A field report on

Integrated Study of Biodiversity Environment Eco-Tourism and Waste Management in Annapurna Conservation Area, Nepal (Waling, Hunikot, Panchase, Bhadaure, Ghorepani, Poonhill Pokhara)



<u>Submitted to</u>:

Saptagandaki Multiple Campus

Bharatpur, Chitwan

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Field visits play a vital role in bridging theoretical knowledge with practical understanding by enabling students and researchers to directly observe and interact with natural and human environments. The educational excursions, which involve careful planning, field activities, and reflections, allow participants to explore real-world phenomena in their natural settings.

The field study of B.Sc. students was designed with the primary aim of deepening the understanding of road engineering practices, environmental impact assessment, vegetation dynamics, eco-tourism, solid waste management, and water quality analysis across different regions including Bharatpur, Mugling–Narayangadh Road, Waling municipality, Bhanjyang, Panchase, Bhadaure, Lumle, Ulleri, Ghorepani–Poonhill, and Pokhara. By offering learning beyond the classroom, participants engaged in experiential learning that fosters analytical skills, environmental awareness, and scientific inquiry.

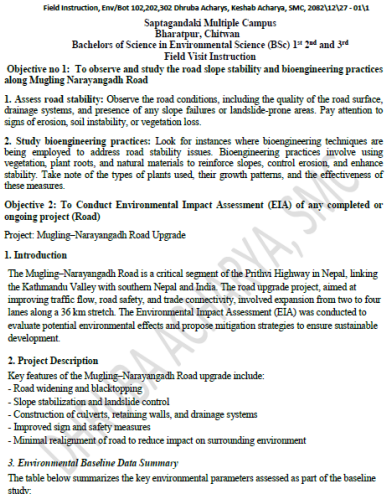
As per the approved proposal for the practical class of course no Env and Bot 101, 102, 103 for B.Sc. first, second and third year students of Saptagandaki Multiple Campus, a field visit was conducted from 2082/12/27 to 2083/01/01. A group of 25 students, nineteen girls and six boys' students from B.Sc. Environmental Science (first, second and third year) participated in the field study under the guidance of Lecturer Mr. Dhruba Acharya and Assistant Lecturer Mr. Keshab Acharya.

The primary aim of the visit was to observe environmental conditions and carry out practical activities related to road slope stability, bioengineering practices, Environmental Impact Assessment (EIA), vegetation assessment, eco-tourism practices, solid waste management, hydrological measurement, and water quality assessment of Phewa Lake. The team departed from Saptagandaki Campus on 2082/12/27 in the morning, traveling along the Mugling–Narayangadh highway.



Photograph 1: a) Bus managed for field b) Field instructors along with students in the bus

Prior to the commencement of the field visit, detailed field instructions were provided to all participating students to ensure effective observation and meaningful engagement with the study sites. These instructions included guidance on field safety, data collection techniques, group coordination, and note-taking methods essential for academic reporting. Students were briefed on specific environmental components to focus on during the journey, enabling them to critically analyze practical aspects of environmental science.



Field Instruction, Env/Bot 102,202,302 Dhruba Acharya, Keshab Acharya, SMC, 2082\12\27 - 01\1

Saptagandaki Multiple Campus
Bharatpur, Chitwan
Bachelors of Science in Environmental Science (BSc) 1st 2nd and 3rd
Field Visit Instruction

Objective no 1: To observe and study the road slope stability and bioengineering practices along Mugling Narayangadh Road

1. Assess **road stability:** Observe the road conditions, including the quality of the road surface, drainage systems, and presence of any slope failures or landslide-prone areas. Pay attention to signs of erosion, soil instability, or vegetation loss.

2. **Study bioengineering practices:** Look for instances where bioengineering techniques are being employed to address road stability issues. Bioengineering practices involve using vegetation, plant roots, and natural materials to reinforce slopes, control erosion, and enhance stability. Take note of the types of plants used, their growth patterns, and the effectiveness of these measures.

Objective 2: To Conduct Environmental Impact Assessment (EIA) of any completed or ongoing project (Road)

Project: Mugling–Narayangadh Road Upgrade

1. Introduction

The Mugling–Narayangadh Road is a critical segment of the Prithvi Highway in Nepal, linking the Kathmandu Valley with southern Nepal and India. The road upgrade project, aimed at improving traffic flow, road safety, and trade connectivity, involved expansion from two to four lanes along a 36 km stretch. The Environmental Impact Assessment (EIA) was conducted to evaluate potential environmental effects and propose mitigation strategies to ensure sustainable development.

