

**Annex 3:**

**THE BASELINE ASSESSMENT FOR  
JUMLA-MUGU SOCIO ECOLOGICAL PRODUCTION LANDSCAPE**



**Details to the  
OPERATIONAL PHASE 8 (OP8)  
SGP COUNTRY PROGRAMME STRATEGY (CPS)**

**NEPAL**

## I. Introduction

The Jumla-Mugu socio ecological production landscape (JML) represents one of Nepal's most strategically critical river basin systems in the high-mountain Karnali region, encompassing a unique convergence of globally significant alpine biodiversity, extreme climate vulnerability, and the deepest socio-economic marginalization within the country. Selected as one of the three priority landscapes for GEF-SGP Operational Phase 8 (OP8), the Jumla-Mugu landscape embodies the programme's strategic evolution towards concentrated, evidence-based interventions that link conservation with sustainable livelihoods and poverty reduction. This landscape selection reflects lessons learned from previous operational phases, particularly the recognition that focused geographic targeting enhances programme impact, fosters synergies among projects, and creates demonstrable pathways for scaling up successful interventions.

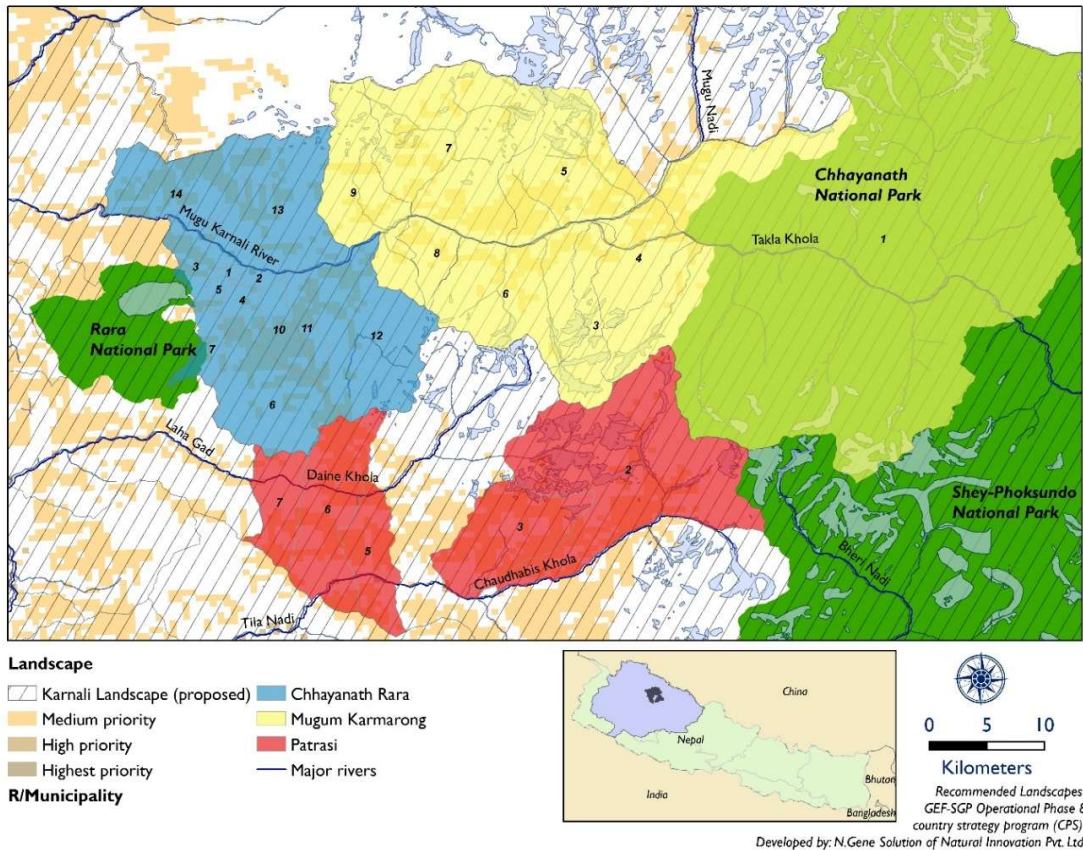
The JML is characterized by its extreme rugged topography, ranging from temperate river valleys at approximately 1,500 metres above sea level (masl) to alpine zones exceeding 5,000 masl within the core area of the newly established Chhayanath National Park (CNP). The landscape faces significant environmental pressures including unsustainable non-timber forest product (NTFP) extraction, fragile alpine land degradation, glacier retreat and hydrological stress, and threats to high-altitude biodiversity including globally threatened flagship species. What makes this landscape particularly compelling for SGP intervention is the powerful convergence of its challenges and opportunities: the declaration of Chhayanath National Park in 2025 creates a non-replicable institutional window to shape inclusive conservation governance from inception, while the landscape's position within a tri-park ecological corridor – connecting CNP, Rara National Park, and Shey-Phoksundo National Park – presents a unique and timely opportunity to advance Nepal's emerging Other Effective Area-Based Conservation Measures (OECMs) framework in line with the Kunming-Montreal Global Biodiversity Framework (GBF) Target 3 (30x30).

The landscape is home to the Kham and Limi indigenous peoples of Mugum Karmarong, and to Dalit communities with deep cultural connections to the high-altitude environment. Tibetan Buddhist and Bon traditions imbue the landscape with sacred significance, and centuries of customary governance systems for managing alpine rangelands (kharka), forests, and medicinal plant resources provide an irreplaceable foundation for community-led conservation. The region's socio-economic profile, marked by Mugu's rank as the least developed district in Nepal (74th of 75) and an extreme dependence on high-value but market-volatile NTFPs, underscores the urgent need for interventions that simultaneously address environmental degradation and livelihood security.

The selection of the Jumla-Mugu landscape for OP8 investment was made through a rigorous multi-criteria GIS-based analysis scoring five dimensions: biodiversity significance, climate vulnerability, socio-economic marginalization, OECM governance potential, and policy moment. The landscape scored at or near maximum on every criterion – a convergence achieved by no other candidate landscape – providing the strongest objective justification for concentrated OP8 investment.

## 2. Geographic Coverage

The Jumla-Mugu landscape spans two districts in Karnali Province: Jumla and Mugu. This multi-district landscape encompasses diverse ecological zones, from the temperate river valleys of the Tila watershed in Jumla to the trans-Himalayan alpine terrain of Mugum Karmarong in Mugu.



**Figure 1:** Map of Jumla-Mugu Landscape

Jumla District contributes the southern and lower-elevation portion of the landscape. Patrasi Rural Municipality (5 wards, 397.04 km<sup>2</sup>) forms the Tila River Valley headwater zone, characterized by temperate forests dominated by blue pine (*Pinus wallichiana*) and oak (*Quercus semecarpifolia*), traditional irrigated agriculture on river terraces, and high-value NTFP collection areas. The Tila watershed features 64.7 km of earthen district roads – critical connectivity infrastructure but also a significant source of erosion and landslide risk on this geologically active terrain.

Mugu District, encompassing two Rural Municipalities, forms the alpine and trans-Himalayan core of the landscape. Chhayanth Rara Rural Municipality (12 wards, 376.06 km<sup>2</sup>) contains the Chhayanth Dham pilgrimage site – after which the new National Park is named – and forms part of the newly designated CNP Buffer Zone. The municipality is characterized by

mixed cultural communities and serves as a gateway to the high-altitude pasture zones. Mugum Karmarong Rural Municipality (7 wards, 1,438.82 km<sup>2</sup>), the largest administrative unit in the landscape, encompasses the core area of Chhayanath National Park and the highest-elevation terrain, reaching 4,790 metres in the Tila watershed. This municipality is dominated by Kham and Limi indigenous communities following Tibetan Buddhist and Bon traditions, and hosts the most extensive alpine rangelands and sacred natural sites in the landscape.

