communities in managing CPRs in Ladakh (see Table 6.26).

Table 6.27 presents the relationship between various dimensions of the Politics of Engagement (PEI) and community perceptions of CPR governance across four key aspects: role and authority of institutions, enforcement and trust, participation and inclusiveness, and perceptions of change over time. Pearson correlation coefficients are used to measure the strength and direction of these relationships. The Power and influence in CPR governance dimension shows a significant positive correlation with the role and authority of institutions ($r = 0.154$, $p < 0.05$), suggesting that villages where power and influence are perceived to be higher also tend to recognize stronger institutional roles. However, its correlations with other governance aspects are weaker and not significant, indicating limited influence on enforcement, participation, or perceived changes over time. Political involvement and policy impact demonstrates a significant negative correlation with participation and inclusiveness ($r = -0.325$, $p < 0.01$) and perceptions of change over time ($r = -0.344$, $p < 0.01$). This suggests that higher top-down political intervention or central policy influence is associated with lower community participation and weaker perceptions of positive changes in CPR governance. The Community representation and participation dimension exhibits strong positive correlations across multiple governance aspects, notably participation and inclusiveness ($r = 0.660$, $p < 0.01$) and perceptions of change over time ($r = 0.576$, $p < 0.01$). This highlights that active involvement and representation of community members strongly enhance perceived governance effectiveness and positive changes. The Military–political interface shows negative correlations with enforcement and trust ($r = -0.322$, $p < 0.01$), participation ($r = -0.236$, $p <$

0.01), and perceptions of change (r = -0.324, p < 0.01), suggesting that military involvement in CPR management undermine trust and reduce participatory governance.

**Table 6.27 Correlation between Politics of Engagement Dimensions and Community Perceptions of CPR Governance**

| Politics of Engagement Dimensions | | Community Perceptions of CPR Governance | | | |
|---|---|---|---|---|---|
| | | Role and authority of institutions | Enforcement and trust | Participation and inclusiveness | Perceptions of change over time |
| Power and influence in CPR governance | Pearson Correlation | .154* | .119 | .029 | .071 |
| | Sig. (2-tailed) | .016 | .064 | .646 | .270 |
| | N | 245 | 245 | 245 | 245 |
| Political involvement and policy impact | Pearson Correlation | -.129* | -.066 | -.325** | -.344** |
| | Sig. (2-tailed) | .043 | .307 | .000 | .000 |
| | N | 245 | 245 | 245 | 245 |
| Community representation and participation | Pearson Correlation | .400** | -.208** | .660** | .576** |
| | Sig. (2-tailed) | .000 | .001 | .000 | .000 |
| | N | 245 | 245 | 245 | 245 |
| Military–political interface | Pearson Correlation | -.118 | -.322** | -.236** | -.324** |
| | Sig. (2-tailed) | .066 | .000 | .000 | .000 |
| | N | 245 | 245 | 245 | 245 |
| Cultural and geopolitical | Pearson Correlation | .375** | .055 | .391** | .371** |
| | Sig. (2-tailed) | .000 | .390 | .000 | .000 |
| | N | 245 | 245 | 245 | 245 |
| Politics of Engagement Index (PEI) | Pearson Correlation | .248** | -.223** | .184** | .100 |
| | Sig. (2-tailed) | .000 | .000 | .004 | .120 |
| | N | 245 | 245 | 245 | 245 |

***. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed). Source: Primary Survey, 2025*

Cultural and geopolitical factors are positively correlated with role and authority (r = 0.375, p < 0.01), participation (r = 0.391, p < 0.01), and perceptions of change (r = 0.371, p < 0.01), indicating that recognition of cultural norms and geopolitical considerations strengthens community perceptions of governance quality. Finally, the overall Politics of Engagement Index (PEI) shows positive correlations with role and authority (r = 0.248, p < 0.01) and

participation and inclusiveness ($r = 0.184$, $p < 0.01$), and a negative correlation with enforcement and trust ($r = -0.223$, $p < 0.01$). This suggests that while overall political engagement enhances recognition of institutional authority and participatory governance, certain dimensions like enforcement is negatively affected depending on the local power dynamics. It reveals that community-driven representation and attention to cultural factors play the most significant positive role in shaping perceptions of effective CPR governance, while top-down political and military interventions can have mixed or negative impacts.

Table 6.28 presents the results of multiple linear regression analyses examining how different dimensions of the politics of engagement influence community perceptions of CPR (Common-Pool Resources) governance across four dependent variables: role and authority of institutions, enforcement and trust, participation and inclusiveness, and perceptions of change over time. The table provides unstandardized coefficients, t-values, and p-values for each predictor, along with overall model statistics including R, $R^2$, adjusted $R^2$, F-values, significance of ANOVA, and Durbin-Watson statistics.

The regression results indicate that power and influence in CPR governance has a significant positive effect on the perceived role and authority of institutions ($\beta = 0.761$, $t = 2.921$, $p = 0.004$) and on enforcement and trust ($\beta = 0.761$, $t = 2.209$, $p = 0.028$), suggesting that communities recognize the importance of power structures in institutional effectiveness. However, its effect on participation and inclusiveness ($p = 0.444$) and perceptions of change over time ($p = 0.078$) is not statistically significant. Political involvement and policy impact shows a negative and significant influence on participation and inclusiveness ($\beta = -0.909$, $t = -3.730$, $p = 0.000$) and perceptions of change over time ($\beta = -1.298$, $t = -4.279$, $p = 0.000$), indicating that higher political entanglement reduce community engagement and the perception of progress in CPR governance. Community representation and participation emerges as a strong positive predictor for participation and inclusiveness ($\beta = 3.062$, $t = 12.583$, $p = 0.000$) and perceptions of change over time ($\beta = 3.053$, $t = 10.078$, $p = 0.000$), highlighting the critical role of active community involvement in shaping governance perceptions. Interestingly, its impact on enforcement and trust is negative ($\beta = -1.079$, $t = -4.342$, $p = 0.000$), suggesting potential tensions between representative structures and enforcement mechanisms. The military–political interface exerts a consistently negative and significant influence across all dependent variables, especially participation and inclusiveness ($\beta = -1.061$, $t = -5.657$, $p = 0.000$) and perceptions of change over time ($\beta = -1.663$, $t = -7.121$, $p = 0.000$), indicating that militarized or politically dominated contexts undermine community trust and engagement.

Lastly, cultural and geopolitical factors positively and significantly affect all four outcomes, emphasizing that shared cultural norms and regional geopolitical considerations enhance community perceptions of governance effectiveness. Model statistics show that the explained variance ($R^2$) ranges from 18.5% for enforcement and trust to 57.5% for participation and inclusiveness, indicating that the predictors moderately explain community perceptions. The F-tests are significant ($p < 0.001$) across all models, confirming the overall fit of the regressions. Durbin-Watson values close to 2 suggest no serious autocorrelation issues. It highlights that community representation, cultural factors, and the distribution of power are key determinants of positive CPR governance perceptions, while excessive political or military influence can significantly diminish community trust and participation.

**Table 6.28 Regression Analysis of Politics of Engagement Dimensions on Community Perceptions of CPR Governance**

| **Independent variables:** Politics of Engagement Dimensions | **Dependent Variable:** Community Perceptions of CPR Governance | | | |
|---|---|---|---|---|
| | Role and authority of institutions | Enforcement and trust | Participation and inclusiveness | Perceptions of change over time |
| Constant | 1.955 (t=11.087, p=0.000) | 3.315 (t=14.224, p=0.000) | 1.344 (t=5.889, p=0.000) | 1.474 (t=5.188, p=0.000) |
| Power and influence in CPR governance | 0.761 (t=2.921, p=0.004) | 0.761 (t=2.209, p=0.028) | 0.258 (t=0.766, p=0.444) | 0.743 (t=1.769, p=0.078) |
| Political involvement and policy impact | -0.191 (t=-1.014, p=0.311) | -0.298 (t=-1.197, p=0.233) | -0.909 (t=-3.730, p=0.000) | -1.298 (t=-4.279, p=0.000) |
| Community representation and participation | 0.923 (t=4.907, p=0.000) | -1.079 (t=-4.342, p=0.000) | 3.062 (t=12.583, p=0.000) | 3.053 (t=10.078, p=0.000) |
| Military–political interface | -0.330 (t=-2.280, p=0.023) | -0.966 (t=-5.042, p=0.000) | -1.061 (t=-5.657, p=0.000) | -1.663 (t=-7.121, p=0.000) |
| Cultural and geopolitical | 1.004 (t=5.234, p=0.000) | 0.701 (t=2.766, p=0.006) | 1.210 (t=4.876, p=0.000) | 1.562 (t=5.053, p=0.000) |
| R | 0.529 | 0.430 | 0.758 | 0.735 |
| $R^2$ | 0.279 | 0.185 | 0.575 | 0.540 |
| Adjusted $R^2$ | 0.264 | 0.168 | 0.566 | 0.531 |
| F (df1, df2) | 18.529 (5,239) | 10.849 (5,239) | 64.749 (5,239) | 56.188 (5,239) |
| Sig. (ANOVA) | 0.000 | 0.000 | 0.000 | 0.000 |
| Durbin-Watson | 1.270 | 1.508 | 1.301 | 1.999 |

*Source: Primary Survey, 2025*

The analysis of the politics of engagement in CPR governance reveals that the distribution of power, community representation, and cultural-geopolitical factors play a critical role in shaping community perceptions. While active community participation and inclusive representation significantly enhance perceptions of governance effectiveness and progress, excessive political entanglement or military–political influence tends to undermine trust, enforcement, and engagement. These findings highlight the complex interplay between institutional authority, power dynamics, and local participation in CPR management, highlighting that sustainable governance requires not only formal institutional structures but also meaningful community involvement and culturally sensitive approaches to policy implementation.

## 6.4 Hypothesis Testing

- H2: Dimensions of politics of engagement, including power and influence, political involvement, community representation, military–political interface, and cultural–geopolitical factors, have a significant influence on community perceptions, participation, trust, and overall governance of common-property resources (CPRs).

To examine this, multiple regression analyses were conducted across Tables 6.1–6.26, assessing the relationships between these political dimensions and four key governance outcomes: role and authority of institutions, enforcement and trust, participation and inclusiveness, and perceptions of change over time. The results consistently highlight that community representation and participation exerted the strongest positive influence on governance perceptions across all models, demonstrating high statistical significance (t-values ranging from 4.907 to 12.583, $p < 0.001$; Tables 6.1, 6.26). Likewise, cultural and geopolitical factors showed a robust positive impact across outcomes (t-values 2.766–5.234, $p < 0.01$), indicating that local traditions, social norms, and historical-political contexts substantially enhance CPR governance effectiveness (Tables 6.12, 6.26).

Conversely, negative effects were observed for military–political interface and political involvement and policy impact, particularly on participation and perceptions of change over time, with significant negative coefficients (t-values -2.280 to -7.121, $p < 0.05$; Tables 6.3, 6.26), suggesting that coercive or top-down political interventions undermine community trust and inclusiveness. The role and influence of political actors had selective significance, positively affecting institutional authority and enforcement/trust (t-values 2.209–2.921, $p < 0.05$), but remaining non-significant for participation and temporal perceptions

(Tables 6.5, 6.26), indicating nuanced and context-dependent effects of power in CPR governance. Collectively, the regression models demonstrated adequate explanatory power, with $R^2$ values ranging from 0.185 to 0.575 and all models statistically significant (F-values 10.849–64.749, $p < 0.001$), while Durbin-Watson statistics (1.270–1.999) confirmed no serious autocorrelation issues (Tables 6.1–6.26).

These results collectively support the general hypothesis, emphasizing that inclusive political engagement and attention to cultural-geopolitical contexts enhance CPR governance, while coercive political interventions and top-down policies can hinder community trust and participation. These findings emphasise the critical importance of participatory, decentralized, and context-sensitive approaches to sustainable CPR governance.

## 6.5 Conclusion

The chapter explored how institutional frameworks, political dynamics, and community perceptions interact in managing common-pool resources (CPRs). It focused on three main areas: the institutional background of CPR governance and the politics of engagement. The Institutional Background of CPR Governance section examined the structures and operations that support resource management. The analysis showed that clear institutions, defined roles, and established authority from local bodies shape community views on CPR governance. Communities tend to trust institutions that have transparent decision-making and consistent enforcement. Additionally, past patterns of governance, including previous participatory efforts and formal policies, helped build legitimacy and foster compliance, providing a basis for assessing political engagement.

The Politics of Engagement in CPRs section looked at how political factors affect governance outcomes. The findings highlighted that community representation and participation are key to positive perceptions of governance. Higher participation levels lead to increased trust and satisfaction with CPR management. Cultural and geopolitical factors also play a positive role, as local traditions and social norms improve institutional effectiveness. However, coercive political methods, such as military influence or top-down involvement, harm community engagement and perceptions of progress over time. The analysis showed that political power can have mixed effects; it strengthen institutional authority in some situations but does not always enhance participation. These results indicate that inclusive, community-focused political processes are essential for effective CPR governance.

The Politics of Engagement Index (PEI) combined the various aspects of political engagement into a single measure. Regression analyses using PEI confirmed that higher scores in engagement led to better views of institutional roles, enforcement, trust, participation, and perceived improvements over time. The PEI provided evidence that participatory, culturally aware, and decentralized governance practices result in more sustainable and community-supported CPR management. Hypothesis testing supported the main idea that inclusive, participatory, and culturally relevant engagement significantly boosts community perceptions and satisfaction with CPR governance. In contrast, coercive or exclusionary political practices weaken these outcomes. The findings show that institutional effectiveness is closely linked to the quality of political engagement and that sustainable CPR management relies on balancing formal authority with active, community-led participation. The chapter emphasizes that well-organized institutions, along with inclusive political processes, trust, compliance, and perceived improvements over time, reinforce the important connection between institutional frameworks and the politics of engagement in achieving effective and sustainable CPR governance.

# CHAPTER VII

# SUSTAINABILITY AND EQUITY IN COMMON PROPERTY RESOURCE GOVERNANCE: CHALLENGES AND OPPORTUNITIES


7.1 Introduction

7.2 Threats to CPRs

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7.6 Conclusion

# CHAPTER VII
# SUSTAINABILITY AND EQUITY IN COMMON PROPERTY RESOURCE GOVERNANCE: CHALLENGES AND OPPORTUNITIES

## 7.1 Introduction

The governance of Common Property Resources (CPRs) stands at the intersection of sustainability, equity, and community welfare. While earlier analyses examined the institutional and political dimensions influencing CPR governance, this chapter shifts focus to the emerging threats, sustainability concerns, and opportunities shaping the equitable management of these shared resources. The sustainability of Common Property Resources (CPRs) in border regions such as Ladakh is increasingly shaped by a complex interplay of ecological pressures, socio-political changes, and institutional transformations. Following the Union Territory (UT) reorganization of Ladakh in 2019, the governance structure of CPRs has undergone significant change, introducing new administrative actors while altering long-standing community-based management systems. Against this backdrop, the present chapter seeks to identify and analyze the major threats confronting CPR sustainability, assess the evolving concerns of local communities, and explore potential opportunities for ensuring equitable and inclusive governance. This analysis extends the findings of the previous chapters on institutional dynamics and politics of engagement, linking governance processes to on-the-ground environmental and livelihood challenges.

Ladakh's fragile mountain ecosystem and its dependence on shared natural resources such as pastures, water sources, forests, and medicinal plant zones make the sustainability of CPRs central to community survival. However, pressures from climatic variability, overgrazing, population growth, tourism expansion, and increased military presence have intensified competition and degradation of these commons. The perceptions and experiences of border households provide critical overview into how these threats translate into socio-economic vulnerability and shifts in resource use patterns. Understanding such local perspectives is vital for designing adaptive and inclusive governance models that align ecological sustainability with social justice and local autonomy.

This chapter systematically examines the interconnections between ecological threats, community responses, and governance outcomes using household-level data from the border

villages of the Union Territory of Ladakh. It analyses the intensity and nature of perceived threats, evaluates sustainability concerns, and identifies collective and institutional responses that emerge as potential opportunities for strengthening CPR governance. Through a combination of descriptive, inferential, and multivariate analyses, the chapter also investigates how socio-economic characteristics, governance experiences, and political factors shape household perceptions and participation in sustainability initiatives.

## 7.2 Nature and Intensity of Threats to Common Property Resources

Common Property Resources (CPRs) in the study region are increasingly exposed to a range of environmental, socio-economic, and institutional pressures that threaten their sustainability and equitable governance. Over time, factors such as population growth, overgrazing, unregulated tourism, and climatic variability have intensified the degradation of shared community assets, particularly rangelands, water bodies, and forest resources. The expansion of developmental and military activities in ecologically sensitive and strategically significant regions has further exacerbated the pressure on traditional resource systems that once functioned under strong community norms. These multiple and interlinked threats not only disrupt the ecological balance but also weaken the social fabric that underpins collective resource management.

This section seeks to identify and analyse the major threats perceived by local communities in relation to CPR availability, quality, and accessibility. By examining both quantitative indicators and community perceptions gathered through the field survey, it assesses the intensity and pattern of these threats across different geographical contexts and livelihood groups. The analysis draws upon responses related to changes in CPR availability, reasons for resource decline, and specific drivers such as climate change, overexploitation, and institutional neglect.

Table 7.1 presents the descriptive statistics of community perceptions regarding the key threats to Common Property Resources (CPRs) and the willingness of individuals to participate in collective management initiatives. Responses were measured on a five-point Likert scale, where 1 indicates strong disagreement and 5 indicates strong agreement. The results highlight a generally high level of concern among respondents about environmental and anthropogenic pressures affecting CPR sustainability. The mean score for the statement “Climate change (e.g., changing snowfall/rainfall, glacier melt) is a serious threat to the CPRs in our village” is 3.90, indicating that most respondents agree that climatic changes pose a major risk to the availability and quality of CPRs.

