



Issue Brief

No.22

November 2025

Emerging Conservation Challenges in Himalayan Meadows (*bugyal*) and the Role of Statutory and Customary Governance

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Acknowledgement: The author acknowledges the support of Gramya Sikshan Paryavaran Sanstha, Dumak (Uttarakhand). This article is an outcome of its collaborative project with WWF-India under the Conservation Catalyst Program.

Cite this publication as:

Singh, Jeet. 2025. 'Emerging Conservation Challenges in Himalayan Meadows (*bugyal*) and the Role of Statutory and Customary Governance'. Centre of Excellence for Himalayan Studies, Shiv Nadar University, Delhi NCR. *Issue Brief*. No. 22. November.

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Jeet Singh

Meadows of the Himalayan region are grasslands beyond the tree line close to glaciers and contribute immensely to Himalayan ecology and the subsistence life of nearby villages. In local languages, these meadows are known by several names - in Jammu and Kashmir, they are suffixed with *marg* (Gulmarg and Sonmarg, for instance) while in Uttarakhand and Himachal Pradesh, these meadows are known as *bugyal* (बुग्याल).

Since time immemorial, agropastoral communities in the Hindu Kush Himalayan region have utilized high altitude alpine meadows as rangelands, religious sites and for the extraction of medicinal herbs. In Jammu and Kashmir and parts of Himachal Pradesh, communities like the Gaddi and Bakarwal have been seasonally migrating to these *bugyal* in summer with their sheep herds. Such practices are also prevalent in Uttarakhand; however, no specific community can be attributed as having this occupation in Uttarakhand.

These meadows are an important component of the Himalayan Biodiversity Hotspot as they are habitat to hundreds of rare Himalayan wildlife and thousands of plant species. Many of these plant species have high medicinal and aromatic properties. Folk medicinal practices in the western Indian Himalaya and Tibet are largely dependent on herbs found in these meadows. These open spaces are snow covered in winter keeping temperatures low for maintenance of glaciers.

In the last few years, the state of Uttarakhand's Forest Department has acknowledged degradation of these alpine meadows due to landslides, soil erosion, dumping of solid waste and increasing trekking activities (Kuniyal et al 2021). Some studies indicate that the tree line is moving upward resulting in the shrinking of *bugyal* space. Such changes have expanded albedo in the deep Himalaya which has resulted in capturing of more solar radiation and increasing local temperature (Anderson et al 2020). While global warming is causing glaciers to recede in the Himalayan region (Ahmed 2025), these local factors along with others are accelerating the impact of climate change in the Himalaya.

Governance of *Bugyals* in the Kedarnath Wildlife Sanctuary in Uttarakhand

The Kedarnath Wildlife Sanctuary located in Chamoli and Rudrapur districts of Uttarakhand in India was established in 1972. Spread across 975.2 sq km out of which a little more than 7% consists of alpine meadows, the *bugyal* are the habitat of thousands of herbs and much wildlife. Many of these species are in the threatened and endangered category as per the IUCN. In fact, the Sanctuary was primarily constituted for the conservation of Himalayan musk deer (*Moschus leucogaster*). According to the IUCN data, the population of musk deer has significantly decreased in the last three generations (about 21 years). Major reasons for the decline include illicit trading of musk glands in international markets, poaching for meat in local regions and loss of habitat.

The alpine forest is also the natural habitat of Uttarakhand's state flower-*Brahma Kamal* (*Saussurea obvallata*). Locally, this flower has cultural and divine value and is used in several religious and cultural rituals. The *Brahma Kamal* is listed as threatened by the government of Uttarakhand.

The Uttarakhand Forest Department has identified 14 *bugyal* in the Sanctuary. Villagers of 128 villages dependent on this forest have cultural, religious, social and economic transactions with one or the other *bugyal*. These *bugyal* are accessible only in summer from June to August for pasture for sheep, cultural and religious functions/rituals and the harvesting of herbs for medical usage.

The *bugyal* are governed under the Wildlife Protection Act, 1972. The department prepares a detailed management plan every ten years to protect the sanctuary including its *bugyal*. However, the conservation and sustainable management of these *bugyal* are still governed by the interplay of local traditional practices, customary laws, belief systems and cultural practices.

Manpai Bugyal

The Manpai Bugyal is a rangeland, located within the Kedarnath Wildlife Sanctuary in Chamoli district, Uttarakhand. Located between 3,600 to 4,000 metres above sea level, it is home to approximately 1,702 plant species, 64 animal species, and 281 bird species (Restor 2025) including the Himalayan musk deer, the *Brahma Kamal*, Himalayan tahr, snow leopard and many other faunas and floras.

According to the management plan of the Kedarnath Wildlife Sanctuary more than 20 villages of Chamoli districts have been using this alpine meadow for sheep rearing, harvesting of herbs and cultural rituals.

Every year villagers of these 20 villages close to the *bugyal* organize a cultural/religious procession in the month of August or September to celebrate the auspicious presence of the folk deity 'Nanda'. The *Brahm Kamal* found in this alpine, is used in a number of other rituals/*pooja* in this region. Five villages also have traditional rights recognized by the Forest Department to use these alpine meadows for sheep rearing in the summer. Moreover, in the last decade and more, people have also started harvesting the *keedajadi* - or caterpillar fungus (*Ophiocordyceps sinensis*), a rare medicinal plant - which has a high market value. Some of this harvesting is legally regulated.

