

Annex A 1:

**THE BASELINE ASSESSMENT FOR
BUDHIGANDAKI-KALIGANDAKI SOCIO ECOLOGICAL
PRODUCTION LANDSCAPE**



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

Nepal

I. Introduction

The Budhi Gandaki – Kali Gandaki (BG-KG) socio ecological production landscape occupies a singular position within the socio-ecological fabric of Nepal, representing one of the most vertically diverse and bioclimatically complex territories on earth. Spanning an altitudinal gradient that exceeds 8,000 metres – from the 228-metre lowlands of southern Gorkha to the 8,163-metre summit of Mt. Manaslu – this landscape connects the glacial summits of the Greater Himalaya to the subtropical forests of the mid-hills and inner Terai. Selected as one of the three priority landscapes for the Global Environment Facility (GEF) Small Grants Programme (SGP) Operational Phase 8 (OP8), the BG-KG landscape embodies the programme’s strategic commitment to concentrated, evidence-based interventions that simultaneously address biodiversity conservation, climate resilience, and human development at community scale.

The selection of this landscape reflects a response to two converging imperatives. First, the landscape is a globally significant biodiversity hotspot: the hydrological and ecological corridor of the Budhi Gandaki and Kali Gandaki rivers supports over 3,430 plant species, 104 mammal species, and more than 500 bird species, embedded within four major Global 200 Ecoregions. The landscape serves as a biological bridge between the Annapurna and Manaslu Conservation Areas, maintaining functional wildlife corridors for Snow Leopard, Red Panda, and the critically threatened Indian Pangolin. Second, the landscape is confronting rapid, structurally disruptive change: the imminent construction of the 1,200 MW Budhi Gandaki Hydroelectric Project (BGHEP), which will displace up to 50,000 people; the ongoing socio-environmental legacy of the Kali Gandaki “A” run-of-river project; accelerating youth out-migration that is feminizing rural landscapes and triggering terrace abandonment; and intensifying climate hazards including glacial lake outburst floods (GLOFs), landslides, and pre-monsoon forest fires.

The landscape is home to over 4.5 million people representing a rich tapestry of indigenous nationalities – the Gurung (Tamu), Magar, Dura, and Bote/Majhi communities – whose customary governance systems have managed high-altitude forests, rangelands, and water resources for centuries. The Madi-Marsyandi Landscape (MML), nested within the broader BG-KG territory, is identified as a core Indigenous and Community Conserved Area (ICCA), leveraging the Nalsabha territorial assemblies and the Thiti customary rule system of the Tamu people as the institutional foundations of community-led conservation.

This Baseline Assessment serves as the foundational strategic document for GEF SGP OP8 in the BG-KG landscape. It consolidates field evidence, published research, and stakeholder knowledge on ecological integrity, geological hazards, socio-economic dynamics, hydropower impacts, indigenous governance, and partnership opportunities. The assessment is structured in alignment with the national SGP Country Programme

Strategy (CPS) to ensure methodological and analytical coherence across Nepal’s three priority landscapes.

2. Geographic Coverage

The BG-KG landscape spans seven districts across Gandaki Province: Gorkha, Kaski, Lamjung, Myagdi, Parbat, Syangja, and Tanahu. This multi-district territory encompasses 30 local government units and 277 wards, representing a complex intersection of rapidly urbanising centres and remote high-altitude communities with traditional governance structures. The landscape covers an estimated 5,970 km² and is anchored by the hydrological basins of two of Nepal’s most culturally and economically significant rivers. The Budhi Gandaki River originates in the high Himalaya north of Gorkha and flows southward, providing the axis for the BGHEP reservoir zone. The Kali Gandaki River cuts through the main Himalayan range, forming the world’s deepest river gorge and creating a vital biological corridor for species migration between the subtropical lowlands and the trans-Himalayan plateau.

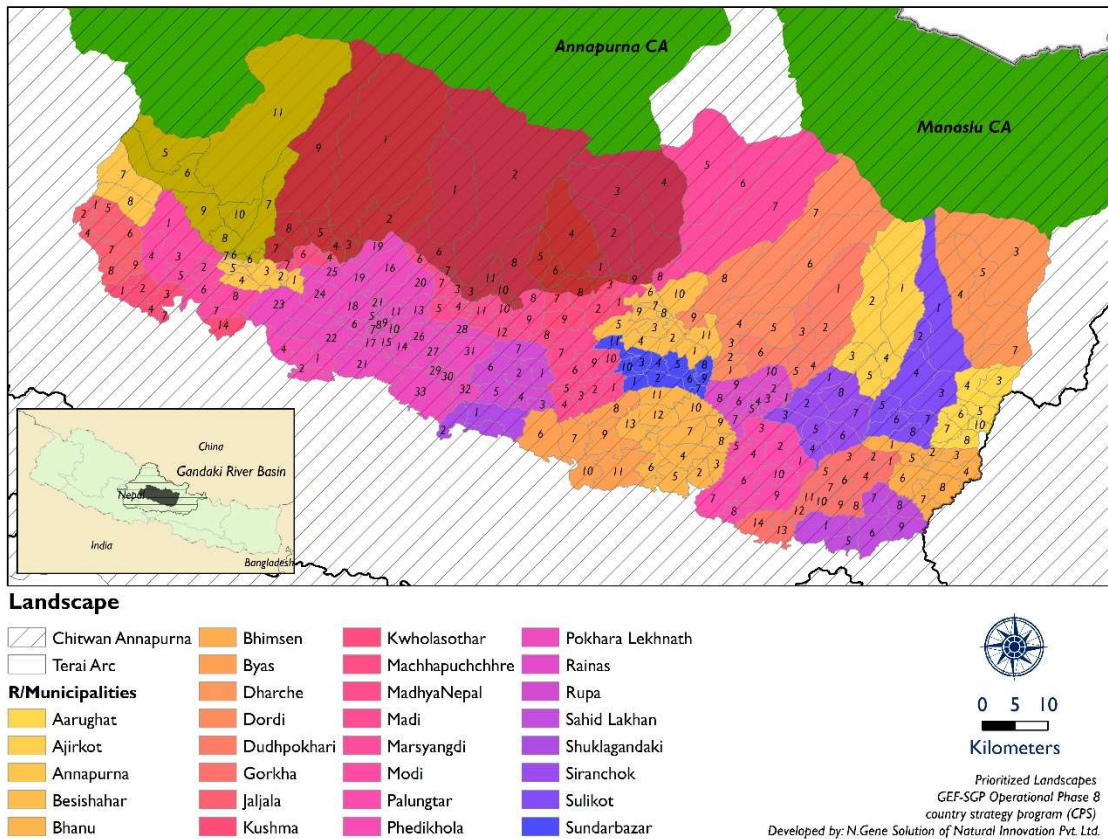


Figure I: Map of Budhi Gandaki – Kali Gandaki Landscape

Gorkha District serves as the strategic anchor of the eastern landscape, encompassing 3,610 km² and ranging from 228 meters to 8,163 meters. It is simultaneously the gateway to the Manaslu Conservation Area (MCA), the epicentre of the 2015 Gorkha earthquake, and the primary impact zone for the BGHEP. Kaski District, housing Pokhara Metropolitan City, is the central hub of the landscape, integrating rapid urbanization pressure with the core ICCA territory of the MML and the Annapurna Conservation Area Partnership (ACAP). Lamjung District has the highest Gurung (Tamu) population density in the country and serves as an ethnomedicinal and agrobiodiversity knowledge center. Myagdi encompasses the deepest section of the Kali Gandaki gorge and maintains exceptional trans-Himalayan floral diversity. Parbat and Syangja form the mid-hill production and CFUG networking zone of the Kali Gandaki sub-basin, while Tanahu anchors the subtropical lowland edge of the landscape, hosting both the JICA-funded Tanahu Hydropower Project (THP) on the Seti River and significant Sal forest ecosystems.

Table I: Summary of Geographical Coverage in the BG-KG Landscape

District	No. of Local Units	No. of Wards	Strategic Landscape Significance
Gorkha	9	70	BGHEP center; 2015 earthquake epicenter; Manaslu Conservation Area gateway; Snow Leopard and Red Panda corridor
Kaski	5	83	Rapid urbanization (Pokhara); core ICCA MML territory; ACAP extension; lake watershed management
Lamjung	8	75	Highest Gurung (Tamu) density; ethno-medicine hub; agrobiodiversity center; Indian Pangolin protection
Myagdi	1	4	World's deepest gorge; trans-Himalayan botanical diversity; CITES-listed medicinal flora
Parbat	3	22	Kali Gandaki 'A' impact zone; citrus and NTFP production center; SALT priority
Syangja	1	3	CFUG networking hub; JICA climate-adaptive forest management demonstration zone
Tanahu	3	20	Subtropical Sal forests; JICA-financed Tanahu Hydropower Project; riverine ecosystem health
Total	30	277	Integrated Socio-Ecological Management Territory – Gandaki Province

3. Ecological and Geographic Characteristics

The ecological complexity of the BG-KG landscape is dictated by its extraordinary verticality. As one of the few places on earth where a major river – the Kali Gandaki – cuts entirely through the main Himalayan range, the landscape serves as a natural laboratory for understanding bioclimatic shifts and species adaptation in the context of a warming planet. The region encompasses seven types of vegetation and seven forest classes, transitioning through four major Global 200 Ecoregions: the Eastern Himalayan Alpine Scrub and Meadows, Eastern Himalayan Broadleaf and Conifer Forests, and

Grasslands, and Western Himalayan Temperate Forests. Collectively, these systems support over 3,430 plant species, 104 mammal species, and more than 500 bird species, many of which are globally threatened.