**Table 7.1 Community Perceptions on Major Threats and Collective Actions for CPR Sustainability**

| Statements | N | Min. | Max. | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Climate change (e.g., changing snowfall/rainfall, glacier melt) is a serious threat to the CPRs in our village. | 245 | 1.0 | 5.0 | 3.902 | 1.3239 |
| Overgrazing and population pressure are reducing the availability of CPRs. | 245 | 1.0 | 5.0 | 3.812 | 1.3079 |
| Tourism and military activities are putting pressure on our community resources. | 245 | 1.0 | 5.0 | 3.702 | 1.1294 |
| Community-based initiatives (e.g., rotational grazing, plantation drives, water management) can improve the sustainability of CPRs. | 245 | 1.0 | 5.0 | 3.959 | 1.3019 |
| I am willing to participate in collective efforts to conserve and manage CPRs. | 245 | 1.0 | 5.0 | 4.086 | .8852 |

*Note: 1 = strong disagreement to 5 =strong agreement; Source: Primary Survey, 2025*

This finding is consistent with the increasing unpredictability of rainfall patterns and glacial retreat observed in several highland and semi-arid regions, which directly affect water availability and grazing lands. Similarly, the perception that "Overgrazing and population pressure are reducing the availability of CPRs" received a mean score of 3.81, suggesting widespread recognition of resource depletion driven by demographic and livestock expansion. The statement concerning "Tourism and military activities putting pressure on community resources" has a moderately high mean of 3.70, reflecting local concerns about external interventions and land-use conflicts that disrupt traditional governance mechanisms. These pressures often lead to restricted access, overuse, and degradation of shared ecological spaces, particularly in ecologically fragile zones.

Encouragingly, the responses to community-level solutions indicate optimism and readiness for collective action. The statement "Community-based initiatives (e.g., rotational grazing, plantation drives, water management) can improve the sustainability of CPRs" received a mean score of 3.96, and "I am willing to participate in collective efforts to conserve and manage CPRs" recorded the highest mean of 4.09, with relatively low variability (SD =

0.885). This reflects a strong sense of community responsibility and willingness to engage in participatory resource management practices. It highlights that while communities clearly recognize multiple external and internal threats to their CPRs—particularly from climate change, population pressure, and unsustainable activities—they also exhibit high potential for participatory conservation. These findings suggest that strengthening local governance and facilitating inclusive management frameworks could serve as effective strategies for ensuring CPR sustainability amidst growing ecological and developmental challenges.

Table 7.2 presents a detailed comparison of responses across five villages—Darchik, Hardas, Kaksar, Mushkoo, and Shilikchay—regarding the perceived threats to Common Property Resources (CPRs) and the willingness of households to engage in collective conservation efforts. The first statement on climate change indicates that perceptions vary significantly between villages ($F(4,240) = 47.778$, $p = 0.000$). Darchik (Mean = 4.96) and Kaksar (Mean = 4.93) show the highest agreement, reflecting strong concern about changing snowfall, rainfall, and glacial melt. Mushkoo, on the other hand, shows the lowest mean (2.10), suggesting either lower exposure to these climate impacts or different local experiences. For overgrazing and population pressure, significant variation also exists ($F(4,240) = 51.306$, $p = 0.000$). Darchik (4.96) and Hardas (4.53) report very high concern, whereas Kaksar (2.44) shows considerably lower perceived pressure, which may reflect differences in population density, herd sizes, or local grazing practices. Tourism and military activity similarly demonstrate significant village-level differences ($F(4,240) = 41.475$, $p = 0.000$). Darchik again reports the maximum concern (Mean = 5.00), highlighting localized impacts of tourism or military operations, while Mushkoo registers the lowest perception of threat (2.38), indicating heterogeneity in exposure to these external pressures. Regarding the effectiveness of community-based initiatives, perceptions differ notably ($F(4,240) = 28.472$, $p = 0.000$). Kaksar (4.91) and Mushkoo (4.55) express strong confidence in initiatives like rotational grazing and water management, whereas Darchik (2.41) appears less convinced, possibly due to prior unsuccessful efforts or lack of awareness.

**Table 7.2 Village-wise Differences in Perceptions of Threats and Collective Action for CPR Sustainability**

| Statements | Villages | N | Mean | SD | Std. Error | ANOVA |
|---|---|---|---|---|---|---|
| Climate change (e.g., changing snowfall/rainfall, glacier melt) is a serious threat to the CPRs in our village. | Darchik | 27 | 4.96 | 0.19 | 0.04 | F (4,240)= 47.778, p=0.000 |
| | Hardas | 86 | 3.59 | 1.04 | 0.11 | |
| | Kaksar | 54 | 4.93 | 0.26 | 0.04 | |
| | Mushkoo | 29 | 2.10 | 1.26 | 0.23 | |
| | Shilikchay | 49 | 3.80 | 1.41 | 0.20 | |
| | Total | 245 | 3.90 | 1.32 | 0.08 | |
| Overgrazing and population pressure are reducing the availability of CPRs. | Darchik | 27 | 4.96 | 0.19 | 0.04 | F (4,240)= 51.306, p=0.000 |
| | Hardas | 86 | 4.53 | 0.61 | 0.07 | |
| | Kaksar | 54 | 2.44 | 0.88 | 0.12 | |
| | Mushkoo | 29 | 3.21 | 1.47 | 0.27 | |
| | Shilikchay | 49 | 3.78 | 1.37 | 0.20 | |
| | Total | 245 | 3.81 | 1.31 | 0.08 | |
| Tourism and military activities are putting pressure on our community resources. | Darchik | 27 | 5.00 | 0.00 | 0.00 | F (4,240)= 41.475, p=0.000 |
| | Hardas | 86 | 4.14 | 0.49 | 0.05 | |
| | Kaksar | 54 | 3.20 | 0.45 | 0.06 | |
| | Mushkoo | 29 | 2.38 | 1.54 | 0.29 | |
| | Shilikchay | 49 | 3.55 | 1.34 | 0.19 | |
| | Total | 245 | 3.70 | 1.13 | 0.07 | |
| Community-based initiatives (e.g., rotational grazing, plantation drives, water management) can improve the sustainability of CPRs. | Darchik | 27 | 2.41 | 1.62 | 0.31 | F (4,240)= 28.472, p=0.000 |
| | Hardas | 86 | 3.90 | 1.13 | 0.12 | |
| | Kaksar | 54 | 4.91 | 0.29 | 0.04 | |
| | Mushkoo | 29 | 4.55 | 0.69 | 0.13 | |
| | Shilikchay | 49 | 3.53 | 1.34 | 0.19 | |
| | Total | 245 | 3.96 | 1.30 | 0.08 | |
| I am willing to participate in collective efforts to conserve and manage CPRs. | Darchik | 27 | 4.26 | 0.45 | 0.09 | F (4,240)= 28.018, p=0.000 |
| | Hardas | 86 | 3.80 | 0.55 | 0.06 | |
| | Kaksar | 54 | 4.81 | 0.39 | 0.05 | |
| | Mushkoo | 29 | 4.48 | 0.63 | 0.12 | |
| | Shilikchay | 49 | 3.45 | 1.29 | 0.18 | |
| | Total | 245 | 4.09 | 0.89 | 0.06 | |

*Note: 1 = strong disagreement to 5 =strong agreement; Source: Primary Survey, 2025*

Finally, willingness to participate in collective action also varies significantly across villages (F(4,240) = 28.018, p = 0.000). Kaksar (4.81) and Mushkoo (4.48) report the highest willingness, reflecting strong community engagement, while Shilikchay (3.45) shows relatively lower readiness. Findings indicates that both perceived threats and the willingness to engage in sustainable management of CPRs are not uniform across villages. The significant ANOVA results shows the influence of local ecological, social, and institutional contexts in shaping community perceptions and participatory behavior. These findings suggest that CPR

governance strategies must be tailored to the specific conditions and challenges of each village to ensure equitable and effective conservation outcomes.

Table 7.3 presents a comparative analysis of perceptions regarding threats to Common Property Resources (CPRs) and willingness to engage in collective management efforts between two regions: Drass and Kargil. Independent sample t-tests were conducted to assess whether the mean differences between the two regions are statistically significant. The first statement on climate change shows a significant difference ($t(243) = -8.462$, $p = 0.000$), with Kargil respondents reporting a higher perception of climate-related threats (Mean = 4.12) compared to Drass (Mean = 2.11). This indicates that communities in Kargil feel more vulnerable to changes in snowfall, rainfall, and glacier melt than those in Drass, potentially due to geographical, climatic, or livelihood-related differences. For overgrazing and population pressure, the mean perception is also significantly higher in Kargil (Mean = 3.88) than in Drass (Mean = 3.30), with $t(243) = -2.190$, $p = 0.029$. This suggests that Kargil communities experience or perceive more pressure from livestock grazing and population growth impacting CPR availability. Tourism and military activities are perceived as a greater threat in Kargil (Mean = 3.85) than in Drass (Mean = 2.48), with the difference statistically significant ($t(28.55)^* = -4.482$, $p = 0.000$). The higher exposure of Kargil to external pressures, including military operations and tourism, likely explains this divergence in perception. Interestingly, Drass respondents report stronger agreement on the potential effectiveness of community-based initiatives (Mean = 4.52) compared to Kargil (Mean = 3.89), $t(53.77)^* = 3.867$, $p = 0.000$, indicating greater confidence in local management strategies such as rotational grazing, plantation drives, and water management initiatives. Finally, willingness to participate in collective efforts is significantly higher in Drass (Mean = 4.48) than in Kargil (Mean = 4.04), $t(243) = 2.489$, $p = 0.013$, reflecting a stronger local engagement culture or social cohesion in Drass for managing CPRs. The results highlight substantial regional differences in both perceived threats and willingness to participate in conservation activities. Kargil communities perceive greater external threats from climate, population pressure, and tourism/military activity, while Drass communities exhibit stronger confidence in local initiatives and higher participatory readiness.

**Table 7.3 Comparative Analysis of Perceptions on CPR Threats and Collective Action between Drass and Kargil**

| Statements | Tehsil | N | Mean | SD | Std. Error | Independent Sample t-test |
|---|---|---|---|---|---|---|
| Climate change (e.g., changing snowfall/rainfall, glacier melt) is a serious threat to the CPRs in our village. | Drass | 27 | 2.11 | 1.28 | 0.25 | -8.462 (243), p=0.000 |
| | Kargil | 218 | 4.12 | 1.15 | 0.08 | |
| | Total | 245 | 3.90 | 1.32 | 0.08 | |
| Overgrazing and population pressure are reducing the availability of CPRs. | Drass | 27 | 3.30 | 1.49 | 0.29 | -2.190 (243), p=0.029 |
| | Kargil | 218 | 3.88 | 1.27 | 0.09 | |
| | Total | 245 | 3.81 | 1.31 | 0.08 | |
| Tourism and military activities are putting pressure on our community resources. | Drass | 27 | 2.48 | 1.55 | 0.30 | -4.482 (28.55)*, p=0.000 |
| | Kargil | 218 | 3.85 | 0.97 | 0.07 | |
| | Total | 245 | 3.70 | 1.13 | 0.07 | |
| Community-based initiatives (e.g., rotational grazing, plantation drives, water management) can improve the sustainability of CPRs. | Drass | 27 | 4.52 | 0.70 | 0.13 | 3.867 (53.77)*, p=0.000 |
| | Kargil | 218 | 3.89 | 1.34 | 0.09 | |
| | Total | 245 | 3.96 | 1.30 | 0.08 | |
| I am willing to participate in collective efforts to conserve and manage CPRs. | Drass | 27 | 4.48 | 0.64 | 0.12 | 2.489 (243), p=0.013 |
| | Kargil | 218 | 4.04 | 0.90 | 0.06 | |
| | Total | 245 | 4.09 | 0.89 | 0.06 | |

*Note: 1 = strong disagreement to 5 =strong agreement; * Equal variances not assumed; Source: Primary Survey, 2025*

Table 7.4 presents an ANOVA-based comparison of perceptions on threats to Common Property Resources (CPRs) and willingness to engage in collective management across four community groups: Balti, Dard, Purig, and Shina. Regarding climate change as a threat to CPRs, the Dard community perceives it as the most serious (Mean = 4.97), followed by Shina (Mean = 3.94), Balti (Mean = 3.66), and Purig (Mean = 3.27). The ANOVA result ($F(3,241) = 9.874$, $p = 0.000$) indicates significant differences among the communities, suggesting that geographic or environmental factors likely influence the perception of climate-related risks. For overgrazing and population pressure, Dard again reports the highest concern (Mean = 4.97), while Shina and Purig report lower levels of perceived threat (Means = 2.71 and 2.82, respectively). Balti falls in between (Mean = 4.37). The highly significant ANOVA ($F(3,241) = 67.023$, $p = 0.000$) shows that community-specific land use practices, livestock dependency, and demographic pressures may shape perceptions of CPR depletion. Tourism and military activities are seen as major pressures by the Dard community (Mean = 5.00), with

Balti also moderately concerned (Mean = 3.96), while Purig and Shina report lower perceptions (Means = 3.18 and 2.92). ANOVA results (F(3,241) = 46.694, p = 0.000) confirm significant differences, reflecting the varied exposure of communities to external developmental and security-related pressures. Interestingly, perceptions of the effectiveness of community-based initiatives differ markedly. Shina shows the highest agreement with the efficacy of initiatives such as rotational grazing and plantation drives (Mean = 4.78), while Dard reports the lowest (Mean = 2.32). Balti and Purig show intermediate levels of agreement (Means = 3.91 and 2.91).

### 7.4 Community-wise Perceptions of Threats to CPRs and Willingness for Collective Action

| Statements | Community | N | Mean | SD | Std. Error | ANOVA |
|---|---|---|---|---|---|---|
| Climate change (e.g., changing snowfall/rainfall, glacier melt) is a serious threat to the CPRs in our village. | Balti, | 120 | 3.66 | 1.19 | 0.11 | F (3,241)= 9.874, p=0.000 |
| | Dard | 31 | 4.97 | 0.18 | 0.03 | |
| | Purig | 11 | 3.27 | 1.10 | 0.33 | |
| | Shina | 83 | 3.94 | 1.56 | 0.17 | |
| | Total | 245 | 3.90 | 1.32 | 0.08 | |
| Overgrazing and population pressure are reducing the availability of CPRs. | Balti, | 120 | 4.37 | 0.90 | 0.08 | F (3,241)= 67.023, p=0.000 |
| | Dard | 31 | 4.97 | 0.18 | 0.03 | |
| | Purig | 11 | 2.82 | 1.33 | 0.40 | |
| | Shina | 83 | 2.71 | 1.17 | 0.13 | |
| | Total | 245 | 3.81 | 1.31 | 0.08 | |
| Tourism and military activities are putting pressure on our community resources. | Balti, | 120 | 3.96 | 0.92 | 0.08 | F (3,241)= 46.694, p=0.000 |
| | Dard | 31 | 5.00 | 0.00 | 0.00 | |
| | Purig | 11 | 3.18 | 0.75 | 0.23 | |
| | Shina | 83 | 2.92 | 1.05 | 0.12 | |
| | Total | 245 | 3.70 | 1.13 | 0.07 | |
| Community-based initiatives (e.g., rotational grazing, plantation drives, water management) can improve the sustainability of CPRs. | Balti, | 120 | 3.91 | 1.13 | 0.10 | F (3,241)= 46.591, p=0.000 |
| | Dard | 31 | 2.32 | 1.60 | 0.29 | |
| | Purig | 11 | 2.91 | 1.14 | 0.34 | |
| | Shina | 83 | 4.78 | 0.50 | 0.05 | |
| | Total | 245 | 3.96 | 1.30 | 0.08 | |
| I am willing to participate in collective efforts to conserve and manage CPRs. | Balti, | 120 | 3.72 | 0.84 | 0.08 | F (3,241)= 38.026, p=0.000 |
| | Dard | 31 | 4.26 | 0.44 | 0.08 | |
| | Purig | 11 | 3.00 | 1.34 | 0.40 | |
| | Shina | 83 | 4.70 | 0.51 | 0.06 | |
| | Total | 245 | 4.09 | 0.89 | 0.06 | |

*Note: 1 = strong disagreement to 5 =strong agreement; Source: Primary Survey, 2025*

The significant ANOVA (F(3,241) = 46.591, p = 0.000) suggests that past experience with local governance and community organization may influence confidence in sustainable CPR management strategies. Finally, willingness to participate in collective conservation

efforts is strongest among Shina (Mean = 4.70) and Dard (Mean = 4.26), moderate in Balti (Mean = 3.72), and lowest in Purig (Mean = 3.00), with F(3,241) = 38.026, p = 0.000. These results highlight variations in social cohesion, community mobilization capacity, and cultural attitudes toward collective action across the communities. Table 7.4 indicates that perceptions of threats to CPRs and the readiness to engage in collective conservation are significantly influenced by community identity, reflecting differences in exposure, dependency on resources, and governance experiences.

Table 7.5 examines whether household socio-economic status, proxied by ration card categories—APL, AAY, BPL, and PHH—affects perceptions of threats to Common Property Resources (CPRs) and willingness to participate in collective management. Regarding climate change as a threat to CPRs, mean scores are broadly similar across ration card categories (APL = 3.93, AAY = 4.00, BPL = 3.88, PHH = 4.00), and the ANOVA result (F(3,241) = 0.044, p = 0.988) indicates no significant difference among households. This suggests that awareness of climate-related risks is relatively uniform across economic groups. For overgrazing and population pressure, the mean perception is slightly higher among AAY (Mean = 5.00) and PHH (Mean = 5.00), compared to APL (3.70) and BPL (3.88), but ANOVA (F(3,241) = 1.201, p = 0.310) shows no statistically significant variation, indicating that concerns about CPR depletion are broadly shared regardless of household economic status. Similarly, tourism and military pressures show minimal variation across ration card types (means ranging from 3.69 to 4.50) with no significant differences (F(3,241) = 0.358, p = 0.784), suggesting that external pressures on CPRs are perceived consistently by households of different economic standing. Perceptions of the effectiveness of community-based initiatives are slightly higher among APL households (Mean = 4.20) than BPL households (Mean = 3.78), but the difference is not statistically significant at the 5% level (F(3,241) = 2.271, p = 0.081). This implies that confidence in local conservation strategies does not strongly vary by economic category. Interestingly, willingness to participate in collective conservation efforts differs significantly across ration card groups (F(3,241) = 5.715, p = 0.001). Households with APL cards report the highest willingness (Mean = 4.33), followed by AAY (4.50), while BPL households report lower willingness (Mean = 3.90). PHH households show the lowest score (3.00). This suggests that economic vulnerability may influence the capacity or motivation to engage in community-level conservation initiatives, with relatively better-off households showing higher readiness to participate. These findings indicates that while perceptions of threats to CPRs are generally consistent across socio-economic groups, economic status can significantly influence

willingness to participate in collective management, highlighting the need for inclusive strategies that consider the constraints of more vulnerable households.

