

Status Paper of Langtang National Park

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Abstract

The Langtang National Park, gazetted in 1976, covers a total area of 2,130 sq.km in the Himalayan mountain region of Central Nepal. The park has an extremely varied vegetation, which ranges from upper tropical forest to alpine grass and shrub. Over 3,000 people reside within the park, and close to 17,000 people are estimated to depend on park resources to varying extents. Economically, local residents still rely primarily on agriculture and livestock herding, and are permitted to graze animals and gather dead wood within the park. Other human activities, that affect rangeland resources include burning, hunting, and trade in medicinal plants. Features of current local management practices include defined user groups with associated access rights and decision-making patterns; pastoral management strategies including transhumance, rotational and deferred grazing, and adjustment of stocking rates; burning to promote desired herbaceous growth; and religious beliefs and practices geared at promoting the pastoral sector. Future park management strategies should include registration of livestock owned by park residents, strict monitoring of wild plant harvesting and the development of a local policy on trading of medicinal plants, increased coordination between the District Forest Office and local park authorities, and the participation of local herdsmen and harvesters in policy development and enforcement.

Introduction

The Langtang National Park (LNP), first proposed by C. Caughley in 1969 and later endorsed by J. Blower in 1974, was formally approved by HMG in 1971 and gazetted in March 1976 as the first mountain park in Nepal, with an area covering 1,710 sq.km. In 1998, an additional 420 sq.km was added to the park as a buffer zone. The Langtang National Park is currently the third largest protected area in Nepal and one of the only five strict nature reserves within the country (Heinen and Kattel 1992).

Located in north-central Nepal, the park's southern boundary extends to just twenty miles north of Kathmandu. It is bounded by the Nepal-Chinese border to the north and east and the Bhote Kosi-Trisuli River to the west, and is bisected east-west by the Gosaikund Lekh-Dorje Lhakpa range.

Park objectives

The main objectives of the park as outlined in the 1977-82 management plan (DUHE 1977) are: to conserve the central Himalayan ecosystem, to regulate tourism, to conserve and manage habitat for endangered fauna such as the red panda, to perpetuate the local culture, and to regulate the use of natural resources by local communities residing within the national park.

Ecological attributes

Encompassing an altitudinal range of over 6,450m, the LNP is distinguished as having one of the greatest elevational ranges within its boundaries among the protected areas in Nepal (DUHE 1977). The wide altitudinal change accounts for the extremely varied vegetation found within the park, which ranges from upper tropical forest to permanent snow and ice. Though classified as a mountain park, a full complement of middle hill flora and fauna are found within the Langtang National Park borders (Heinen and Kattel 1992). Approximately 25% of the area is forested, and slightly over 30% is under permanent ice and snow, with the rest consisting mainly of alpine grass and scrub (Borradaile *et al.* 1977 in Heinen and Kattel 1992:64). The park's climate is typically monsoonal, though a rainshadow effect is produced north of the Gosaikund Lekh-Dorje Lhakpa range.

Over 1,000 plants, 160 birds, and 30 mammal species have been recorded in the park, including the *Larix nepalensis* (Himalayan larch), the only deciduous conifer in the region, and five threatened mammal species including the red panda. Endangered species such as the snow leopard and clouded leopard were also recorded in 1977, though no recent sightings have been reported (Heinen and Kattel 1992:64)²⁵ Other major wildlife species include Himalayan tahr and black bear, leopard, musk deer, barking deer, wild dog, wild boar, goral, and serow.

Socioeconomic attributes

The LNP encompasses parts of Rasuwa, Nuwakot, and Sindhupalchowk districts (56%, 6%, and 38% respectively) and houses twenty-six separate village development committees.²⁶ According to Heinen and Kattel (1992), over 3,000 people reside within the park, though close to 17,000 may depend on park resources to varying extents, with most of the latter living in villages on the southern boundary of the park.²⁷ The local population of both the park and its buffer zone area is culturally and ethnically heterogeneous, with both Hindu castes (e.g., Brahmin and Chhetri) and Buddhist groups (e.g., Tamang, Sherpa, and Tibetan) represented.

Rangelands and their use

Rangeland data for the Langtang National Park, including the identification of plant communities and the impacts of use activities on them, are conspicuously sparse. The original management plan (DUHE 1977), written over 20 years ago, still provides the most detailed information and is the basis for subsequent descriptions found in more recent publications. According to this report, LNP plant species fall into the following zones: upper tropical (below 1,000m), subtropical (1,000-2,000m); hill (2,000-2,600m); mountain (2,600-3,000m), sub-alpine (3,000-4,000m); and alpine (4,000-5,000m). Although the alpine

²⁵ Note that Heinen and Yonzon (1994) report that there is no evidence that Great Tibetan sheep (*Ovis ammon hodgsoni*) occur in the park as reported by Shrestha in 1981, and doubt the presence of wild yak (*Bos grunniens*) anywhere in Nepal.