3.1 Forest Resources and Biodiversity

Forest cover in the BG-KG landscape varies significantly by elevation, governance modality, and proximity to human settlement. The subtropical and tropical zones of Tanahu and lower Gorkha are dominated by Sal (*Shorea robusta*) forests of high ecological and livelihood value. In the mid-hills of Lamjung, Parbat, and Syangja, the dominant species shift to Katus (*Castanopsis indica*), Chilaune (*Schima wallichii*), and Pine (*Pinus roxburghii*), transitioning to Oak (*Quercus semecarpifolia*), Maple, Rhododendron, and Silver Fir at temperate elevations. The subalpine and alpine zones of Gorkha and Myagdi host Birch, Juniper, and Rhododendron scrub communities transitioning to high-altitude cushion plants and mosses.

Forest composition is changing under compound pressures. In the mid-hills of Lamjung and Gorkha, traditional forest use patterns – daily fodder collection, leaf litter harvest for composting, and regular grazing – that once kept forest floors clear of combustible material have been disrupted by youth out-migration. The resulting accumulation of dry leaf litter in Chilaune and Sallo forests has dramatically increased the intensity and frequency of pre-monsoon forest fires (February to May). Simultaneously, the proliferation of invasive alien plant species (IAPS) is displacing native ground flora and reducing forest regeneration capacity across multiple elevation zones.

Invasive plants represent a growing ecological threat that is often underestimated in landscape management plans. *Ageratina adenophora* (Kalo banmara) grows profusely in disturbed forest margins between 500 and 2,400 meters, displacing native understory species across extensive mid-hill forest areas. *Mikania micrantha* (Lahare banmara) is a fast-growing climber that blocks sunlight in lower grasslands and riverine forests, particularly threatening in the Kali Gandaki corridor. *Lantana camara* (Ban phanda) dominates scrublands and forest margins from 75 to 1,700 meters, and *Eichhornia crassipes* (water hyacinth/Jal kumbhi) is invading lakes and wetlands of Kaski district, including Phewa Lake, reducing light and oxygen for aquatic organisms. Community-based invasive species removal is therefore an essential component of any forest restoration intervention.

The landscape hosts several plant species protected by the Government of Nepal and listed under CITES or the IUCN Red List. Nationally protected species include *Juglans regia* (Okhar/walnut), *Dactylorhiza hatagirea* (Panchaunle orchid), and *Shorea robusta*. CITES-listed species include *Cyathea spinulosa* (Tree Fern), *Rauvolfia serpentina* (Sarpagandha), *Dioscorea deltoidea* (Bhyakur), and *Taxus wallichiana* (Lauth salla/Himalayan yew). High-altitude regions in Gorkha and Myagdi are hubs for threatened medicinal flora

including *Neopicrorhiza scrophulariiflora* (Kutki, VU), *Nardostachys grandiflora* (Jatamansi, EN), and *Valeriana jatamansi* (Sugandhawaal). The Panchase Hill area of Kaski alone hosts 113 orchid species, including the endemic *Panisea panchaseensis* and *Eria pokharensis*, making it one of the most important orchid refugia in Nepal.

Table 2: Vertical Zonation, Dominant Flora, and Ecological Significance

Physiographic Zone	Elevation (m)	Dominant Species	Ecological Significance
Lower Tropical	< 300	Sal (<i>Shorea robusta</i>), <i>Dalbergia sissoo</i>	High biomass production; critical Sarus Crane and vulture habitat; riverbed mining vulnerable
Upper Tropical	300–1,000	Sal, Asna (<i>Terminalia alata</i>), Khayar (<i>Acacia catechu</i>)	Primary vulture nesting zone; high fire risk; JICA-supported CFUG management
Subtropical	1,000–2,000	Katus (<i>Castanopsis</i>), Chilaune (<i>Schima wallichii</i>), Pine	Major NTFP zone (Tejpat, Timur, Sugandha Kokila); invasive IAPS hotspot
Temperate	2,000–3,000	Oak (<i>Quercus</i>), Maple, Rhododendron, Fir (<i>Abies</i>)	Core Red Panda and Himalayan Black Bear habitat; Panchase orchid refuge
Subalpine	3,000–4,000	Birch (<i>Betula</i>), Juniper, Rhododendron scrub	Musk Deer and Himalayan Tahr habitat; Nalsabha-governed kharka (rangelands)
Alpine / Arctic	> 4,000	Cushion plants, Hardy shrubs, Mosses, Lichens	Snow Leopard habitat; glacial retreat vulnerability; GLOF risk zone

3.2 Avian Diversity and Vulture Conservation

The Gandaki River system is a vital migratory corridor for birds and is of critical importance for the recovery of South Asia’s vulture populations. Historically, the landscape hosted vast populations of nine vulture species, but the widespread use of Diclofenac in veterinary medicine caused a catastrophic 99.9% population collapse by the early 2000s – one of the most dramatic vertebrate population crashes ever recorded. Current conservation efforts are anchored by the Rampur Vulture Conservation Park and Sahid Lakhan in Gorkha, where communities operate “vulture restaurants” providing safe carcasses sourced from Gaushalas, coupled with monitoring and protection of Simal (*Bombax ceiba*) nesting trees. Bird Conservation Nepal (BCN) coordinates these efforts in partnership with CFUGs, working to eliminate Diclofenac use and promote safe veterinary alternatives such as Meloxicam.

The Sarus Crane (*Antigone antigone*, VU), the world’s tallest flying bird, is a flagship species for the wetland and agricultural zones of lower Gorkha and Tanahu. The species faces compound threats from wetland drainage for agricultural intensification, chemical fertiliser and pesticide contamination of rice fields that destroys aquatic prey, and direct habitat

loss from urbanization. Conservation strategy involves promoting crane-friendly rice farming practices, restoring seasonally flooded grasslands critical for nesting, and advocating for wetland protection ordinances at the municipal level. The landscape also hosts over 500 bird species overall, including the Himalayan Monal (Nepal’s national bird), multiple raptor species, and migratory waterfowl in the Pokhara lake cluster.

3.3 Flagship Mammals, Corridor Connectivity, and Aquatic Ecosystems

The BG-KG landscape functions as a biological bridge between the Annapurna Conservation Area Partnership (ACAP) and the Manaslu Conservation Area (MCA), maintaining one of the most intact high-altitude wildlife corridors in South Asia. The Manaslu-Annapurna landscape supports an estimated 30–40 Snow Leopards (*Panthera uncia*, VU), whose survival depends on healthy populations of Blue Sheep (*Pseudois nayaur*) and Himalayan Tahr (*Hemitragus jemlahicus*) in the high-altitude pastures of Dharche and Annapurna municipalities. Red Panda (*Ailurus fulgens*, EN) sightings in the Namlung and Samdo areas of Gorkha confirm the functional connectivity of the temperate forest corridor.

At mid-elevations, the Indian Pangolin (*Manis crassicaudata*, CR) – the world’s most trafficked mammal – finds refuge in community-protected forest patches of Rainas and Dudhpokhari in Lamjung, where local communities have established “Pangolin Conservation Committees”. These grassroots governance bodies are perhaps the most direct analogue to OECM governance in the landscape, demonstrating that community self-organization around a flagship species can provide effective de facto habitat protection outside the formal protected area system.

The aquatic ecosystems of the BG-KG landscape face severe pressure. The Budhi Gandaki River historically supported diverse fish biodiversity, serving as a migration route for mahseer and other endemic species, but BGHEP construction is disrupting spawning migrations. The Kali Gandaki “A” dam has already blocked long-range fish migrations, reducing both fish populations and the livelihoods of the Bote and Majhi fishing communities. The lakes of the Pokhara cluster – Phewa, Begnas, and Rupa – face acute eutrophication from agricultural runoff, urban waste, and invasive water hyacinth. Phewa Lake has lost 5.62 km² of surface area since 1962, primarily from sedimentation caused by upstream land degradation and the Harpan Khola catchment. In the Rupa Lake Ecosystem Services model, 19 CFUGs surrounding the lake receive NRs 4,000 annually from the Rupa Lake Fishery Cooperative for bio-engineering and gully control activities – a proven ecosystem services (ES) mechanism demonstrating that conservation can be made financially self-sustaining.