### 7.5 Perceptions of CPR Threats and Collective Participation by Household Ration Card Status

| Statements | Ration Card Status | N | Mean | SD | Std. Error | ANOVA |
|---|---|---|---|---|---|---|
| Climate change (e.g., changing snowfall/rainfall, glacier melt) is a serious threat to the CPRs in our village. | APL | 106 | 3.93 | 1.40 | 0.14 | F (3,241)= 0.044, p=0.988 |
| | AAY | 2 | 4.00 | 1.41 | 1.00 | |
| | BPL | 136 | 3.88 | 1.28 | 0.11 | |
| | PHH | 1 | 4.00 | | | |
| | Total | 245 | 3.90 | 1.32 | 0.08 | |
| Overgrazing and population pressure are reducing the availability of CPRs. | APL | 106 | 3.70 | 1.34 | 0.13 | F (3,241)= 1.201, p=0.310 |
| | AAY | 2 | 5.00 | 0.00 | 0.00 | |
| | BPL | 136 | 3.88 | 1.28 | 0.11 | |
| | PHH | 1 | 5.00 | | | |
| | Total | 245 | 3.81 | 1.31 | 0.08 | |
| Tourism and military activities are putting pressure on our community resources. | APL | 106 | 3.70 | 1.19 | 0.12 | F (3,241)= 0.358, p=0.784 |
| | AAY | 2 | 4.50 | 0.71 | 0.50 | |
| | BPL | 136 | 3.69 | 1.09 | 0.09 | |
| | PHH | 1 | 4.00 | | | |
| | Total | 245 | 3.70 | 1.13 | 0.07 | |
| Community-based initiatives (e.g., rotational grazing, plantation drives, water management) can improve the sustainability of CPRs. | APL | 106 | 4.20 | 1.31 | 0.13 | F (3,241)= 2.271, p=0.081 |
| | AAY | 2 | 4.00 | 1.41 | 1.00 | |
| | BPL | 136 | 3.78 | 1.28 | 0.11 | |
| | PHH | 1 | 3.00 | | | |
| | Total | 245 | 3.96 | 1.30 | 0.08 | |
| I am willing to participate in collective efforts to conserve and manage CPRs. | APL | 106 | 4.33 | 0.67 | 0.07 | F (3,241)= 5.715, p=0.001 |
| | AAY | 2 | 4.50 | 0.71 | 0.50 | |
| | BPL | 136 | 3.90 | 0.98 | 0.08 | |
| | PHH | 1 | 3.00 | | | |
| | Total | 245 | 4.09 | 0.89 | 0.06 | |

*Note: 1 = strong disagreement to 5 =strong agreement; Source: Primary Survey, 2025*

Table 7.6 presents the perceived changes in the availability of Common Property Resources (CPRs) over the last ten years across different socio-geographic and economic categories, including revenue villages, tehsils, community groups, and household ration card status. The data show that respondents from Darchik, Hardas, and Kaksar overwhelmingly reported a decrease in CPR availability, with nearly 100% indicating reduction, highlighting significant localized resource stress. Mushkoo and Shilikchay reported a comparatively lower decrease, with some households noting no change or slight increases, suggesting heterogeneity

in CPR trends even within small regions. The Chi-Square test ($\chi^2 = 70.162$, $p = 0.000$) confirms that CPR availability changes are significantly associated with revenue village.

**Table 7.6 Changes in CPR Availability Over the Last 10 Years by Revenue Village, Tehsil, Community, and Ration Card Status**

| Variable | Category | | Status CPR availability changed in last 10 Years | | | Total | Chi-Square Test |
|---|---|---|---|---|---|---|---|
| | | | Decrease | Increase | No Change | | |
| Revenue Village | Darchik | N | 27 | 0 | 0 | 27 | 70.162 (8), p=0.000 |
| | | % | 100.0 | 0.0 | 0.0 | 100.0 | |
| | Hardas | N | 85 | 0 | 1 | 86 | |
| | | % | 98.8 | 0.0 | 1.2 | 100.0 | |
| | Kaksar | N | 54 | 0 | 0 | 54 | |
| | | % | 100.0 | 0.0 | 0.0 | 100.0 | |
| | Mushkoo | N | 15 | 2 | 12 | 29 | |
| | | % | 51.7 | 6.9 | 41.4 | 100.0 | |
| | Shilikchay | N | 37 | 3 | 9 | 49 | |
| | | % | 75.5 | 6.1 | 18.4 | 100.0 | |
| Tehsil | Drass | N | 14 | 2 | 11 | 27 | 43.072 (2), p=0.000 |
| | | % | 51.9 | 7.4 | 40.7 | 100.0 | |
| | Kargil | N | 204 | 3 | 11 | 218 | |
| | | % | 93.6 | 1.4 | 5.0 | 100.0 | |
| Community | Balti, | N | 112 | 1 | 7 | 120 | 29.031 (6), p=0.000 |
| | | % | 93.3 | 0.8 | 5.8 | 100.0 | |
| | Dard | N | 31 | 0 | 0 | 31 | |
| | | % | 100.0 | 0.0 | 0.0 | 100.0 | |
| | Purig | N | 6 | 2 | 3 | 11 | |
| | | % | 54.5 | 18.2 | 27.3 | 100.0 | |
| | Shina | N | 69 | 2 | 12 | 83 | |
| | | % | 83.1 | 2.4 | 14.5 | 100.0 | |
| Ration Card Status | APL | N | 99 | 0 | 7 | 106 | 6.060 (6), p= 0.416 |
| | | % | 93.4 | 0.0 | 6.6 | 100.0 | |
| | AAY | N | 2 | 0 | 0 | 2 | |
| | | % | 100.0 | 0.0 | 0.0 | 100.0 | |
| | BPL | N | 116 | 5 | 15 | 136 | |
| | | % | 85.3 | 3.7 | 11.0 | 100.0 | |
| | PHH | N | 1 | 0 | 0 | 1 | |
| | | % | 100.0 | 0.0 | 0.0 | 100.0 | |

*Note: Percent within rows; Source: Primary Survey, 2025*

Across tehsils, about half of the respondents in Drass perceived a decrease, while 40.7% reported no change, indicating a relatively stable CPR condition compared to Kargil, where 93.6% reported a decrease. The Chi-Square test ($\chi^2 = 43.072$, $p = 0.000$) shows a statistically significant difference between tehsils in perceived CPR change, reflecting regional disparities in environmental pressures or resource management effectiveness. Among community groups, the Dard community uniformly reported a decrease (100%), while the Balti and Shina communities largely indicated decreased availability (93.3% and 83.1%, respectively). The Purig community showed more variation, with 54.5% reporting a decrease, 18.2% an increase, and 27.3% no change. The Chi-Square test ($\chi^2 = 29.031$, $p = 0.000$) indicates significant differences in CPR trends across communities, likely reflecting variations in resource dependence, cultural practices, or local governance. CPR availability trends by household economic status, indicated by ration card type, show a slightly lower decrease among BPL households (85.3%) compared to APL households (93.4%), while AAY and PHH households are too small in number for meaningful variation. The Chi-Square test ($\chi^2 = 6.060$, $p = 0.416$) indicates no statistically significant association between ration card status and perceived CPR change, suggesting that economic category alone does not strongly influence perceptions of CPR depletion. The data indicate that perceived CPR depletion is widespread across villages, tehsils, and communities, though the intensity varies spatially and culturally. Village- and community-level factors, such as local governance, land use patterns, and ecological conditions, are critical in shaping CPR trends, while household economic status has less influence on perceptions of change.

### 7.2.1 Threat Perception Index (TPI)

To quantify the perceived threats to Common Property Resources (CPRs) among households, a Threat Perception Index (TPI) was developed. The TPI integrates both the reported reasons for CPR depletion and the respondents' perceptions of specific environmental and anthropogenic threats. Data for the index were drawn from two sections of the survey. First, the binary indicators from question where respondents identified the reasons for changes in CPR availability over the last ten years, such as climate change, overgrazing, population pressure, tourism, military activity, or government restrictions. Each response was coded as 1 if selected and 0 if not selected. Second, the perceived threat statements from question, where respondents rated their agreement with statements on threats to CPRs, including climate change, overgrazing, and tourism or military pressure, on a Likert scale from 1 (strongly disagree) to 5 (strongly agree).

To construct the TPI, all items were first standardized using the Min-Max normalization method, bringing each variable onto a common scale ranging from 0 to 1. This standardization ensured comparability between binary and Likert-scale variables. Following this, the standardized scores for each respondent were averaged, giving equal weight to all items, thereby producing a composite score that reflects the overall perception of threats to CPRs. The resulting TPI ranges from 0 to 1, with higher values indicating greater perception of threats. This composite index allows for comparisons across villages, communities, and socio-economic groups, and can be further analyzed in relation to governance practices, livelihood dependence, or other relevant factors. By combining both objective identification of threat factors and subjective perceptions of their severity, the TPI provides a strong and broad measure of community-level threat awareness regarding CPRs.

Table 7.7 presents the Threat Perception Index (TPI) across different spatial and socio-economic categories, highlighting variations in how households perceive threats to Common Property Resources (CPRs). At the village level, Darchik registers the highest mean TPI (.846), indicating that respondents here perceive the greatest threat to their CPRs, likely reflecting severe environmental or anthropogenic pressures. Mushkoo and Shilikchay report the lowest mean TPIs (.245 and .426, respectively), suggesting comparatively lower threat perception among residents. The ANOVA result ($F = 70.535$, $p = 0.000$) confirms that these differences across villages are statistically significant.

At the tehsil level, Kargil shows a higher mean TPI (.532) compared to Drass (.248), indicating greater awareness or concern about threats among households in Kargil. The t-test result ($t = -7.581$, $p = 0.000$) confirms that the difference in threat perception between these two tehsils is significant. Looking at community groups, the Dard community perceives the highest threats (mean TPI = .844), while the Purig community reports the lowest (.266). This pattern shows how cultural and livelihood contexts may shape awareness and concern about CPR sustainability. The differences among communities are statistically significant ($F = 68.004$, $p = 0.000$). In contrast, ration card categories show minimal variation in TPI, with APL, AAY, BPL, and PHH households reporting mean values close to the overall mean (.501). The ANOVA ($F = 0.171$, $p = 0.916$) indicates that socio-economic status, as proxied by ration card type, does not significantly influence perceived threats to CPRs. It demonstrates that geographical location and community identity are more decisive factors in shaping threat perceptions than economic categorization, suggesting that local environmental pressures and cultural dependence on CPRs strongly influence household awareness and concern.

**Table 7.7 Threat Perception Index (TPI) across Villages, Communities, Tehsils, and Ration Card Categories**

| Variable | Category | N | Mean TPI | Std. Deviation | Std. Error | ANOVA/ t-test |
|---|---|---|---|---|---|---|
| Revenue Village | Darchik | 27 | .846 | .078 | .015 | F (4, 240)=70.535, p=0.000 |
| | Hardas | 86 | .498 | .116 | .012 | |
| | Kaksar | 54 | .539 | .087 | .012 | |
| | Mushkoo | 29 | .245 | .123 | .023 | |
| | Shilikchay | 49 | .426 | .230 | .033 | |
| | Total | 245 | .501 | .204 | .013 | |
| Tehsil | Drass | 27 | .248 | .122 | .023 | t (243)=-7.581, p=0.000 |
| | Kargil | 218 | .532 | .190 | .013 | |
| | Total | 245 | .501 | .204 | .013 | |
| Community | Balti, | 120 | .479 | .148 | .014 | F (3, 241)=68.004, p=0.000 |
| | Dard | 31 | .844 | .079 | .014 | |
| | Purig | 11 | .266 | .153 | .046 | |
| | Shina | 83 | .436 | .173 | .019 | |
| | Total | 245 | .501 | .204 | .013 | |
| Ration Card | APL | 106 | .511 | .194 | .019 | F (3, 241)=0.171, p=0.916 |
| | AAY | 2 | .513 | .124 | .088 | |
| | BPL | 136 | .493 | .214 | .018 | |
| | PHH | 1 | .450 | | | |
| | Total | 245 | .501 | .204 | .013 | |

*Source: Primary Survey, 2025*

Table 7.8 presents the results of a multiple regression analysis conducted to examine the influence of key factors—Threat Perception Index (TPI), Politics of Engagement Index (PEI), governance changes since UT status, role and authority of institutions, enforcement and trust, and participation and inclusiveness—on the Utilization CPRs Index. The model summary indicates an R value of 0.618, suggesting a moderately strong correlation between the predictors and the utilization of CPRs. The $R^2$ value of 0.381 indicates that approximately 38.1% of the variation in CPR utilization across households can be explained by the combined effect of the independent variables, while the adjusted $R^2$ of 0.366 adjusts for the number of predictors in the model. The Durbin-Watson statistic of 1.976 suggests no significant autocorrelation in the residuals, confirming the reliability of the model. The ANOVA table shows that the overall regression model is statistically significant ($F = 24.463$, $p = 0.000$), indicating that the selected predictors collectively have a meaningful effect on CPR utilization.

Looking at the coefficients, Threat Perception Index ($\beta = -0.396$, $p = 0.000$) has a significant negative effect on CPR utilization, implying that households perceiving higher threats from climate change, overgrazing, tourism, or military activities tend to reduce their reliance or intensity of CPR usage. The Politics of Engagement Index ($\beta = -0.109$, $p = 0.080$)

shows a negative relationship, although it is marginally non-significant, suggesting a limited effect of political influence on resource use. Governance changes since UT status (β = -0.216, p = 0.047) also have a small but significant negative impact, possibly reflecting transitional challenges or uncertainties in administrative control post-UT conversion.

**Table 7.8 Multiple Regression Analysis of Factors Influencing Utilization of Common Property Resources (CPRs**

| **Model Summary** | | | | |
|---|---|---|---|---|
| R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
| .618 | .381 | .366 | .2050700 | 1.976 |

| **ANOVA** | | | | | |
|---|---|---|---|---|---|
| | Sum of Squares | Df | Mean Square | F | Sig. |
| Regression | 6.172 | 6 | 1.029 | 24.463 | .000 |
| Residual | 10.009 | 238 | .042 | | |
| Total | 16.181 | 244 | | | |

| **Coefficients** | | | | | | |
|---|---|---|---|---|---|---|
| | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics |
| | B | Std. Error | Beta | | | VIF |
| (Constant) | .536 | .085 | | 6.341 | .000 | |
| Threat Perception Index | -.500 | .074 | -.396 | -6.781 | .000 | 1.312 |
| Politics of Engagement Index (PEI) | -.264 | .150 | -.109 | -1.757 | .080 | 1.478 |
| Governance changes since UT status | -.048 | .024 | -.216 | -1.999 | .047 | 4.495 |
| Role and authority of institutions | .000 | .031 | .001 | .007 | .994 | 2.708 |
| Enforcement and trust | .102 | .021 | .347 | 4.749 | .000 | 2.052 |
| Participation and inclusiveness | .092 | .023 | .422 | 4.031 | .000 | 4.219 |

*Note: Dependent Variable: Utilization CPRs Index; Source: Primary Survey, 2025*

In contrast, enforcement and trust (β = 0.347, p = 0.000) and participation and inclusiveness (β = 0.422, p = 0.000) exhibit significant positive effects on CPR utilization. This indicates that households are more likely to engage with and sustainably use CPRs when institutional rules are fairly enforced, and when governance is participatory and inclusive. The role and authority of institutions (β = 0.001, p = 0.994) appears to have no significant impact

on CPR utilization, suggesting that formal authority alone may not translate into effective engagement at the community level. The variance inflation factors (VIF) for all variables are below 5, indicating no serious multicollinearity among predictors. The regression analysis highlights that perceived threats, governance quality, enforcement, and participatory inclusion are key determinants of CPR utilization in the border villages of Ladakh.

## 7.3 Sustainability of Common Property Resources

Sustainability of Common Property Resources (CPRs) is a critical dimension in understanding their long-term viability and contribution to local livelihoods, particularly in fragile and border ecosystems like those of Ladakh. CPRs, including pastures, water sources, forests, and cultivable lands, are not only essential for the daily subsistence of communities but also form the backbone of their socio-cultural and ecological resilience. However, these resources are increasingly under pressure from multiple stressors such as climate variability, overgrazing, population growth, tourism expansion, and military activities, which threaten both their availability and regenerative capacity.

In the context of Ladakh's border villages, sustainability encompasses not only the ecological health of these resources but also the effectiveness of governance mechanisms, enforcement of usage rules, and equitable participation in resource management. Evaluating sustainability thus requires an integrated perspective that considers ecological, social, and institutional factors simultaneously. This section examines the current state of CPR sustainability by analyzing household perceptions, community management practices, governance interventions, and collective efforts aimed at conservation. By assessing how these resources are maintained and the challenges they face, the study aims to highlight pathways for ensuring long-term resilience and equitable utilization of CPRs in these ecologically sensitive border regions.