**Table 1:** Detailed Administrative Coverage of Jumla-Mugu Landscape

| DISTRICT     | R/Municipality              | Number of Wards | Total Area (Approx. km <sup>2</sup> ) | Key Ecological Context   |
|--------------|-----------------------------|-----------------|---------------------------------------|--|
| Jumla        | Patrasi RM                  | 5               | 397.04                                | Tila River Valley headwaters; temperate forests; traditional agriculture and watershed stabilization.  |
| Mugu         | Chhayanath Rara RM          | 12              | 376.06                                | Chhayanath Dham pilgrimage site; CNP Buffer Zone; community forest transition zone.                    |
|              | Mugum Karmarong RM          | 7               | 1,438.82                              | CNP core area and buffer zone; Tibetan-influenced indigenous communities; extensive alpine rangelands. |
| <b>Total</b> | <b>2 Districts / 3 R/Ms</b> | <b>24</b>       | <b>~2,232</b>                         | <b>High-altitude Alpine/Trans-Himalayan Zone</b>   |

### 3. Ecological and Geographic Characteristics

The Jumla-Mugu landscape encompasses three distinct ecological zones: the temperate river valleys of the lower Tila watershed in the south (1,500–2,500 masl), the subalpine transition zone of mixed coniferous and broadleaf forests (2,500–4,000 masl), and the alpine and trans-Himalayan zone of the CNP core area and Mugum Karmarong rangelands (4,000–5,000+ masl). This ecological gradient creates diverse habitats supporting globally significant biodiversity while presenting distinct conservation and development challenges in each zone.

#### 3.1 Forest Resources and Biodiversity

Forest cover in the Jumla-Mugu landscape varies significantly by elevation and community governance status. The temperate and subalpine zones host blue pine (*Pinus wallichiana*), West Himalayan spruce (*Picea smithiana*), silver fir (*Abies spectabilis*), oak (*Quercus semecarpifolia*), and

Himalayan maple (*Acer caesium*) in different elevation bands, transitioning to dwarf rhododendron (*Rhododendron anthopogon*), juniper (*Juniperus indica*), and finally to alpine meadow vegetation above the treeline. Overall forest cover in community-managed areas (CFUGs) is considered stable or increasing in extent, though forest quality and composition are changing, with respondents noting declining densities of high-value medicinal species under unregulated collection pressure.

**Table 2:** Major Flora and NTFP Species in the Jumla-Mugu Landscape

| Species (Common Name)     | Scientific Name                        | IUCN Status | Primary Zones / Uses  |
|---------------------------|--|-------------|---|
| <b>Yarsagumba</b>         | <i>Ophiocordyceps sinensis</i>         | VU          | Alpine meadows (4,000–5,000 m); highest-value NTFP; major household income source.  |
| <b>Jatamansi</b>          | <i>Nardostachys grandiflora</i>        | EN          | Subalpine zones; aromatic root; CITES Appendix II; distillation potential in Jumla. |
| <b>Kutki</b>              | <i>Neopicrorhiza scrophulariiflora</i> | VU          | Alpine/subalpine; pharmaceutical; high export value.                                |
| <b>Morel Mushroom</b>     | <i>Morchella esculenta</i>             | LC          | Subalpine forest floors; premium culinary market; drying potential.                 |
| <b>Blue Pine</b>          | <i>Pinus wallichiana</i>               | LC          | Temperate/subalpine; dominant timber species; watershed stabilization.              |
| <b>Silver Fir</b>         | <i>Abies spectabilis</i>               | LC          | Subalpine; critical for water retention and slope stabilization.                    |
| <b>Dwarf Rhododendron</b> | <i>Rhododendron anthopogon</i>         | LC          | Alpine; indicator species; important for snowmelt regulation.                       |

### 3.2 Wildlife and Flagship Species Conservation

The Jumla-Mugu landscape is a globally significant biodiversity hotspot for high-altitude fauna. The newly established Chhayanath National Park formalizes protection of the core habitat, but critical wildlife populations extend well beyond park boundaries into community-managed forests, alpine rangelands, and the inter-park corridor. The landscape hosts crucial populations of flagship species, the conservation of which provides the primary biodiversity justification for GEF investment.

The Snow Leopard (*Panthera uncia*, VU), listed as Vulnerable on the IUCN Red List and in CITES Appendix I, is the apex predator and conservation flagship of the landscape. It depends on the high-altitude terrain and prey species found throughout the CNP and surrounding rangelands. The Blue Sheep (*Pseudois nayaur*, LC) is the primary prey species for the Snow Leopard, and the health of its population is intrinsically linked to apex predator survival; it is abundant in the alpine zones of Mugum Karmarong. The Himalayan Musk Deer (*Moschus*

*chrysogaster*, EN), listed as Endangered on the IUCN Red List, is critically targeted by illegal hunters for its valuable musk pod. The Tibetan Wild Ass/Kiang (*Equus kiang*, VU) inhabits the trans-Himalayan zones of Mugum Karmarong. The Wild Yak (*Bos mutus*, VU), while rare, has been recorded in the landscape. Significant avifauna includes the Bearded Vulture/Lammergeier (*Gypaetus barbatus*, VU), the Black Eagle (*Ictinaetus malaiensis*, EN), and the Himalayan Monal (*Lophophorus impejanus*), Nepal's national bird.

Human-wildlife conflict represents an emerging and escalating concern, particularly regarding Snow Leopard predation on domestic livestock in high-altitude villages of Mugum Karmarong. As herding communities' livestock constitute critical household wealth, retaliatory killing of Snow Leopards poses a direct threat to species recovery. SGP interventions must address this conflict through livestock insurance schemes, predator-proof corrals, and community conservation incentive programmes that make Snow Leopard presence economically beneficial rather than costly to local communities.

### 3.3 Alpine Ecosystems, Mountain Wetlands, and OECM Candidate Sites

The Jumla-Mugu landscape encompasses high-altitude wetland ecosystems and seasonal water bodies that provide critical services for biodiversity and downstream hydrology. Alpine wetlands – including seasonal ponds, glacial lakes, and spring-fed meadows at elevations of 3,500–5,000 masl – serve as primary water sources for both wildlife (Snow Leopard, Tibetan Wild Ass) and domestic livestock, and support specialized aquatic invertebrate communities. These systems are highly sensitive to glacial retreat and changing precipitation patterns, making them critical indicators of climate change impacts in the landscape.

Of equal ecological and governance significance is the landscape's position as a candidate zone for Other Effective Area-Based Conservation Measures (OECMs). The inter-park corridor between CNP, Rara National Park, and Shey-Phoksundo National Park contains a mosaic of community forests (CFUGs), indigenous pastoral rangelands (kharka), and sacred natural sites managed under customary governance systems that deliver sustained, positive biodiversity outcomes outside formal protected area boundaries – meeting the IUCN–CBD OECM criteria under the CBD Programme of Work on Protected Areas and GBF Target 3. These areas are described in detail in Section 6.2.

## 4. Geological Context and Disaster Risk

The Jumla-Mugu landscape represents an exceptionally dynamic geological setting shaped by the ongoing collision of the Indian and Eurasian tectonic plates. Understanding this geological foundation is essential for designing effective and resilient interventions in land degradation control, climate change adaptation, and watershed management. The landscape's geology is structured by two primary tectonic boundaries – the Main Boundary Thrust (MBT) and the Main Central Thrust (MCT) – which define zones of contrasting rock types, stability, and environmental vulnerability.