4. Geological Context and Disaster Risk

Designing resilient conservation and livelihood interventions in the BG-KG landscape requires a sophisticated understanding of its geological foundation. The landscape is built upon the active tectonic interaction of the Main Central Thrust (MCT) and Main Boundary Thrust (MBT) – zones of intense brittle deformation producing highly fractured rock masses prone to catastrophic failure. The 2015 Gorkha earthquake (Mw 7.8), which had its epicenter in Sulikot of this landscape, demonstrated the lethal consequences of geological instability: it triggered more than 25,000 landslides across the Gandaki Basin and devastated communities and infrastructure in Gorkha district. This earthquake history is not a past event but a persistent reminder that the entire region sits on an active seismic system where new ruptures are inevitable.

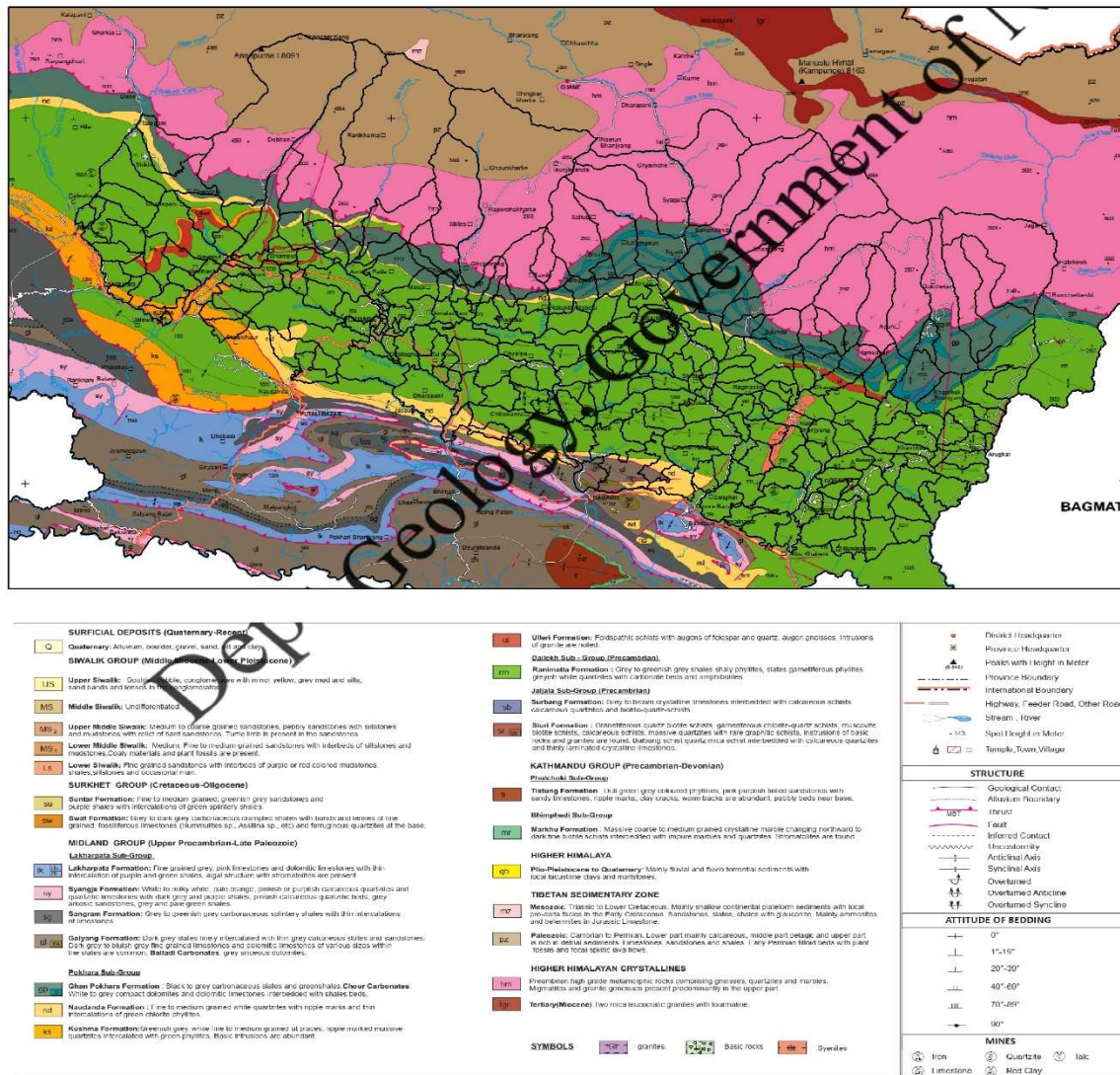


Figure 2: Geology of BudhiGandaki - KaliGandaki Landscape

4.1 The Main Central Thrust, Main Boundary Thrust, and Mass Wasting

The MCT forms the boundary between the Greater Himalayan Crystalline Sequence – which underlies the high peaks and northern highland zones – and the Lesser Himalayan Sequence to the south. This tectonic boundary is a zone of continuous brittle deformation where rocks are intensely fractured and sheared. In the Budhi Gandaki sub-basin, the MCT runs roughly NW-SE through upper Gorkha district, coinciding with the zones of highest landslide density. The MCT’s influence is amplified by the river’s incision: the Budhi Gandaki basin receives approximately 1,530 mm of annual rainfall, with 74% concentrated in the monsoon season – an intensity that triggers thousands of small-scale and several large-scale landslides each year.

The MBT forms the southern structural boundary, separating Lesser Himalayan rocks from the Siwalik (Chure) Group sedimentary formations. The Siwalik formations are composed of soft, poorly consolidated fluvial deposits – alternating sandstone, mudstone, shale, and conglomerate – intrinsically prone to mass wasting and severe erosion. The expansion of the Madan Bhandari Highway and other rural road networks in Gorkha and Lamjung is repeatedly cited by field respondents as a major trigger for increased landslide frequency, as road undercutting typically occurs without adequate bio-engineering or slope stability analysis. In 70% of springs in some Lesser Himalayan sub-basins, flow has decreased measurably due to land-use changes and tectonic stress, directly impacting agricultural water availability.

Table 3: Geological Zones, Dominant Hazards, and Socio-ecological Impacts

Geological Zone	Tectonic Significance	Dominant Hazards	Socio-ecological Impact
Greater Himalaya	Upper MCT plate; high relief; crystalline rocks	Rockfalls, avalanches, GLOFs, reservoir-induced seismicity	Threatens high-altitude pastures; BGHEP dam stability concern; GLOF risk to Arughat
Lesser Himalaya	MCT influence; intensely fractured schist and gneiss	Landslides, deep-seated slope failures, spring depletion	Displaces mid-hill villages; reduces irrigation water; road-triggered instability
Siwalik (Chure)	MBT influence; soft sand/shale; highly erodible	Severe erosion, flash floods, gulying	Generates enormous sediment loads; turbine damage in Kali Gandaki ‘A’; downstream flooding
Terai / Inner Terai	Recent Quaternary alluvium; unconsolidated sediments	River aggradation, bank cutting, waterlogging	Raises riverbeds above floodplains; increases flood risk in Tanahu and Gorkha urban areas

4.2 Glacial Hazards and GLOF Risk

The northern zones of Gorkha and Myagdi contain a high concentration of glaciers. The Kali Gandaki sub-basin contains 399 glaciers while the Budhi Gandaki sub-basin contains 180. CMIP6 climate projections for the Budhi Gandaki River Basin indicate drastic temperature rises under high-emissions scenarios, potentially reaching an average annual increase of 1.7°C by mid-century and significantly higher by end-century under SSP5-8.5 scenarios. These warming trends are driving rapid glacial retreat, expanding pro-glacial lakes retained by unstable moraine dams. Research has identified 47 potentially dangerous glacial lakes (PDGLs) across the Koshi, Gandaki, and Karnali basins, including lakes in the upper Budhi Gandaki that pose significant GLOF risk to downstream settlements at Arughat and to the planned BGHEP reservoir infrastructure. The failure of a single large moraine dam could generate a flood wave capable of catastrophic destruction across the entire length of the Budhi Gandaki valley.

River discharge modelling suggests that the depletion of snow and ice melt will reduce dry-season flows in the Budhi Gandaki and Kali Gandaki by 20 to 25% by mid-century, profoundly affecting agricultural water availability, hydropower generation, and aquatic ecosystems. This hydrological decline will disproportionately impact the communities – particularly women farmers managing irrigation in the absence of male labor migrants – who depend on spring-fed gravity irrigation systems already showing significant flow reductions.

4.3 Sediment Dynamics and River Aggradation

The Kali Gandaki is one of the world's most sediment-laden rivers, carrying an estimated 43 million tonnes of suspended sediment load annually. This sediment, with a high concentration of abrasive angular quartz, causes excessive mechanical damage to turbine components in the Kali Gandaki "A" hydroelectric project, increasing operational costs and reducing plant efficiency. For riverside communities in Parbat and lower Myagdi, coarse sediment aggrades river channels – raising riverbeds above the surrounding floodplain – making rivers highly unstable and prone to sudden channel migration and bank cutting during high monsoon flows.