2. Project Description

Key features of the Mugling–Narayangadh Road upgrade include:
- Road widening and blacktopping
- Slope stabilization and landslide control
- Construction of culverts, retaining walls, and drainage systems
- Improved sign and safety measures
- Minimal realignment of road to reduce impact on surrounding environment

3. Environmental Baseline Data Summary

The table below summarizes the key environmental parameters assessed as part of the baseline study:



Photograph 2: a) Field instruction b) Bio-engineering practice at Mugling Narayangadh road section

During the travel along the Mugling–Narayangadh road section, students were specifically instructed to observe and document bioengineering practices implemented to prevent landslides and soil erosion. These included techniques such as gabion walls, vegetation-based slope stabilization, and drainage management systems. In addition, students were guided to observe the

vegetation patterns along the route, including natural forest covers and roadside plantations, noting any changes in species composition with elevation and land use.

A focused Environmental Impact Assessment (EIA) study of the Mugling–Narayangadh road upgrade project was also carried out. Students examined environmental impacts such as dust pollution, noise, landslide risks, and river sedimentation, along with mitigation measures including slope stabilization, drainage systems, and plantation programs.

The team also observed the wildlife underpass at Bharandabhar forest corridor (Jaldevi Community Forest), which demonstrated the integration of infrastructure development with biodiversity conservation. Natural areas are increasingly fragmented and degraded globally due to increasing anthropogenic pressure. Linear infrastructures such as roads, railways, canals, and transmission lines are major causes for such fragmentation resulting in population isolation, habitat connectivity loss, and gene pool shrinkage. Various mitigation measures are adopted to minimize such effects. The first such mitigation measure (an underpass) has been constructed along the Narayanghat – Ramnagar, and Ramnagar – Jugedi section of the Narayanghat-Muglinroad (section connecting two national highways; Prithvi and Mahendra highway).





Photographs 3: a) Study of wildlife underpass along Mugling –Narayangadh road

We had lunch at Bimalnagar, Aabukhaireni at around 9:30 AM and then continued our journey along the Prithvi Highway, heading towards Pokhara. The owner of Chiya Durbar in Pokhara kindly offered us tea at his premises. We truly enjoyed the experience and are very grateful for his warm hospitality. We would like to thank him sincerely and wish him continued success and prosperity in his business.




Photographs 4: Group photo at Chiya Durbar, Pokhara

Further, students visited Waling Municipality where they attended an orientation program and observed solid waste management practices at the Sarsafai Kendra (MRF center). They studied waste collection, segregation, recycling processes, and challenges faced by the municipality. The Waling Municipality Sarsafai Kendra manages waste using a "waste to resources" model, focusing on the collection and processing of dry waste. The Waling Municipality adopted of simple and effective waste management practices in the area. The center was established on land leased from a community school, and it primarily handles collected dry waste. It operates with the concept of generating income from waste and is actively implementing this approach in Waling municipalities.




Photograph 5: a) Presentation on SWM of Waling municipality b) Receiving token of love



Photograph 6: Observation of Solid waste management practice of Waling municipality

In the same day, discharge measurement of Aandhi Khola was carried out using the surface floating method. Students measured velocity and cross-sectional area to calculate discharge, enhancing their understanding of hydrological processes.





Photograph 7: Discharge measurement at Aadhi Khola, Syangja.

The day concluded with an overnight stay at Hunikot Homestay, Syangja. Hunikot Homestay in Syangja is a traditional Gurung homestay that offers visitors an authentic experience of local culture, lifestyle, and hospitality. Located in a scenic rural setting, it allows guests to stay close to nature while enjoying panoramic views of hills and surrounding landscapes. The homestay is operated by Gurung families, giving travelers the opportunity to experience local customs, traditional food, music, and warm community interaction. It is an ideal destination for those seeking cultural immersion along with peaceful village life in Syangja.



Photographs 8: Vegetation study along Hunikot-Buspark trekking route

On the second day of the field visit, 2082/12/28, students conducted vegetation enumeration from Hunikot to Putalibazar using transect walk methods. They recorded species diversity and distribution, identifying key species such as Schima wallichii, Alnus nepalensis, and Castanopsis species.

The team then traveled toward Pokhara via Bhanjyang and studied altitudinal variation of vegetation along Bhanjyang to Panchase–Bhadaure area. Students observed gradual changes in vegetation types from lower elevation sal forests to temperate forests dominated by oak and rhododendron. This provided insights into ecological zoning and biodiversity patterns. The night stay was arranged at Bhadaure.



Photographs 9: Road maintenance and vegetation study along Sidhane-Bhanjyang road



Photographs 10: Vegetation study along Sidhane-Bhanjyang road



Photographs 11: a) Pond conservation b) Information map board



Photographs 12: a) Pond conservation at Bhanjyang b) Information about Panchase-Sunakhari



Photographs 13: a) Bisauni b) Recharge pond constructed along Bhanjyang-Panchase route



Photographs 14: a) Worshiping God at Panchase b) Recharge pond and foot trail c) Panchase

On the third day of the field visit, the team had breakfast at Bhadaure and then proceeded toward Lumle, Kaski to visit the agro-meteorological station at the Regional Agricultural Research Center. During the visit, students actively participated in an orientation program where they learned about the importance of meteorological data in agriculture and environmental studies. Various instruments such as thermometers, hygrometers, and rain gauges were observed, and students were introduced to techniques for measuring air temperature, humidity, and precipitation. They also gained knowledge about data recording methods and how such information is used for weather forecasting, crop management, and climate research.



Photographs 15: Visit to Regional Agricultural Research Council, Lumle, Kaski



Photographs 16: Agro-metrological station at Regional Agricultural Research Council, Lumle

After completing the study at Lumle, the team traveled toward Ulleri and began trekking to Ghorepani. Along the trekking route, students observed diverse vegetation types, including temperate forests dominated by rhododendron and oak species, as well as various medicinal and aromatic plants (MAPs).



Photograph 17: a) During trekking b) Traditional water conservation practice and chautari c) indigenous community and their livelihood

On the fourth day, the team woke up early in the morning and began a hike to Poonhill, one of the most famous viewpoints in the Annapurna region. Upon reaching the viewpoint, students observed a spectacular sunrise along with panoramic views of the Himalayan ranges. The area was rich in rhododendron forests, and students carefully studied different species of rhododendron and other associated vegetation found in higher elevations. This provided valuable knowledge about temperate forest ecosystems and their ecological significance.



Photograph 18: Visitors and Rhododendron forest in Ghorepani-Poonhill area

After spending some time at Poonhill, the team returned to Ghorepani and later descended toward Ulleri. Along the return trek, students continued observing vegetation patterns and human activities related to eco-tourism, including lodges, local hospitality services, and trekking infrastructure.



Photograph 19: a) Group photo at Poonhill view point b) Field instructor

After reaching Ulleri, the team traveled to Pokhara by vehicle. In the evening, students gathered at Lakeside Pokhara where they celebrated New Year's Eve, which also provided an opportunity to observe urban tourism practices, cultural interactions, and recreational activities in a major tourist hub. The day ended with an overnight stay in Pokhara.



Photograph 20: New year eve celebration at Lakeside Pokhara

On the final day of the field visit, the team began the morning with a study of Phewa Lake, focusing on human impacts on the aquatic ecosystem. Students observed various activities such as boating, tourism pressure, waste disposal, and shoreline development, which influence the lake environment. Following this, water samples were collected from the lake using proper sampling techniques, including grab and composite sampling methods. The collected samples were analyzed for physicochemical parameters such as temperature, pH, chloride content, and free carbon dioxide using standard laboratory procedures.



Photograph 21: a) Phewa Lake b) Water quality analysis of Phewa lake water

Students used a thermometer to measure air and water temperature, a digital pH meter for acidity/alkalinity, and titration methods for chloride and CO_2 determination. These practical activities enhanced their understanding of water quality assessment and environmental monitoring. After completing the fieldwork at Phewa Lake, the team visited the International Mountain Museum in Pokhara, where they gained knowledge about Himalayan geography, biodiversity, mountaineering history, and cultural heritage. Finally, the team returned to Bharatpur, concluding the field visit with valuable academic experience and practical knowledge gained from the entire study.



Photograph 22: a) Visit international mountain museum at Pokhara

Achievement:

The field study proved to be a highly valuable and enriching experience for all participating students, as it provided practical exposure to various aspects of environmental science, including road bio engineering, vegetation analysis, hydrology, solid waste management, eco-tourism, and water quality assessment. Students developed essential field skills such as observation, data collection, sampling, and analysis, which enhanced their understanding of real-world environmental conditions. The study also strengthened their knowledge of human-environment relationships and improved their teamwork, communication, and research abilities.

Finally, we would like to express our sincere gratitude to Saptagandaki Multiple Campus for providing us with this wonderful opportunity to conduct such an informative and practical field visit, which greatly contributed to our academic learning and personal development.