Table 7.9 outlines the methodology for measuring the sustainability of Common Property Resources (CPRs) in the border villages of Ladakh. It lists each indicator, its measurement, coding, and standardization procedure, culminating in a composite Sustainability Index. This index integrates both ecological and socio-institutional dimensions to provide a general assessment of CPR sustainability. The Resource Availability Change and Resource Availability indicators capture the ecological dimension, reflecting how the quantity and access to CPRs have evolved over time. Standardizing these variables ensures comparability across villages, with higher values signifying more sustainable conditions. The

**Table 7.9 Indicators, Standardization, and Measurement of the Sustainability Index for Common Property Resources (CPRs)**

| Variable / Indicator | Measurement | Scale / Units | Standardization | Notes |
|---|---|---|---|---|
| Resource Availability Change | Has CPR availability increased, decreased, or remained unchanged in the last 10 years | Decrease = 1, No Change = 2, Increase = 3 | (X-Min)/(Max-Min) | if higher value = more sustainable |
| Resource Availability | Availability of Type of Resources | Not Available= 0 Available =1 | (X-Min)/(Max-Min) | if higher value = more sustainable |
| Threat Perception Index (TPI) | Combined score of perceived threats (climate change, overgrazing, tourism/military pressure) | Standardized 0–1 | Revers Coded (1-TPI) | if needed: Higher TPI = higher perceived threat → lower sustainability |
| Community Conservation Initiatives | Participation in rotational grazing, plantations, water management | 1 = Not participating, 5 = Fully participating | (X-Min)/(Max-Min) | Reflects proactive sustainability efforts |
| Governance Effectiveness | Role and authority of institutions, enforcement of CPR rules | 1–5 Likert scale | (X-Min)/(Max-Min) | Higher score = better governance support for sustainability |
| Participation & Inclusiveness | Extent of community voice, involvement of women/youth | 1–5 Likert scale | (X-Min)/(Max-Min) | Higher score = more inclusive governance |
| Willingness to Participate in Collective Action | Self-reported readiness to engage in CPR conservation | 1–5 Likert scale | (X-Min)/(Max-Min) | Higher score = higher commitment to sustainability |
| **Sustainability Index (Composite)** | **Average of standardized scores of the above indicators** | **0–1** | **Calculated** | **Higher score = higher sustainability of CPRs** |

*Source: Estimated by Author*

Threat Perception Index (TPI) measures perceived environmental and anthropogenic threats, including climate change, overgrazing, and tourism/military pressure. By reversing TPI values (1–TPI), the index aligns with sustainability measurement, where higher values indicate lower threats and thus greater sustainability potential. Socio-institutional aspects are captured

through Community Conservation Initiatives, Governance Effectiveness, Participation & Inclusiveness, and Willingness to Participate in Collective Action. These indicators assess community engagement, institutional support, and inclusivity in CPR governance, with higher standardized scores reflecting stronger capacities to maintain and enhance CPR sustainability. The Sustainability Index (Composite) is calculated as the average of the standardized scores of all indicators, ranging from 0 to 1. A higher composite score signals a more sustainable CPR system, integrating both ecological availability and community-driven governance practices.

Table 7.10 presents the Sustainability Index (SI) for Common Property Resources (CPRs) across different villages, tehsils, communities, and household categories in the border regions of Ladakh. The index integrates ecological availability, threat perceptions, governance effectiveness, and community participation to provide a broad measure of sustainability. At the village level, Kaksar exhibits the highest mean sustainability index (.7684), indicating strong CPR availability, lower perceived threats, and active community engagement in conservation initiatives. In contrast, Shilikchay shows the lowest mean index (.4442), reflecting greater environmental pressures, weaker governance support, or limited community participation. The ANOVA result ($F(4, 240) = 115.211$, $p = 0.000$) confirms statistically significant differences in sustainability across villages. At the tehsil level, Drass (.602) and Kargil (.585) show relatively similar sustainability outcomes, with the t-test indicating no significant difference ($t(243) = 0.607$, $p = 0.545$).

This suggests that while village-level variation is substantial, broader administrative units may experience comparable sustainability conditions due to shared ecological and socio-political contexts. For community groups, Shina exhibits the highest mean sustainability (.711), reflecting effective local governance, inclusive participation, and strong community-based conservation initiatives. Purig shows the lowest mean index (.371), indicating challenges in resource availability, governance, or collective action. The ANOVA ($F(3, 241) = 82.071$, $p = 0.000$) highlights significant differences among communities. Finally, sustainability differences across households by ration card status are relatively modest, with APL households (.612) slightly higher than BPL (.567), while the ANOVA ($F(3, 241) = 2.323$, $p = 0.076$) indicates these differences are not statistically significant. This suggests that socio-economic status, as proxied by ration card ownership, has limited influence on overall CPR sustainability. It demonstrates that village-level and community-level factors are the primary drivers of CPR sustainability in Ladakh, emphasizing the importance of local governance, active participation, and ecological management in shaping long-term resource sustainability.

**Table 7.10 Sustainability Index of Common Property Resources across Villages, Communities, and Social Groups**

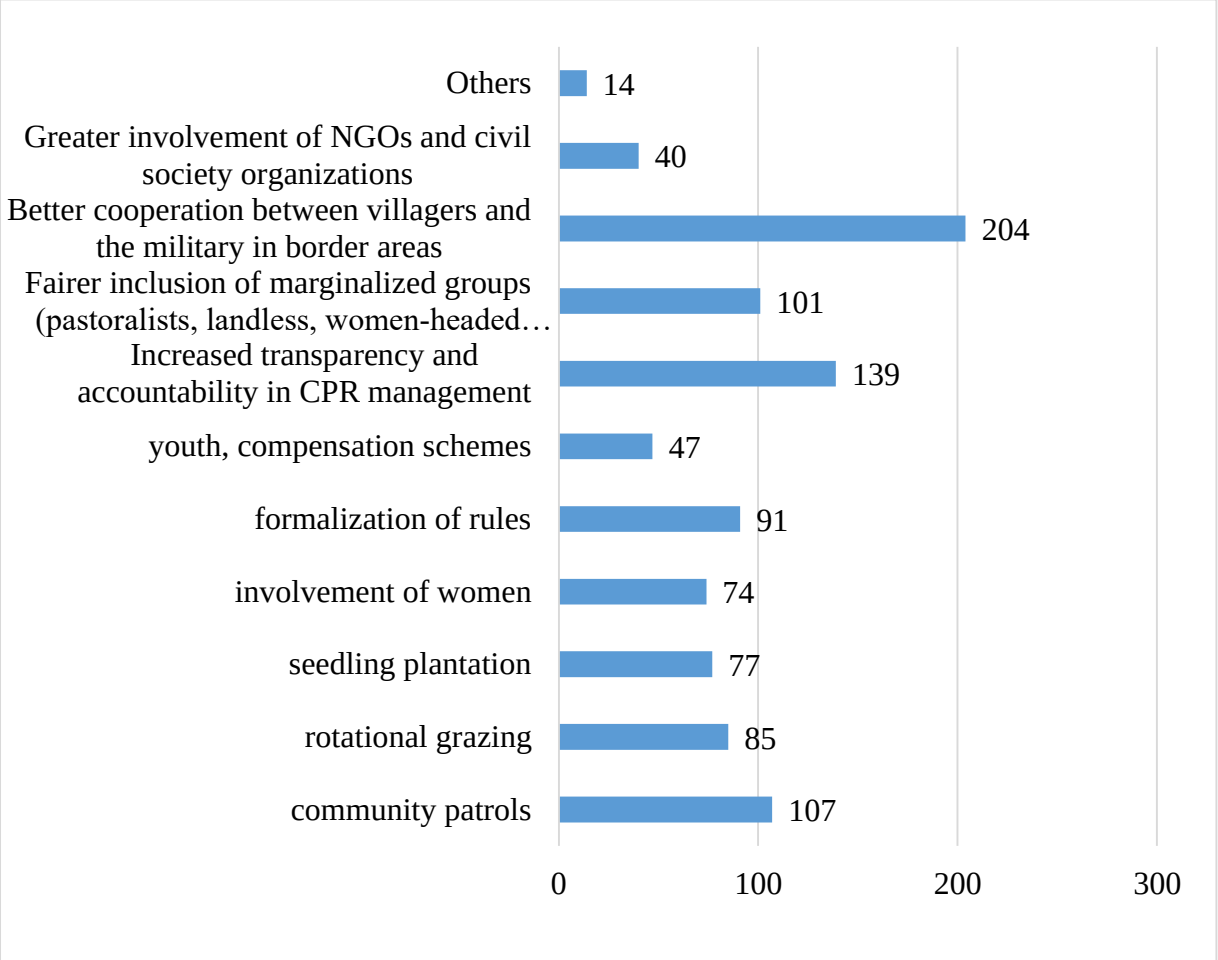
| Variable | Category | N | Mean Sustainability Index | Std. Deviation | Std. Error | ANOVA/ t-test |
|---|---|---|---|---|---|---|
| Revenue Village | Darchik | 27 | .5467 | .0512 | .0099 | F (4, 240)= 115.211, p=0.000 |
| | Hardas | 86 | .5605 | .0709 | .0076 | |
| | Kaksar | 54 | .7684 | .0394 | .0054 | |
| | Mushkoo | 29 | .6046 | .1027 | .0191 | |
| | Shilikchay | 49 | .4442 | .1147 | .0164 | |
| | Total | 245 | .5868 | .1342 | .0086 | |
| Tehsil | Drass | 27 | .602 | .105 | .020 | t (243)=0.607, p=0.545 |
| | Kargil | 218 | .585 | .137 | .009 | |
| | Total | 245 | .587 | .134 | .009 | |
| Community | Balti, | 120 | .531 | .099 | .009 | F (3, 241)=82.071, p=0.000 |
| | Dard | 31 | .545 | .050 | .009 | |
| | Purig | 11 | .371 | .074 | .022 | |
| | Shina | 83 | .711 | .104 | .011 | |
| | Total | 245 | .587 | .134 | .009 | |
| Ration Card | APL | 106 | .612 | .128 | .012 | F (3, 241)=2.323, p=0.076 |
| | AAY | 2 | .597 | .092 | .065 | |
| | BPL | 136 | .567 | .137 | .012 | |
| | PHH | 1 | .629 | | | |
| | Total | 245 | .587 | .134 | .009 | |

*Source: Primary Survey, 2025*

Figure 7.1 presents the measures suggested by households to improve the sustainable management of Common Property Resources (CPRs) in the border villages of Ladakh. The responses show a combination of governance, ecological, and community participation measures prioritized by the respondents. Among the suggestions, better cooperation between villagers and the military was most frequently cited, with 204 respondents (83.27%) emphasizing its importance. This highlights the critical role of military engagement in CPR access and management in the border context. Increased transparency and accountability was suggested by 139 respondents (56.73%), reflecting the community's demand for more open, participatory governance. Traditional and community-based measures such as community patrols (107 respondents, 43.67%), formalization of rules (91 respondents, 37.14%), and rotational grazing (85 respondents, 34.69%) were also significant, showing local preference for structured and collective management practices. Seedling plantations (77 respondents, 31.43%) and youth/compensation schemes (47 respondents, 19.18%) indicate ecological restoration and livelihood-oriented strategies, while involvement of women (74 respondents, 30.20%) and fairer inclusion of marginalized groups (101 respondents, 41.22%) suggest awareness of equity and inclusivity in CPR governance. Greater NGO and civil society involvement (40

respondents, 16.33%) was less frequently mentioned, showing that external actors are considered supplementary to local management efforts. The figure reflects a multi-dimensional approach favored by the community, combining ecological sustainability, governance reforms, inclusivity, and cooperation with the military.

**Figure 7.1 Community-Suggested Measures for Enhancing Sustainable Management of CPRs**




*Source: Primary Survey, 2025*

Table 7.11 presents the distribution of community-suggested measures for enhancing the sustainable management of Common Property Resources (CPRs) across five revenue villages in the border areas of Ladakh. The data indicates that better cooperation between villagers and the military is consistently the most prioritized measure across all villages, with percentages ranging from 72.3% in Shilikchay to 92.6% in Kaksar. This emphasizes the unique role of military presence in CPR access and governance in border regions. Increased transparency and accountability in CPR management is another widely recognized measure,

especially in Kaksar (94.4%) and Darchik (74.1%), suggesting strong community demand for open and fair decision-making.

**Table 7.11 Village-Wise Community-Suggested Measures for Sustainable Management of CPRs**

| Community-Suggested Measures for Enhancing Sustainable Management of CPRs | | Revenue Village | | | | |
|---|---|---|---|---|---|---|
| | | Darchik | Hardas | Kaksar | Mushkoo | Shilikchay |
| Community patrols | N | 0 | 35 | 25 | 24 | 23 |
| | % | 0.0 | 40.7 | 46.3 | 82.8 | 48.9 |
| Rotational grazing | N | 0 | 38 | 9 | 13 | 25 |
| | % | 0.0 | 44.2 | 16.7 | 44.8 | 53.2 |
| Seedling plantation | N | 0 | 16 | 48 | 2 | 11 |
| | % | 0.0 | 18.6 | 88.9 | 6.9 | 23.4 |
| Involvement of women | N | 3 | 15 | 35 | 8 | 13 |
| | % | 11.1 | 17.4 | 64.8 | 27.6 | 27.7 |
| Formalization of rules | N | 10 | 24 | 32 | 8 | 17 |
| | % | 37.0 | 27.9 | 59.3 | 27.6 | 36.2 |
| Youth, compensation schemes | N | 2 | 18 | 4 | 10 | 13 |
| | % | 7.4 | 20.9 | 7.4 | 34.5 | 27.7 |
| Increased transparency and accountability in CPR management | N | 20 | 26 | 51 | 14 | 28 |
| | % | 74.1 | 30.2 | 94.4 | 48.3 | 59.6 |
| Fairer inclusion of marginalized groups (pastoralists, landless, women-headed households) | N | 16 | 19 | 33 | 12 | 21 |
| | % | 59.3 | 22.1 | 61.1 | 41.4 | 44.7 |
| Better cooperation between villagers and the military in border areas | N | 24 | 71 | 50 | 25 | 34 |
| | % | 88.9 | 82.6 | 92.6 | 86.2 | 72.3 |
| Greater involvement of NGOs and civil society organizations | N | 2 | 12 | 2 | 3 | 21 |
| | % | 7.4 | 14.0 | 3.7 | 10.3 | 44.7 |
| Others | N | 3 | 2 | 2 | 1 | 6 |
| | % | 11.1 | 2.3 | 3.7 | 3.4 | 12.8 |

*Note: Percent within Villages; Source: Primary Survey, 2025*

Traditional governance and ecological practices also feature prominently. Community patrols are highly emphasized in Mushkoo (82.8%) and Shilikchay (48.9%), while rotational grazing receives notable support in Hardas (44.2%) and Shilikchay (53.2%). Seedling plantations show marked variation, with Kaksar having the highest support (88.9%) but minimal mention in other villages, indicating localized ecological priorities. Measures

promoting equity and inclusivity, such as involvement of women and fairer inclusion of marginalized groups, vary across villages but remain important, particularly in Kaksar and Balti-dominated villages. Other interventions like youth/compensation schemes and greater NGO involvement receive moderate to low support, highlighting the community's preference for locally managed and immediate-action measures over external interventions. It reflects village-specific priorities, balancing ecological sustainability, governance reforms, inclusivity, and cooperation with military authorities.

## 7.4 Conceptual Model for Governing Common Property Resources in Border Villages of Ladakh

The governance and management of common property resources (CPRs) in the border villages of Ladakh is influenced by a complex interplay of environmental, political, and social factors. This study proposes a conceptual model that integrates threat perceptions, political engagement, governance structures, and community participation to understand their combined effect on CPR utilization and sustainability. The model is designed to capture the multifaceted nature of CPR governance, particularly in areas affected by border politics, military presence, and climatic vulnerabilities.

### 7.4.1 Drivers of CPR Governance-Threats and Political Engagement

Perceived threats to CPRs, measured through the Threat Perception Index (TPI), include climate change impacts, overgrazing, and pressures from tourism and military activities. Higher perceived threats may negatively affect resource availability and sustainability unless mitigated by effective governance. Political engagement, captured through the Political Engagement Index (PEI), reflects the power and influence of community members in CPR governance, their involvement in policy-making, representation in local institutions, and the interaction between community and military-political structures. PEI is hypothesized to positively influence governance effectiveness and community participation.

### 7.4.2Governance and Institutional Mediation

Governance variables serve as mediators between external drivers and CPR outcomes. These include institutional changes since the Union Territory status, the role and authority of local and formal institutions, enforcement of rules and trust, participation and inclusiveness of community members, and perceptions of governance changes over time. Strong and inclusive governance is expected to enhance both the equitable use of CPRs and their long-term sustainability, acting as a buffer against external threats.

### 7.4.3Utilization of CPRs

The model considers the utilization of CPRs as an intermediate outcome, reflecting how households access, control, and benefit from resources. Effective governance, coupled with political engagement and low threat perception, is hypothesized to lead to higher and more equitable utilization. Patterns of CPR use provide the idea into both the dependence of households on these resources and the efficiency of governance structures in managing access and preventing overexploitation.

### 7.4.4 Sustainability of CPRs

The ultimate outcome in the model is the Sustainability Index (SI), which integrates resource availability, participation in conservation initiatives, governance effectiveness, and community willingness to engage in collective action. Higher SI scores indicate more sustainable management practices, greater community involvement, and resilience to environmental and socio-political pressures. Sustainability is thus conceptualized as the result of effective governance, equitable political engagement, proactive community measures, and moderated threat perceptions.