In the Pokhara Valley, sedimentation driven by upstream land degradation is causing a measurable reduction in lake surface areas. Phewa Lake, the largest in the Pokhara cluster and the economic heart of the tourism industry, has lost 5.62 km² of surface area since 1962, primarily from Harpan Khola-borne sediment and urban encroachment. The Begnas and Rupa lakes are similarly threatened. This lake shrinkage simultaneously degrades tourism potential, threatens aquatic biodiversity including endemic fish species, and reduces flood buffering capacity for the Pokhara urban area – making upstream watershed management a direct economic interest of the city's tourism sector.

5. Socio-economic Profile and Community Characteristics

The BG-KG landscape is home to over 4.5 million people, representing a complex tapestry of indigenous nationalities, occupational castes, and hill-to-urban migrants whose livelihoods are embedded in the landscape's natural resources. The socio-economic reality is defined by a profound transition from subsistence-based mountain agriculture to a remittance-dependent economy, a transformation with far-reaching consequences for both communities and ecosystems. Understanding this social landscape is essential for designing inclusive interventions that reach the most marginalized and for leveraging the remarkable richness of indigenous ecological knowledge that remains embedded in community practice.

5.1 Ethnic and Social Composition

The Gurung (Tamu) people are the predominant indigenous group in the high hills of Lamjung, Kaski, and Gorkha, constituting 20–30% of the local population in many municipalities. Globally recognized for their military history and robust customary governance systems, the Tamu are the custodians of the high-altitude corridors and the ICCA MML territory. The Magar community is dominant in the mid-hills of Tanahu, Syangja, and Gorkha, managing traditional terrace agroforestry systems and citrus orchards. Khas-Arya communities (Brahmin and Chhetri) are distributed throughout the landscape, dominant in urban centers and commercial farming areas. The Dalit communities bring traditional metalworking, tailoring, and artisanal knowledge that is increasingly relevant for value-added forest enterprises.

The Dura people of Sundarbazaar in Lamjung represent a particularly significant indigenous knowledge resource: documented ethnobotanical research has recorded that the Dura community uses 73 plant species to treat 64 different ailments, with 14 customary forest patches managed under traditional rules prohibiting over-harvesting. This knowledge, held primarily by elders, is at acute risk of being lost within a generation as youth migrate for employment. Systematic TEK documentation is therefore both a conservation priority and an intergenerational justice obligation.

The Bote/Majhi communities of the Gorkha and Tanahu riverbanks are among the most vulnerable populations in the landscape – traditionally dependent on fishing, boat operation, and river resource management, they face existential economic displacement from hydropower development. The Kali Gandaki “A” dam has already effectively ended commercial fishing in significant reaches of the river for the Bote communities, and BGHEP will produce equivalent displacement in the Budhi Gandaki. Conservation strategies must either restore traditional resource rights through fish passages and aquaculture investment, or provide competitive alternative livelihoods through river-based eco-tourism and sustainable sand/gravel management.

Table 4: Ethnic Composition and Traditional Livelihoods in the BG-KG Landscape

Ethnic/Caste Group	Primary Location	Population (approx.)	Traditional Livelihoods	SDG Contributions
Gurung (Tamu)	Lamjung, Kaski, Gorkha	20–30% in hill municipalities	High-altitude herding, cliff honey hunting, ICCA governance, army service	SDG 1, 10, 15, 16
Magar	Tanahu, Syangja, Gorkha	Significant minority	Terrace agriculture, bamboo handicrafts, citrus and orange farming	SDG 1, 2, 10, 15
Khas (Brahmin/Chhetri)	Throughout landscape	~37%	Commercial agriculture, public service, livestock rearing	SDG 1, 2, 10
Dalit	Throughout landscape	~10%	Metalwork, tailoring, NTFP collection; traditional artisanal skills	SDG 1, 5, 8, 10
Dura	Lamjung (Sundarbazaar)	Small	73 plant species for 64 ailments; 14 customary forest patches	SDG 3, 10, 15
Bote / Majhi	Kali Gandaki and Budhi Gandaki riverbanks	Small; highly vulnerable	Fishing, boat operation, river resource management; at risk from hydropower	SDG 1, 2, 14, 15

5.2 Livelihood Patterns and Economic Base

Agriculture remains the primary livelihood base across the landscape, though patterns vary dramatically by elevation and proximity to urban centres. In the high hills of Lamjung and Gorkha, traditional agriculture is predominantly subsistence-oriented: rice, wheat, maize, and buckwheat are primary cereals, supplemented by millet landraces whose genetic diversity is extraordinary. Field surveys have documented 144 cultivated crop species in the BG-KG landscape, including 74 rice landraces (“Marshi”, “Rato anadi”, “Seto anadi”, “Jhinuwa”), 23 maize landraces, 26 millet varieties, and significant diversity in indigenous vegetables including *Amorphophallus campanulatus* (Owal), *Trewia nudiflora* (Pidar), and *Rumex vesicarius* (Chahi sag). MadhyaNepal Municipality in Lamjung is a notable hub, maintaining 22 indigenous millet varieties that are essential for climate adaptation due to their resistance to pests and erratic precipitation patterns. These landraces are critical genetic resources threatened by replacement with commercial hybrids.

Commercial agriculture focuses on mandarin orange and citrus in the mid-hills of Parbat and Lamjung; off-season vegetables targeting Pokhara markets; ginger and turmeric

cultivation; and the high-altitude cliff honey of the Tamu community, produced by the world's largest honeybee *Apis laboriosa* and sold at premium prices to international buyers. Forest-based livelihoods remain important, particularly through NTFPs: Timur (*Zanthoxylum armatum*), Sugandha Kokila (*Cinnamomum glaucescens*), Lokta (*Daphne species*) paper, Allo (*Girardinia diversifolia*) fibre, and various medicinal and aromatic plants. However, the economic viability of forest livelihoods is severely constrained by inadequate market linkages, absence of processing infrastructure, policy restrictions on harvest, and the persistent lack of technically skilled NTFP managers.

Migration for foreign employment is the dominant structural economic force. Remittances account for approximately 46% of household income in Gandaki Province – among the highest rates in Nepal. While this has improved household food security and education access, it has fundamentally transformed the landscape in ecologically damaging ways: agricultural terraces are being abandoned, triggering erosion and landslides as terrace walls crumble and drainage channels fail; forest biomass accumulates without the traditional daily interaction of grazing and fodder collection, fuelling intense pre-monsoon forest fires; and women, children, and the elderly now manage the majority of CFUGs, requiring a fundamental shift in how technical training and extension services are designed and delivered.

6. Community-Based Forest Management

Community-based forest management is among the strongest institutional assets of the BG-KG landscape. The CFUG system, established under Nepal's Forest Act, represents one of the most successful examples of participatory natural resource management in Asia, and the Gandaki Province with 30,637 hectares of CFUG-managed forest provides a substantial institutional foundation for SGP interventions. However, CFUGs in the BG-KG landscape are increasingly constrained by migration-induced membership decline, technical capacity gaps, and policy restrictions that limit sustainable commercialization of forest products.

6.1 Community Forest User Groups

CFUGs in the BG-KG landscape vary significantly in their organizational capacity and ecological impact. Stronger CFUGs in accessible areas conduct regular monthly meetings, implement five-year operational plans developed with Division Forest Office (DFO) support, undertake plantation activities, provide timber and non-timber forest products to member households, and implement seasonal fire prevention measures. In Tanahun district, community management of Sal forests has been demonstrably effective: studies document that Sal density has increased significantly following handover to community

management, with inverse-J shaped size class distributions confirming robust natural regeneration and good long-term forest health.

However, CFUGs in the BG-KG landscape face structural challenges that threaten their effectiveness. Declining active membership due to male out-migration means that executive committee responsibilities fall disproportionately on women who may lack formal education, technical training, and access to financial management support. Policy restrictions prohibiting the sale of “fresh” timber – only dried or dead wood can be legally sold – create perverse incentives where some community members deliberately set fires to create sellable dried wood, undermining the very conservation mission of the CFUG. Insufficient resources for fire prevention and control, weak market linkages for NTFPs, and inadequate technical support for sustainable harvesting protocols further limit CFUG conservation contribution.

The JICA “Technical Cooperation Project on Climate Change Adaptation through Sustainable Forest Management” (2022–2027), implemented in partnership with the Ministry of Forest and Environment (MoFE) at the federal level and the Ministry of Forest Environment and Soil Conservation (MOFESC) in Gandaki Province, is directly relevant to strengthening CFUG capacity in the BG-KG landscape. Working through Division Forest Offices (DFOs) and Soil and Watershed Management Offices (SWMOs) in Tanahun and Syangja – both within the BG-KG landscape – the project focuses on building institutional capacity for climate change adaptation through community-based forest management. This represents a prime opportunity for SGP to align its CFUG capacity building investments with JICA’s forest governance framework, avoiding duplication and ensuring technical approaches are consistent across the province.

6.2 ICCAs and Indigenous Governance

The BG-KG landscape is a frontier for the formal recognition of ICCAs in Nepal. The MML-ICCA, nested within the broader territory, exemplifies how indigenous governance systems can achieve conservation outcomes more effectively than top-down state models. The Tamu people of Lamjung, Kaski, and Gorkha have historically governed their territory through the Nalsabha and Thiti systems – not merely cultural relics but functional management frameworks with centuries-long track records.