The Manpai Bugyal has been traditionally recognized as holy land with strong connections with local religious and cultural practices. However, the effectiveness of traditionally organized activities of dependent villagers related to culture, religion, sheep rearing and harvesting of herbs has deteriorated. This deterioration of social safeguards has been caused by the inability of traditional social systems to recognize and respond to new challenges of increasing anthropogenic pressure and rapid commercialization of herbs and other alpine resources.

The Manpai Bugyal has cultural and religious importance but more than this it directly supports subsistence life of nearly five villages in Chamoli district of Uttarakhand - Dumak, Syun, Bemru, Math and Ludaon. Every year, more than 5,000 sheep from these five villages camp in Manpai for four to five months in summer and local youth camp there in the month of May and June to extract herbs and other *bugyal* resources for their subsistence use and commercial sale. While the whole *bugyal* is governed by the Kedarnath Wildlife Sanctuary, people of these five villages have concessions and rights to use *bugyal* resources for their livelihoods.

Over the last couple of decades, the Manpai Bugyal and its surrounding meadows have been facing many anthropogenic biotic processes that have adversely affected the local ecology and production of *bugyal* resources. This can be largely attributed to the longer

stay of herb collectors in summer, increasing trekking activities and the increasing popularity of the *Nanda Jaat* procession held every year in the month of August or September. In 2024, a local NGO, Gramya Sikshan Paryavaran Sanstha documented yearly footfall in the Manpai Bugyal with the help of WWF-India.

The survey was conducted in the months of November and December in four villages namely Dumak, Syun, Bemaru and Math. These villages have a higher number of interactions with the Manpai Bugyal. Data reveal that as many as 233 people of 148 families of these four villages visited the *Bugyal* in 2024 with a cumulative 3,036 days spent by these visitors. Most people visited Manpai Bugyal for religious processions (112) followed by 75 people for the collection of herbs and other *bugyal* resources. Moreover, 3,200 sheep from different villages grazed Manpai and surrounding *bugyal* from June to September 2024.

Table 1
Footfall in Manpai and surrounding *bugyal* in 2024

S. No.	Details	Dumak	Syun	Bemaru and Math	Total
1	Total Number of families in the village	64	56	88	208
2	Number of families that visited the <i>bugyal</i>	57	44	47	148
3	Total number of people that visited the <i>bugyal</i>	82	56	95	233
4	Total number of days spent by all visitors in the <i>bugyal</i>	1617	877	542	3,036
5	Families that visited to collect herbs	45	22	10	76
6	Families that visited with their sheep	08	1	0	9
7	Families that visited for religious processions	37	38	37	112
8	Families that accepted they leave garbage in the <i>bugyal</i>	46	36	38	120
9	Families who denied leaving of garbage in the <i>bugyal</i>	10	08	09	27
10	Total sheep that grazed in the <i>bugyal</i> (from Dumak, Syun, Bemaru, Math)				3,200

Source: Author's data collection

As many as 120 people out of the 148 that visited the *bugyal* accepted that they left garbage in the *bugyal*. Major items littered by these visitors include plastic wrappers of noodles and biscuit packets, plastic raincoats, clothes, and metal and plastic utensils. Dumping of solid waste including plastic and other human interventions are taking a toll on these high-altitude meadows. Conserving the meadows, however, is essential not only for the environment but also for local livelihoods and religious or cultural faith.

Customary Governance of Manpai Bugyal

Institutional governance of forests and its resources in Uttarakhand was initiated by the British in the late 19th century. Institution-building and framing of forest related laws took a long time but in the early 20th century, the British colonial government started governing forests in Uttarakhand either through the state forest department or the state revenue

department. The forest area under the Kedarnath Wildlife Sanctuary including all its *bugyal* were under the state revenue department till the 1970s (Pathak 1997). People dependent on these *bugyal* have been using them from time immemorial for subsistence life, recreation and religious faith. Therefore, all villages in this whole region have strong customary laws for conservation of the *bugyal* and its resources.

The Gramya Sikshan Paryavaran Sanstha has documented customary laws of local communities to protect and conserve Manpai *Bugyal* and its surrounding. Major customary laws used for de facto governance of the *Bugyal* and its resources are as follow:

Etiquette for Visiting the bugyal

- **Maintaining Silence:** Visitors are expected to remain quiet to avoid disturbing wildlife—especially rare and sensitive species like the musk deer, for whose protection the region was declared a sanctuary. Loud devices and garish clothing are discouraged, reflecting a deep-rooted awareness of wildlife needs and the value of a tranquil environment.
- **Footwear Traditions:** The delicate grass of these meadows is easily harmed by hard or sharp footwear. During important religious events such as the *Nanda Jaat* pilgrimage, devotees have historically walked barefoot across the *bugyal* as an act of reverence and environmental care. Today, soft-soled footwear is advised for those unable to go barefoot, continuing the tradition of minimizing harm to the ecosystem.

Cleanliness and Sacredness

- **Renni (रेणी):** Shepherds' huts are treated as sacred spaces, akin to temples. Leftover food is never discarded in the open: instead, it is consumed by guard dogs or other animals, maintaining both cleanliness and a sense of sanctity. This practice is locally called *renni*. All visitors, including tourists and campers, are encouraged to adopt these standards within their own shelters.
- **Waste Disposal:** Traditional customs insist on the burial of biodegradable waste in pits, reflecting the sacred status of the *bugyal* and an ethic of responsibility. In response to modern challenges, all non-biodegradable waste—especially plastics—must now be carried out of the meadow, addressing the pressures of increasing visitor numbers and non-traditional materials.

Grazing and Biodiversity Stewardship

- **Midak (मिड़क):** Shepherds actively guide flocks to different patches of the meadow, ensuring even grazing and aiding the dispersal of plant seeds across the landscape. This rotation preserves plant diversity and supports natural regeneration - areas neglected by the sheep tend to become monocultures. The practice of rotational grazing by shepherds is locally known as *midak*.
- **Preventing Overgrazing:** To safeguard the vegetation, shepherds regularly move campsites, typically every week or ten days, so that no one area is depleted. This rotational strategy has long been fundamental to sustaining the productivity and diversity of the *bugyal*.

Stewardship of Rare Plants and Wildlife

- ***Brahma Kamal Collection:*** The sacred *Brahma Kamal* flower is protected both by custom and calendar: it is not to be picked before a traditional date in late summer, allowing seed dispersal before collection. Harvesting beyond these limits, or in protected ‘orchards’ reserved for deities and specific festivals, is strictly prohibited - even grazing is barred from these zones.
- ***Protecting the Musk Deer:*** Deep-seated taboos exist against harming the musk deer; local belief holds that poaching one brings misfortune upon the hunter’s lineage. This has served as a powerful deterrent, strengthening conservation.

Sustainable Harvesting of Medicinal Herbs

- ***Laal Jadi (red herb):*** This valuable medicinal plant is only to be dug up in true times of need, for actual wounds or illness. It is believed that unwarranted harvesting brings misfortune on the gatherer, which curbs abuse and over-collection.
- ***Timing and Limits on Collection:*** Traditionally, no herbs are dug before the *Nanda Jaat* festival, except in urgent cases. Furthermore, harvested herbs cannot be stored in shepherds’ huts before the festival; only immediate, essential uses are permitted, embedding restraint in everyday management of meadow resources.

Way Forward

The Kedarnath Wildlife Sanctuary, including its *bugyal*, is managed by the Uttarakhand State Forest Department. Various forest and wildlife laws - such as the Indian Forest Act (1927), the Wildlife Protection Act (1972), and the Forest (Conservation) Act (1980) - empower the institutional framework that oversees the protection and conservation of these meadows. The Sanctuary administration prepares a decadal management plan to ensure systematic conservation of the forests and their resources. The current management plan, covering 2020-21 to 2029-30, identifies 14 *bugyal* within its jurisdiction (GoUK 2020) but it does not clearly specify the conservation challenges these meadows face.

Out of the total decadal management budget of Rs.26.03 crore, the plan allocates Rs.0.40 crore specifically for *bugyal* conservation. Yet, no programmatic activities or detailed strategies are outlined for their protection. Given the lack of infrastructure, limited manpower, and the challenging high-altitude terrain, the Sanctuary administration has very restricted access to these upper Himalayan meadows.

Although the *bugyal* legally fall under the purview of the Forest Department, they are traditionally accessed by local villagers for social, economic, and cultural purposes. For example, nearly 26 villages enjoy some rights and concession in the Manpai Bugyal, with 20 of them holding legal grazing rights. Beyond these formal rights, local communities possess deep traditional knowledge of the ecology that encompasses species identification, habitat protection, sustainable grazing, and the use of medicinal herbs. This knowledge is reinforced by strong customary laws that have long guided the conservation and management of these landscapes.

In practice, local communities maintain greater physical access to the *bugyal* than the sanctuary authorities. Despite the existence of multiple formal conservation laws, these meadows have largely been preserved through customary governance systems built on the

communities' symbiotic relationship with the land and these traditional rules, deeply embedded in local culture, have proven highly effective in conserving *bugyal* resources.

However, over the past two decades, new challenges have emerged that these customary systems are ill-equipped to manage. Issues such as increasing tourist influx, extended human presence, off-season visits, solid waste accumulation, plastic littering, and rising noise pollution threaten the ecological balance. Furthermore, the impacts of climate change - such as glacier retreat and shifting floral diversity - have become more pronounced.

While formal conservation mechanisms under the Forest Department could potentially address these newer threats, administrative limitations, resource shortages, and inadequate infrastructure hinder effective implementation. Given the ecological, economic, cultural, and social importance of the *bugyal* for the western Indian Himalaya, there is an urgent need for convergence between formal statutory systems and community-based customary practices. Collaborative, co-learning approaches can ensure sustained conservation of these high-altitude meadows and the broader Himalayan ecosystem.

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