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学 位 論 文 題 名

Assessing land use/land cover dynamics and community perceptions in Sagarmatha and Khaptad national parks: designing an integrated framework for national parks of Nepal
（サガルマータ国立公園とカプタード国立公園における土地被覆と土地利用の動態および地域社会認識の評価：ネパールにおける国立公園管理にむけた統合的フレームワークの設計）

This dissertation investigates how land use/land cover (LULC) change, climate variability, and livelihood–tourism dynamics are reshaping mountain protected areas in Nepal, using Sagarmatha National Park (SNP) and Khaptad National Park (KNP) as contrasting case studies. The research integrates multi-temporal satellite remote sensing, climate datasets, LULC change prediction, and household survey evidence to (i) map and interpret long-term landscape transitions, (ii) identify socio-economic factors linked to perceived forest-cover change, and (iii) propose an implementable management framework for strengthening Nepal's protected-area system.

Remote sensing results show that both protected areas have undergone noticeable landscape transformation, with the change concentrated in buffer zones where human use is most intense. In SNP, the most prominent patterns include declining snow/ice features and forest-cover reduction alongside localized expansion of built-up and other land-cover classes associated with growing human activity and tourism-related development. In KNP, forest and shrubland decline is accompanied by increases in agriculture/grassland-related classes and built-up features. High-resolution interpretation further indicates emerging access and infrastructure expansion in KNP's buffer zone, highlighting the importance of tracking linear developments (e.g., roads) that can accelerate land conversion and resource extraction. Forward projections under a business-as-usual scenario suggest these pressures may persist in the near term, reinforcing the need for proactive management to prevent buffer-zone impacts from propagating into core conservation zones.

Climate trend analysis provides an additional stress context for park governance. In SNP, warming is clearly evident, while precipitation shows a weak downward tendency that is not statistically significant but remains directionally consistent with drying risk in extreme years. In KNP, both temperature and precipitation show increasing tendencies. Importantly, household perceptions broadly align with these scientific signals: respondents in both parks overwhelmingly report warming conditions, while

precipitation perceptions differ by park in a manner consistent with the observed direction of change. This convergence supports the value of incorporating local observations into monitoring and early-warning systems, particularly in data-sparse mountain environments.

To connect social drivers with forest outcomes, the OLS regression was applied using perceived forest-cover change as the dependent variable (coded as decrease/neutral/increase). Across both sites, agriculture- and tourism-related livelihood variables are consistently associated with perceived forest decline, though the strength of relationships differs between parks. In SNP, agricultural productivity and household tourism involvement emerge as the most salient predictors, suggesting that livelihood intensification and tourism-linked demand can translate into pressure on nearby forests through land conversion and increased resource use. In KNP, forest dependency is also an important predictor, indicating a stronger livelihood–resource reliance pathway in the lower-tourism context. These results demonstrate that uniform policy prescriptions are unlikely to be effective: high-tourism parks require stronger management of tourism-linked land demand and resource use, whereas parks with higher forest dependence require targeted interventions to reduce extraction pressure and strengthen alternatives.

Building on these findings, the thesis proposes the Integrated Land-Use and Community Adaptation Framework (ILCAF) as a solution-oriented contribution to Nepal's protected-area system. ILCAF operationalizes adaptive governance by integrating regular LULC monitoring and forecasting, prioritizing buffer zones as the primary interface of pressure, and formally incorporating community perceptions and livelihood realities into management cycles. The framework emphasizes cross-sector coordination (tourism, agriculture, forest management), accountability mechanisms, and locally appropriate measures such as zoning and carrying-capacity guidance, community-based awareness and incentives, and targeted support to reduce reliance on forest extraction. Overall, the dissertation argues that effective mountain protected-area management requires an integrated, forward-looking approach that treats land-use change, tourism development, livelihoods, and climate stress as a coupled system rather than separate issues.

We highly evaluated these results and concluded that Ankita Gupta was a sincere and dedicated researcher with sufficient qualifications for a doctoral degree, and that she was suitable for a Doctor of Philosophy (Environmental Science).