The Nalsabha is a four-tiered territorial assembly managing boundaries and resolving disputes over common-pool resources. Historically, it governed 125 villages across eight territorial Nals. The Thiti system is an indigenous rule-making mechanism implementing seasonal restrictions (bandej) on harvesting and grazing, ensuring the agro-pastoral cycle aligns with the natural regenerative capacity of the landscape. These customary prohibitions on over-harvesting function as de facto OECMs under the Kunming-Montreal GBF Target 3 criteria – geographically defined areas governed in ways that achieve sustained, positive biodiversity outcomes outside formal protected area boundaries. The

revitalization of the Nalsabha and Thiti systems, supported by SGP's "Grantmaker Plus" advocacy for their legal recognition under the Forest Act 2019, represents the highest-leverage governance investment available in this landscape.

Ancient Bön practices in Ghale Gaun integrate spiritual reverence with practical resource regulation, manifesting in sustainable traditions like cliff honey hunting where the timing, volume, and method of harvest are governed by cultural protocols that maintain bee populations and forest ecosystem health. In Sundarbazaar, the Dura community maintains 14 forest patches under customary laws prohibiting over-harvesting, protecting an extraordinary medicinal plant resource that includes 73 species with documented therapeutic applications for 64 ailments. These ICCAs collectively cover an estimated area that, if formally recognized, would make a significant contribution to Nepal's GBF 30x30 commitments.

7. Critical Environmental Challenges

The BG-KG landscape faces a convergence of environmental pressures that threaten both ecological integrity and community wellbeing. These challenges are deeply interconnected – migration drives both forest fires and terrace abandonment; hydropower development simultaneously causes fish migration blockage, displacement, and community livelihood disruption; and climate change amplifies all other threats. Effective OP8 intervention requires integrated responses that address multiple drivers simultaneously rather than treating each challenge in isolation.

7.1 Forest Fires: An Escalating Crisis

Forest fires have become one of the most critical and rapidly worsening environmental problems across the BG-KG landscape, mentioned consistently across all field assessments. The fire season – typically February to May – has become increasingly severe and spatially extensive. The fundamental driver is not primarily climatic but socio-economic: the collapse of traditional forest use patterns that once maintained natural firebreaks through daily human activity has allowed enormous quantities of dry leaf litter, particularly in Chilaune and Sallo forests, to accumulate across the mid-hills.

The impacts are severe and multifaceted: direct loss of standing timber and forest biomass; destruction of vulture nesting trees, particularly Simal; loss of medicinal plants and biodiversity; accelerated soil degradation and erosion on burned slopes; smoke and air quality impacts on nearby communities; and destruction of habitat critical for Red Panda, Pangolin, and other wildlife. Paradoxically, restrictive harvest policies contribute to fire risk. Current regulations prohibit the commercial sale of "fresh" timber from community forests, but allow sale of dried or dead wood – creating a perverse incentive structure where deliberately setting fires can be economically rational for households seeking

income. This policy failure must be addressed through both regulatory reform and the creation of alternative economic incentives for forest stewardship.

Effective fire management requires an integrated approach combining community-based fire management systems – including village fire management committees with clear roles, adequate equipment, community fire management plans linked to CFUG operational plans, and early warning systems – with economic incentives for forest protection such as Duna Tapari enterprises (leaf-plate production using Sal and Sallo leaf litter) that create demand for the very combustible material that fuels fires. This approach transforms fire risk mitigation into a livelihood opportunity, making it economically self-sustaining.

7.2 Land Degradation and Terrace Abandonment

Land degradation affects an estimated 40% of Nepal's land, and the BG-KG landscape is one of the most severely affected territories in the country given its combination of geological fragility, intensive historic agricultural use, and the rapid withdrawal of labour through migration. The problem manifests through multiple interacting pathways across the landscape. In the Siwalik hill zone, the inherently soft and poorly consolidated nature of the underlying geology is dramatically accelerated by road construction without adequate engineering safeguards. The expansion of rural road networks – while essential for connectivity and often a legitimate development aspiration of hill communities – is the single most consistent trigger for new landslide initiation across the BG-KG hills.

Abandoned agricultural terraces represent a growing land degradation crisis. As male youth migrate, the labor-intensive maintenance of terrace walls, drainage channels, and irrigation systems fails. Terraces that were stable for generations begin to collapse in sequence, generating gullies that mobilize enormous sediment volumes. The consequences cascade downstream: Phewa Lake loses surface area, the Kali Gandaki carries sediment loads that damage turbines, and riverside communities face increased flood risk from aggrading channels. Addressing terrace abandonment requires not just technical solutions – SALT, bioengineering, check dams – but economic strategies that make mountain agriculture viable and attractive for the generation currently choosing migration over farming.

Nepal has committed to achieving Land Degradation Neutrality (LDN) by 2030, with national targets including increasing Soil Organic Carbon (SOC) by 7% per year and restoring 70% of wetland ecosystems. The BG-KG landscape is a priority territory for demonstrating LDN achievement through SALT, community-based bio-engineering, pro-poor leasehold forestry, and agroforestry models. SGP's proven track record with SALT technology across South-South cooperation networks positions the programme to make a credible and measurable contribution to Nepal's LDN commitments through targeted investments in this landscape.

8. Agricultural and Development Constraints

Several developmental constraints in the BG-KG landscape have direct and significant environmental implications, shaping both the drivers of ecological degradation and the strategic context for SGP interventions.

8.1 Water Governance and Ecosystem Services

Water scarcity is reported as a growing constraint across the mid-hill and upper zones of the landscape, directly linked to declining spring discharge, reduced snowmelt, and inadequate water harvesting infrastructure. In 70% of springs in some Lesser Himalayan sub-basins, flow has measurably decreased due to combined land-use change and tectonic stress. This spring depletion, affecting gravity-fed irrigation systems that millions of hill farmers depend upon, is one of the most immediate and tangible manifestations of environmental degradation affecting agricultural productivity. CMIP6 projections indicating a 20–25% reduction in dry-season river discharge by mid-century suggest this trend will intensify significantly.

Despite these water stress signals, the Gandaki River Basin remains fundamentally underutilised for ecosystem services (ES) approaches. The Rupa Lake model provides a compelling proof of concept: 19 CFUGs surrounding the lake receive annual payments from the Rupa Lake Fishery Cooperative (NRs 4,000 per group) for watershed protection activities including bio-engineering, gully control, and invasive species management, benefiting over 5,000 households. Comparable ES mechanisms are functional around Phewa Lake – where upstream communities, hotel owners, and boatmen are connected through a watershed management framework – and in the Mid-Marsyangdi hydropower catchment, where an ES management network coordinates upstream land use with downstream hydropower efficiency. SGP should invest in scaling these proven ES models, providing technical and institutional capacity for new ES agreements between upstream CFUG providers and downstream service users, aligned with Nepal’s national LDN targets.

8.2 Market Linkages, NTFP Value Chains, and Hydropower Constraints

Despite the exceptional commercial value of NTFPs and agricultural products in the BG-KG landscape, communities receive disproportionately small shares of final market value due to structural market failures. For Timur (Sichuan pepper), Sugandha Kokila (whose essential oil commands high prices in international cosmetic and pharmaceutical markets), and cliff honey (sold at premium prices to tourism markets), inadequate aggregation infrastructure, lack of quality certification, and complex multi-intermediary supply chains concentrate value upstream of communities. The absence of local processing facilities for essential oil distillation and honey processing represents both a lost livelihood opportunity and a conservation gap – raw NTFP export creates incentives for volume-maximizing

extraction, while value-added processing creates incentives for sustainable, quality-focused management.

The hydropower sector introduces additional and qualitatively distinct market and livelihood constraints. The Kali Gandaki “A” project has reduced white-water rafting opportunities that previously generated income for Bote communities and tourism operators. The dam has blocked long-range migratory fish, eliminating traditional fisheries for Majhi communities in Parbat and lower Myagdi. BGHEP will create even larger-scale displacement, inundating 63 km² of the Budhi Gandaki valley including agricultural land, sacred sites, and the entire livelihood base of 45,000–50,000 people. While substantial compensation has been distributed (NPR 43 billion as of 2026), governmental performance is widely perceived as strong in financial compensation but critically weak in addressing long-term biodiversity loss, cultural disruption, and sustainable livelihood transition for displaced communities. SGP has a specific role in filling this gap through nature-based livelihood development for displaced and project-affected communities.

9. Strategic Opportunities for SGP OP8 Intervention

The BG-KG landscape, despite its formidable challenges, presents specific and time-sensitive opportunities for high-impact SGP interventions that can generate demonstration models replicable across Nepal’s mountain landscapes.