### 7.4.5 Conceptual Model

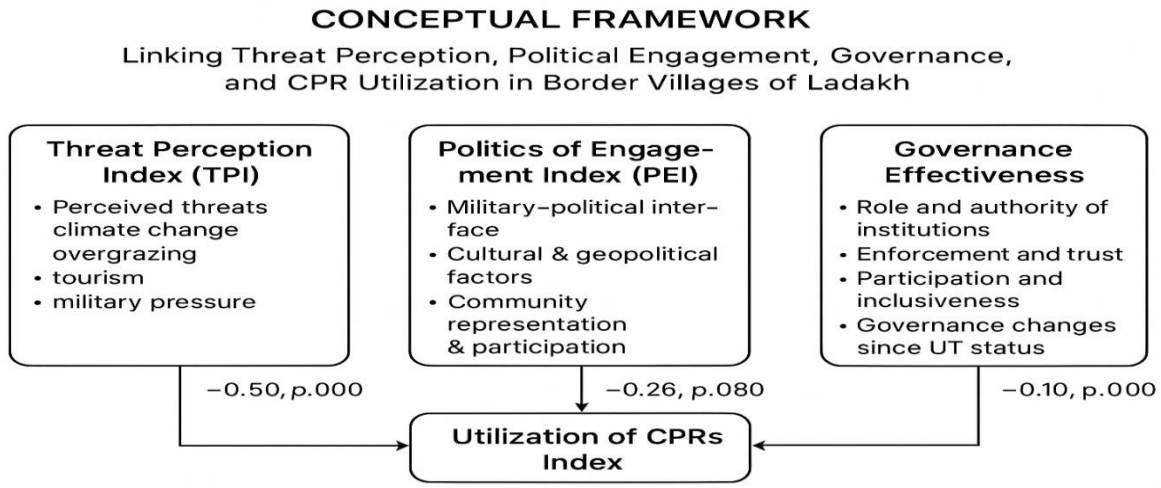
The regression analyses done in the analysis shows the strong and empirical support for the conceptual framework of this study, which emphasizes the interplay of threat perception, political engagement, and governance effectiveness in shaping the utilization and sustainability of common property resources (CPRs) in the border villages of Ladakh. As shown in Table 7.8, the Threat Perception Index (TPI) exhibits a significant negative effect on CPR utilization ($\beta = -0.396$, $p < 0.001$). This indicates that higher perceived threats—stemming from climate change, overgrazing, tourism, and military pressures—are associated with lower sustainable use of CPRs. This finding aligns with the conceptual framework, which posits that environmental and anthropogenic stressors directly influence community behavior and resource management outcomes. The reverse coding of TPI ensures that higher threat perceptions translate into lower sustainability, thereby linking the community's awareness of risks to their practical engagement with CPRs.

The influence of political engagement, as measured by the Politics of Engagement Index (PEI), also supports the conceptual model. As indicated in Table 6.25, dimensions such as the military–political interface negatively affect CPR utilization ($\beta = -0.508$, $p < 0.001$), whereas cultural and geopolitical factors positively contribute ($\beta = 0.150$, $p = 0.010$). This emphasises the dual role of power structures and geopolitical dynamics in either constraining

or facilitating effective CPR governance. Additionally, regression analyses on community perceptions of governance (Table 6.26) reveal that community representation and participation significantly enhance perceptions of institutional effectiveness and inclusiveness, further validating the framework's emphasis on participatory governance as a determinant of resource management outcomes.

Institutional effectiveness, reflected through variables such as enforcement and trust, participation and inclusiveness, and governance changes since UT status, significantly influences CPR utilization (Table 7.8). Both enforcement and trust ($\beta = 0.347$, $p < 0.001$) and participation and inclusiveness ($\beta = 0.422$, $p < 0.001$) positively affect utilization, highlighting the critical role of strong institutions and inclusive decision-making in sustaining CPRs. Governance changes following the Union Territory status show a modest yet significant effect ($\beta = -0.216$, $p = 0.047$), indicating that administrative restructuring and policy shifts can alter access, control, and benefit-sharing of CPRs. These results closely correspond to the conceptual framework's assertion that institutional authority and governance mechanisms are central to sustainable management. Collectively, these regression models explain 38% of the variation in CPR utilization ($R^2 = 0.381$, Table 7.8), demonstrating that threat perception, political engagement, and governance effectiveness form a substantial explanatory triad for understanding community behavior and resource outcomes. The findings confirm that sustainable CPR management in border villages is not determined solely by ecological availability but is mediated by social, political, and institutional factors.

**Figure 7.2 Conceptual Model for Governing Common Property Resources in Border Villages of Ladakh**




*Source: Estimated from Primary Survey, 2025*

## 7.5 Hypothesis Testing

- H3: Household perceptions of threats to Common Property Resources (CPRs), levels of political engagement, and governance effectiveness significantly influence the utilization and sustainability of CPRs in border villages of Ladakh.

The study hypothesized that household perceptions of threats to Common Property Resources (CPRs), levels of political engagement, and governance effectiveness significantly influence the utilization and sustainability of CPRs in the border villages of Ladakh. To test this hypothesis, multiple analytical procedures were employed, including regression analysis and the use of composite indices. The Threat Perception Index (TPI), which captures household perceptions of environmental and anthropogenic threats such as climate change, overgrazing, tourism, and military activities, was found to have a significant negative effect on CPR utilization ($\beta = -0.396$, $p < 0.001$, Table 7.8). This indicates that households perceiving higher threats tend to reduce their reliance on CPRs, confirming that environmental stressors directly affect resource use. Political engagement, measured through the Politics of Engagement Index (PEI), showed a negative but marginally non-significant effect on CPR utilization ($\beta = -0.109$, $p = 0.080$, Table 7.8), while specific dimensions of political engagement, such as the military–political interface, exhibited a significant negative effect ($\beta = -0.508$, $p < 0.001$) and cultural-geopolitical factors a positive effect ($\beta = 0.150$, $p = 0.010$, Table 6.25). These results suggest that political engagement influences CPR utilization in a complex manner, mediated by power structures and local geopolitical conditions. Governance effectiveness, including enforcement and trust, participation and inclusiveness, and governance changes since the Union Territory status, was found to have a significant positive impact on CPR utilization (enforcement and trust $\beta = 0.347$, $p < 0.001$; participation and inclusiveness $\beta = 0.422$, $p < 0.001$) while governance changes showed a modest but significant negative effect ($\beta = -0.216$, $p = 0.047$, Table 7.8). This demonstrates that strong institutions and inclusive decision-making are critical for sustainable CPR management. The Sustainability Index (SI), which integrates resource availability, community participation, governance effectiveness, and threat perception, further supports these findings, with higher sustainability observed in villages and communities characterized by effective governance and active participation, whereas household economic status had minimal influence (Table 7.10). Overall, the regression models explain approximately 38.1% of the variation in CPR utilization ($R^2 = 0.381$, Table 7.8), providing strong empirical support for the hypothesis. These results align with the conceptual framework (Figure 7.2), highlighting that sustainable CPR management in Ladakh's border villages is

shaped not only by ecological availability but also by the interplay of household threat perceptions, political engagement, and institutional governance effectiveness.

## 7.6 Conclusion

The examination of the availability, use, management, and sustainability of Common Property Resources (CPRs) in the border villages of Ladakh shows that many villages, tehsils, and community groups feel that CPRs are being depleted. The strength of this perception differs across locations and cultures. Villages like Darchik, Hardas, and Kaksar reported nearly universal drops in CPR availability, reflecting significant local environmental stress. In contrast, Mushkoo and Shilikchay showed more moderate changes, indicating differences in resource trends even within small geographic areas. Variations among tehsils and communities demonstrate that ecological, social, and cultural factors shape perceptions and experiences of resource availability. Household economic status, as seen through ration card categories, plays a minimal role in how people perceive changes in CPRs.

This chapter also develops and uses the Threat Perception Index (TPI) to measure how households recognize environmental and human-made risks to CPRs. The findings show that how people perceive threats is a key factor in resource use. A higher perception of threats leads to less use of CPRs. This highlights the strong link between community awareness and actions. Political involvement, measured through the Politics of Engagement Index (PEI), and governance effectiveness are equally important. The analysis indicates that inclusive participation, rule enforcement, and trust in institutions positively affect CPR use. At the same time, changes in governance due to the Union Territory status have a modest, yet significant, effect on resource access and benefit-sharing. Together, these findings confirm the proposed framework for CPR governance, which focuses on how threat perception, political involvement, and governance effectiveness shape both use and sustainability.

The Sustainability Index (SI) analysis combines ecological availability, threat perception, governance effectiveness, and community engagement to assess CPR sustainability. Villages like Kaksar and communities such as the Shina have higher sustainability scores. This reflects strong resource availability, active local conservation efforts, and inclusive governance. On the other hand, Shilikchay and the Purig community have lower scores, which point out challenges in ecological management and organizational ability. These results suggest that sustainability is not just about ecological resources but is also

strongly affected by social and institutional factors. While household economic status is relevant for vulnerability, it does not significantly influence overall sustainability.

Finally, community-suggested ideas for better CPR management stress the need for cooperation with the military, transparency and accountability in governance, community patrols, rotational grazing, ecological restoration, and the involvement of women and marginalized groups. These suggestions highlight the need for context-specific, locally driven actions that connect governance reforms, ecological sustainability, and social fairness. They show that effectively managing CPRs in Ladakh's border villages requires a multi-faceted approach, balancing ecological, institutional, political, and community factors to ensure long-term resilience, fair access, and stable livelihoods in these ecologically fragile and geopolitically sensitive areas.

# CHAPTER VIII

# FINDINGS AND CONCLUSION


8.1 Introduction

8.2 Major Findings

8.3 Implications

8.4 Policy Suggestions

8.5 Future Research

8.6 Conclusion

# CHAPTER VIII

# FINDINGS AND CONCLUSION

## 8.1 Introduction

Common Property Resources (CPRs) have long constituted the ecological and socio-economic foundation of rural livelihoods in the high-altitude Himalayan region, particularly in Ladakh, where extreme climatic conditions, limited arable land, and fragile ecosystems constrain private resource ownership. In the border villages of Ladakh, CPRs such as alpine pastures, glacial-fed irrigation channels, forests, riverine resources, and culturally significant commons remain indispensable for agriculture, livestock rearing, fuel and fodder collection, and overall community survival. Traditionally, these resources were governed through locally embedded institutions and customary norms that emphasized collective responsibility, equitable access, and ecological sustainability. However, CPR governance in Ladakh's borderlands has undergone significant transformation due to administrative centralization, the reorganization of Ladakh as a Union Territory, increasing military presence along the Line of Control, and growing climatic stresses such as glacier retreat and water scarcity. These changes have introduced new forms of institutional complexity, power asymmetry, and access restrictions, often reshaping community–resource relations and challenging traditional governance mechanisms. Despite the continued reliance of border communities on CPRs, there remains limited empirical understanding of how livelihoods, institutional arrangements, political engagement, and perceived threats interact to shape CPR governance and sustainability in this militarized and ecologically fragile context, highlighting the need for a focused and context-sensitive investigation.

The study was undertaken against the backdrop of increasing ecological fragility, livelihood vulnerability, and geopolitical securitization in the trans-Himalayan borderlands, where CPRs such as alpine pastures, glacial-fed irrigation systems, forests, and riverine commons constitute the backbone of agro-pastoral livelihoods and community survival. As highlighted in the earlier, the governance of these shared resources has undergone significant transformation due to intensified border militarization, administrative restructuring following Ladakh's transition to Union Territory status, and growing climate-induced stresses, resulting in new patterns of access, exclusion, and institutional contestation. The central problem addressed by this study was the lack of an integrated empirical understanding of how CPR governance in Ladakh's border villages is shaped by the interaction between livelihood

dependence, institutional arrangements, political engagement, and ecological and geopolitical threats. Existing studies on CPRs have largely focused on community-based management in relatively stable socio-political contexts, provides only limited idea into borderland situations where traditional institutions operate alongside civil administration and military authority. Responding to this gap, the study was guided by clearly defined objectives aimed at mapping CPR availability and livelihood contribution, examining governance structures and the role of border politics, analyzing participation, inequalities, and conflicts, and identifying threats and opportunities for sustainable and equitable CPR governance.

Methodologically, the study adopted a descriptive–analytical research design with a quantitative-dominant mixed-methods approach. Empirical evidence was generated through a household survey conducted in five selected border villages of Kargil district, supplemented by key informant interviews, focus group discussions, and field observations. The analytical framework was anchored in an integrated theoretical perspective drawing from the Institutional Analysis and Development (IAD) framework, the Sustainable Livelihoods Framework (SLF), Political Ecology, and the Politics of Engagement approach. These perspectives were operationalized through a coherent conceptual framework that linked household livelihood assets, politics of engagement, threat perception, governance effectiveness, and sustainability outcomes. Composite indices such as the Utilization Index of CPRs, Politics of Engagement Index (PEI), Threat Perception Index (TPI), and Sustainability Index (SI) were employed alongside descriptive statistics, comparative tests, correlation, and regression analysis to rigorously examine the study hypotheses.

Within this context, the present chapter integrates and interprets the empirical findings presented in the preceding chapters to arrive at substantive conclusions regarding the nature of CPR governance in Ladakh's border villages. It reflects on how livelihood dependence on commons persists under conditions of militarization, how institutional pluralism and power asymmetries shape governance outcomes, and how community perceptions of threat influence utilization and sustainability. The chapter also highlights the broader theoretical and policy implications of the findings, emphasizing the need for inclusive, participatory, and context-sensitive governance frameworks capable of balancing livelihood security, ecological sustainability, and national security imperatives in borderland environments.

## 8.2 Major Findings

This section presents a consolidated summary of the major empirical findings of the study derived from the analysis of household survey data, institutional interactions, and composite indices. The findings are organized thematically in line with the objectives of the study, highlighting key patterns in CPR availability and use, governance structures, politics of engagement, and sustainability outcomes in the border villages of Ladakh.

### 8.2.1 Common Property Resources, Governance, and Borderland Dynamics in Ladakh

The study finds that Common Property Resources (CPRs) constitute the foundational ecological and economic base of border villages in Kargil district, where extreme cold-arid conditions, limited arable land, and geographic isolation make private resource dependence insufficient for survival. Water resources derived from glacial melt, alpine pastures, communal grazing lands, forest and shrublands, and village commons emerge as the most critical CPRs supporting agriculture, livestock rearing, household energy needs, and food security. Secondary data from the District Statistics & Evaluation Office, Kargil (2023–24) and Census of India (2011), combined with primary household survey data, clearly indicate that nearly the entire net cropped area depends on community-managed irrigation systems such as khuls and zings, highlighting the indispensable role of collective action in sustaining livelihoods in the border environment.

A key finding relates to the decisive influence of Ladakh's physical and environmental setting on CPR governance. The cold desert climate, low precipitation, short growing season, and near-total dependence on glacial meltwater create chronic resource scarcity, making cooperation essential rather than optional. The study documents that accelerated glacial retreat, erratic water flows, and increased frequency of extreme weather events have destabilized traditional irrigation calendars and intensified competition over water CPRs. These environmental stresses, identified through both survey-based threat perception data and secondary ecological statistics, reveal that CPR sustainability in Kargil is increasingly threatened by climate change rather than by population pressure alone.

The analysis highlights the continued centrality of traditional and customary institutions in managing CPRs. Institutions such as the goba (village headman), churpun (water manager), and lorapa (grazing regulator) remain crucial in regulating access, enforcing seasonal rules, and resolving conflicts through consensus-based mechanisms. Household survey responses and qualitative institutional mapping show that these customary systems

retain high social legitimacy and are particularly effective in ensuring equitable distribution of scarce resources such as irrigation water and grazing land. However, the study also finds that these institutions are increasingly strained due to youth outmigration, declining collective labor availability, and growing interference from formal administrative structures.

Another major finding concerns the emergence of institutional overlap and governance fragmentation. Panchayati Raj Institutions, district administration, line departments, and the Ladakh Autonomous Hill Development Council operate alongside customary institutions, often with unclear jurisdictional boundaries. The study finds that while formal institutions bring financial resources, legal authority, and development schemes, their top-down implementation frequently conflicts with locally embedded norms. This dual governance structure weakens accountability, complicates decision-making, and sometimes marginalizes traditional authorities who historically ensured CPR sustainability, particularly in irrigation and pasture management.

The study clearly establishes that border politics and militarization fundamentally reshape CPR access and governance. Military buffer zones, security restrictions, and land acquisition for defense infrastructure have resulted in the loss of ancestral grazing lands and restricted access to common pastures in LoC-adjacent villages such as Drass, Mushkoo, and Batalik. Primary survey evidence, supported by administrative records, shows that this enforced exclusion has transformed ecological scarcity into political scarcity, forcing livestock concentration on limited permissible commons and accelerating land degradation. At the same time, the military has become a major economic actor by providing employment, infrastructure, and market access, creating a complex dependency relationship that limits community bargaining power over CPR access.

The study further finds that livelihoods in border villages remain deeply CPR-dependent despite gradual economic diversification. Agro-pastoralism continues to dominate household livelihoods, with livestock rearing relying heavily on communal pastures and fodder resources. Emerging income sources such as tourism, horticulture, army-linked markets, and government employment provide supplementary income but also introduce new pressures on water and land CPRs. Survey-based livelihood data reveal growing inequalities, as households with better institutional access or market linkages benefit disproportionately, while marginal households remain heavily dependent on CPRs for subsistence and risk absorption. A significant institutional turning point identified in the study is the creation of Ladakh as a Union

Territory in 2019. The findings indicate widespread perceptions of political dispossession and reduced local autonomy following the centralization of governance and the weakening of the LAHDC's decision-making role. Household perceptions, key informant interviews, and documentary analysis show that new land and development policies, along with centrally driven schemes such as the Vibrant Villages Programme, have intensified anxieties over external control of land and commons. This has politicized CPR governance and triggered collective mobilization demanding constitutional safeguards for local resource rights.

Finally, the study finds that the sustainability and equity of CPR governance in Ladakh's border villages are increasingly fragile. Climate change, overgrazing, institutional weakening, and geopolitical restrictions collectively threaten the long-term viability of water and pasture resources. However, the findings also highlight strong elements of community resilience, including adaptive practices such as artificial glaciers, water harvesting, rotational grazing, collective conservation efforts, and political assertion for local autonomy. These responses reveal that while CPR systems are under severe stress, inclusive governance, trust-based institutions, and meaningful community engagement remain critical pathways for sustaining livelihoods and ecological balance in militarized border areas.