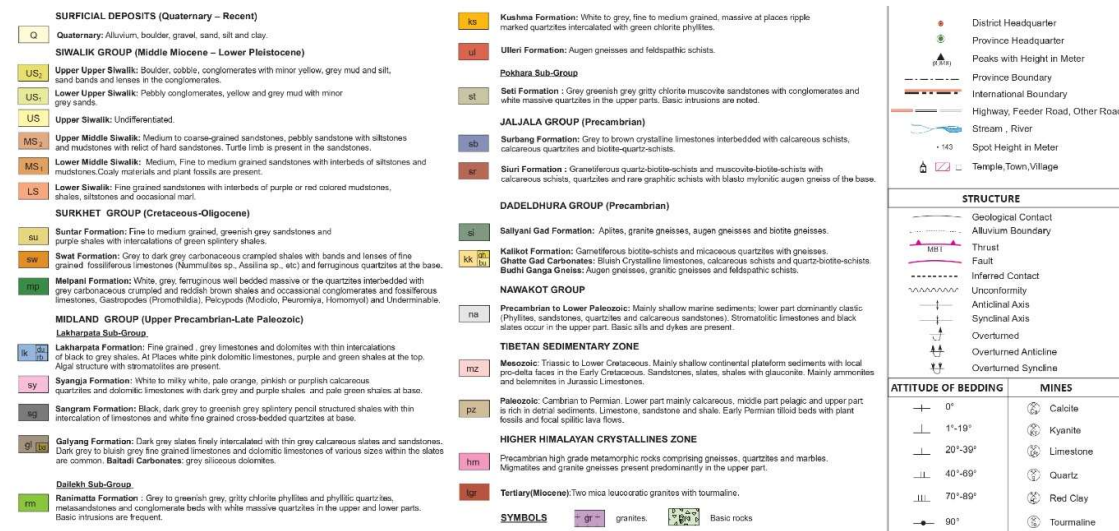
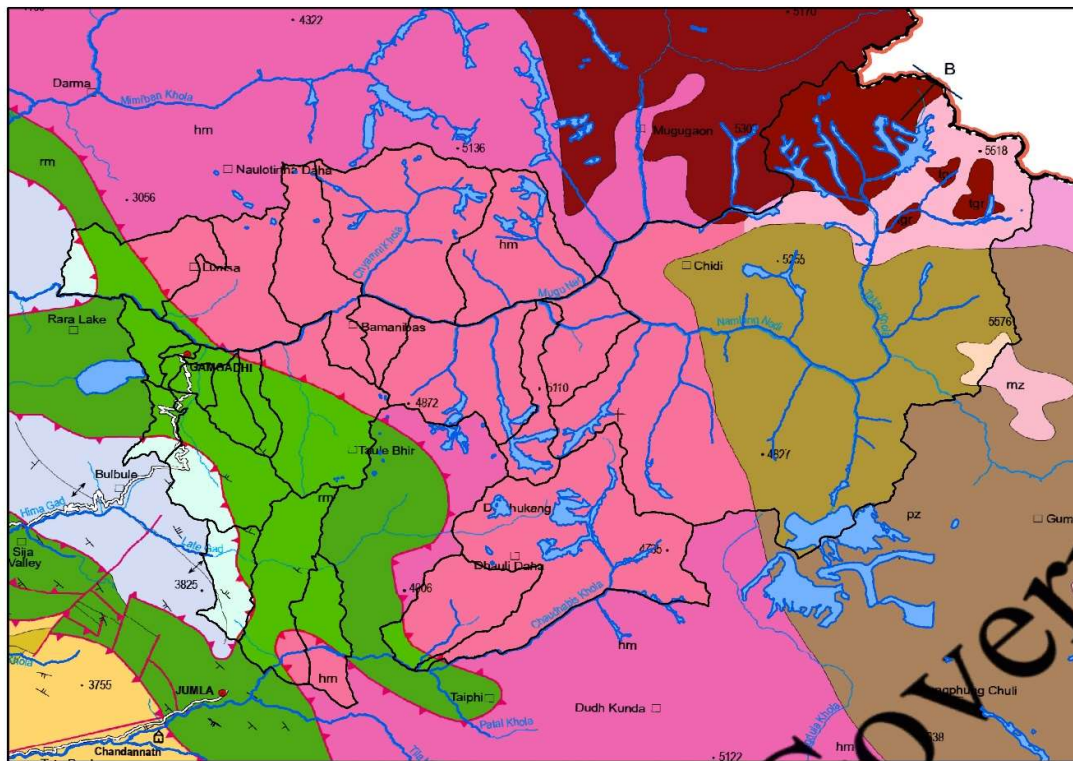


Figure 2: Geology of Jumla-Mugu Landscape

#### 4.1 The Main Boundary Thrust (MBT) and Main Central Thrust (MCT)

The Main Central Thrust (MCT) is the most significant tectonic structure in the Jumla-Mugu landscape, forming the boundary between the High Himalayan Crystalline Sequence – which underlies the CNP core zone and the highest peaks – and the Lesser Himalayan Sequence rocks to the south. The MCT marks a zone where the High Himalayas have been tectonically thrust over the Lesser Himalayan sequence, creating extremely complex and intensely

deformed rock sequences. The landscape also contains the Jumla Window, where erosion has exposed deeper rock layers, creating unusual geological exposures and particularly unstable terrain.

The Main Boundary Thrust (MBT) forms the southern structural boundary, separating the Lesser Himalayan rocks from the Siwalik Group sedimentary formations. While less prominent than in the Tila landscape to the south, the MBT influences rock stability and erosion patterns in the lower Tila watershed of Jumla. The region around Rara Lake is itself interpreted as a tectonic feature – likely a pull-apart basin within this active zone. This pervasive geological instability means the entire area is inherently prone to erosion, landslides, and slope failures, necessitating conservation and development strategies that are adaptive and risk-informed.

#### *4.2 Alpine and Sub-Alpine Terrain Instability*

The steep slopes and fractured rock masses of the subalpine zone – particularly in the transition zone between the Tila River Valley and CNP core area – are inherently susceptible to mass wasting events. Human activities significantly accelerate natural erosion rates. The development of earthen district roads (64.7 km in the Tila watershed) is repeatedly cited by community members as a major trigger for increased landslide frequency, reflecting inadequate attention to geological constraints in road design and maintenance. The collection of high-value NTFPs, particularly Yarsagumba, involves digging and disturbing the fragile alpine turf, directly leading to topsoil loss and gully erosion on steep slopes. Abandoned agricultural terraces, a consequence of youth out-migration exceeding 60% in some areas, collapse and trigger erosion as their maintenance systems fail.

The consequences are severe: loss of productive agricultural land through gullying and landslides; increased disaster risk to settlements and infrastructure; generation of sediment loads that degrade downstream water quality in the Karnali River Basin; and reduced water retention capacity leading to intensified dry-season water scarcity. Projects targeting Sustainable Land Management (SLM) and erosion control must be prioritized in these zones, but interventions must be designed with the understanding that this is not simply “bad soil management” but a fundamental geological vulnerability requiring bioengineering approaches and community-based monitoring systems.

#### *4.3 Karnali Watershed Systems*

The Jumla-Mugu landscape holds profound importance for international waters management by virtue of its status as a critical headwater system for the Karnali River Basin (KRB). The landscape encompasses the upper reaches of the Tila River and the Mugu Karnali River, which are major tributaries forming the main 507 km Karnali River. The environmental management practices implemented in these high-altitude headwaters directly influence the hydrological stability, water quality, and sediment load for the vast 43,147 km<sup>2</sup> downstream KRB, which provides freshwater resources for tens of millions of people in Nepal and India.

Climate change impacts – accelerated glacial retreat, reduced winter snowpack, and increasingly erratic monsoon precipitation – pose an intrinsic threat to the regional

hydrological system. Reduced snowmelt and glacial runoff are already manifesting as decreased dry-season stream flows in springs and irrigation channels, directly constraining agricultural water availability in a landscape already experiencing food shortages of 3–4 months annually. SGP-supported interventions in watershed stabilization, spring protection, and sustainable land management in the Tila River Valley function as crucial upstream safeguards, providing measurable hydrological benefits to the entire downstream KRB system.

## **5. Socio-economic Profile and Community Characteristics**

The Jumla-Mugu landscape is characterized by extreme socio-economic marginalization that is both the primary development challenge and the fundamental driver of environmental pressure. The Karnali region consistently ranks at the bottom nationally across all major development indicators, and this landscape represents the most marginalized communities within an already disadvantaged region. Understanding this social landscape is critical for designing inclusive and effective SGP interventions that link conservation success to livelihood security.

### *5.1 Ethnic and Social Composition*

The landscape is home to distinct indigenous and marginalized communities whose identities are inseparable from the high-altitude environment they steward. The Kham Magar people constitute the majority in Mugum Karmarong Rural Municipality, maintaining traditional agro-pastoral livelihoods and Tibetan Buddhist cultural practices. The Limi community, a small trans-Himalayan group with close cultural ties to Tibet, inhabit the highest elevation settlements and manage extensive alpine rangelands under customary governance systems. Dalit communities (Kami – traditional blacksmiths) are present throughout the landscape and face compounded marginalization as both economically poor and socially excluded groups.

The Tibetan Buddhist and Bon traditions of Mugum Karmarong imbue particular forests, water sources, mountain peaks, and the Chhayanath Dham pilgrimage site with deep spiritual significance, creating informal hunting and harvesting prohibitions enforced through religious and cultural norms. These communities possess sophisticated Traditional Ecological Knowledge (TEK) developed over centuries to manage resources in this inhospitable high-altitude setting, particularly regarding seasonal NTFP collection, alpine pasture management, and sacred landscape stewardship. This TEK must be formally integrated into SGP conservation design to ensure cultural appropriateness and project sustainability. The naming of the new National Park after the revered Chhayanath Dham pilgrimage site underscores the necessity of integrating cultural preservation with formal conservation governance.

### *5.2 Livelihood Patterns and Economic Base*

Agriculture remains the primary livelihood base across the landscape, though patterns vary significantly by elevation and community. In the Tila Valley of Patrasi Rural Municipality (Jumla), agriculture is predominantly subsistence-oriented, with rice, wheat, maize, and buckwheat as

primary cereals. Traditional crops including barley and cold-hardy pulses are maintained, though changing precipitation patterns and reduced labour availability due to youth out-migration are transforming crop mix. The district produces apple and stone fruits in the temperate valleys, with growing commercial potential.

Forest-based livelihoods, particularly NTFP collection, are the primary income source across much of the landscape, with households in Mugu depending on high-value wild-collected products for up to 63.7% of their high-value NTFP income in good collection years (2015/16 data for Jumla households). Yarsagumba collection provides critical seasonal income for communities in Mugum Karmarong, while Jatamansi and Kutki contribute to cash income across both districts. However, the economic viability of NTFP livelihoods is severely constrained by policy restrictions on export and harvest, absence of local value-addition infrastructure, inadequate technical knowledge for sustainable harvesting, and extreme exposure to market and policy volatility – starkly demonstrated by the collapse of the Jatamansi market following CITES-related export uncertainties in 2017.

**Table 3:** Ethnic and Social Composition of the Jumla-Mugu Landscape

| <b>Ethnic/Caste Group</b> | <b>Primary Location</b>       | <b>Approx. %</b> | <b>Traditional Livelihood/Practices</b>   | <b>SDG Contributions</b> |
|---------------------------|-------------------------------|------------------|---|--------------------------|
| Kham Magar                | Mugum Karmarong RM            | Majority         | Agro-pastoralism, alpine herding, traditional land management, Buddhist practices.      | SDG 1, 2, 10, 15         |
| Limi                      | High-altitude Mugum Karmarong | Small            | Trans-Himalayan trade, extensive kharka management, alpine NTFP collection.             | SDG 1, 10, 15            |
| Kami (Dalit)              | Throughout landscape          | Minority         | Traditional metalwork/blacksmithing; agricultural labour; lowest socio-economic status. | SDG 1, 5, 8, 10          |
| Khas (Brahmin/Chhetri)    | Patrasi RM (Jumla)            | Significant      | Agriculture, livestock rearing, NTFP trade, local governance.                           | SDG 1, 2, 10             |

A major structural challenge that fundamentally undermines both livelihood security and conservation sustainability is food insecurity. Target communities in Jumla and Mugu experience food shortages of 3–4 months annually, compelling reliance on NTFP collection as a financial safety net. When extraction is driven by immediate necessity rather than sustainable management, it leads to intensive and unregulated collection practices that degrade the very biodiversity assets upon which livelihoods depend. This direct causal link between poverty and environmental pressure means that addressing food insecurity through Climate-Smart Agriculture (CSA) and water resource management is simultaneously the most critical climate

adaptation measure and a fundamental prerequisite for conservation success. Critically low literacy rates – nationally the lowest in Mugu at 27.79% overall, with historical female literacy as low as 9% – directly restrict women’s participation in governance, economic, and conservation processes.

## **6. Community-Based Natural Resource Management**

Community-based natural resource management in the Jumla-Mugu landscape operates through multiple, overlapping modalities – formal Community Forest User Groups (CFUGs) established under Nepal’s Forest Act, indigenous customary governance systems predating formal law, and the newly forming Buffer Zone User Committees (BZUCs) for Chhayanath National Park. These institutions collectively govern the majority of the landscape’s natural resource base and provide the foundational institutional architecture for SGP interventions.

### *6.1 Community Forest User Groups*

CFUGs in the Jumla-Mugu landscape manage temperate and subalpine forests in the lower and mid-elevation zones of Patrasi Rural Municipality (Jumla) and Chhayanath Rara Rural Municipality (Mugu). These groups operate under operational plans approved by the District Forest Office, conduct regular meetings, implement plantation activities, and provide forest products to member households. Stronger CFUGs undertake fire control measures and regulate NTFP collection within their boundaries.

However, CFUGs face multiple challenges that limit their conservation and livelihood contribution in this remote landscape. Weak organizational capacity in areas such as technical bio-trade management, financial management, and proposal development is a documented constraint from previous SGP phases. Limited resources for monitoring and enforcement, declining active membership due to youth out-migration, and policy constraints on commercial utilization of high-value medicinal species restrict the effectiveness of many CFUGs. Women’s groups manage certain community forests and have shown particular interest in NTFP enterprise development, but face severe constraints in accessing technical training and market support due to extremely low literacy rates.

There is significant variability across the landscape, with some CFUGs effectively managing forests and providing benefits to members, while others exist largely on paper with minimal active management. The nascent governance of the CNP Buffer Zone – requiring the formation and capacity building of BZUCs in Chhayanath Rara and Mugum Karmarong – represents both an urgent challenge and the most significant institutional opportunity in the landscape, as it allows inclusive governance systems to be co-designed from inception rather than retrofitted.

### *6.2 OECMs and Indigenous Governance Systems*

The Jumla-Mugu landscape contains the most significant concentration of OECM candidate sites in Nepal’s high-mountain zone. Under the Kunming-Montreal Global Biodiversity Framework (GBF) Target 3, OECMs are defined as “geographically defined areas other than

Protected Areas, which are governed and managed in ways that achieve positive and sustained long-term outcomes for the in-situ conservation of biodiversity” (CBD COP 14, Decision XIV/8). The landscape contains at least four distinct categories of OECM candidate sites that collectively deliver measurable biodiversity outcomes through existing community governance.

Community Forest User Groups (CFUGs) in the inter-park corridor – covering an estimated 200–350 km<sup>2</sup> – manage coniferous and mixed temperate forests under operational plans that directly satisfy OECM biodiversity outcome and governance criteria. They provide critical habitat connectivity between CNP and Rara National Park, supporting Snow Leopard prey species populations.

Indigenous rangelands (kharka) of Mugum Karmarong, managed by Kham and Limi communities under customary rotational grazing systems, cover extensive high-altitude pastures (3,500–5,000 masl) that provide irreplaceable habitat for Snow Leopard, Tibetan Wild Ass, Blue Sheep, and Himalayan Marmot. These customary systems regulate grazing rotation, seasonal livestock movement, and access by outsiders, functioning as de facto OECM governance systems that predate formal conservation law by centuries.

Sacred natural sites and monastery landscapes surrounding the Chhayanath Dham pilgrimage site and associated monasteries function as de facto wildlife sanctuaries, where community-enforced taboos against killing or disturbing wildlife have maintained higher biodiversity densities than surrounding areas. Such spiritually governed sites are specifically recognised as a distinct OECM governance type under CBD guidelines, with strong international evidence from Bhutan’s Sokshing forests and similar Himalayan systems confirming their conservation effectiveness.

The CNP Buffer Zone (177 km<sup>2</sup>), under community co-management through BZUCs, shares key OECM characteristics in that governance authority is substantially exercised by local committees. Where BZUCs develop participatory management plans with demonstrable biodiversity outcomes – which SGP investment is specifically designed to enable – the buffer zone may qualify for dual recognition as both a PA buffer and an OECM, maximising Nepal’s GBF 30x30 contribution.

Nepal’s national OECM recognition process, coordinated by the Department of National Parks and Wildlife Conservation (DNPWC) in alignment with the NBSAP 2023–2030, is nascent and lacks specific guidance for high-altitude and indigenous-governed sites. The Jumla-Mugu landscape is positioned to become one of the first OECM demonstration sites in Nepal’s high-mountain zone, and lessons generated here can directly inform national guidelines and Nepal’s CBD National Report.

## **7. Critical Environmental Challenges**

The Jumla-Mugu landscape faces a complex of interconnected environmental challenges that both justify its selection as an OP8 priority landscape and define the strategic focus areas for SGP intervention.

### *7.1 Climate Change and Hydrological Stress*

Climate change represents the most pervasive and escalating environmental threat in the Jumla-Mugu landscape. Mugu is ranked 5th nationally for overall climate vulnerability according to the National Adaptation Programme of Action (NAPA 2021) assessments and is among the highest for drought susceptibility. Climate change impacts are directly observed by communities and confirmed by data: increased freshwater scarcity driven by reduced snowfall and accelerated glacial retreat diminish dry-season flows in irrigation channels and mountain springs upon which subsistence agriculture critically depends; rainfall has become increasingly irregular and erratic; and temperature increases at high altitude are shifting the distribution and phenology of NTFP species, particularly the seasonally and altitudinal sensitive Yarsagumba.

The consequences cascade through the entire socio-ecological system. Reduced irrigation water availability compresses the agricultural growing season and reduces crop yields, intensifying food shortages that already last 3–4 months annually. As communities face more frequent food crises, pressure on NTFPs and forest resources intensifies, creating a vicious cycle where climate stress drives ecological degradation that further undermines climate resilience. Reduced snowmelt also threatens downstream water security for the entire Karnali River Basin, with implications for tens of millions of people in Nepal and India. Building household and community adaptive capacity requires not only climate-resilient agriculture and water management but also addressing basic development needs: investing in water access, clean cooking energy, and improving living standards for women directly strengthens their ability to cope with climate-induced shocks.

### *7.2 Land Degradation and Erosion*

Land degradation is a major threat across the fragile alpine and subalpine zones of the Jumla-Mugu landscape, exacerbated by both climate change and human activity. The steep slopes of the Tila watershed are intrinsically susceptible to erosion given the pervasive geological instability of the MCT/MBT tectonic zone. Human activities dramatically accelerate natural erosion rates across multiple pathways.

The collection of high-value NTFPs, particularly Yarsagumba, involves digging and disturbing the fragile alpine turf in ways that directly cause topsoil loss, gully initiation, and erosion in high-altitude meadows. When collection is driven by immediate livelihood necessity rather than managed sustainably, the intensity of disturbance can devastate the vegetation and soil structure of collection areas within a few seasons. Agricultural strain on marginal lands – as communities try to expand food production to compensate for climate-induced yield declines – further accelerates soil exhaustion on steep terrain unsuited to intensification. The development of earthen district roads (64.7 km in the Tila watershed alone) triggers increased landslide frequency and soil loss when construction fails to account for the area's geological fragility. Overgrazing of alpine pastures, particularly in areas where customary rotational governance has weakened, degrades vegetation cover and exposes mineral soil to accelerated water and wind erosion. Collectively, these pressures generate elevated sediment loads that

degrade the Karnali headwaters, reducing water quality and destabilizing downstream channel systems.

## **8. Agricultural and Development Constraints**

While not strictly environmental issues, several agricultural and developmental constraints in the Jumla-Mugu landscape have direct environmental implications and shape the critical context for SGP interventions.

### *8.1 Water Scarcity and Irrigation*

Water scarcity is reported as a critical constraint across the entire landscape, affecting both domestic use and agricultural production. The problem is linked to the geological and topographical factors of steep, fractured terrain with poor water retention, declining spring discharge attributed to changes in snowmelt timing and land-use change, and the inadequacy of small-scale irrigation infrastructure to cope with highly variable precipitation. Communities have traditionally relied on spring-fed irrigation channels (kulo), small diversion weirs, and gravity-fed systems for agricultural water supply. However, with observed reductions in spring discharge of 20–40% reported by community members over the past decade, these systems are increasingly unreliable.

Water scarcity has direct environmental implications beyond the immediate agricultural crisis. It limits opportunities for diversified, profitable agriculture that could compete with unsustainable NTFP extraction as a livelihood strategy; drives agricultural extensification onto marginal and ecologically sensitive lands as communities try to maintain food production; limits tree survival in plantation and watershed rehabilitation programmes; and intensifies competition between domestic water use, livestock, and environmental flows, further degrading aquatic ecosystems. SGP interventions in water harvesting (ponds, cisterns), spring protection and recharge programmes, and small-scale irrigation rehabilitation are therefore simultaneously climate adaptation, food security, and biodiversity conservation investments.

### *8.2 Market Linkages and NTFP Value Chains*

Despite the exceptionally high commercial value of NTFPs harvested in the Jumla-Mugu landscape, communities receive a disproportionately small share of final market value due to structural market failures. The extreme remoteness of the landscape – requiring multi-day transport to reach Jumla market, the nearest commercial centre – creates high transaction costs for all products. Absence of organized collection and bulking systems, limited processing infrastructure, and complex supply chains with multiple intermediaries mean that communities are price-takers with minimal bargaining power. This is most starkly evident in the Jatamansi market collapse: following export uncertainties related to CITES Act implementation in 2017, the legal export market for Jatamansi collapsed, causing sudden loss of income for over 75% of collecting households in Jumla and Mugu. Two distillation units in Jumla were forced to close, and households immediately shifted collection pressure onto alternative NTFPs, notably

Yarsagumba, demonstrating that policy and market failures act as direct triggers for ecological risk.

The strategic implication is that policy stability and economic infrastructure must be treated as essential environmental safeguards. Investment in local value addition and processing (reviving or establishing distillation units in Jumla), technical assistance for sustainable harvesting protocols, and organizational capacity building for NTFP cooperatives are not merely livelihood interventions – they are biodiversity conservation investments that reduce extractive pressure on fragile alpine ecosystems by making sustainable, managed collection more economically rational than intensive, unmanaged extraction.

## **9. Strategic Opportunities for SGP OP8 Intervention**

The Jumla-Mugu landscape, despite its formidable challenges, presents specific and time-sensitive strategic opportunities for high-impact SGP interventions that align with OP8 priorities and can generate demonstration effects for replication and scaling across Nepal's high-mountain zone.

### *9.1 Chhayanath National Park Buffer Zone Governance and Conservation*

The declaration of Chhayanath National Park in 2025 is the a significant conservation event in Karnali Province in recent years, and creates a non-replicable institutional window that SGP must act upon immediately. The Buffer Zone (177 km<sup>2</sup>) is newly established, its governance structure nascent, and its benefit-sharing mechanisms as yet undefined. SGP must act strategically and rapidly to co-design Buffer Zone User Committees (BZUCs) and institutional frameworks with local Indigenous Peoples and communities – establishing inclusive, equitable governance before external management structures become entrenched.

Previously, local people had to travel for up to a week to access park services in Dolpa. The new, locally-based CNP management structure in Mugu is intended to resolve this, confirming a high-level mandate for community-centred conservation. SGP support would fund BZUC establishment and capacity building, co-design of participatory management plans for the 177 km<sup>2</sup> buffer zone, and targeted conservation investments in Snow Leopard prey species (Blue Sheep) habitat management and livestock depredation compensation schemes, directly addressing the human-wildlife conflict that represents the primary threat to Snow Leopard persistence in the landscape.

### *9.2 High-Value Medicinal Plant (NTFP) Enterprise Development*

Several high-value NTFP enterprise opportunities have been identified through field assessments and community consultations, each addressing both livelihood security and conservation objectives. Jatamansi distillation and essential oil production has proven commercial potential – with two distillation units previously operational in Jumla before the 2017 market collapse – and SGP support to revitalize or establish new distillation facilities would retain profits locally, diversify the market base, and insulate communities from export policy shocks. Kutki (*Neopicrorhiza scrophulariiflora*, VU) represents significant pharmaceutical

market potential and is amenable to both wild-harvest management and cultivation on degraded alpine plots. Yarsagumba, the landscape's highest-value NTFP, requires community-governed collection protocols and benefit-sharing systems to prevent the unregulated, erosion-causing extraction that currently characterizes much of the harvest.

SGP support could include technical assistance and minor capital investment to revitalize or establish local distillation and processing units in Jumla; support to IP-led NTFP cooperatives to shift from raw export to value-added processing; development of sustainable harvest protocols and community monitoring systems for Yarsagumba and other sensitive species; and policy advocacy with federal and provincial authorities to resolve the regulatory paralysis affecting the NTFP export trade – demonstrating SGP's "Grantmaker Plus" role in influencing the enabling policy environment.

### *9.3 Climate-Smart Agriculture and Water Security*

The acute need to address chronic food insecurity – with households facing 3–4 months of shortage annually – provides both the primary development imperative and a perfect platform to pilot high-altitude Climate-Smart Agriculture (CSA) models. Addressing this food deficit is not merely a development intervention: it is the most critical form of climate change adaptation funding, since stable livelihoods directly reduce the extractive pressure on Snow Leopard habitat and alpine biodiversity assets. SGP support should introduce and scale high-altitude, drought-resilient crops (traditional grain varieties, cold-hardy horticulture) and improved livestock management practices.

Water harvesting and spring protection represent the most foundational and highest-leverage investment in this landscape. Community-managed water harvesting structures (ponds, cisterns) and spring protection and recharge programmes directly counteract the observed hydrological stress from reduced winter snow and irregular precipitation, ensuring reliable water access for domestic use and supplementary irrigation. High-altitude agroforestry systems (up to 4,500 masl) would improve soil fertility, sequester carbon, reduce erosion, and diversify income beyond reliance on seasonal wild collection. Gender equity must be central: given the critically low female literacy (9% historically) and the high drudgery burden of water collection and cooking on women, interventions must prioritize women's groups for improved cook stoves, solar energy access, and community water management schemes.

### *9.4 OECM Recognition and Formalization of Indigenous Conservation Governance*

The OP8 portfolio must treat OECM site assessment, governance strengthening, and national recognition as a primary structural outcome. The community forests, indigenous kharka rangelands, and sacred sites of the inter-park corridor represent potentially the largest addition to Nepal's effective conservation estate achievable within OP8, at zero cost of land acquisition and with full community legitimacy. Three targeted SGP actions are required.

First, fund participatory OECM screening assessments for CFUGs, kharka management areas, and sacred natural sites using Nepal's draft OECM assessment guidelines, with community members – including women and IPLC representatives – leading data collection to ensure FPIC compliance throughout. Second, strengthen governance institutions of CFUG executive

committees and kharka management groups, integrating OECM monitoring indicators into operational plans, and ensuring women’s and Dalit representation in governance structures as a prerequisite for recognition. Third, engage through SGP’s “Grantmaker Plus” role with the national OECM steering committee (DNPWC, IUCN, WWF Nepal, Ministry of Forests and Environment) to ensure lessons from this landscape inform national guidelines for high-altitude and indigenous-governed OECMs. This directly contributes to Nepal’s GBF 30x30 commitments under the NBSAP 2023–2030.

Critically, OECM recognition must be FPIC-based, with communities retaining the right to renegotiate if management rules prove detrimental to food security or cultural practices. NTFP harvesting rights within candidate OECM sites must be explicitly protected and sustainably regulated – not prohibited – since the livelihoods of households deriving up to 63.7% of high-value income from NTFP collection cannot be extinguished in the name of conservation without undermining the community support upon which OECM effectiveness ultimately depends.

#### *9.5 Karnali Headwater Watershed Management*

Integrated headwater stabilization in the Tila and Mugu Karnali watersheds serves simultaneously as a land degradation, climate change adaptation, and international waters intervention. Slope remediation and strategic afforestation in the most erosion-prone areas of the Tila watershed reduce sediment load and stabilize the river system, ensuring upstream ecosystem services contribute to downstream hydrological stability throughout the 43,147 km<sup>2</sup> Karnali River Basin. Spring shed mapping, protection, and monitoring – using community-based monitoring systems that inform adaptive watershed management – sustain dry-season flows critical for both agricultural water supply and aquatic ecosystems.

Watershed governance should be linked to OECM recognition processes: CFUGs managing forests on critical watershed slopes are already delivering hydrological services and should receive formal recognition and support for this ecosystem service role. Connecting watershed management to the broader national water security agenda and climate finance mechanisms (e.g., through the Climate Investment Funds and National Adaptation Fund) represents a key leverage opportunity for SGP’s engagement.

## **10. Stakeholder Landscape and Partnership Opportunities**

The Jumla-Mugu landscape has a growing but still fragile institutional environment that requires deliberate investment to develop effective partnerships. The historic remoteness and sustained underdevelopment of this landscape means that institutional density – the breadth of government agencies, CSOs, and community organizations capable of implementing complex programmes – is significantly lower than in more accessible parts of Nepal. This reality must shape SGP’s approach, prioritizing institutional capacity building as a prerequisite for programme delivery.

### *10.1 Government Institutions*

The Department of National Parks and Wildlife Conservation (DNPWC) holds primary authority over Chhayanath National Park and its buffer zone. The newly established CNP management office in Mugu (replacing the previous dependency on the Shey-Phoksundo administration in Dolpa) is the most critical government partner for SGP in this landscape. The CNP office will need substantial support to develop community-centered management approaches, and SGP's early engagement in Buffer Zone governance co-design will be decisive in setting the institutional culture of this new protected area management body.

The District Forest Office (DFO) in both Jumla and Mugu provides technical support to CFUGs, manages government forests, and implements the regulatory framework for NTFP harvest and trade. DFOs face severe resource constraints in personnel, equipment, and operational budgets, limiting their field presence and effectiveness in remote wards. SGP should avoid duplicating DFO functions but can enhance DFO effectiveness through co-investment in community monitoring systems and shared technical training. Karnali Province line agencies – the Provincial Forest Directorate, the Ministry of Land Management, Agriculture and Cooperatives, and the Ministry of Social Development – provide strategic oversight and have growing provincial budgets under Nepal's federal restructuring that SGP should seek to mobilize and align.

The three Rural Municipalities (Patrasi, Chhayanath Rara, Mugum Karmarong) have significant roles and resources under Nepal's federal system and are the most proximate government partners for communities. Several have demonstrated active engagement in conservation and development issues, and SGP should work to strengthen municipal technical capacity, particularly in areas of environmental management, OECM governance, and climate-smart agriculture extension.

### *10.2 Civil Society Organizations*

Local Civil Society Organizations (CSOs) and Indigenous Peoples' organizations in Jumla and Mugu are the primary delivery channel for SGP grants, but their capacity is a known constraint from previous SGP phases. The remoteness and historic lack of sustained development presence mean that many local CSOs have limited experience with complex technical project management, financial accountability, and proposal development. This is not a reason to exclude them – it is precisely why foundational capacity building investment must precede or accompany substantive project funding.

Key CSO stakeholders include indigenous peoples' organizations of the Kham and Limi communities in Mugum Karmarong, which hold traditional authority over natural resource governance and are indispensable partners for OECM recognition and kharka management; NTFP and medicinal plant cooperatives in Jumla, which provide an organizational base for enterprise development interventions; women's savings and credit groups across all three Rural Municipalities, which represent the most viable entry points for gender-targeted clean energy and water management interventions; and environmental NGOs working in the broader Karnali landscape with technical expertise in biodiversity conservation, watershed management, and climate adaptation.

ICIMOD, which maintains active landscape management programmes in the Karnali region, is a key strategic partner whose research, technical capacity, and regional convening role can amplify SGP's landscape interventions. Formal partnership agreements with ICIMOD should be explored for collaborative knowledge management, joint monitoring of alpine ecosystem change, and co-facilitation of OECM site assessments.

### *10.3 Academic and Research Institutions*

Mid-West University and relevant faculties of Tribhuvan University's constituent campuses have presence in the Karnali region and represent potential partners for applied research on NTFP sustainable harvesting protocols, traditional ecological knowledge documentation, and community health and nutrition assessments linked to food security interventions. The International Centre for Integrated Mountain Development (ICIMOD), conducts extensive research on Himalayan ecosystems, climate change impacts, and community-based natural resource management in the Karnali region, and represents an academic-practitioner hybrid institution with high relevance to the SGP portfolio.

Specific collaboration opportunities include hosting OECM assessment training and documentation processes; conducting biodiversity baseline assessments and participatory monitoring for SGP projects; providing technical training for community groups, CSOs, and local government staff; and facilitating student engagement in community-based conservation through internships and thesis research. Establishing formal partnerships between SGP and research institutions can enhance the knowledge management dimension of the programme, creating a virtuous cycle where community practice informs research and research findings improve practice.

## **11. Conclusion: A Landscape of Strategic Priority**

The Jumla-Mugu landscape, with its extreme convergence of globally critical biodiversity, profound socio-economic marginalization, climate vulnerability, and emerging conservation governance opportunities, embodies both the urgency and the opportunity that define SGP's mission. This is not a wilderness requiring protection from human presence: it is a living, working landscape where the Kham, Limi, and other communities have been stewards of biodiversity for centuries, and where the pathway to sustainability must be co-created through partnership that honors their rights, knowledge, and agency.

The selection of the Jumla-Mugu landscape as a priority for OP8 reflects a sophisticated understanding of how environmental programmes can achieve transformative impact. By concentrating resources in a defined geography at the precise moment of a major institutional change – the establishment of Chhayanth National Park – SGP can shape inclusive conservation governance from inception rather than trying to reform entrenched systems. The landscape's OECM candidacy represents potentially the most significant contribution that SGP Nepal can make to the country's GBF 30x30 commitments, formalizing existing community conservation governance without imposing new restrictions or displacing community authority.

The landscape is the home of communities whose livelihoods, cultures, and futures are intimately tied to the health of their high-altitude environment. The Kham and Limi communities managing kharka and sacred sites in Mugum Karmarong, the NTFP-collecting households whose food security depends on healthy alpine meadows, the women carrying firewood through deep snowfall who would transform their lives with access to clean energy, the youth facing the choice between migration and viable local livelihoods – all represent agents of change whose capacities SGP can strengthen and whose innovations SGP can amplify.

The strategic framework for OP8 in the Jumla-Mugu landscape must therefore be both ambitious and grounded: pursuing large-scale impact through carefully sequenced, community-led interventions. By investing in Buffer Zone governance co-design with local IPLCs before external management structures become entrenched; by treating OECM recognition as a structural conservation outcome rather than a supplementary activity; by reframing food security investment as the most effective form of biodiversity conservation; by revitalizing NTFP value chains to reduce extractive pressure on fragile alpine ecosystems; and by building foundational institutional capacity in local CSOs and communities as a prerequisite for sustainable programme delivery – SGP can contribute not just to environmental outcomes but to a fundamental shift in how conservation and development are understood and practiced in Nepal’s highest and most marginalized landscapes.

The Jumla-Mugu landscape thus represents more than a geographic focus area for OP8. It is a strategic investment in demonstrating that alpine conservation and Indigenous Peoples’ wellbeing are not competing goals but complementary imperatives that can be advanced together through rights-based, community-centered interventions. The lessons learned, OECM governance models developed, and institutional capacities built in this landscape have the potential to influence conservation practice and policy far beyond the Karnali watershed, contributing to Nepal’s national goals and global commitments under the GBF and UNFCCC.

**Jumla-Mugu landscape : District, Municipality/Rural Municipality & Wards**

| S.N          | District           | Municipality / Rural Municipality | Wards                        | Total Wards     |
|--------------|--------------------|-----------------------------------|------------------------------|-----------------|
| 1            | Jumla              | Patrasi                           | 2,3,5,6,7                    | 5               |
| 2            | Mugu               | Chhayanath Rara                   | 1,2,3,4,5,6,7,10,11,12,13,14 | 12              |
| 3            | Mugu               | Mugum Karmarong                   | 1,3,4,5,6,7,8,9              | 8               |
| <b>Total</b> | <b>2 districts</b> | <b>3 Municipality</b>             |                              | <b>25 wards</b> |

## Summary Tables

**Table 4: Socio-Economic and Climate Vulnerability Snapshot (Karnali Zone Context)**

| Indicator  | Jumla (Patrasi RM)  | Mugu (Chhayanath Rara/Mugum Karmarong RMs)  | Karnali Regional Context  | SGP Rationale for Focused Intervention  |
|--|---|---|---|---|
| <b>Development Rank (National)</b>               | 69/75   | 74/75 (Lowest)  | Lowest overall development status, characterized by hunger, disease, and exploitation.                    | Direct fulfillment of SGP's core poverty reduction and inclusion mandate (SDG 1). |
| <b>Overall Climate Vulnerability Rank (NAPA)</b> | 31/75   | 5/75 (Very High)  | Highly vulnerable to drought, compounding historical food insecurity.                                     | Urgent focus on CCA/LD focal areas to build resilience and adaptive capacity.     |
| <b>Literacy Rate (Average/Female)</b>            | 32% (Approx.)   | 27.79% (9% Female)  | Low living and health standards for women due to lack of basic facilities (water, clean energy).          | Targeted investment in gender equality and empowerment (SDG 5).                   |
| <b>Livelihood Structure</b>                      | Complex synergy of traditional agriculture, animal husbandry, and NTFP trade. | Extreme dependence on high-value NTFPs, providing up to 63.7% of high-value NTFP income in Jumla (2015/16). | Requires robust diversification and stabilization of NTFP value chains against policy and climate shocks. |   |

**Table 5:** Summary of Critical Environmental Challenges and Response Areas

| Challenge                            | Primary Drivers   | Key Impacts  | Priority Response Areas   | Relevant SDGs    |
|--------------------------------------|---|--|---|------------------|
| Climate Change & Hydrological Stress | Glacial retreat, reduced snowpack, erratic precipitation                      | Food shortages (3–4 months/year), irrigation failure, NTFP phenology change        | CSA adoption, water harvesting, spring protection, drought-resilient varieties      | SDG 2, 6, 13, 15 |
| Land Degradation & Erosion           | Unmanaged NTFP collection, road construction, overgrazing, abandoned terraces | Topsoil loss, landslides, sediment loading of KRB, loss of agricultural land       | SLM techniques, alpine agroforestry, SALT, bioengineering, CFUG monitoring          | SDG 13, 15, 2    |
| Biodiversity Loss & Poaching         | Habitat degradation, illegal hunting, HWC, unsustainable collection           | Species endangerment, prey depletion threatening key predators, NTFP stock decline | CNP Buffer Zone governance, BZUC capacity, community based conservation incentives  | SDG 15, 1, 10    |
| NTFP Market & Policy Failure         | CITES export uncertainty, absent local processing, price volatility           | Income collapse, pressure shifting to more fragile species, poverty                | Distillation units, cooperative formation, policy advocacy, value-chain development | SDG 1, 8, 12, 15 |
| Headwater Degradation                | Upstream erosion, road cuts, deforestation, reduced snowmelt                  | Increased sediment load in KRB, reduced dry-season flows, downstream flood risk    | Slope remediation, afforestation, spring shed management, community monitoring      | SDG 6, 13, 15    |
| Social Exclusion & Gender Inequity   | Lowest HDI (0.34), female literacy 9%, lack of clean energy, high drudgery    | Women excluded from governance and conservation, reduced adaptive capacity         | Clean energy (ICS, solar), community water schemes, women's CSO capacity building   | SDG 1, 5, 7, 10  |

**Table 6: Strategic Interventions and Expected Outcomes**

| <b>Intervention Area</b>                               | <b>Target Communities</b>                                | <b>Expected Outcomes</b>  | <b>OP8 Strategic Alignment</b>           | <b>Primary SDGs</b> |
|--|--|---|--|---------------------|
| CNP Buffer Zone Governance & Snow Leopard Conservation | Kham/Limi IPLCs, BZUCs, CNP Management                   | Inclusive buffer zone governance established; Snow Leopard prey habitat maintained; HWC reduced                                     | Biodiversity, Community Conservation     | SDG 15, 1, 10       |
| NTFP Enterprise & Value-Chain Development              | NTFP cooperatives, IP organizations, women's groups      | Distillation units revived; sustainable collection protocols; 10+ jobs in medicinal plant enterprises                               | Biodiversity, Sustainable Livelihoods    | SDG 1, 8, 12, 15    |
| Climate-Smart Agriculture & Water Security             | Smallholder farmers, women's groups, all 24 wards        | 40 households with CSA adoption; 3–4-month food deficit addressed; Model village with solar/ICS access                              | Climate Change Adaptation, Food Security | SDG 2, 6, 7, 13     |
| OECM Recognition & Indigenous Governance               | CFUGs, kharka management groups, sacred site custodians  | OECM assessments completed for 3+ candidate sites; Kham/Limi land rights formalization initiated; national OECM guidelines informed | Biodiversity, OECM, 30x30                | SDG 15, 10, 16      |
| Karnali Headwater Watershed Management                 | Watershed communities, CFUGs, downstream KRB users       | Alpine pasture restored using SLM/SALT; spring sheds mapped and protected; sediment load reduced                                    | Land Degradation, International Waters   | SDG 6, 13, 15       |
| Institutional Capacity Building                        | Local CSOs, CBOs, women's organizations, municipal staff | Local CSOs capable of managing complex BD/CC/IW projects; 20+ community members trained in community based conservation             | All focal areas – foundational           | SDG 1, 10, 17       |

Photos:





**जिल्ला वन कार्यालय, जुम्ला**

**जडीवुटी विवरण**

**जुम्ला जिल्लामा पाइने प्रमुख जडीवुटीहरू**

| क्र.सं. | जडीवुटीको नाम | वैज्ञानिक नाम                   | गुणकारी अंग | उपयोग हुने भाग |
|---------|---------------|---------------------------------|-------------|----------------|
| १       | दोप           | Daphniphyllum himalayense       | गुणकारी अंग | खाने भाग       |
| २       | दुबु          | Neoplochiniza longichaulimoides | गुणकारी अंग | खाने भाग       |
| ३       | सुपारी        | Nardostachys grandiflora        | गुणकारी अंग | खाने भाग       |
| ४       | सुपारी        | Bahgenia chata                  | गुणकारी अंग | खाने भाग       |
| ५       | सुपारी        | Rheumastrale                    | गुणकारी अंग | खाने भाग       |
| ६       | सुपारी        | Dactyloctenium aegyptium        | गुणकारी अंग | खाने भाग       |
| ७       | सुपारी        | Scorvium spp.                   | गुणकारी अंग | खाने भाग       |
| ८       | सुपारी        | Scorus salernus                 | गुणकारी अंग | खाने भाग       |
| ९       | सुपारी        | Scorvium tenuifolium            | गुणकारी अंग | खाने भाग       |
| १०      | सुपारी        | Platysiphon                     | गुणकारी अंग | खाने भाग       |
| ११      | सुपारी        | Urtica dioica                   | गुणकारी अंग | खाने भाग       |
| १२      | सुपारी        | Valeriana jatamansi             | गुणकारी अंग | खाने भाग       |
| १३      | सुपारी        | Smitax spp.                     | गुणकारी अंग | खाने भाग       |
| १४      | सुपारी        | Juglans regia                   | गुणकारी अंग | खाने भाग       |
| १५      | सुपारी        | Zanthoxylum spp.                | गुणकारी अंग | खाने भाग       |
| १६      | सुपारी        | Galium spp.                     | गुणकारी अंग | खाने भाग       |
| १७      | सुपारी        | Rheum australe                  | गुणकारी अंग | खाने भाग       |
| १८      | सुपारी        | Hippophae spp.                  | गुणकारी अंग | खाने भाग       |
| १९      | सुपारी        | Artemisia spp.                  | गुणकारी अंग | खाने भाग       |
| २०      | सुपारी        | Juniperus spp.                  | गुणकारी अंग | खाने भाग       |
| २१      | सुपारी        | Taxus baccata/T. wallichiana    | गुणकारी अंग | खाने भाग       |
| २२      | सुपारी        | Urtica dioica                   | गुणकारी अंग | खाने भाग       |
| २३      | सुपारी        | Rhododendron anthopogon         | गुणकारी अंग | खाने भाग       |
| २४      | सुपारी        | Alnus nepalensis                | गुणकारी अंग | खाने भाग       |
| २५      | सुपारी        | Swertia spp.                    | गुणकारी अंग | खाने भाग       |
| २६      | सुपारी        | Artemisia spp.                  | गुणकारी अंग | खाने भाग       |
| २७      | सुपारी        | Cordyceps spp.                  | गुणकारी अंग | खाने भाग       |
| २८      | सुपारी        | Wild mushroom                   | गुणकारी अंग | खाने भाग       |
| २९      | सुपारी        | Corus deodara                   | गुणकारी अंग | खाने भाग       |