9.1 Revitalizing Customary Governance and ICCA Recognition

The survival of the BG-KG landscape’s biodiversity corridors depends fundamentally on the strength and vitality of local governance institutions. The Nalsabha and Thiti systems of the Tamu people provide the most effective framework for landscape-scale resource management currently available in this territory, yet they operate without formal legal recognition, limiting their authority and sustainability. SGP’s highest-leverage governance investment is to support the revival and codification of these systems and to advocate for their recognition under provincial law.

Concretely, this means: providing technical and financial support to re-establish functional Nalsabha assemblies across priority Nal territories in Madi, Marsyangdi, and Kwholasothar municipalities; assisting CFUGs to formally integrate Thiti protocols (seasonal harvest bans, grazing rotation rules, extraction limits) into their government-approved five-year operational plans; supporting the systematic documentation of TEK from Dura, Gurung, and Magar elders before this knowledge is lost; and engaging Gandaki Province’s Ministry of Industry, Tourism, Forest and Environment (MoITFE) to recognize Nalsabha and Dura customary councils as legitimate co-management partners under the Forest Act 2019. This legal recognition would constitute a milestone for ICCA advancement in Nepal and a direct contribution to GBF Target 22 on Indigenous Peoples’ rights.

9.2 Scaling SALT, Bio-engineering, and Pro-poor Leasehold Forestry

Sloping Agricultural Land Technology (SALT) is the most immediately scalable and impact-proven land restoration technology available for the BG-KG landscape. By integrating double hedgerows of nitrogen-fixing species (*Flemingia macrophylla*, *Leucaena leucocephala*) into contour lines on rain-fed terraces, SALT simultaneously traps sediment reducing soil loss by 3.4 tonnes per hectare per year, improves soil fertility through nitrogen fixation, maintains agricultural productivity on marginal slopes, and generates fodder biomass that reduces grazing pressure on natural forests. SGP has promoted SALT extensively through South-South cooperation networks and has established demonstration sites across Nepal; OP8 should systematically scale SALT adoption in Parbat, Gorkha, and Lamjung where sloping rain-fed terraces are most vulnerable to abandonment and erosion.

Bio-engineering for rural road stabilization addresses one of the highest-impact single drivers of land degradation in the landscape. Working with local governments to apply bioengineering (deep-rooted native grasses and shrubs planted on roadside slopes) along the Budhi Gandaki ring road and other rural roads can prevent the landslide triggering that currently destroys roads, degrades watersheds, and endangers communities within one to two monsoon seasons of construction. Pro-poor leasehold forestry, where degraded government forest lands are leased to landless and economically marginalized households for 40-year terms – providing rights to harvest and sell products from rehabilitated forest – represents the most direct pathway for simultaneously addressing land degradation and poverty in the same intervention.

JICA's 2022–2027 Technical Cooperation Project on Climate Change Adaptation through Sustainable Forest Management provides an enabling framework for SGP's land restoration investments. JICA is working through the Gandaki Province MOFESC and DFOs in Tanahun and Syangja to demonstrate community-based forest management practices for climate adaptation. SGP should co-design SALT and bio-engineering demonstration sites in these districts as complementary pilots, leveraging JICA's institutional relationships with DFOs and SWMOs to enable rapid uptake of restoration techniques through the government extension system. This SGP-JICA alignment exemplifies the "Grantmaker Plus" function of the programme – not merely funding projects but catalyzing systemic change through strategic institutional partnerships.

9.3 Sustainable Value Chains and Forest-Based Enterprise Development

Conservation must be economically attractive to be sustainable in a landscape where remittances from foreign employment represent 46% of household income. SGP's enterprise development strategy must create locally-based economic opportunities that can genuinely compete with migration as a livelihood pathway. Several high-value enterprise opportunities have been identified through field assessments, each with strong conservation co-benefits.

Duna Tapari (leaf-plate) production using Sal and Sallo leaves addresses two conservation priorities simultaneously: it removes the accumulated dry leaf litter that fuels devastating forest fires, and it provides employment and income for women and Dalit community members who are otherwise economically marginalized. By creating an economic value for healthy forest litter, Duna Tapari enterprises transform forest fire risk into a livelihood asset. SGP should support formation of producer cooperatives, provision of leaf-pressing equipment, development of supply chains to urban markets and restaurants in Pokhara and Gorkha, and policy advocacy for plastic plate bans that create market demand.

Essential oil distillation for Sugandha Kokila and Timur targets premium pharmaceutical and cosmetic export markets. The Gorkha and Lamjung uplands host significant wild populations of Sugandha Kokila, whose cinnamon-type essential oil commands high international prices, yet there is currently no local distillation capacity – raw material is sold to intermediaries at a fraction of its processed value. SGP support for establishing community distillation units, training in quality control and organic certification, and development of direct buyer relationships with pharmaceutical and cosmetics companies would retain profits locally while incentivizing the sustainable management of wild populations and the establishment of cultivated plots on degraded land. Timur processing for the Sichuan pepper export market follows a similar logic and is already familiar to Magar farming communities in the mid-hills.

Indigenous millet marketing represents an agro-biodiversity conservation and rural income strategy simultaneously. The 22 indigenous millet varieties maintained in MadhyaNepal Municipality – including “Seto”, “Mudke”, and “Nangkatuwa” – are nutritionally superior to commercial hybrids, more resilient to climate variability, and of growing interest to health-conscious urban consumers and the international Gurung/Magar diaspora. Creating a certified brand for MML millet varieties, targeting the Pokhara tourism market, Kathmandu specialty food retailers, and diaspora community networks in the UK, Hong Kong, and Australia, would generate premium income for indigenous farmers while creating strong economic incentives for on-farm conservation of genetic diversity. LI-BIRD’s expertise in community seed banks and participatory variety selection makes it an ideal technical partner for this enterprise.

Cultural eco-tourism, anchored by the Ghale Gaun homestay model in Kwholasothar, represents a proven enterprise that can be replicated across the landscape. Ghale Gaun has demonstrated that authentic cultural and natural tourism, managed through community governance, generates income that is directly reinvested in conservation. Scaling this model to Dordi (Lokta paper and cliff honey experiences), Sundarbazaar (Dura ethno-medicine and forest walks), and high-altitude trekking hubs linking ICCA territories to the Manaslu and Annapurna circuits can distribute tourism benefits more equitably while expanding the conservation value of indigenous-governed areas.

9.4 Hydropower Mitigation and Environmental Justice

The BGHEP presents SGP with both a challenge and a strategic opportunity. The challenge is that 45,000–50,000 people are being displaced, their livelihoods and cultural landscapes inundated, at a scale that no community-level grant programme can fully address. The opportunity is that SGP can serve as a critical advocate for biodiversity offsets, community benefit-sharing, and nature-based livelihood transition in a policy environment that currently prioritizes infrastructure completion over ecological justice.

Specifically, SGP should: support Bote and Majhi communities in Aarughat and downstream areas to develop alternative livelihoods in riverine eco-tourism, managed aquaculture in reservoir margins, and sustainable sand/gravel extraction – economic activities that utilize the changed hydrological system rather than mourning the lost one; advocate through the “Grantmaker Plus” role for BGHEP’s environmental management plan to include mandatory biodiversity offsets proportional to the 63 km² of inundated ecosystem, to be invested in habitat restoration and ICCA recognition in the landscape; document and advocate for the preservation of sacred cultural sites, cremation grounds, and traditional fishing rights through legally binding commitments from the Nepal Electricity Authority; and support communities in negotiating access to BGHEP project shares (equity participation) as a form of long-term benefit sharing that provides a dividend stream beyond one-time land compensation.

9.5 Climate and Disaster Resilience

Community-based GLOF monitoring in the upper Budhi Gandaki and Kali Gandaki headwaters represents a high-priority, feasible, and cost-effective intervention where SGP can genuinely save lives. Training high-altitude herders and youth in Dharche and Annapurna municipalities to monitor glacial lake water levels, ice dam integrity, and early warning signals – and connecting them to real-time communication networks and downstream evacuation protocols – transforms traditional ecological knowledge of glacier behavior into a disaster risk reduction asset. This community-based monitoring complements, but cannot be replaced by, remote sensing systems, and can be sustained at low cost through embedding in CFUG and Nalsabha governance structures.

Proactive human-wildlife conflict (HWC) mitigation, moving beyond reactive compensation to habitat modification, is needed urgently in conflict hotspots of Rainas and Sulikot municipalities. Planting buffer crops unpalatable to wildlife (tea, ginger, lemon) at the forest-agricultural interface, constructing predator-proof livestock enclosures in Snow Leopard territory, and establishing community incentive programmes that make Snow Leopard presence economically beneficial through wildlife-linked tourism and payments for coexistence, can reduce retaliatory killing and improve community tolerance for conservation.

Urban green infrastructure for the Pokhara metropolitan area is needed to address the combined threats of lake sedimentation, urban flooding, and declining water quality. SGP can pilot community-implemented bioswales in Harpan Khola catchment, urban wetland restoration along Pokhara's lakeshores, rooftop farming and composting programmes to reduce organic waste loads, and nature-based solutions for stormwater management – demonstrating replicable models that the Lake Conservation and Development Authority (LCDA) can scale through municipal investment.