### 8.2.2 Availability, Use, and Livelihood Dependence on Common Property Resources

The analysis of primary data collected through a structured household survey of 245 households across five border villages of Ladakh reveals that Common Property Resources (CPRs) constitute the backbone of livelihood systems in this cold-arid and geopolitically sensitive region. Descriptive statistics show that water resources (92.65%), religious and cultural commons (90.20%), and pastures (80.82%) are the most widely available CPRs, highlighting their ecological, economic, and socio-cultural centrality. These findings confirm that CPRs in Ladakh are not marginal assets but core livelihood resources that sustain agriculture, livestock rearing, household energy needs, and community cohesion in an environment characterized by limited private landholdings and extreme climatic constraints.

The study finds substantial spatial variation in the availability and diversity of CPRs across villages, reflecting ecological heterogeneity and differential access shaped by terrain and border proximity. Villages such as Hardas and Kaksar exhibit greater CPR diversity, including water, cultivable land, pastures, forests, medicinal plants, and community storage facilities, whereas villages like Darchik and Shilikchay display more selective availability due to topographical constraints and restricted access near sensitive border zones. This spatial

differentiation shows that CPR governance and dependence are deeply place-specific and cannot be addressed through uniform policy frameworks.

Patterns of CPR usage reveal a clear distinction between daily-use, seasonal-use, and limited-use resources. Water resources are used daily by over 90 percent of households, highlighting their indispensability for drinking, irrigation, and livestock. Religious and cultural commons also show very high daily usage, reflecting their role in social organization and collective life. In contrast, pastures, cultivable land, and community storage facilities are predominantly used on a seasonal basis, aligning with Ladakh's agro-pastoral livelihood cycle. Forests and medicinal plants show comparatively lower and more irregular use due to limited forest cover and the localized availability of alpine flora. These findings, derived from frequency analysis and mean usage scores, illustrate adaptive livelihood strategies shaped by ecological rhythms and resource constraints.

Inferential analysis using one-way ANOVA confirms statistically significant inter-village differences in the usage intensity of most CPRs, including pastures, water, forests, medicinal plants, community storage, and religious commons. Villages such as Mushkoo and Kaksar exhibit significantly higher overall CPR utilization, while Darchik shows minimal usage across several resource categories. These differences highlight how geography, infrastructure, and livelihood orientation influence the intensity of CPR dependence, reinforcing the need for localized and context-sensitive resource governance strategies in border regions. The findings further reveal that CPRs make a substantial contribution to household livelihoods. On average, approximately 76.6 percent of household livelihoods are derived from CPRs, with complete dependence reported in villages such as Kaksar and Mushkoo. Similarly, about 73.5 percent of working household members rely on CPR-based activities for their livelihood. These results, obtained through ANOVA and percentage-based measures, establish CPRs as a critical safety net and primary livelihood source, particularly in villages with limited alternative employment opportunities. Despite high livelihood dependence, direct income generation from CPRs remains limited. Only 3.3 percent of households report earning direct cash income from CPRs, indicating that these resources are predominantly used for subsistence rather than commercial purposes. This suggests that while CPRs are essential for survival and livelihood security, their economic potential remains underutilized due to market constraints, access restrictions, and policy limitations in border areas.

The construction of a composite Utilization Index of CPRs using standardized indicators including perceived importance, livelihood dependence, labor dependence, frequency of use, and income generation reveals pronounced variation across villages and social groups. Mushkoo and Kaksar record the highest utilization indices, while Darchik shows extremely low utilization. Significant differences are also observed across community groups, with Shina and Balti households exhibiting higher dependence on CPRs than Dard households. However, differences based on ration card status are not statistically significant, indicating that CPR reliance cuts across poverty categories and functions as a universal livelihood base in border villages. Finally, the study finds that household characteristics such as landholding size and education level significantly influence CPR utilization. A positive correlation exists between landholding size and CPR utilization, suggesting that households with larger landholdings have greater capacity to integrate common resources into their livelihood strategies. Education also shows a significant association with utilization levels, with households having primary and secondary education exhibiting higher engagement with CPRs. These findings underline the role of human and natural capital in shaping how households access and benefit from common resources in Ladakh's border communities.

### 8.2.3 Governance Structures of Common Property Resources

The analysis reveals that governance of Common Property Resources (CPRs) in the border villages of Ladakh is shaped by a complex and evolving institutional architecture characterized by the coexistence of traditional community institutions, formal administrative structures, and military authorities. Primary data collected through the household survey (2025), supported by key informant interviews, indicate that CPR governance historically rested on locally embedded institutions such as the Goba, Lambardar, Churpon, and village councils, which regulated access, enforced seasonal rules, and resolved disputes through customary norms. These institutions derived legitimacy from social trust, ecological knowledge, and long-standing cultural practices, enabling relatively equitable and adaptive resource management in a harsh ecological environment.

However, the findings reveal a significant reconfiguration of governance structures following the reorganization of Ladakh as a Union Territory in 2019. Descriptive and comparative analysis shows a marked shift in perceived authority from community-based institutions and Panchayats toward the Union Territory administration. More than sixty percent of respondents identify the UT administration as the most powerful decision-making authority in CPR governance, while traditional institutions and the Ladakh Autonomous Hill

Development Council (LAHDC) are perceived as having substantially reduced influence. This shift reflects increasing administrative centralization, greater reliance on formal regulations, and the extension of bureaucratic oversight into areas previously governed through customary arrangements.

Despite this centralization, the findings highlight a governance paradox. While the UT administration is viewed as possessing formal authority and enforcement capacity, it is not widely perceived as legitimate or responsive to local realities. Trust levels in UT-led CPR governance remain relatively low, and a majority of households report that local control over CPRs has weakened. Statistical analysis shows that although enforcement is increasingly undertaken by formal authorities, compliance and legitimacy continue to depend on informal negotiation and social acceptance, revealing a disconnect between authority and legitimacy within the governance system. The role of the military emerges as a defining feature of CPR governance in border villages. Although only a very small proportion of respondents formally identify the military as a governance authority, a substantial majority report direct interaction and negotiation with military personnel regarding access to grazing lands, water sources, and movement routes. This indicates that the military exercises significant de facto control over CPRs through security zoning, restricted areas, and operational discretion, rather than through explicit legal mandates. The findings thus reveal a governance structure in which formal administrative authority, customary legitimacy, and military control coexist uneasily, often resulting in ambiguity, overlap, and institutional fragmentation.

The governance of CPRs in Ladakh's border villages is neither purely community-based nor fully state-controlled. Instead, it represents a hybrid and contested system in which decision-making authority is increasingly centralized, traditional institutions are weakened but not displaced, and military influence operates through informal yet powerful channels. This institutional pluralism profoundly shapes access, enforcement, and sustainability outcomes.

### 8.2.4 Participation, Inclusiveness, Inequalities, and Conflicts in CPR Governance

The study finds that participation and inclusiveness in CPR governance are limited and uneven across villages, social groups, and institutional settings. Survey-based evidence shows that a majority of households perceive decision-making related to CPRs as largely top-down, with minimal opportunities for meaningful community input. More than half of the respondents report that their opinions are rarely or never considered in decisions affecting access to or management of common resources. Participation is often confined to information

dissemination rather than genuine consultation, reflecting a procedural rather than substantive form of engagement.

Gender and generational exclusion are particularly pronounced. Women and youth are reported to have negligible involvement in CPR governance processes, despite their substantial contribution to agriculture, livestock management, and household resource use. The absence of institutional mechanisms to incorporate these groups reinforces existing social hierarchies and limits the inclusiveness of governance arrangements. Statistical comparisons across villages reveal that participation levels are marginally higher where traditional institutions retain some authority, suggesting that customary systems despite their patriarchal tendencies still provide greater scope for local engagement than formal administrative processes.

The findings further reveal significant social and spatial inequalities in CPR access and benefit-sharing. ANOVA and t-test results indicate notable differences across villages and ethnic communities. Villages in the Drass tehsil generally report higher participation, trust, and perceived fairness in CPR governance than those in the Kargil tehsil. Similarly, Balti and Purig communities exhibit relatively better access to decision-making forums compared to Dard and Shina communities, whose villages are often located closer to sensitive border zones and subject to stricter security controls. These patterns indicate that geography, ethnicity, and proximity to the Line of Control significantly influence governance experiences.

Conflicts over CPRs are found to be relatively frequent but predominantly non-violent and localized. The most common sources of conflict include access restrictions imposed due to military activity, disputes over grazing timing, and competition for scarce water during peak agricultural seasons. Importantly, the study finds that most conflicts continue to be resolved through informal negotiation and community mediation rather than formal legal channels. However, increasing involvement of administrative authorities in dispute resolution reflects a gradual shift toward bureaucratic management of conflicts, which risks undermining local conflict-resolution capacities. CPR governance in Ladakh's border villages is marked by constrained participation, social differentiation, and growing inequalities, shaped less by internal competition among villagers and more by external institutional and geopolitical constraints. These findings challenge conventional commons narratives that emphasize community failure and instead highlight exclusion and marginalization driven by power asymmetries.

### 8.2.5 Threats, Sustainability Concerns, and Opportunities for Equitable CPR Governance

The study identifies widespread and acute perceptions of threat to CPR sustainability across all study villages. Data from the household survey and Threat Perception Index show that an overwhelming majority of respondents perceive a decline in the availability and quality of common resources over the past decade. The most frequently cited threats include military activities, climate change, population pressure, and government-imposed access restrictions, indicating that CPR degradation is driven by both ecological and political forces. Climate-related threats such as glacier retreat, erratic snowfall, and declining water availability are perceived as long-term and unavoidable stressors that undermine agricultural productivity and livestock rearing. At the same time, geopolitical threats particularly restricted access to pastures and forests due to security concerns are viewed as immediate and externally imposed. Regression analysis reveals that higher threat perception is associated with lower utilization of CPRs, suggesting that households adopt risk-averse strategies by avoiding distant or restricted commons. This finding contradicts conventional assumptions of overuse under scarcity and instead points to a pattern of withdrawal and abandonment in militarized settings.

Sustainability concerns are further compounded by weak coordination among governing authorities. The study finds limited cooperation between UT administration, LAHDC, village institutions, and military agencies, resulting in fragmented management and unclear responsibility for conservation. Despite high dependence on CPRs, collective conservation initiatives remain sporadic and inadequately supported. Nevertheless, villages with higher levels of trust, participation, and inclusive governance reveal stronger collective action and better sustainability outcomes, as reflected in higher Sustainability Index scores. Importantly, the study identifies several opportunities for more equitable and sustainable CPR governance. Statistical analysis shows strong positive relationships between inclusive political engagement, governance effectiveness, and CPR utilization. Where communities are meaningfully engaged, customary practices respected, and dialogue maintained with administrative and military authorities, governance outcomes are significantly improved. Community-led adaptive practices such as rotational grazing, water-sharing systems, artificial glaciers, and collective maintenance of irrigation channels exhibit the resilience and innovative capacity of border communities.

The study finds that Common Property Resources (CPRs) in the border villages of Ladakh are perceived to be under severe and multi-dimensional threat, arising from the

combined effects of ecological change, demographic pressure, development activities, and geopolitical constraints. Data generated from the primary household survey (N = 245) reveal a high level of consensus among respondents that climate change constitutes the most serious long-term threat to CPR sustainability, as reflected in the high mean perception score (Mean = 3.90). Respondents consistently identified changing snowfall patterns, glacier retreat, and increasing water uncertainty as factors directly affecting the availability of irrigation water, grazing lands, and biomass resources. These findings underline that CPR degradation in Ladakh is not episodic but structurally linked to broader climatic transformations affecting high-altitude ecosystems.

Alongside ecological pressures, anthropogenic threats particularly overgrazing and population pressure emerge as significant sustainability concerns. The relatively high mean score for overgrazing-related stress (Mean = 3.81) indicates widespread recognition that increasing livestock numbers and reduced pasture availability are contributing to rangeland degradation. Importantly, the analysis shows that these pressures are not uniformly distributed. Village-wise ANOVA results reveal statistically significant differences in threat perception, with villages such as Darchik and Kaksar reporting extremely high concern, while Mushkoo exhibits comparatively lower perceived stress. This spatial variation highlights the localized nature of CPR vulnerability and suggests that sustainability challenges are shaped by village-specific ecological and institutional contexts rather than uniform regional trends.

A distinctive and critical finding of the study relates to the role of tourism and military activities as perceived threats to CPR sustainability. With a mean score of 3.70, respondents clearly associate external interventions especially military presence, land-use restrictions, and infrastructure development with declining access to traditional commons. This perception is particularly strong in villages located close to the Line of Control and among communities such as the Dard group, who report the highest levels of threat from military and tourism-related pressures. These findings highlight that in border regions like Ladakh, sustainability challenges are inseparable from geopolitical realities, where security considerations directly reshape access, control, and use of common resources.

The study further shows that perceptions of CPR decline are not merely attitudinal but correspond to observed changes over time. Chi-square analysis of perceived CPR availability over the past ten years indicates that an overwhelming majority of households report a decline in CPR availability, with nearly universal reporting of decline in villages such as Darchik,

Hardas, and Kaksar. The statistically significant association between village location and perceived resource decline confirms that sustainability challenges are highly localized. In contrast, household economic status, measured through ration card categories, does not show a significant association with perceived CPR change, suggesting that sustainability concerns transcend income categories and are experienced collectively at the community level.

The construction and analysis of the Threat Perception Index (TPI) provide a consolidated measure of how households cognitively assess risks to CPR sustainability. The index reveals substantial variation across villages, tehsils, and community groups, with Darchik and the Dard community recording the highest TPI scores. Regression analysis reveals that higher threat perception has a statistically significant negative effect on CPR utilization ($\beta = -0.396$, $p < 0.001$), indicating that heightened insecurity leads households to withdraw from or reduce reliance on CPRs. This finding challenges classical "tragedy of the commons" assumptions and instead points toward a "withdrawal under threat" dynamic, where insecurity particularly from military activity and access restrictions discourages sustainable use and collective stewardship.

Despite the pervasive perception of threats, the study identifies strong potential for community-led sustainability initiatives. Respondents express high confidence in the effectiveness of community-based measures such as rotational grazing, plantation drives, and collective water management (Mean = 3.96), along with a strong willingness to participate in conservation efforts (Mean = 4.09). These positive orientations are especially pronounced in villages like Kaksar and Mushkoo and in the Drass tehsil, where social cohesion and traditional governance structures remain relatively strong. This indicates that sustainability challenges do not stem from community apathy but rather from institutional and political constraints that limit effective collective action.

The Sustainability Index (SI), which integrates ecological availability, threat perception, governance effectiveness, participation, and collective action, provides a comprehensive assessment of long-term CPR viability. The results reveal significant variation in sustainability outcomes across villages and communities. Kaksar emerges as the most sustainable village, reflecting strong governance support, active participation, and lower perceived threats, while Shilikchay records the lowest sustainability score due to higher vulnerability and weaker institutional support. Notably, sustainability differences are not significantly associated with household economic status, reinforcing the finding that CPR

sustainability functions as a collective good shaped primarily by institutional quality and community engagement rather than individual wealth.

Finally, the study highlights clear opportunities for advancing equitable and sustainable CPR governance in Ladakh's border villages. Community-suggested measures overwhelmingly emphasize improved cooperation between villagers and the military, greater transparency and accountability in governance, formalization of rules, and inclusion of women and marginalized groups. The prominence of civil–military cooperation as a sustainability measure reflects the unique governance context of border regions, where military institutions exercise substantial control over land and resources. These findings indicate that sustainable CPR governance in Ladakh requires not only ecological and community-based interventions but also institutional innovation that formally integrates security actors into participatory and accountable governance frameworks.

### 8.2.6 Discussion and Interpretation

The empirical findings of the study strongly validate the relevance and explanatory power of the integrated theoretical framework and the Geo-Political Livelihoods and Governance (GLG) Model developed for analyzing Common Property Resource (CPR) governance in Ladakh's border villages. Across all objectives, the results establish that CPR governance in a militarized borderland cannot be adequately understood through single-theory approaches such as community self-management or state regulation alone. Instead, governance outcomes emerge from the dynamic interaction between livelihood dependence, institutional pluralism, power asymmetries, and perceived ecological and geopolitical threats, as conceptualized in the GLG framework.

Findings related to CPR availability and utilization substantiate the Sustainable Livelihoods Framework (SLF) by confirming that CPRs constitute the core livelihood base for households in Ladakh's border villages. The high dependence on water, pastures, and cultural commons reflects the dominance of natural and social capital in an environment where private landholdings, financial capital, and alternative employment opportunities are limited. Importantly, the findings challenge simplistic interpretations of CPRs as "resources of the poor" by empirically supporting the complementarity hypothesis embedded in the GLG model: households with larger landholdings often exhibit higher CPR utilization because common resources such as irrigation water and grazing lands are essential inputs for making private land productive.

The Theory of Access provides critical understanding into the divergence observed between customary rights and actual use of CPRs. The study's evidence that villages and communities located closer to the Line of Control experience lower utilization despite historical claims confirms Ribot and Peluso's distinction between rights to resources and ability to benefit from them. Military restrictions, fencing, and security zones operate as powerful access filters, indicating that coercive authority and geopolitical considerations override both legal and customary property arrangements. This finding reinforces the GLG model's emphasis on access mediation as a central mechanism shaping CPR use in border contexts.

The findings on governance structures strongly resonate with Ostrom's Institutional Analysis and Development (IAD) framework while simultaneously exposing its limitations in militarized settings. The identification of a polycentric Action Arena comprising traditional institutions, Union Territory administration, and the military confirms the IAD premise that governance outcomes are shaped by interactions among multiple actors with varying rules, incentives, and capacities. However, the stark asymmetry of power observed in Ladakh's border villages fundamentally disrupts Ostrom's assumption of relatively autonomous, negotiated rule-making among resource users.

Here, the concept of Institutional Bricolage provides a more accurate explanatory lens. The empirical evidence shows that CPR governance does not follow a linear transition from traditional to formal systems but instead evolves through hybrid and improvised arrangements. Villagers continue to rely on the Goba or Chhurpon for day-to-day regulation and conflict resolution, while simultaneously engaging with UT officials for enforcement and negotiating informally with military authorities for access permissions. This bricolage reflects pragmatic adaptation to a fragmented governance setting rather than institutional failure, affirming Cleaver's argument that institutions are socially embedded, historically contingent, and continuously reworked in response to power relations.