²⁶ Of the 26 VDCs, 13 are from Rasuwa, 5 from Nuwakot, and 8 from Sindhupalchowk. Only 7 VDCs are completely bounded by the park, though all are considered as buffer zone area. The 7 VDCs situated within the park house a total of 45 villages.

²⁷ Like other mountain parks, Langtang is zoned to exclude village areas which instead are designated as buffer zone.

zone accounts for the highest percentage of the park's area (25%), the subtropical zone is said to be the greatest affected by man (DUHE 1977).

Below 2,000m, *Pinus roxburghii* and *Schima wallichii* occur in small pockets along the Langtang Khola (DUHE 1977:26). *Michalia champaca*, which is one of only two forest species found within the LNP that is protected by federal law²⁸, grows near Dunche and may occur in the lower Langtang Valley (Narendra Pradhan, pers. comm.). Shrubs occur only in the driest, rockier habitats, where a small number of species, including *Eupatorium adenophorum*, *Artemisia bulgaris*, and *Berberis asiatica*, dominate. Because these species are favoured by grazing (DUHE 1977:26), it is often assumed from their presence that overgrazing occurs. However, simply because these species exist in the area does not indicate degradation *per se*. Throughout the Himalayas, small areas are cleared within the forest by graziers to use as camping sites; these can be dominated by these species, although they occur only sporadically in neighbouring forest (C.E. Richard, pers. comm.).

Between 2,000 and 3,000m, *Pinus excelsa* and *Rhododendron arboreum* forest dominate. In 1977, the DUHE team remarked that the presence of livestock in spring and autumn had degraded natural forest resulting in shrubby growth forms where *R. arboreum*, they claim, is at a selective advantage (1977:27). They also noted that drier habitats are transformed into pastures where grazing-resistant species flourish, including *Anaphalis*, *Anemone*, *Potentilla*, and *Gentiana* spp.

Referring to the Langtang Valley only, Miller (1981) noted that between 2,500m and 3200m, *Andropogon tristis* is the most commonly encountered grass, and is replaced by *Arundinella hookerii* in areas that have been heavily grazed. He wrote, "The prevalence of a 'climax' species such as *Andropogon tristis* is indicative of good rangeland condition and dispels fears of serious overgrazing"²⁹ (Miller 1993, Annex 1, p.5). In drier sites in the sub-alpine zone, extensive areas are dominated by *Danthonia schneideri*, and replaced by *Agrostis inaequiglumis* and *Agrostis pilosula* in degraded areas (Miller 1981). Miller does not mention where these degraded areas are located, so it is impossible to say why they are so. Altitudinally, the area does correspond with the settled zone so that deterioration may be associated with overgrazing by domestic livestock during the winter months, but it is not clear.

On the south-facing slopes of the Langtang Valley at 3,000-3,600m, the DUHE survey noted *Hippophae rhamnoides salicifolia* and a community of *Caragana nepalensis* and other shrubs (DUHE 1977:28). According to Dobremez (1972), the latter is a plagioclimax community where the forest has disappeared and overgrazing has probably taken place for many years (cited in DUHE 1977:28). Others, however, argue that *Caragana* shrub is a natural community that occurs in dry areas, and thus is expected on south-facing slopes at high altitudes, such as those in the rain shadow areas of the upper Langtang Valley. These south-

²⁸ The other is *sal* (Narendra Pradhan, pers. comm.)

²⁹ He goes on to note that rangelands at 2,700 to 3,000 m are estimated to produce 1,500 to 1,800 kg of dry matter per hectare (Miller 1993: Annex 1, p.5).

facing slopes are warmer and drier than north-facing slopes, which are typically cool and moist, and will exhibit characteristics of Trans-Himalayan flora (C.E. Richard, personal communication).

Hay lands are reportedly dominated by *Elymus* and *Dactylis glomerata*, while *Medicago falcata* is found in both hay lands and abandoned fields around Langtang village (Miller 1992). These are located in various places throughout the subalpine zone, and their harvesting is regulated by the community.