10. Stakeholder Landscape and Partnership Opportunities

The complexity and scale of the BG-KG landscape requires a multi-stakeholder alliance that leverages SGP's community-level grant capacity against larger institutional programmes. The landscape benefits from a significantly richer institutional environment than either the Tinau or Jumla-Mugu landscapes, with established conservation organizations, research institutions, and multilateral programmes already operational. This density of partners is an asset, but also a risk if it leads to fragmented, uncoordinated interventions. SGP's strategic role is to ensure that community-level interests are represented and amplified within this complex institutional landscape.

10.1 Government Institutions

The Gandaki Province Ministry of Industry, Tourism, Forest and Environment (MoITFE) is the primary provincial policy partner for forest management, ecotourism regulation, and environmental governance. MoITFE's provincial budget and planning authority under Nepal's federal system give it growing capacity to co-finance community conservation initiatives, making it a critical partner for ensuring SGP interventions are embedded within government planning cycles. The Lake Conservation and Development Authority (LCDA) is an essential partner for all Pokhara valley interventions, with direct authority over Lake Watershed management and the existing institutional relationships with CFUGs that SGP needs for its urban green solutions work.

The Division Forest Offices (DFOs) in all seven districts are the operational government counterparts for CFUG oversight, NTFP harvest regulation, and forest management plan approval. Their effectiveness is constrained by personnel and budget limitations, but they are indispensable partners whose endorsement is required for any forest management or OECM recognition initiative. Agricultural Knowledge Centers (AKCs) provide agricultural extension services and are key partners for SALT dissemination, indigenous millet promotion, and climate-resilient crop promotion. SGP should leverage AKC networks to reach smallholder farmers beyond the direct reach of SGP grantees.

JICA's 2022–2027 Technical Cooperation Project on Climate Change Adaptation through Sustainable Forest Management works through the MoFE–MoITFE–DFO–SWMO

institutional chain, specifically targeting Tanahun and Syangja districts within the BG-KG landscape. In parallel, JICA provides ODA loan financing for the 140 MW Tanahu Hydropower Project (THP) on the Seti River in Tanahu district, with associated rural electrification and community development programme components that have already completed electrification of Tanahu district and funded 63 community infrastructure sub-projects including education, health, water, and road river embankment. SGP should engage with THP's community development programme to coordinate livelihood interventions in THP-affected areas, leveraging infrastructure investment for conservation enterprise development.

10.2 Civil Society and Research Partners

Bird Conservation Nepal (BCN) is the technical lead for vulture restaurant operations and Sarus Crane monitoring across the lower landscape, with established community networks around Sahid Lakhan and lower Gorkha. BCN is the natural partner for avian conservation interventions and brings scientific monitoring capacity that complements SGP's community governance emphasis. The National Trust for Nature Conservation (NTNC), as manager of both ACAP and MCA, provides technical support for wildlife monitoring, trekking tourism development, and high-altitude ecosystem management across the core conservation zones of the landscape. NTNC's existing infrastructure and ranger networks are assets that SGP community interventions should connect to and strengthen.

Local Initiatives for Biodiversity, Research and Development (LI-BIRD) brings expertise in community seed banks, participatory plant breeding, and agrobiodiversity conservation that is directly relevant to the millet variety conservation and agrobiodiversity enterprise development strategy. LI-BIRD has existing community relationships in the Gandaki region and is the most technically qualified partner for the MML millet branding initiative. The NGO Federation of Nepal is a partner for civil society capacity building, particularly in training local representatives in climate-resilient ecosystem management and in navigating the legal frameworks for ICCA recognition.

10.3 Academic and Multilateral Partnerships

Pokhara University and Tribhuvan University constituent campuses in Gandaki Province provide applied research capacity for biodiversity monitoring, NTFP pharmacology, agrobiodiversity documentation, and social-ecological system analysis. Tribhuvan University's Central Department of Population Studies has ongoing research on migration trends and natural resource management impacts that directly informs the BG-KG strategy. ICIMOD, with its Himalayan landscape management programmes and regional research capacity, is a strategic partner for GLOF monitoring system design, high-altitude ecosystem research, and South-South knowledge exchange.

The Green Climate Fund (GCF) “Improving Climate Resilience of Vulnerable Communities in the Gandaki Basin” project (USD 32.7 million) provides co-financing opportunities for bio-engineering, GLOF early warning systems, and community climate resilience interventions. SGP should systematically align its community-level project portfolio with GCF-funded basin-scale interventions, ensuring that community grants from SGP and the larger infrastructure investments of the GCF are mutually reinforcing. CSR funding from hydropower companies operating in the Marsyangdi and Kali Gandaki basins – whose operational costs are directly affected by upstream watershed degradation and sediment loading – represents an under-utilized private sector financing source that SGP’s “Grantmaker Plus” convening role should actively mobilize for upstream watershed conservation.

II. Conclusion

The Budhi Gandaki – Kali Gandaki landscape stands at a historical crossroads. The rapid transition towards infrastructure-led development – embodied above all by the imminent BGHEP – is reshaping the physical, social, and institutional landscape at a pace that threatens to permanently displace indigenous communities, eliminate irreplaceable biodiversity, and undermine the ecological foundations upon which both livelihoods and downstream water security depend. GEF SGP Operational Phase 8 provides a critical and time-sensitive window of opportunity to ensure that this transition does not come at the cost of the region’s biological and cultural integrity.

By placing the human stewards of the landscape – the Gurung farmers maintaining indigenous millet landraces in MadhyaNepal, the Tamu elders holding Thiti governance knowledge in Kwholasothar, the Dura community managing medicinal forest patches in Sundarbazaar, the Bote fishers seeking dignified livelihoods after dam-induced displacement, the women CFUGs maintaining forest cover across a feminized mid-hill landscape – at the centre of the conservation narrative, SGP can catalyze a transformation where biodiversity is not a constraint to development but its primary driver.

The revival of the Nalsabha, the protection of the Indian Pangolin, the restoration of Phewa Lake’s watershed, the commercialization of indigenous millet varieties, the formalization of sacred sites as OECMs, and the building of SGP-JICA synergies in climate-adaptive forest management are not isolated grant activities. They are the interconnected building blocks of a resilient Gandaki civilization – one that can withstand the pressures of climate change, hydropower-induced displacement, and a globalized economy. The success of this strategy will ultimately be measured by the ability of the landscape to maintain its extraordinary ecological integrity while providing a prosperous and dignified future for its people. The rivers that power the nation must continue to sustain the communities that have stewarded them for generations.

Summary Tables

Table 5: Detailed Municipal and Ward Coverage

District	Municipality / Rural Municipality	Wards	Strategic Significance for OP8
Gorkha	Aarughat RM	7	Budhi Gandaki basin; primary resettlement hub for BGHEP-displaced families; livelihood transition priority
	Ajirkot RM	5	Mid-hill ecological zone; significant CFUG coverage; SALT and agroforestry potential
	Bhimsen RM	8	Lower Budhi Gandaki; intensive agriculture and small-scale irrigation focus
	Dharche RM	4	High-altitude Manaslu corridor; Snow Leopard, Himalayan Tahr; GLOF monitoring priority
	Gorkha Municipality	14	Cultural capital; urban sustainability; post-earthquake reconstruction heritage
	Palungtar Municipality	10	Irrigation and river training focus; gateway to Tanahu
	Sahid Lakhan RM	6	Vulture restaurant sites; community beekeeping; mid-hill biodiversity
	Siranchok RM	8	Landslide hotspot; bio-engineering and SALT priority; JICA forest project demonstration
	Sulikot RM	8	2015 earthquake affected area; disaster resilience and community recovery focus
Kaski	Annapurna RM	13	Part of ACAP; trans-Himalayan biodiversity; trekking and sustainable tourism
	Machhapuchchhre RM	11	Watershed protection for Pokhara lakes; rangeland conservation
	Madi Municipality	18	Core ICCA MML territory; Tamu Nalsabha revival; customary governance
	Pokhara Metropolitan City	34	Rapid urbanization; Phewa/Rupa lake conservation; urban green solutions
	Rupa Municipality	7	Community-managed fisheries; Rupa Lake ecosystem restoration; ES payment model
Lamjung	Besishahar Municipality	11	District HQ; market linkages for NTFPs; processing infrastructure
	Dordi RM	9	Lokta paper and cliff honey traditions; Allo fibre enterprise
	Dudhpokhari RM	6	Indian Pangolin protection priority; community conservation committees
	Kwholasothar RM	9	Thiti system management; Ghale Gaun cultural tourism replication model
	MadhyaNepal Municipality	10	Agrobiodiversity hub; 22 indigenous millet varieties; seed bank priority
	Marsyangdi RM	9	Nalsabha revival; high-value crops (Macadamia, Timur); NTFP enterprise
	Rainas Municipality	10	Human-wildlife conflict mitigation; Indian Pangolin habitat
Myagdi	Sundarbazar Municipality	11	Dura TEK documentation; ethno-medicinal plant processing; JICA forest project zone
	Annapurna RM	4	Deepest gorge section; trans-Himalayan floral diversity; CITES-listed species
Parbat	Jaljala RM	8	Citrus production hub; slope stabilization through SALT; NTFP value chains