The findings also reveal a governance paradox consistent with political-institutional critiques of centralized control: while the UT administration holds formal authority and enforcement power, it lacks local legitimacy and trust, leading to weakened compliance and reduced community ownership of CPR governance. This disconnect between authority and legitimacy highlights the importance of participation and representation emphasized in the GLG model.

The study's findings on participation, inclusiveness, and conflict provide strong empirical support for the Politics of Engagement framework embedded within a political ecology perspective. Limited participation, exclusion of women and youth, and uneven representation across villages and ethnic groups indicate that CPR governance is shaped not merely by institutional presence but by the quality of engagement between communities and governing actors. The regression results showing that community representation positively influences governance effectiveness, while top-down political involvement undermines trust, directly validate the conceptual distinction between meaningful engagement and symbolic participation. Political ecology is particularly useful in interpreting the role of the military in CPR governance. The findings reveal that militarization functions as a form of strategic enclosure, where environmental governance becomes a mechanism of territorial control rather than conservation. Pasture closures, movement restrictions, and land acquisition for defense infrastructure transform ecological scarcity into political scarcity. This supports political ecology arguments that environmental change and resource access are deeply political processes shaped by state power, sovereignty, and security imperatives. At the same time, the military's dual role as both a restricting authority and a provider of employment and infrastructure creates dependency relationships that further complicate engagement. The GLG model captures this complexity by positioning the military not as an external shock but as an integral actor within the governance Action Arena, whose involvement fundamentally reshapes access, negotiation, and sustainability outcomes.

The findings related to threats and sustainability strongly affirm the third phase of the GLG model and contribute a significant theoretical understanding through the Threat–Withdrawal Hypothesis. Contrary to Hardin's "Tragedy of the Commons," the study reveals that high perceived threats particularly military activity and access insecurity lead not to overuse but to reduced utilization and abandonment of certain CPRs. Regression results showing a negative relationship between Threat Perception Index (TPI) and CPR utilization empirically support this reversal. This behavioral response aligns with Social–Ecological Systems (SES) theory, which emphasizes adaptive behavior under risk and uncertainty. In Ladakh's border villages, households adopt risk-averse strategies by avoiding distant or dangerous commons, even when they remain ecologically viable. However, this withdrawal produces uneven pressure on safer, near-village resources, generating new ecological stresses and governance challenges. The findings thus extend SES thinking by highlighting how militarization alters feedback loops between human behavior and ecological systems.

The Sustainability Index analysis provides strong conceptual validation for the GLG model's core proposition that sustainability is a collective, institutionally mediated outcome rather than an individual or purely ecological one. The non-significance of household economic status in determining sustainability outcomes highlights that even relatively better-off households cannot secure CPR sustainability in the absence of effective, trusted governance. Villages with higher participation, stronger collective action, and better institutional coordination exhibit greater resilience despite facing similar ecological and geopolitical threats. The positive association between inclusive governance, willingness for collective action, and sustainability outcomes confirms the GLG model's emphasis on Politics of Engagement (PEI) as a positive driver and Governance Effectiveness as a critical mediator. These findings suggest that strengthening participatory governance and institutional trust can offset the negative impacts of high threat perception, transforming vulnerability into adaptive resilience.

The discussion of findings, when interpreted through the Geo-Political Livelihoods and Governance (GLG) conceptual framework, clearly shows that the sustainability of Common Property Resources (CPRs) in Ladakh's border villages is shaped by an inseparable interaction between livelihood dependence, access mediation, institutional power relations, and perceived ecological and geopolitical threats. The empirical results strongly support the central premise of the GLG model that CPR outcomes cannot be explained solely through ecological availability or household needs, but must be understood as the product of multi-scalar governance processes operating within a militarized borderland context. The conceptual framework thus provides a coherent lens for linking household-level behavior to institutional dynamics and long-term social–ecological outcomes.

Findings related to CPR utilization affirm the GLG model's first analytical phase the Livelihood–Access Nexus by indicating that dependence on CPRs is structurally embedded within household livelihood systems. CPRs function simultaneously as subsistence safety nets and productive complements to private assets, confirming the framework's rejection of the simplistic "CPRs as resources of the poor" narrative. The observed complementarity between private landholding and CPR use aligns closely with the model's assumption that natural capital intensifies, rather than substitutes, reliance on common resources. More importantly, the findings validate the access filter embedded in the GLG framework: despite customary or historical rights over pastures and water sources, households' actual utilization is constrained by spatial proximity to the Line of Control, security restrictions, and differential ability to

negotiate access. This confirms that access is mediated not only by property rights but by authority, identity, and geopolitical location, as conceptualized in the framework.

The second phase of the GLG model the Institutional–Political Interface is strongly reflected in the findings on governance structures and participation. The study reveals a polycentric but asymmetrical governance arena in which traditional institutions, Union Territory administration, and military actors coexist, yet exercise unequal forms of power. While formal authority has shifted decisively toward centralized administrative structures following the Union Territory reorganization, legitimacy and everyday governance continue to rely heavily on traditional institutions. This disconnect between authority and legitimacy directly supports the conceptual emphasis on institutional bricolage within the GLG model, where governance is neither fully community-driven nor entirely state-controlled, but improvised through hybrid arrangements shaped by necessity and power. The persistence of informal negotiation with military authorities for CPR access further illustrates how governance outcomes are produced through negotiated exceptions rather than rule-based inclusion.

The Politics of Engagement, as operationalized within the conceptual framework, emerges as a decisive mechanism explaining variations in governance effectiveness and sustainability outcomes. The findings show that where engagement is inclusive, representative, and culturally grounded, trust in institutions and willingness for collective action are significantly higher. Conversely, top-down political involvement and militarized decision-making weaken participation and erode institutional trust. This confirms the GLG model's assertion that participation cannot be treated as a procedural formality; rather, the quality and agency embedded in engagement processes determine whether governance acts as a facilitator or a constraint on sustainable CPR management. The framework thus helps explain why centralized governance structures, despite stronger enforcement capacity, often fail to achieve legitimacy or sustainability in border villages.

The third phase of the GLG framework Social–Ecological Outcomes shaped by Threat Perception finds strong empirical validation in the study. High levels of perceived ecological and geopolitical threat significantly reduce CPR utilization, supporting the framework's Threat–Withdrawal Hypothesis. Contrary to classical commons theory, the findings indicate that scarcity and risk in militarized environments do not lead to competitive overuse but to strategic withdrawal from certain resources. This withdrawal, driven by fear of military

activity, shelling, and access uncertainty, leads to uneven pressure on safer CPRs and contributes to new sustainability challenges. The GLG framework effectively captures this behavioral response by linking cognitive perceptions of risk to livelihood strategies and collective management outcomes.

The Sustainability Index results further reinforce the conceptual model's emphasis on governance effectiveness as a mediating variable between threat perception and sustainability. Villages exhibiting higher levels of trust, participation, and collective action reveal greater resilience despite facing similar ecological and geopolitical pressures. The lack of a significant relationship between household economic status and sustainability outcomes highlights the framework's core understanding that sustainability is a collective and institutional phenomenon rather than an individual attribute. This finding strengthens the GLG model's argument that governance quality and politics of engagement are more critical to long-term CPR sustainability than household wealth or resource endowments alone.

## 8.3 Implications of the Study

The study has significant theoretical implications for the understanding of Common Property Resource (CPR) governance in borderland and conflict-affected regions. By applying and empirically validating the Geo-Political Livelihoods and Governance (GLG) conceptual framework, the study extends existing commons theory beyond its conventional assumptions of autonomous community management or benign state regulation. The findings show that in militarized border contexts, CPR governance is shaped by asymmetrical power relations, access mediation, and threat perception, rather than by resource characteristics alone. This contributes to political ecology and institutional analysis by highlighting militarization and geopolitics as central variables in shaping social–ecological outcomes, thereby offering a more nuanced theoretical lens for studying commons in contested and high-risk environments.

The policy implications of the study are particularly relevant for governance reforms in Ladakh following its transition to Union Territory status. The findings suggest that centralized administrative control, while improving formal enforcement, has weakened local participation, legitimacy, and trust factors that are essential for sustainable CPR management. The study implies that effective governance in border villages requires an institutional approach that integrates traditional authorities, customary practices, and community-based decision-making within the formal administrative structure. Moreover, the prominent role of the military in shaping access to CPRs highlights the need for structured civil–military

coordination mechanisms that can balance national security concerns with local livelihood requirements and environmental sustainability.

At the practical and developmental level, the study emphasises the importance of strengthening community engagement and collective action as pathways toward resilience and sustainability. The high willingness among villagers to participate in conservation and governance initiatives indicates substantial local capacity that remains underutilized due to institutional and political constraints. Development interventions should therefore prioritize inclusive participation, particularly of women and marginalized groups, enhance transparency in decision-making, and support adaptive livelihood strategies responsive to both climatic and geopolitical risks. These measures can reinforce trust, improve governance effectiveness, and enable borderland communities to sustainably manage CPRs despite persistent ecological uncertainty and security pressures.

## 8.4 Policy Suggestions

- Formally involve traditional institutions like the Goba and Chhurpon in managing common resources.
- Ensure villagers are consulted and included in decisions related to CPRs.
- Improve coordination between communities, civil administration, and the military.
- Frame clear and fair rules for access to pastures, forests, and water resources.
- Increase the participation of women, youth, and marginalized groups in CPR governance.
- Support community efforts such as grazing management, plantation, and irrigation maintenance.
- Integrate climate-resilient practices into CPR management.
- Strengthen transparency, accountability, and grievance redressal mechanisms.
- Provide training and awareness programs on sustainable CPR use.
- Design policies suited to the specific conditions of each border village.

## 8.5 Scope for Further Research

- Compare CPR governance in different border regions to understand similarities and differences.
- Conduct long-term studies to examine changes in CPR governance and livelihoods over time.

- Study the effects of Union Territory governance and civil–military coordination on local resource management.
- Use qualitative methods to understand everyday practices and power relations in CPR governance.
- Focus on the role of women and youth in CPR management.
- Examine the impact of tourism and new livelihood activities on common resources.
- Explore climate change impacts and local adaptation strategies related to CPRs.

## 8.6 Conclusion

The study set out to examine the governance of Common Property Resources (CPRs) in the border villages of Ladakh by situating livelihood dependence, institutional arrangements, and sustainability concerns within a militarized and ecologically fragile context. Drawing on primary data collected through a household survey across selected border villages and supported by secondary sources, the study addressed a critical gap in existing literature that often treats commons governance either through community-centric or state-centric lenses, with limited attention to geopolitics and security regimes. By focusing on Ladakh's borderland setting, the study highlighted how CPRs such as pastures, water systems, forests, and cultural commons are not merely economic resources but foundational elements of survival, identity, and social organization for local communities.

The findings clearly establish that CPRs continue to play a central role in household livelihoods despite administrative restructuring and increasing external pressures. Households rely heavily on CPRs for agriculture, livestock rearing, fuel, and cultural practices, highlighting their importance as both subsistence safety nets and productive complements to private assets. At the same time, access to these resources is increasingly mediated by non-local actors and security considerations. The study reveals that livelihood dependence alone does not determine CPR utilization; rather, access is filtered through spatial proximity to the Line of Control, identity, institutional authority, and the ability to negotiate within a securitized governance environment. This highlights a critical distinction between customary rights and actual ability to benefit from common resources.

The analysis of governance structures reveals a complex and fragmented institutional setting characterized by the coexistence of traditional institutions, formal administrative bodies under the Union Territory framework, and the security establishment. While formal authority over CPR governance has become increasingly centralized, traditional institutions such as the

Goba and Chhurpon continue to retain social legitimacy and relevance in everyday resource management and conflict resolution. The erosion of local decision-making power without corresponding gains in trust or participation has weakened governance effectiveness. The study shows that governance in Ladakh's border villages operates through institutional bricolage, where communities pragmatically combine customary norms, bureaucratic procedures, and informal negotiations with military authorities to manage resources and resolve disputes.

Patterns of participation and inclusiveness further reveal deep governance challenges. Community participation in CPR decision-making remains limited, with women, youth, and marginalized groups largely excluded from formal governance processes. Participation varies across villages and communities, reflecting uneven power relations and differential access to institutions. Importantly, the study finds that governance effectiveness and trust are strongly linked to inclusive and representative forms of engagement, rather than to top-down political intervention. Where communities perceive that their voices matter, compliance with rules and willingness for collective action are higher, reinforcing the central role of the politics of engagement in shaping governance outcomes.

The study's examination of threats and sustainability provides one of its most significant contributions. CPRs in Ladakh's border villages are under multiple and overlapping pressures arising from climate change, overgrazing, development activities, tourism, and, most critically, military and border-related restrictions. High levels of perceived threat significantly reduce CPR utilization, not through overexploitation but through withdrawal and avoidance of risky or restricted areas. This finding challenges classical "*tragedy of the commons*" assumptions and instead points toward a "*tragedy of enclosure*" dynamic, where insecurity and restricted access undermine sustainable use and collective stewardship. Sustainability outcomes vary widely across villages and are shaped more by governance quality, participation, and collective action than by household economic status.

The theoretical and conceptual contributions of the study are anchored in the development and empirical validation of the Geo-Political Livelihoods and Governance (GLG) framework. By integrating the Sustainable Livelihoods Framework, Theory of Access, Institutional Analysis and Development, Political Ecology, and the Politics of Engagement, the GLG model provides a comprehensive and context-sensitive approach to understanding CPR governance in militarized borderlands. The findings confirm that sustainability is an emergent property of interactions between livelihood needs, access mechanisms, institutional power

relations, and threat perceptions. Governance effectiveness emerges as a key mediating factor that can either mitigate or amplify the negative impacts of ecological and geopolitical pressures.

The study reveals that sustainable and equitable CPR governance in Ladakh's border villages cannot be achieved through centralized administration or security-driven regulation alone. Instead, it requires inclusive, participatory, and context-specific governance arrangements that recognize traditional institutions, strengthen community engagement, and institutionalize coordination between civil administration and security forces. By foregrounding the lived realities of border communities, this study contributes to broader debates on commons governance, borderland studies, and sustainable development, and provides a grounded framework for policy interventions aimed at preserving both ecological integrity and human dignity in conflict-affected regions.

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# ANNEXURE

# BIBLIOGRAPHY

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# APPENDIX A

# SCHEDULE

## Governing Common Property Resources and Politics of Engagement: A Case Study of Border Villages in the Union Territory of Ladakh

Schedule No. Block: Village:

Section A: General Information

1. Respondent's Name: _____
2. Respondent's Age (in years): _____
3. Gender (Head of Household): ☐ Male ☐ Female ☐ Other
4. Occupation (Head of Household): ☐ Farmer ☐ Cultivator ☐ Herdsman ☐ Business ☐ Govt. Service ☐ Private Sector Employee ☐ Daily Wage/Casual Labor ☐ Self Employed ☐ Other
5. Education level of household head: ☐ No formal ☐ Primary ☐ Secondary ☐ Higher
6. Household size: _____
7. Community Group: ☐ Balti ☐ Purig ☐ Shina ☐ Other
8. Total landholding (acres) (if none put 0): _____
9. Does any household member practice seasonal migration for grazing or work? ☐ Yes ☐ No
10. What type of ration card does your household possess? ☐ No Ration Card ☐ AAY ☐ PHH ☐ BPL ☐ APL

**Section B: Types and Usages of Common Property Resources**

11. Which CPRs exist in your village? (Tick all that apply) ☐ Pastures ☐ Water Resources ☐ Forests ☐ Cultivable land ☐ Medicinal plants ☐ Community storage ☐ Religious & Cultural Commons ☐ Others
12. How often does your household use CPRs? (Daily / Weekly / Seasonally / Rarely / Never)

| CPRs | Daily | Weekly | Seasonally | Rarely | Never |
|---|---|---|---|---|---|
| Pastures | ☐ | ☐ | ☐ | ☐ | ☐ |
| Water Resources | ☐ | ☐ | ☐ | ☐ | ☐ |
| Forests | ☐ | ☐ | ☐ | ☐ | ☐ |
| Cultivable land | ☐ | ☐ | ☐ | ☐ | ☐ |
| Medicinal plants | ☐ | ☐ | ☐ | ☐ | ☐ |
| Community storage | ☐ | ☐ | ☐ | ☐ | ☐ |
| Religious & Cultural Commons | ☐ | ☐ | ☐ | ☐ | ☐ |
| Others | ☐ | ☐ | ☐ | ☐ | ☐ |

13. Rank the importance of CPRs for your household (1=Least Important, 5=Most Important):
14. For what purposes do you use CPRs? (Tick all that apply) ☐ Grazing ☐ Firewood ☐ Irrigation ☐ Medicinal plants ☐ Cultivation ☐ Fishing ☐ Tourism ☐ Others
15. Approximate % of household livelihood that depends on CPRs: _____
16. Percentage of working members that depends on CPRs: _____
17. Does your household earn any direct income from CPRs? ☐ Yes ☐ No
18. If yes, please specify approximate monthly/annual income (₹): _____

19. Approximately what percent (%) of your household's annual livelihood depends on CPRs? _____
20. Please indicate your agreement with the following statements (1=Strongly Disagree, 5=Strongly Agree):

| Statement | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| CPRs are essential for my household's survival and livelihood. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Even without CPRs, my household could manage equally well. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Over the last 10 years, my household has become more dependent on CPRs. | ☐ | ☐ | ☐ | ☐ | ☐ |
| My household would face serious difficulties if CPRs were degraded or lost. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Among all resources available, CPRs are more important than private resources. | ☐ | ☐ | ☐ | ☐ | ☐ |

Section C: Governance & Management

21. Before Ladakh became a UT in 2019, who primarily controlled CPRs? ☐ Panchayat/Community ☐ J&K Government ☐ Hill Council ☐ Religious authority ☐ Other
22. Since 2019 (UT status), has governance of CPRs changed? ☐ Strengthened local control ☐ Weakened local control ☐ No change ☐ Not sure
23. Who holds authority over CPRs in your village under UT system? ☐ Village Council ☐ LAHDC ☐ UT Administration ☐ Military ☐ Religious Trusts ☐ Other
24. Do villagers trust LAHDC Kargil as a protector of CPR rights? ☐ Yes completely ☐ Partially ☐ No ☐ Don't know
25. Do you feel LAHDC has adequate power to manage CPRs? ☐ Yes ☐ No ☐ Not Sure

26. Are there written/oral agreements on CPR use? ☐ Written ☐ Oral ☐ Both ☐ None
27. Who enforces CPR usage rules now? ☐ Village elders ☐ UT officials ☐ Military ☐ LAHDC ☐ Other
28. Have UT policies changed your CPR access? ☐ Strongly decreased ☐ Somewhat decreased ☐ No change ☐ Somewhat increased ☐ Strongly increased
29. How are CPR disputes resolved now? ☐ Village council ☐ UT officials ☐ Military ☐ Courts ☐ Religious leaders ☐ Family Heads ☐ Other
30. Are CPR-related projects decided more by: ☐ UT Administration ☐ Central Government ☐ Local community institutions ☐ NGOs
31. Do villagers feel that their voices are heard in decisions related to CPRs? ☐ Always ☐ Frequently ☐ Sometimes ☐ Rarely ☐ Never
32. Has Military presence changed CPR access? ☐ Yes ☐ No
33. Are women and youth involved in CPR governance? ☐ Yes ☐ No
34. How transparent are decisions about CPRs? ☐ Completely ☐ Mostly ☐ Moderately ☐ Slightly ☐ Not at all
35. Do you receive govt/NGO support for CPR conservation? ☐ Yes ☐ No
36. If yes, specify program: _____
37. Have CPR availability changed in last 10 years? ☐ Increase ☐ Decrease ☐ No Change
38. If decrease, what reasons? ☐ Climate change ☐ Overgrazing ☐ Population pressure ☐ Tourism ☐ Military activity ☐ Govt restrictions ☐ Other
39. Do different authorities cooperate or conflict in managing CPRs? ☐ Mostly cooperate ☐ Sometimes cooperate ☐ Mostly conflict ☐ No interaction ☐ Don’t know

40. Has your household's dependency on CPRs changed in the last 10 years? ☐ Strongly increased ☐ Somewhat increased ☐ No change ☐ Somewhat decreased ☐ Strongly decreased
41. Instruction to enumerator: Read each statement aloud and ask the respondent to rate their level of agreement on a scale of 1–5: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.

Governance changes since UT status:

| Statement | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Governance of CPRs has improved. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Local voices in CPR management strengthened. | ☐ | ☐ | ☐ | ☐ | ☐ |
| UT administration more responsive to villagers' needs. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Rules and policies more transparent. | ☐ | ☐ | ☐ | ☐ | ☐ |

Role and authority of institutions:

| Statement | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Village Council has adequate authority to manage CPRs. | ☐ | ☐ | ☐ | ☐ | ☐ |
| LAHDC plays positive role in protecting community rights. | ☐ | ☐ | ☐ | ☐ | ☐ |
| UT administration has sufficient power/resources to manage CPRs. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Military respects local CPR rights. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Religious authorities important for fair CPR usage. | ☐ | ☐ | ☐ | ☐ | ☐ |

Enforcement and trust:

| Statement | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| CPR rules applied fairly to all members. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Villagers trust LAHDC as protector of CPR rights. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Enforcement of CPR rules is consistent. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Disputes over CPR use are resolved fairly. | ☐ | ☐ | ☐ | ☐ | ☐ |

Participation and inclusiveness:

| Statement | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Villagers' voices are heard in decision-making. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Women and youth have equal opportunities in governance. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Governance meetings are transparent. | ☐ | ☐ | ☐ | ☐ | ☐ |
| NGOs strengthen community voice. | ☐ | ☐ | ☐ | ☐ | ☐ |

Perceptions of change over time:

| Statement | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Governance has become more inclusive. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Governance has become more accountable. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Overall satisfaction with CPR governance. | ☐ | ☐ | ☐ | ☐ | ☐ |

Section D: Politics of Engagement in CPRs

42. Who has the strongest influence in CPR decision-making? ☐ Village elders ☐ UT administration ☐ LAHDC ☐ Army/Border Forces ☐ Religious bodies ☐ NGOs ☐ Other
43. Do you feel power is fairly distributed among these actors? ☐ Yes ☐ No ☐ Not Sure
44. Are there political parties or leaders involved in CPR-related decisions? ☐ Yes ☐ No
45. If yes, which and how: _____
46. Since 2019, have political decisions from the central government affected CPR access? ☐ Yes ☐ No ☐ Not Sure
47. Do you feel UT administration represents border villages in CPR matters? ☐ Always ☐ Frequently ☐ Sometimes ☐ Rarely ☐ Never
48. Who usually represents your village in CPR-related meetings? ☐ Elected councillor ☐ Village headman (Goba) ☐ Religious leader ☐ Youth group ☐ Women's group
49. How often do UT/LAHDC officials visit your village to discuss CPRs? ☐ Regularly ☐ Frequently ☐ Occasionally ☐ Rarely ☐ Never
50. Has the Army/Border Security intervened in CPR management? ☐ Yes ☐ No
51. If yes, describe: _____
52. Do villagers negotiate directly with the military for CPR use? ☐ Yes ☐ No
53. How are political disputes over CPRs resolved? ☐ Local negotiation ☐ LAHDC ☐ UT administration ☐ Courts ☐ Military arbitration ☐ Other
54. Do villagers feel they have a political voice in CPR-related decisions? ☐ Yes ☐ No ☐ Sometimes
55. Do NGOs/civil society amplify community's voice? ☐ Yes ☐ No
56. If yes, which NGOs and how: _____

57. Do you feel cultural traditions are respected in CPR policies? ☐ Yes ☐ No ☐ Sometimes
58. Do border politics influence access to CPRs? ☐ Very Strongly ☐ Strongly ☐ Somewhat ☐ Not Strongly ☐ Not at all
59. Are community consultations organized before interventions in CPRs? ☐ Always ☐ Frequently ☐ Sometimes ☐ Rarely ☐ Never
60. Do you feel Army prioritizes its needs over villagers' rights? ☐ Always ☐ Frequently ☐ Sometimes ☐ Rarely ☐ Never
61. Have political parties used CPR issues during elections? ☐ Yes ☐ No
62. If yes, how: _____
63. Political engagement in CPRs has: ☐ Improved ☐ Worsened ☐ No change
64. Threats, Sustainability & Community Solutions: Instruction to enumerator: Read each statement aloud. Ask the respondent to indicate their level of agreement (1–5).

| Statement | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Climate change is a serious threat to CPRs. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Overgrazing and population pressure reduce CPR availability. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Tourism and military activities pressure community resources. | ☐ | ☐ | ☐ | ☐ | ☐ |
| Community initiatives (rotational grazing, plantations, water management) improve sustainability. | ☐ | ☐ | ☐ | ☐ | ☐ |
| I am willing to participate in collective efforts to conserve CPRs. | ☐ | ☐ | ☐ | ☐ | ☐ |

65. What measures would you suggest to improve sustainable management of CPRs? (Tick all that apply)☐ Community patrols ☐ Rotational grazing ☐ Seedling plantation ☐ Involvement of women ☐ Formalization of rules ☐

Youth/compensation schemes ☐ Transparency & accountability ☐ Inclusion of marginalized groups ☐ Better cooperation with military ☐ Greater NGO involvement ☐ Others

66. Comments/ Remarks/Suggestions

Date: Name of Investigator

# APPENDIX B

# Villages/hamlets as the Areas Adjoining Actual Line of Control (ALC) in the UT of Ladakh

## I. District Leh

| S. No. | Name of the Tehsil | Name of the Revenue Village | Name of Hamlets |
|---|---|---|---|
| 1 | **Khaltsi** | Dha | Dha |
| | | | Baima |
| | | | Sanith |
| | | | Lasthang |
| 2 | | Hanu | Hanu Thang |
| | | | Hanu Yokma |
| | | | Hanu Gongma |
| 3 | **Nyoma** | Demjok | Demjok |
| 4 | | Koyul | Koyul |
| 5 | | Mud | Tsaga |
| 6 | | Nyoma | Dungti TR |
| 7 | | Anlay | Pungug |
| 8 | | Korzok | Chumur |
| | | | Tegazong |
| 9 | **Durbuk** | Chushul | Chushul |
| 10 | | Maan Pangong | Khakted |
| | | | Merek |
| | | | Maan |
| | | | Spangmik |
| | | | Lukung |
| | | | Phobrang / Yurgo |
| 11 | **Nubra** | Thang | Thang |
| 12 | | Tyakshi | Pachathang |
| | | | Tyakshi |
| 13 | | Turtuk Yul | Turtuk Yul |
| 14 | | Turtuk Farol | Turtuk Farol |

| | | | |
|---|---|---|---|
| 15 | | Chulunkha | Chulunkha |
| 16 | | Waris Fastan | Waris |
| | | | Fastan |
| | | | Sunodho |
| | | | Dongpo Lhas |
| 17 | | Bogdang | Shukpa |
| | | | Stanguksa |
| | | | Bogdang Phoo |
| 18 | **Sumoor** | Khemi | Khemi |
| | | | Nungstet |
| | | | Dongsa |
| | | | Sangyar |
| | | | Yarma Gonbo |
| | | | Warshi |
| | | | Tongstet |
| | | | Hanachey |
| | | | Changlung |
| | | | Sasoma 1st |

**II. <u>District Kargil</u>**

| **S. No.** | **Name of the Tehsil** | **Name of the Revenue Village** | **Name of Hamlets** |
|---|---|---|---|
| 1 | **Kargil** | Kaksar (1st Village) | Ajanoporo |
| | | | Majanopor |
| | | | Kharinopora I |
| | | | Kharinopora II |
| 2 | **Kargil** | Karkit (1st Village) | Farka |
| | | | Gynchoks |
| | | | Haral |
| | | | Gongama Badgam |
| | | | Khunda |
| | | | Majdass |
| | | | Karkitchoo |

| | | | |
|---|---|---|---|
| | | | Imamabada |
| | | | Tnagboo |
| | | | Ningos |
| 3 | **Kargil** | Drelung (1st Village (Latoo)) | Latoo |
| 4. | **Kargil** | Chuliskamboo | Barampa Ga Qasimpa |
| | | | Abul Pa |
| | | | Majino Poro |
| | | | Kharino Poro |
| | | | Munthang |
| | | | Gailaly |
| | | | Dass Groung |
| | | | Bado Groung |
| | | | Shelo Groung |
| | | | Raimaly Groung |
| 5 | **Kargil** | Hardass | Ground A |
| | | | Ground B |
| | | | Thang A |
| | | | Thang B |
| | | | Grongjuk A |
| | | | Grongjuk B |
| | | | Kharool |
| 6 | **Kargil** | | Beythang |
| | | Shilikchey (1st Village) | Hunduman Mal |
| | | | Yukma Shilikchey |
| 7 | **Kargil** | Clhulichan (1st Village) | Grangstod A |
| | | | Grangstod B |
| | | | Grongkill |
| | | | Grongjuk |
| | | | Sharchay Fali |
| | | | Sharchay |
| | | | Khangstong |
| 8 | **Kargil** | Akchamal | Yokma Akchamal |
| | | | Grong Akchamal |

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| | | | Fraith Akchamal |
| | | | Farma Akchamal |
| | | | Rong Akchamal |
| | | | Oll |
| | | | Mangbore |
| 9 | **Kargil** | Yourbaltak | Haider Ground Ghutumail |
| | | | Doks Chutumail |
| | | | Stayang Chutumail |
| | | | Tor Chutumail |
| | | | Sharbat Gund |
| | | | Bongsik Yourbaltak |
| | | | Fuker Yourbaltak |
| | | | Yourbaltak |
| | | | Bayma |
| | | | Thanjuk |
| | | | Shagran |
| 10 | **Kargil** | Andoo Hamlet of Pashkum Village | Andoo |
| 11 | **Kargil** | Tumail | Groung Tumail |
| | | | Groung Toot Tumail |
| | | | Groung Yur Tumail |
| | | | Gatoo Tumail |
| | | | Thang Jook |
| 12 | **Kargil** | Apatee | Apatee |
| | | | Garpong |
| | | | Gongma Garpong |
| | | | Spangajook |
| 13 | **Kargil** | Barchay | Yourkrol Barchey |
| | | | Landuqas Barchey |
| 14 | **Kargil** | Lalung | Groung Jouck 2nd |
| | | | Nangkhar |
| | | | Nangkhar 3rd |
| | | | Groung Krill |
| 15 | **Kargil** | Silmoo | Groung Stoth Ist |

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| | | | Groung Stoth 2nd |
| | | | Lumboo |
| | | | Groung B |
| | | | Pugoo C |
| | | | Saburchey D |
| | | | Olikha E |
| | | | Lakha Silmo |
| | | | Baltum Silmo |
| | | | Gongama Thang |
| | | | Yougma Thang |
| | | | Grongzok |
| | | | Batalik |
| | | | Dangal |
| | | | Mir Grong |
| | | | Adam |
| 16 | **Kargil** | Darchiks | Latoo |
| | | | Sanachay |
| | | | Manaythang |
| | | | Barjay |
| | | | Dodon |
| | | | Gurji |
| 17 | **Kargil** | Garkone | Gargardoo |
| | | | Hordass |
| | | | Haro |
| | | | Sil Changrah |
| | | | Too |
| | | | Yaldor |
| 18 | **Shaker Chiktan** | Sanjak | Sanjak |
| 19 | **Drass** | Botokul Uninhabited | Botokul |
| 20 | **Drass** | Mushkoo | Ajino Pora |
| | | | Majino Pora |
| | | | Kharino Pora |
| 21 | **Drass** | Holiyal | Masjid Gam |

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| | | | Akhoon Mallah |
| | | | Majeno Mallah |
| 22 | **Drass** | Muradbagh | Gongma Mohalla |
| | | | Yokhma Mohalla |
| | | | Trama Mohalla |
| | | | Thangjuk Mohalla |
| 23 | **Drass** | Troungjen | Troungjen |
| | | | Haji Pora |
| | | | Salam Pora |
| | | | Falo Pora |
| | | | Falo Pora |
| | | | Nagopra |
| | | | Darlo Pora |
| | | | Aul Bayaras |
| 24 | **Drass** | Ranbirpora | Aliyer |
| | | | Rambirpora |
| | | | Khandiyal |
| | | | Tesboo |
| | | | Taiser |
| | | | Fravo |
| 25 | **Drass** | Goshan | Majapor |
| | | | Gatoo |

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| | | | Naith Gham |
| | | | Gongma |
| | | | Hantous Groung |
| | | | Doks |
| | | | Jololo |
| | | | Lamar |
| | | | Gringo |
| 26 | **Drass** | Youlboo | Youlboo |
| | | | Lamochan |
| | | | Skutiyal |
| 27 | **Drass** | Gindiyal | Nowpora |
| | | | Gundiyal |
| | | | Hatoo |
| | | | Masjidgam |
| 28 | **Drass** | Bhimbhat | Kashal and Sanyil |
| | | | Banjar and Kurtiyal |
| | | | Gendiyal |
| | | | Bhimbat |
| | | | Hondow and Betoo |
| | | | Zargar |
| | | | Ningoor |
| 29 | **Drass** | Thasgam | Sumat |
| | | | Masjeed Gam |
| | | | Bazur Gam |
| | | | Daper Gam |
| 30 | **Drass** | Shimsha | Kool |
| | | | Maja Poor |
| | | | Masjid Gam |
| | | | Badgroom |
| | | | Masgid Gam |
| | | | Hayt Mohalla |
| | | | Dar Mohalla |

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| 31 | **Drass** | Kharboo | Kool |
| | | | Kothi Bagh |
| | | | Naryal |
| | | | Soonay |
| | | | Maskiyal |
| | | | Aziyaz |
| | | | Badgoom |
| 32 | **Drass** | Throngous | Gunyal |
| | | | Chaspang |
| | | | Throngous |
| 33 | **Drass** | Chokiyal | Toko Dox |
| | | | Chokiyal Dongchick |
| | | | Khunda |
| 34 | **Drass** | Jasgund | Dandal |
| | | | Dandal Thang |
| | | | Sheerting pora |
| | | | Bayik Pora |

# APPENDIX C

## Glossary of Indigenous and Local Terminologies of the Study Area

| | |
|---|---|
| Biama | : Stand |
| Bichit | : Cattle shelter for summer |
| Chaksa | : Dry Toilet |
| Charagh | : Grazing ground |
| Chu | : Water |
| Churpon | : Water guardian/manager/distributor |
| Chu Lam | : Path along Water Channels |
| Chuka | : River |
| Dangra | : Cattle shelter for winter |
| Dhoks | : Pasture |
| Do | : Cultivated Field |
| Doksa | : Seasonal Settlement (Temporary camps in upland pastures) |
| Gangri | : Glacier |
| Ghaschrai | : Grazing Land |
| Gato | : Cattle shed |
| Goba | : Village Headman / Community Leader |
| Kha | : Snow |
| Khalisa | : Common property |
| Khul | : Water Tank |
| Lam | : Pathways |
| Lchangrah | : Sitting Place/Polo Ground |

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|---|---|
| Lchangma | : Tree |
| Lambardar/Goba | : Village Head |
| Mi Lam | : Human Pathways |
| Nallah/Yurba | : Water Channel |
| Nallah/Yurba | : Seasonal water stream used for irrigation and water stream |
| Ra Lam | : Cattle Pathways |
| Rut Lam | : Flood Channels |
| Rdwa | : Stone |
| Sa | : Soil |
| Shing | : Fire Wood |
| Zgrom/ Baksa | : Wooden/ Steeel boxes where grain stored |