Betula utilis—*Rhododendron arboreum* forests occur on north-facing slopes up to approximately 4,050m and mark the upper timber line. Above the birch-rhododendron forests, alpine meadows used as summer grazing stretch up to the present glacier margin, which reaches about 5,100m. (Odo and Sadakane 1986:103). The zone between 4,000 and 4,500m is described as rich in shrub species, which are dominated by juniper in dry areas like the upper Langtang Valley. *Ephedra gerardiana* and *Spiraea arcuata* are also found.³⁰ In 1977, large areas of *Salix* spp. were also reported, which are seldom seen in the more southern regions of the park. On riverside gravels and flats, *Myricaria rosea* and *Hippophae tibetana* were also found, though the latter is restricted to drier areas, extending on to old, colonised moraines. Only grasses, herbs, and cushion plants are able to grow in the upper alpine zone (4,500-5,500m) (DUHE 1977:29).

Animal husbandry

Economically, local residents still rely primarily on agro-pastoralism, of which animal husbandry is an essential component and an integral part of the social, economic, and religious life of the area. It also remains one of the main sources of cash income for many residents, particularly those affected by the government-run cheese factories.³¹ Communities located in the more northern regions and higher altitudinal ranges of the park rely more heavily on animal husbandry than their southern neighbours. The relative importance of animal husbandry to individual households is governed by many factors, including the availability of summer and winter pastures and a reliable fodder supply.

Livestock are kept for their meat, milk, wool, hide, manure, and draught power. Domestic livestock found within the Langtang National Park include buffalo, lowland and highland cattle, yak and yak-cattle crossbreeds, sheep, goats, and horses. Though buffalo, cattle, and yak are reared in all three districts, specific herd compositions vary throughout the park, depending on factors such as altitude and availability of grazing and fodder resources. Cattle predominate in most VDCs but, in three, (Golche, Dandagaon and Sikharsensi) the percentage of buffaloes is higher. Langtang is the only VDC where the yak dominates, though the percentage of yaks is also high in Timure, Thuman, Jumla, Chilime, and Syabrubensi (DUHE 1977).

³⁰ The DUHE report notes "The Upper Langtang Valley is more related to Stainton's 'Dry Alpine Scrub' due to its sheltered, semi-arid environment" (1977:29).

³¹ A study conducted in the Langtang Valley by Borradaile *et al.* (1977), for example, revealed that because the land produced only enough food for three months of the year, earnings from pastoral activities were necessary to purchase food for the remaining nine months.

Since herd composition determines grazing patterns and feeding requirements, the associated impact on rangeland resources also varies. For example, because buffalo and lowland cattle are kept at lower altitudes, tethered near homes and stall fed, they have a greater impact on forest cover near permanent settlements. Yak and cross-breeds, on the other hand, generally depend more heavily on natural pastures in high-altitude areas, and thus rely more on fragile alpine communities.

Wild plant harvesting

Wild plants are collected from a wide altitudinal range within the LNP, and are harvested for both their subsistence and their commercial value (McVeigh in progress; Yonzon 1993; DUHE 1977). Both resident communities of the national park and people from outside the region collect wild plants, which are used for a variety of purposes. Yonzon, for example, notes that of 172 useful plants known within the park, more than half have medicinal value, 22.7% are used as food, 13% as fuelwood, nearly 6% as fodder, and 3.5% for religious purposes (Yonzon 1993).

Very little is actually known about wild plant harvesting and its impact on plant communities in the Langtang National Park.³² Our literature review found only one recent article on the topic, addressing specifically the commercial harvesting of medicinal plants. According to Yonzon (1993), entire species are threatened as a result of a growing trade in plants for herbal medicines, particularly those which are popular, rare, slow-growing (such as those at high altitudes), and/or habitat specialists. He notes that for a significant number of species, the entire plant is destroyed during harvesting, suggesting the potentially devastating impact of harvesting on a commercial scale.

Burning

Over 20 years ago the Durham University team reported that summer pastures within the LNP were often burned during the winter in an attempt to remove undesirable shrubs from pastures (DUHE 1977). Forest in lower altitude areas was also reported to be burned, to increase both herbaceous growth and the extent of available pasture, especially in the conifer zone. More recently, Miller (1992) noted the burning of shrub lands in the Langtang/Helambu region, though information as to the extent and reason for this practice was not reported. Though burning practices appear to be beneficial in the short term, their effects in the long term are not clearly understood.

Rangeland Management

Indigenous pasture management systems

Research conducted in several areas of the Langtang National Park suggests that resident herders are not only using but managing pastoral resources in their

³² HMG's Department of Medicinal Plants conducted a survey of medicinal plants in the Langtang Valley in the 1970s, and the 1977-82 management plan has a short section on forest products which includes medicinal plants. However, both of these studies are now over 20 years old and very little recent information seems to be available.

areas.³³ Though pasture lands lying outside of designated village areas are technically owned by the state, communities recognise *de facto* rights held in common by local residents on which basis indigenous pastoral management systems can and do operate.

Throughout the park, there is enormous variability in herd management strategies, both within and between communities. Factors such as social organization, land tenure arrangements, livestock composition, degree of dependence on agricultural products, interactions with outside groups, and labour availability all play a role in determining how individual families and entire communities allocate and manage pastoral resources. Features of local pastoral management systems in the Langtang National Park include: defined user groups and associated access rights; specific decision-making patterns and conflict management strategies; pastoral management strategies including transhumance, rotational grazing, deferred grazing, and adjustment of stocking rates; burning practices to promote desired herbaceous growth; and religious beliefs and practices geared at promoting the pastoral sector.

DNPWC policy and management initiatives

By law, only livestock owned by national park residents are allowed to graze inside park boundaries, and then only with the appropriate permits. In some sensitive areas, such as the Red Panda Conservation Area (Cholang-Dokache area), grazing regulations have been implemented that reduce the number of effective grazing days allowed in the area. For the most part, however, the DNPWC does not actively manage grazing within park boundaries, and grazing permits are not sought by local residents. Also, people living outside the park, namely residents of Yarsa VDC, still seasonally graze within park borders without interference.

Issues and Impacts

The following are the main practices affecting rangeland resources in the Langtang National Park.

- Animal husbandry
- Wild plant harvesting (both for commercial and subsistence use)
- Cheese-making (both by the government-run factories and local individuals)
- Tourism
- Hunting/poaching
- Burning
- Fuelwood collection

The following are the main issues of concern related to these practices.

- Over-grazing/over-harvesting with associated changes in floristic composition
- Soil erosion and compaction
- Trampling
- Forest degradation and loss of tree cover
- Loss of wildlife habitat
- Competition with wildlife for grazing resources

³³ See, for example, Cox (1985) and McVeigh (in progress) for descriptions of the indigenous pastoral management system in Langtang VDC, and Fox *et al.* (no date) for information on Syabru VDC.

Research and Management Gaps

To ensure that the rangelands remain productive for livestock and wildlife alike, viable pastoral development strategies and range management programmes need to be implemented in the Langtang National Park, based on current, up-to-date information.

Research gaps	Research needs
<ul style="list-style-type: none"> • Local harvesting of wild plants and its impact on plant communities is poorly understood. More data are needed, and whatever information is available needs to be updated. There is also a lack of information differentiating local vs. outside impacts/practices, commercial vs. subsistence use, and the impacts of specific harvesting practices (e.g., is the whole plant being destroyed?). • Lack of up-to-date information on rangeland resources and conditions throughout the entire park, and the impact of current practices on them. Available information is out-dated. • Lack of current data on fodder use and management • Lack of information on the long-term effects of current burning practices 	<ul style="list-style-type: none"> • Park wide ethnobotanical survey of indigenous plants, including an inventory of local names, uses, and harvesting practices; resident dependence on plant species; and determination of critical population sizes. Need to monitor the resilience of local species to harvesting practices, which in turn needs to differentiate between subsistence vs. commercial harvesting, as well as harvesting by local residents vs. outsiders. • Detailed survey of all grazing grounds inside the park identifying 1) active grazing areas; 2) animal user groups (both domestic and wild) including numbers, origin, and time of grazing; and 3) plant species' composition, including seasonal variations and their response to different user groups (including herbivores) and user activities. • Research on livestock feeding practices differentiated according to ethnic group, location, and herd composition. • Research investigating both the short- and long-term effects of burning in alpine grassland and forest areas.
Management gaps	Management needs
<ul style="list-style-type: none"> • Ineffective management of wild plant collection and suppression of smuggling (see Yonzon 1993). • Lack of monitoring of livestock numbers and pasture use 	<ul style="list-style-type: none"> • Strict monitoring of wild plant harvesting, particularly by outside groups • Greater coordination between the District Forest Office and the DNPWC • Development of local policy on trading of medicinal plants • Participation of local harvesters in policy development and enforcement. • Registration of livestock owned by people from each settlement within the park.

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APPENDIX I: Dobremez 1972; Borradaile *et al.* 1977; Odo & Sadakane 1986.
Literature and Project Resources Relevant to the Langtang National Park

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Projects undertaken in the LNP

- Expansion of local school (with funding from the British Education Trust)
- Micro-Hydro Electric Project and associated activities (Japanese funded)
- Langtang Ecotourism Project (The Mountain Institute)
- Livestock Fodder Development Project (HMG)
- Quality Tourism Project (UNDP)
- Snow and Glacier Hydrology Project (Department of Hydrology and Meteorology, HMG)