	Kushma Municipality	6	District HQ; riverbank protection along Kali Gandaki
	Modi RM	8	Catchment protection for Modi Khola sub-basin; biodiversity corridor
Syangja	Phedikhola Municipality	3	CFUG networking and monitoring; JICA climate-adaptive forest management site
Tanahu	Bhanu Municipality	12	Sal forest restoration; JICA THP community development programme zone
	Byas Municipality	6	Urban-rural interface; Seti River riparian ecosystem management; THP project area
	Shuklagandaki Municipality	2	Sustainable riverbed extraction management; THP downstream area

A. Budi Gandaki-Kali Gandaki Landscape: District, Municipality/Rural Municipality & Wards

S.N	District	Municipality / Rural M	Wards no.	Total Wards
1	Gorkha	Aarughat	3,4,5,6,7,8,10	7
2	Gorkha	Ajirkot	1,2,3,4,5	5
3	Gorkha	Bhimsen	1,2,3,4,5,6,7,8	8
4	Gorkha	Dharche	3,4,5,7	4
5	Gorkha	Gorkha	1,2,3,4,5,6,7,8,9,10,11,12,13,14	14
6	Gorkha	Palungtar	1,2,3,4,5,6,7,8,9,10	10
7	Gorkha	Sahid Lakhan	1,5,6,7,8,9	6
8	Gorkha	Siranchok	1,2,3,4,5,6,7,8	8
9	Gorkha	Sulikot	1,2,3,4,5,6,7,8	8
10	Kaski	Annapurna	1,2,3,4,5,6,7,8,9,10,11	11
11	Kaski	Machhapuchchhre	1,2,3,4,5,6,7,8,9	9
12	Kaski	Madi	1,2,3,4,5,6,7,8,9,10,11,12	12
13	Kaski	Pokhara Lekhnath	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33	33
14	Kaski	Rupa	1,2,3,4,5,6,7	7
15	Lamjung	Besishahar	1,2,3,4,5,6,7,8,9,10,11	11
16	Lamjung	Dordi	1,2,3,4,5,6,7,8,9	9
17	Lamjung	Dudhpokhari	1,2,3,4,5,6	6
18	Lamjung	Kwholasothar	1,2,3,4,5,6,7,8,9	9
19	Lamjung	Madhya Nepal	1,2,3,4,5,6,7,8,9,10	10
20	Lamjung	Marsyangdi	1,2,3,4,5,6,7,8,9	9
21	Lamjung	Rainas	1,2,3,4,5,6,7,8,9,10	10
22	Lamjung	Sundarbazar	1,2,3,4,5,6,7,8,9,10,11	11
23	Myagdi	Annapurna	5,6,7,8	4
24	Parbat	Jaljala	1,2,4,5,6,7,8,9	8

25	Parbat	Kushma	1,2,3,4,7,14	6
26	Parbat	Modi	1,2,3,4,5,6,7,8	8
27	Syangja	Phedikhola	1,2,4,	3
28	Tanahu	Bhanu	2,3,4,5,6,7,8,9,10,11,12,13	12
29	Tanahu	Byas	6,7,8,9,10,11	6
30	Tanahu	Shuklagandaki	1,2	2
Total	7 districts	30 Municipality	Ward 266	266

Table 6: Summary of Critical Environmental Challenges and Response Areas

Challenge	Primary Drivers	Key Impacts	Priority Response Areas	Relevant SDGs
Forest Fires	Out-migration; leaf litter accumulation; policy perverse incentives; climate warming	Timber loss; vulture nesting site destruction; soil degradation; wildlife habitat loss	Duna Tapari enterprises; CFUG fire protocols; fuel load management; harvest policy reform	SDG 13, 15, 1, 8
Land Degradation & Erosion	Siwalik geology; unplanned road construction; terrace abandonment; overgrazing	Turbine siltation (KGA); landslides; topsoil loss; lake sedimentation (Phewa -5.62 km ²)	SALT technology; bio-engineering for roads; pro-poor leasehold forestry; check dams	SDG 13, 15, 2, 6
Hydropower Impact	BGHEP reservoir (63 km ²); Kali Gandaki 'A' damming; JICA-funded THP on Seti River	Bote/Majhi livelihood loss; fish migration blockage; sacred site inundation; community displacement	Biodiversity offsets; fish passages; eco-tourism; aquaculture; community benefit-sharing	SDG 14, 15, 1, 10
GLOF and Climate Hazards	Glacial retreat; 399 glaciers (KG) + 180 (BG); CMIP6 -20-25% dry-season flow	GLOF risk to Arughat and BGHEP dam; irrigation failure; agricultural productivity decline	Community-based GLOF monitoring; early warning networks; water harvesting; spring protection	SDG 13, 6, 11, 2
Invasive Alien Plant Species	Disturbance from road building; agricultural expansion; reduced forest management	Native species displacement; forest regeneration failure; lake eutrophication (Phewa)	Community IAPS removal campaigns; native species replanting; lake watershed buffer restoration	SDG 15, 6, 14
Human-Wildlife Conflict	Habitat fragmentation; Snow Leopard and monkey population	Livestock losses; crop raiding; retaliatory killing of Snow Leopard;	Buffer crops (tea, ginger); predator-proof pens; community conservation	SDG 15, 1, 13

	recovery; livestock grazing	reduced CFUG tolerance	incentives; eco-tourism	
Urban Siltation	Unplanned growth in Pokhara; upstream land degradation; waste management failures	Phewa lake shrinkage; eutrophication; reduced tourism revenue; flood risk in urban areas	Urban green infrastructure; bioswales; wetland restoration; waste management programmes	SDG 11, 13, 6, 15

Table 7: Strategic Interventions, Target Communities, and Expected Outcomes

Intervention Area	Target Communities	Expected Outcomes	OP8 Strategic Alignment	Primary SDGs
SALT & Bio-engineering	Smallholders in Gorkha, Parbat, Lamjung	A hectare stabilized; soil loss reduced; LDN contribution	Land Degradation; Sustainable Agriculture	SDG 2, 13, 15
Nalsabha Revival & ICCA Formalization	Tamu (Gurung) IPLCs in Madi, Lamjung, Gorkha	1 functional Nalsabhas with written rules; ICCAs area recognized; GBF 30x30 contribution	Biodiversity; OECM; Indigenous Governance	SDG 15, 10, 16
NTFP Enterprise Development	Women/Dalit groups; NTFP cooperatives in mid-hills	2% household income increase; local distillation units for Sugandha Kokila and Timur; sustainable harvest protocols	Sustainable Forest Management; Livelihoods	SDG 1, 8, 12, 15
Indigenous Agrobiodiversity	Indigenous farmers in MadhyaNepal; Tamu communities	At least 2 millet varieties conserved; operational seed bank; certified millet brand for Pokhara and diaspora markets	Climate Adaptation; Food Security	SDG 2, 13, 15
Hydropower Mitigation	Bote/Majhi communities in BGHEP/KGA areas	Preservation of river-based livelihoods; aquaculture in reservoir margins; eco-tourism developed; benefit-sharing advocated	Environmental Justice; Inclusive Development	SDG 1, 10, 14
Vulture & Sarus Crane Conservation	CFUGs and Gaushalas in Lamjung and Tanahu	Operational vulture restaurant; Diclofenac-free veterinary zones declared; stabilized nesting populations	Biodiversity; Flagship Species	SDG 15, 11
SGP-JICA Forest Climate Partnership	CFUGs in Tanahun and	Community-based forest adaptation	Climate Adaptation;	SDG 13, 15, 17

	Syangja (JICA project zones)	demonstrated; SALT pilots	Sustainable Forest Management	
Urban Green Solutions (Pokhara)	Pokhara Metropolitan City; lake catchment communities	Reduced runoff into Phewa/Rupa lakes; waste segregation rate improved; urban wetland restored	Sustainable Cities; Water Management	SDG 6, 11, 13

Table 8: Key Performance Indicators Aligned with GBF Targets

Strategic Objective	Key Indicator	Baseline (2025)	Target (2028)
Area Protected / Conserved	Hectares of CFUG + ICCA under improved management	30,637 ha (CFUGs in Gandaki Province)	Formally recognized as ICCAs
Customary Governance	Number of functional Nalsabhas with written rules	0 functional assemblies	1 functional Nalsabhas operational
Biodiversity	Vulture and Sarus Crane active nests in monitored zones	Decreasing/stable trend	Increase in active nests
Livelihoods	HH income from biodiversity enterprises	Baseline to be established in Year 1	Income increase for 200 households
Land Restoration	Hectares under active SALT/bio-engineering restoration	0 ha systematic restoration	10 ha restored; LDN data submitted
Gender Equity	Women in CFUG executive committee leadership	Trying to reach ~33% current representation	33% in executive committee roles
Climate Resilience	Communities with functional GLOF early warning systems	0 communities	5 high-altitude communities connected to warning networks

Photo features:



