

**SANGEETA NEUPANE**

**MOUNTAIN TOURISM AND SUSTAINABILITY: THE DARK STORY OF  
EVEREST TRASH IN NEPAL**



2023

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**Masters in Tourism Economics and Regional Development**

**Work Carried out under the guidance of:**

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2023

# **MOUNTAIN TOURISM AND SUSTAINABILITY: THE DARK STORY OF EVEREST TRASH IN NEPAL**

## **Declaration of authorship of work**

I declare to be the author of this work, which is original and unpublished. Authors and works consulted are duly cited in the text and appear in the list of references included.

### **Candidate's signature**

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## **Abstract**

Tourism is a key industry for improving the economy of a place since it provides opportunities for locals and others to work and benefit in a variety of ways. It aids in the transformation of the destination's lives. Locals and visitors will be able to trade ideas, cultures, and currencies, as well as socialize. However, tourism has also negative impacts. Particularly in the case of mountain tourism in Nepal, it poses problems in terms of noise, air, and soil pollution, as well as trash creation, all of which have an impact on biodiversity and the natural ecosystems.

This dissertation pays attention to the waste generated in the Everest (Sagarmatha for the locals) hiking zone and the role that various interest groups play in their management. There is plenty of waste in the Everest area, which has been referred to as a junkyard mountain. Waste created in the region, whether purposefully or inadvertently, is a major source of worry. The requirement for self-awareness regarding safe trash disposal is generally lacking among the residents and tourists in the region. As a result, waste management at all levels by many stakeholders, including local people, visitors, government, NGOs, and the corporate sector, is required for the development of the Everest region.

The study is based on a reflexive literature review, analysis of key data and news on the media, and interviews with key stakeholders. This research used qualitative techniques to investigate respondents' viewpoints and views. The interviews with residents, business owners, tourists, and public officers, underline that there are many reasons for the Mount Everest region having serious waste management problems. Considerable issues include, for instance, the increase in the number of tourists, lack of information, limited waste management infrastructure, and scarce collective engagement. Stakeholders do not seem to be contributing in a way that makes the site sustainable as a tourism destination, and this must be addressed. Although many locals believe they are making efforts to address the situation, there is not an efficient articulation with the other stakeholders.

**Keywords:** Sustainability, Mountain tourism, Everest, Garbage, Waste Management.

## Resumo alargado

O turismo é uma indústria chave para melhorar a economia de um lugar, uma vez que oferece oportunidades para os residentes e outros indivíduos trabalharem e beneficiarem de várias formas. Ajuda na transformação das suas vidas no destino turístico. Os residentes e visitantes poderão trocar ideias, culturas e recursos financeiros, assim como socializar. No entanto, o turismo tem também impactos negativos. Particularmente no caso do turismo de montanha no Nepal, coloca problemas em termos de ruído, poluição do ar e do solo, bem como de criação de lixo, todos eles com impacto na biodiversidade e nos ecossistemas naturais.

Esta dissertação debate o problema dos resíduos gerados na zona de caminhadas do monte Everest, Sagarmatha para os locais, bem como os papéis que os vários grupos de interesse desempenham na sua gestão. Há muitos resíduos na zona do Everest, que tem sido referido como uma montanha de lixo. Os resíduos criados na região, quer propositada ou inadvertidamente, são uma grande fonte de preocupação. A exigência de auto-consciencialização relativamente à eliminação segura do lixo é geralmente inexistente entre os residentes e turistas da região. Como resultado, a gestão integrada do lixo por parte dos diferentes grupos de interesse, tais como os residentes, visitantes, governo, ONGs, e o sector empresarial, é necessária para o desenvolvimento da região.

O estudo empírico baseia-se numa análise reflexiva da literatura, análise de dados secundários e notícias relacionadas em meios de comunicação social de referência, para além de entrevistas às principais partes interessadas. Esta investigação utilizou técnicas qualitativas para investigar os pontos de vista dos diferentes tipos de *stakeholders* do turismo de montanha no Everest. As entrevistas com residentes, empresários, turistas, e funcionários públicos, sublinham que existem muitas razões para a região do Monte Everest ter sérios problemas de gestão de resíduos. Questões a ter em conta incluem, por exemplo, o aumento do número de turistas, a falta de informação, a carência de infraestruturas de gestão de resíduos, e o escasso envolvimento coletivo. Os *stakeholders* não parecem estar a contribuir de uma forma proactiva e que torne o local sustentável como destino turístico.

Após este estudo, podemos assegurar que a região do Monte Evereste está a ter grandes problemas na gestão de resíduos. Os *stakeholders* não parecem estar alinhados. Os residentes acreditam que estão a fazer o seu melhor para lidar com a crise, mas que não estão a receber assistência suficiente de outras partes envolvidas. Também o governo acredita que está a dar atenção, implementando medidas adequadas. Os empresários locais acreditam que não fazem parte do problema, mas não parecem estar envolvidos na conceção ou implementação de qualquer ação de mitigação. Os turistas, que são vistos como a fonte do problema, são ao mesmo tempo referidos pelos outros tipos de intervenientes entrevistados como os que estão mais conscientes do problema real do lixo e empenhados em tomar medidas para o resolver.

Inspirados nas entrevistas e no restante trabalho empírico, algumas ações - organizadas em seis dimensões, aspetos físicos da gestão do lixo, campanhas de limpeza, campanhas de sensibilização, articulação institucional, regulamentação e financiamento - foram sugeridas para ajudar a mitigar o problema da eliminação do lixo no Evereste.

**Palavras-chave:** Sustentabilidade, Turismo de montanha, Evereste, Lixo, Gestão de Resíduos.

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## **List of Abbreviations**

GDP	Gross Domestic Product
ISWA	International Solid Waste Association
ISWM	Integrated Solid Waste Management
NGO	Non-Governmental Organization
NMA	Nepal Mountaineering Association
NTB	Nepal Tourism Board
SPCC	Sagarmatha Pollution Control Committee
UNEP	United Nations Environment Program
UNESCO	United Nations Education Science and Cultural Organization
UNWTO	United Nations World Tourism Organization
VDC	Village Development Committee

## **Introduction**

Hiking, trekking, and climbing up mountains, known as mountaineering, were considered elite activities until the turn of the twentieth century (Apollo, 2017). Presently, mountaineering is becoming more of a mainstream tourism activity than an elite one, thanks to diversification, commodification, and commercialization (Apollo, 2017; Miller & Mair, 2019). The threat mass tourism poses to this type of tourism is, among other aspects, due to the number of people attracted to relatively small locations, which are usually of major ecological importance (Kruczek et al., 2018). One of these types of territories regards high mountains in developing countries. Sensitive to outside influences, the animate and inanimate environment of high mountain places, which used to be isolated, has been unexpectedly exposed to human pressure (Apollo, 2017).

The ecosystem of high mountains has reacted to the external impact of mountaineering, even if only by a small number of people. These reactions, however, are not categorically negative or positive; the topic at hand is far more complicated. For instance, according to Kruczek et al. (2018), while tourism is one of the Himalaya's primary development factors and has the potential to drive future development in the region, it can only do so if it is planned and implemented in accordance with sustainable development principles.

Sustainable development entails an integrated approach that takes into consideration not only the environment, but also the social and economic dimensions. An important driver for this dissertation is the growing attention given to sustainability. Specially since 1987, with the United Nations Brundtland Commission, that defined sustainability as addressing the needs of the present without compromising the ability of the future generations to meet their needs, the concept entered in the policy agenda. Today, with the threat of climate emergency, concrete efforts are being made with the implementation of actions to directly respond to the United Nations Sustainable Development Goals (United Nations, 2015).

Open and unregulated access often causes economic and environmental overexploitation of a given resource. This is what is classically defined as 'the tragedy of the commons' (Hardin's, 1968). In

tourism this phenomenon is present, with destinations taking limited attention to existing carrying capacities, being caught in a process that leads to the devastation of the resources upon which they depend more, in particular natural resources (Pintassilgo and Silva, 2007). The clear existence of the ‘tragedy of the commons’ in tourism provides a supporting framework to stakeholders in a given destination to cooperate in its planning and management.

The challenge is to find new and sustainable models of tourism that will benefit both highland and lowland residents while also contributing to the poverty alleviation without compromising sensitive mountain ecosystems. Mountains are often neglected in the development agenda, despite their relevance. Although the value of ecosystem services provided by mountains is acknowledged, approaches to economic valuation of services and payment systems in mountain environments, which are required to appreciate and realize the advantages, have yet to be fully established (Rasul et al., 2011).

Environmental, economic, and socio-cultural components are all included in the concept of sustainable tourism development, and a balance between these three dimensions is essential for long-term success (Samy and El-Barmelgy, 2005). For mountain tourism, that is heavily based in natural resources this is even clearer. Mountain tourism development consists of numerous components, including the preservation of tourism-dependent natural resources, improved local quality of life, and increased tourist satisfaction. The ecosystems of mountain places have a significant impact in the destination attractiveness. Climate change can also have a significant impact on visitors. Lack of snow, for example, will require large investments to mitigate the impacts in the tourism demand. Topography is another major factor to consider when developing and maintaining destinations because scenery and landscape are crucial aspects for the consolidation of a mountain tourism destination (UNWTO, 2018).

While the presence of protected natural areas in mountain areas offers a strong foundation for tourism, it is not a guarantee of long-term success. Such locations, on the other hand, can contribute to responsible environmental resource management and protection while also serving as tourist attractions. Protected areas are threatened by overuse, resistance from residents who may gain little economic benefit, and even refusal of access to visitors (Vanat, 2013).

Tourism is one of the most active economic sectors in many growing Asian countries. As an instrument of regional strategy, it promotes local communities and builds solid foundations for economic growth (Shrestha, 2008). Asia is host to the world's highest peaks.

The Hindu Kush Himalayan region is known as the third Pole because of its ice and snow masses. Nepal is considered as the most appropriate destination for mountaineering because of the sheer number of mountains - 1,792 peaks above 5,800m. Among them, 414 have been opened officially for climbing, and 1,378 remains to be opened. The government has waived mountaineering royalty for peaks below 5,800m. Nepal has 122 and 1,310 mountains above 7,000m and 6,000m, respectively. Nepal boasts eight of the world's fourteen 8000-meter-high snow-capped mountains: Kanchanjunga (8,585m), Lhotse (8,516m), Makalu (8,463m), Cho oyu (8,201m), Dhaulagiri (8,167m), Manaslu (8,163m), and Annapurna I (8,091m). Nepal's mountains attract tourists, trekkers, and mountaineers for a variety of reasons. As a result, Nepal's mountain tourism's key tourism goods are climbing and trekking, which increase tourists' length of stay, assist the local economy, and have a substantial impact on the whole tourism sector. Nepal's tourism industry is a key source of foreign exchange revenue and has great growth potential. Because of its breathtaking beauty, natural riches, cultural, religious, and historical heritages, Nepal is a popular tourist destination around the world. Nepal tourism figures, show that the total number of tourists from 2015-2019 was 4,602,458. Among them, tourists visiting Nepal for mountaineering accounted for 11 per cent, or 491,986 (Ministry of Culture, Tourism & Civil Aviation, 2020). After a huge reduction caused by the impact of COVID-19, the number of visitors to Nepal's mountains increased significantly in 2022 (Department of Tourism, 2022). Despite existing potential and recent growth, Nepal's rich mountain resources have not been fully utilized.

Nepal is the Mount Everest's homeland, home to world-famous climbers, the Sherpas, and to the Yeti's enigma. Mount Everest, at 8,848 meters (29,032 feet) above sea level, is the world's tallest peak and is known in Nepal as "Sagarmatha," which means "forehead in the sky." Everest is part of the Himalaya, a 2,400-kilometer (1,500-mile) mountain range that stretches through six Asian countries. Sagarmatha National Park was established in 1976 to protect the mountain and its wildlife, and the United Nations Educational, Scientific, and Cultural Organization (UNESCO) declared it as a World Heritage Site in 1979 (Manfredi, 2010). The Park receives roughly 100,000 visitors each year, putting a strain on the natural ecosystem. Trees are being cut down to make

cottages and fuel for tourists, resulting in deforestation in the area. During peak season, the park attracts up to 500 tourists each day on the walk to base camp, and the park's trails are degrading because of the heavy foot traffic. However, the biggest concern is on the mountain itself. Each of those climbers spends weeks on the mountain trying to adjust to the altitude at a series of camps before attempting the summit. Everyone creates roughly eight kilos of garbage throughout that time, the most of it is dumped on the mountain (Shrestha, 2008). No one knows how much garbage is on the mountain, but it is in the thousands of tons. Glaciers are erupting with trash, while camps are overflowing with human garbage.

In 1953, Edmund Hillary and Tenzing Norgay became the first people to reach the top of Everest. It was a life-or-death endurance test that grabbed international attention. Since then, thousands of visitors have flocked to the summit. This is beginning to take its toll. Due to its congestion and litter, Everest is now commonly regarded as the "world's highest garbage dump" (Mint, 2019).

Additionally, for every climber, at least one local worker cooks, transports equipment, and directs the trip. Climbers must often queue for hours in subzero temperatures to reach the peak, where the air is so thin that they must use an oxygen mask to breathe. They walk in single line and at a snail's pace up the Hillary Step, the final challenge before the summit. Because of the overcrowding, when climbers reach the summit, there is barely enough room to stand. Each of those climbers spends weeks on the mountain before reaching the summit, acclimating to the altitude at a series of camps. Each person creates waste throughout that time, the most of it is dumped on the mountain. The mountains are littered with empty oxygen canisters, abandoned tents, food containers, and even human feces. At base camp, there are tented restrooms with enormous collecting buckets that may be dragged away and emptied. The restrooms, on the other hand, come to an end there. Climbers must urinate on the mountain for the remainder of their journey (Everest Summit Association, 2011).

Jamling Tenzing Norgay, son of Tenzing Norgay, who first climbed Everest with Sir Edmund Hillary in 1953, penned an opinion post about the dangers that the region faces because of Everest's growing popularity (Ecohimal, 2011:3). Norgay cautioned:

*"These operations have caused a significant ecological problem. (...) They are also evidence of climbing community contempt and a disregard for nature on the part of those men and women who believe their personal accomplishments are more important than the integrity of a unique environment. (...) Garbage is a huge issue. While we generally think of the Himalayas as being beautiful, the snows on Everest hide empty oxygen tanks, wrappers, cans, and other trash left behind by climbers. (...) Culturally and environmentally, the area surrounding the mountain is equally exploited. (...) Forests have been razed to make way for guest campfires (...) snickers bars have become as prevalent as yak butter, and gore-tex parkas have replaced chubas and other traditional garments".*

Norgay also concluded that the Everest is currently "the highest garbage dump on the planet" (Ecohimal, 2011:4).

Thankfully, the issue has not gone unnoticed by the authorities in the area. NGOs have sent trash-collecting missions up the mountain, and climbers who do not bring their junk back with them now face a hefty punishment. Locals have begun to use solar electricity, and there is a resurgence of interest in not only trash management, but also waste treatment, deforestation, and climate change. The destruction of Everest is more than superficial; it has serious ramifications for the local population. The region is at risk of flash floods due to rising temperatures and melting snow and glaciers. Endangered species are threatened by overgrazing and deforestation (Everest Summit Association, 2011).

This dissertation aims to contribute for the discussion of mountain tourism, highlighting the sustainability concerns based in the case study of Everest in Nepal. The specific objectives are five:

1. Present mountain tourism as a relevant tourism product and with socioeconomic potential for many deprived mountain areas.
2. Debate the sustainability challenges for mountain tourism destinations.
3. Introduce the subject of garbage as a key aspect for the development of the mountain tourism sustainability, particularly in Nepal.

4. Assess key Everest tourism stakeholder's views about the challenges posed by the garbage in the mountain.
5. Suggest crucial lines of action, to influence policy-making, concerning the mitigation of garbage in Nepalese mountain tourism destinations.

To respond to the mentioned objectives, the dissertation is organized in five different chapters. The Introduction, regards the current chapter, presenting briefly the motivation and topics of the study. The second chapter, a Literature Review, that deepens the different major topics related to mountain tourism like history, industrialization, perceptions, potentials, and its emerging challenges. The third chapter, with the Methodology, explaining the main options concerning the empirical research. Result and discussions, chapter four, that integrates the secondary information with the different interviews conducted in the field. Finally, the chapter five, a Conclusion, with a summary of main ideas, limits of the research, future developments and relevant policy implications.

## Chapter 2 - Literature Review

### 2.1. Mountain Tourism: Discovery and Socioeconomic Relevance

#### 2.1.1. *The discovery of the mountain as a tourism destination*

Mountains have long been seen as fascinating, but also dangerous and unpredictable environments that evoke both dread and awe. They were major obstacles that soldiers, pilgrims, and traveling salesman only over when absolutely required. Petrarch, a famous Italian philosopher, and poet, claimed to be the first person since ancient times to climb a mountain for the view. He enjoyed the unique aspect of mountains after reaching the summit of Mount Ventoux in 1336 a.d., located in the French Provence region at 1,912 meters above sea level (Blain, 2005).

Only when poets, painters, and philosophers began to perceive mountains as a realm of unspoiled nature, or even heaven on Earth, did the frightening picture of mountains shift. With his novel entitled “Julie”, or *la Nouvelle Héloïse*, Jean-Jacques Rousseau, a social philosopher from Geneva, developed the Alpine fantasy and helped to launch a run on the Alps in the 18th and 19th centuries. It was fashionable for upper-class young men, particularly from Britain, to travel around Europe to complete their studies, and the Alps were on their route. In the upper slopes, the first guesthouses to accommodate these travelers began to emerge (Vanat, 2013).

Aristocrats and businessmen, whom the famed economist Thornstein Veblen dubbed as the "leisure class" (Veblen, 1994) and for whose palace hotels and cogwheel railways amidst exquisite Alpine vistas were built, soon followed by young visitors. The Alps were more than a dream destination for the European elite; they became a mandatory activity for the wealthy and famous (Blain, C., 2005). The first mountain tourism boom in history was sparked by pioneering entrepreneurs and innovators. They pioneered in every aspect of mountain tourism. With intuition, personal experience, and implicit local knowledge, the pioneers established the most attractive areas and built the modern tourism infrastructures. They could not rely on advanced planning methods or mountain-specific education and vocational training. Mountain railways, such as cogwheel railways and funicular railways, provided accessibility to mountain resorts and summits (Charter & Saxon, 2007).

The first mountain tourist boom, which lasted thirty years and was distinguished by significant advancements in science and the arts, took place during the Belle Époque. This first rush to the mountains ended abruptly at the onset of the First World War. The age of months-long stays in Alp's hotels or on the French or Italian Riviera was past, and mountain tourism in the major Alpine countries was hit by a long-term structural crisis. During the First World War, emergency measures were implemented in Switzerland, a market-oriented and liberal country, such as a general building halt for new hotel construction. To solve the serious structural tourism crisis, Switzerland's National Tourism Office and the Swiss Hotel Credit Society were established (Leung. et. al., 2018).

Leisure winter sports were established to cater to the wants of the wealthy clients during the first wave of mountain tourism and the discovery of the winter season in the second half of the 19<sup>th</sup> century. Many special winter sports facilities, such as polo on frozen mountain lakes or bobsledding on natural ice runs, were available in areas like St. Moritz because these guests often stayed in resort hotels for the whole season. Winter sports were seen as privileged leisure pursuits at the time (Macchiavelli, 2013).

Mountain tourism has evolved over time to become more specialized. In the 18th century, the mountains were a popular holiday resort for Europe's upper crust. Innovative businesses-built castle hotels, mountain railroads, and designed specific mountain leisure activities for the mostly youthful guests in the beautiful and majestic scenery of the Alps (Macchiavelli, 2013). The leisure class, which was mostly made up of nobility, contributed to the first Alpine tourism boom in the second half of the nineteenth century. Alpine tourism saw a revival after the two World Wars and the Great Depression, thanks to rising income among the people in these regions and neighboring nations, as well as social and technological improvements such as paid vacations and the availability of private transportation. The current structuring of mountain tourism on a worldwide level is essentially a reflection of the protracted specialization process in the Alps (UNWTO, 2018).

Major historical events and technology advancements have enabled mass skiing to take place (Keller, 1998). In 1960, the first ski lift was built in Davos. Since 1960, ski slopes have been groomed mechanically. Since 1980, high-capacity cable cars and chair lifts have been built and

prepared on ski slopes. Since 1985, snow-making machines have been in use. Since 1995, Transportation facility design and operation using computers

The first stage in bringing downhill skiing to the faithful patrons of existing Alpine summer resorts was to adapt Scandinavian cross-country skiing to mountain settings with steep slopes. It was accompanied by a series of technological advancements that resulted in significant changes in mountainous regions. The traditional leisure sports activities in the Alps were industrialized because of these advancements (Vanat, 2013). The resorts' industrial zones became transportation installations and slopes. High mountains became accessible to everyone without requiring a significant amount of work

These advances were good from an economic standpoint. Skiing has been one of the most profitable types of tourism for decades. However, the creation of skiing regions was costly, and the start of the ski boom resulted in poorly constructed skiing facilities, which often had unfavorable financial outcomes. Confrontations with conservationists and ecologists arose as high mountain tourism became more industrialized (Ibidem, 2013).

For guests who want to appreciate the views from high altitudes, funiculars, cogwheel railroads, and cable cars were erected. The first cable car was the brainchild of a Spanish inventor whose concept could not be implemented in Switzerland due to legal issues. In 1907, he was able to construct it in his hometown of Santander. In Bozen, Southern Tyrol, Italy, the first cable car in the Alps was built (Macchiavelli, 2013).

Mountain regions have always enthralled visitors, particularly those drawn by natural areas, adventure, outdoor activities, milder summer temperatures, and the unique features of mountain culture and traditions, with a sense of spirituality enhanced by the mountains' geographic isolation and towering heights, with a sense of spirituality reinforced by the mountains' isolation and rising heights. The European Alps, for example, served as a backdrop for some of the earliest forms of tourism. Few places in the world today do not acknowledge the uniqueness of mountain landscapes, which contribute to the growth of a diverse range of mountain tourism activities based on snow and winter sports; the distinctiveness of local populations and traditional cultural values;

an abundance of natural and thermal springs; the sacred factor contributed to many mountain locations and peaks (UNWTO, 2021).

### *2.1.2 The socioeconomic relevance of the mountain tourism*

Mountain tourism is an important part of the tourism business, particularly in developed countries. However, not all mountain areas are conducive to tourism development. The ideal mountain ranges for tourism are those with subalpine and alpine zones. The types of tourism activities available are influenced by the biological and physical characteristics of a location (Charter & Saxon, 2007).

Mountain tourism covers a broad range of activities related to the interest in spending leisure time in open spaces and interacting with nature. Mountain ranges across the world provide a variety of tourist options, which are mostly well renowned over others:

- In the winter, sports tourism: A few of the winter activities accessible in higher elevation mountain locations are: Cross-country, alpine, and glacier skiing, heli-skiing, snowboarding, sledding, snowshoeing, and tobogganing.
- Tourism that is based on walking. Visitors can encounter mountain sceneries, flora, and fauna, as well as local cultural history, because of this. It can provide several economic and social benefits to citizens and towns if properly planned and promoted, particularly as a source of summer revenue in locations where snow-based activities are the norm.
- Mountain locations can be used for adventure and sports activities both within and outside of the snow season. They are dependent on the weather and access to the place. There are several activities to choose from, including mountain biking, zip line, quad biking, horseback riding, rock climbing, ice climbing, paragliding, zorbing, and caving. Examples of freshwater adventure and sports activities include canoeing, sailing, windsurfing, paddle-surfing, kitesurfing, kayaking, rafting, and freshwater fishing (UNWTO, 2021).

Many mountain economies rely on tourism, particularly in areas where natural resource exploitation is prohibitively expensive due to restricted accessibility and severely harmful to mountain ecosystems. This fine balance is well known in some of the most scenic mountain ranges,

such as the North Cascades National Park in Washington State and the Makalu Barun National Park in Nepal, where the advantages of biodiversity, watersheds, and recreation are well characterized and conserved. The COVID-19 epidemic has offered a chance to underline the importance of building sustainable mountain tourism that accommodates visitors' increased desire to spend time outdoors. In a modern search for locations that suggest a beneficial environment and exceptional excellence of natural life, alpine and rural places are increasingly being considered as a haven against the epidemic. This spike in demand opens new possibilities while also highlighting current issues for both established and growing mountain locations (UNWTO, 2021).

Despite the COVID-19 pandemic's impact on tourism — international tourist numbers decreased by 73% in 2020 worldwide (UNWTO, 2021a) — the sector remains one of the world's most significant economic activities and a major engine of global and local prosperity. Mountain tourism's competitiveness and quality, on the other hand, are inextricably tied to the natural, social, and cultural heritage's fragility, as well as the economy's dynamism. To support long-term growth while preserving a balanced use of resources, all countries must adopt a sustainable approach to mountain tourism (UNWTO, 2021). The number of visitors to mountains is now increasing significantly again, after the massive reduction caused by the impact of COVID-19. This requires an attentive understanding of challenges towards the sustainability of the destination and tourism product.

## **2.2 Mountain Tourism: Appeal and Challenges**

### *2.2.1. The appeal of mountain tourism*

Mountain tourism is mostly a leisure activity seen in developed countries, where it is typically one of the most popular. Despite its importance, there is no globally agreed-upon definition or data gathering criteria for mountain tourism. Even countries where mountain tourism is a major source of revenue are unable to provide reliable national statistics. Governments seeking to determine mountain tourist growth strategies and address some of the sector's potential negative impacts must first comprehend its socioeconomic aspects (Charter & Saxon, 2007). This includes learning more about the many stakeholders in the industry, including as investors, operators, suppliers, and users,

as well as their motivations and goals. While there are beautiful mountain ranges in many countries and places, not all of them are good tourist destinations. Most tourists seeking mountain resorts are looking for alpine or sub-alpine conditions (UNWTO, 2018).

In the mountains, tourism growth necessitates both a high level of planning and a willingness to adapt to market demands. Examining the various strategies for evaluating mountain resources is also critical. According to conservationists, all natural and cultural mountain resources may have intrinsic intangible value beyond their economic usefulness (Vanat, 2013). Environmentalists may want to safeguard all these resources and resist any attempts to exploit them for profit. In the tourism industry, however, not all mountain resources are created equal. Only those with a sufficient level of client demand should be selected for expansion. As a result, while a mountain range may have significant public value in terms of protection, just a small piece of it may be suited for economic exploitation (UNWTO, 2018).

Similarly, many mountain resources that are not intrinsically valuable from the standpoint of conservation may have significant economic worth. Restaurants, hotels, spas, and ski resorts are all man-made resources that, despite having little to no conservation value, contribute greatly to a location's worth as a tourist attraction (Vanat, 2013).

Consumer demand fluctuates and evolves over time; therefore, tourism development plans must be adaptable. Because the economic potential of a tourist site is determined by market demand, development planning must be able to respond to such changes if mountain tourism resources are to be properly exploited (Blain, 2005).

The number and quality of attractions in a resort contribute to its appeal. This can result in a virtuous cycle, in which more tourism allows operators and investors to expand and update current facilities, resulting in increased demand. These market dynamics can benefit companies who reinvest in their facilities, as they can generate larger profits. They also benefit the external economies of these businesses by providing agglomeration benefits. The importance and quantity of the attractions, as well as the presence of powerful source markets nearby, influence the magnitude of a mountain resort (Nepal & Chipeniuk, 2005).

The proximity saves potential tourists money and time on transportation. This is also why a definite hierarchy amongst mountain destinations has been developed. Larger cities throw a shadow on their surrounding areas, restricting resort and commercial expansion potential. The hierarchy of destinations in the mature mountain tourist sector has resulted in a concentration of visitor flows in the most enticing locations. There are around 2,000 ski resorts in the world, yet just 48 of them attract over one million skiers per day (Vanat, 2013).

### *2.2.2. Challenges and emerging issues in mountain tourism*

Monitoring and analyzing the positive and negative effects of mountain tourism operations is exceedingly challenging, especially in developing nations, because most mountain locations across the world lack reliable tourism data and indicators (Romeo et al., 2021). Because they might include a range of discrete, distinct habitats and can have relatively short seasons for plant and animal development and reproduction, mountain ecosystems are particularly vulnerable to changes brought about by people. Avalanches, landslides, earthquakes, floods, rockfalls, deforestation, lava flows, and drought may quickly change the appearance of mountains. A typical aspect of tourism activities is the creation and extensive use of trails, as well as vehicle-made sports tracks, landscape loss brought on by the building of tourist facilities (which is occasionally against the law), and motorized and nonmotorized transportation (Romeo et al., 2021).

The general crowding of tourists in a select few areas raises the amount of trash produced and noise pollution. The invasion of natural areas like meadows and marshes by mountain sports, which involve both humans and pack animals, poses serious environmental issues like soil compaction in camping areas, water pollution, waste buildup, and fauna impact, all of which have a negative impact on delicate and sensitive ecosystems. For instance, it has been demonstrated that tents and makeshift tourist restrooms harm water supplies and soil in both the Himalayas and the Andes (Hock et al., 2019). A recent UNWTO report (Romeo et al., 2021) draws attention to selected domains that are of crucial relevance for mountain tourism. They refer to the pollution, plastic waste, seasonality, leakages, health and safety, sociocultural impacts, economic aspects, and crisis management (cf. Table 1 below).

Table 1: Challenges for waste management in mountain tourism

<p><b>Pollution</b></p>	<p>Large amounts of solid waste and wastewater are produced due to the large number of tourists in mountainous areas; if poorly stored and disposed of, these wastes can harm groundwater, streams, lakes, and soil. Solid waste can amass as a result of the consumption of food and beverages as well as the disposal of extra packaging, materials, and equipment. Pharmaceuticals, batteries, personal care products, and cleaning supplies, among other items, may include hazardous materials that have an impact on the environment, wildlife, and people. For instance, snowmobile emissions pollute the pure alpine air while also contributing to climate change. Freshwater resources can be harmed by sewage and wastewater from buildings, boats, and big herds of animals, especially because alpine habitats breakdown toxins and waste more slowly than other ecosystems (Charters &amp; Saxon, 2007). The volume and nature of garbage generated are frequently determined by the operations and practices of tourist-related businesses, as well as tourist behavior. As a result, even the most isolated locations are being bombarded by waste such as plastics, metals, and other non-biodegradables that formerly did not reach those areas. There is still a need to build and execute appropriate waste management systems (such as ecologically sound management) to address the issue, particularly in developing countries (Crawford, Mathur and Gerritsen, 2017). Lack of established institutional waste management systems, particularly in rural locations, often leads to informal trash disposal methods that are damaging to human and environmental health, producing water pollution, for example: Mountain ecosystems can be further strained by mountain tour operations, which can use a lot of natural resources and energy (Alfthan et al., 2016).</p>
<p><b>Plastic waste in mountain areas</b></p>	<p>There are connections between tourism and plastic waste in the mountains (Global Mountain Garbage Survey, 2021). Mountain ecosystems are among those most damaged by plastic litter. Mountainous regions across the world are seeing an increase in pollution, which is largely due to tourism (Alfthan et al., 2016). Mountain locations, in addition to local consequences, have been shown to be deposits of plastic trash in the form of microplastics from other regions, according to research. Microplastics travel a long way through the atmosphere before settling in large amounts in mountainous places distant from their source (Alfthan et al., 2016). Research conducted in the Carpathians, showed a strong link between an increase in visitor numbers and a rise in municipal solid waste, especially plastic garbage (Przydatek and Ciaglo, 2020). Popular mountain tourist destinations as a result, such as the tops of the Himalayas and Kilimanjaro (Kaseva and Moirana, 2009), have become hotspots for plastic waste. In the Tibetan Plateau, microplastics have been found in glacier surface snow, while "plastic rain" has been seen in the Alps, Pyrenees, and Rocky Mountains (Hutt, 2019; Leahy, 2019; Martynenko, 2019; Zhang et al., 2020). Plastic waste usually includes persistent organic pollutants that are used as additives in anything from clothing to packaging to</p>

	other climbing equipment (Secretariat of the Basel, Rotterdam and Stockholm Conventions, draft, forthcoming).
<b>Limited management infrastructure</b>	Plastic garbage collection and sorting is particularly difficult in mountainous parts of developing countries, resulting in poor collection rates (Agovino and Musella, 2020). Similar issues occur with sanitary landfills, transportation and separation systems, and recycling capacity. These issues lead to higher rates of dumping, particularly illegal dumping, and open burning of plastic waste in mountainous places. The growing volume of plastic garbage (mostly food packaging) dumped in the Himalayas is one noteworthy example (Marsh and Shalvey, 2018). However, there has been some development in some places. For instance, a "trashin-trash-out" system in the Kilimanjaro National Park has increased solid waste collection rates from 64% at 2003 to 94% in 2006. (Kaseva and Moirana,2009).
<b>Climate change</b>	The international transport forum (ITF) and UNWTO both presented statistics in December 2019 that indicated that the tourist industry is anticipated to increase CO2 emissions by at least 25% by 2030, (UNWTO and ITF, 2019). Even though the COVID-19 pandemic has caused a 7 percent reduction in global greenhouse gas (GHG) emissions, it is anticipated that as operations resume, tourism-related emissions will quickly rebound. Therefore, if the industry is to meet global goals, it is essential to align operations with climate action (UNWTO, 2021). Global warming is causing a significant loss of glaciers in mountain ranges including the Himalayas, Alps, Rocky Mountains, and southern Andes, as well as lone summits like Kilimanjaro in Africa. Climate change will have an impact on the sustainability, competitiveness, and development of tourism destinations, according to UNWTO, UNEP, and the World Meteorological Organization (WMO).
<b>Sociocultural impacts</b>	People who live in mountains might be especially susceptible to the affects and changes that tourism brings about. One of the detrimental impacts of tourism is the disturbance of local inhabitants and questions about cultural authenticity. Some of the most severe adverse effects of tourism development in mountain areas include indigenous peoples losing their lands, communities trading in their traditional ways for more "modern" ones preferred by tourists, changes in values and lifestyles, identity loss, and religious sites not being respected by visitors (Charters & Saxon, 2007). The preservation of "old ways of life" may conflict with inhabitants' desires for modernization, especially among the younger generations, who travel to the highlands to experience them. Trade-offs between tradition preservation and economic growth may become more widespread as technology advances and tourism increases. By limiting the availability of scarce shared resources like fuelwood, shellfish, and freshwater, poorly managed tourism may also have a detrimental influence on society. Even though rural, traditional, and indigenous people might not wish to share their culture with visitors or acknowledge that tourists are interested in their way of life, such communities cannot completely isolate themselves from outside influences (Charters & Saxon, 2007).
<b>Economic aspects</b>	The most obvious economic issues in mountain regions are seasonality, leakages, the creation of stable and decent work, inclusivity in the distribution

	<p>of economic benefits among communities and destinations, competitiveness of tourism businesses, and tourism to reduce poverty and contribute to biodiversity conservation (Godde, 2000). Seasonality: In general, there are few alpine destinations that see year-round tourist. The seasonality of the sector is influenced by latitude, climatic conditions, and the presence of ski lifts and winter sports infrastructure: There are two tourism seasons in locations that have ski lifts and other winter sports infrastructure: the winter season (which typically starts with the arrival of the first snow and ends with the arrival of spring) and the summer season (which in the northern hemisphere begins around the Easter holidays and ends at the beginning of a new year). The Rocky Mountains in the United States and the European Alps, for example, are examples of this. Other alpine destinations may be influenced by harsh winter weather, which makes any activity above 3000 meters nearly impossible. The Hindu Kush Himalayas and the Central Northern Andes in Latin America are two examples (Keller, 2014). Leakage occurs in the tourism industry when income from economic activities is not available for reinvestment or consumption of products and services within the same location, It occurs most frequently when tourist businesses are foreign-owned and/or based abroad. Tourism-related economic leakage is particularly evident in developing nations, particularly in many mountainous regions. When working conditions are poor, employment is seasonal and short-term, and there is no investment in enhancing the skills or ability of locals, local economies suffer (Jönsson, 2015). On the other hand, properly managed tourism can contribute to the growth of local infrastructure, the expansion of the local value chain, the provision of social services, and the diversification of local economies, all of which have a positive effect on the economic sustainability and self-sufficiency of mountain communities (Korcekova, 2011).</p>
<p><b>Health and safety</b></p>	<p>Addressing health and safety concerns is a must for long-term tourism development, especially considering international travelers' sensitivity to both real and perceived health and safety dangers. Travelers, the tourism sector, and the local community are all affected by how health and safety issues are handled in the business. Visitors can be stressed by physical and environmental changes, especially when traveling internationally in mountainous locations. Changes in air and water quality, as well as exposure to changes in height, humidity, temperature, and time zones, are examples (Musa, et. al., 2004). Destination, length of stay, nature of activities, standards of housing and food hygiene, and traveler behavior, as well as health status, gender, age, and experience, all influence the risks connected with travel. Accidents, food poisoning and diarrhea, sunstroke, asthma, weariness, heart difficulties, and cases of hypothermia and acute mountain sickness are the most common problems. Natural disasters, such as avalanches, flooding, and earthquakes, are common causes of death. These dangers are considerably minimized in areas with high-quality accommodations, tourism amenities and infrastructure, hygiene, sanitation, and medical treatment. The COVID-19 epidemic has highlighted the importance of maintaining sanitary conditions in tourist accommodations, facilities, and infrastructure (Musa, et. al., 2004).</p>

<b>Crisis management</b>	Natural disasters, as well as man-made incidents and crises, pose a threat to mountain resorts. As in the case of COVID-19 lockdowns, these situations may lead to changes to flight routes, shutdown of access routes, or a lack of travel options. The impact might last for months or years since it may take some time for the public's perception of the risk to change once order has been restored. The greatest dangers to mountainous terrain are avalanches, floods, landslides, earthquakes, and tensions caused by border disputes. They are more susceptible to phenomena like social upheaval, violence, and kidnappings, which can cause major drops in visitor numbers throughout entire regions, even when the events took place far away. For example, after the April 2015 earthquake in Nepal, which struck the Gorkha district, the disaster paralyzed the country's whole tourist economy for about a year, in addition to suspending any tourist flows in the afflicted area (UNWTO, 2021).
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Source: Inspired by UNWTO (Romeo et al., 2021).

## **Chapter 3 - Methodology**

### **3.1. Research Purpose**

This dissertation is based in an empirical study eminently exploratory. A study is deemed exploratory if the research questions are broad and the theories that are accessible for the study do not offer much in the way of predictions (Samouel, Money, Babin, & Hair, 2003). There are three main methods for conducting exploratory research: reading the literature, consulting experts, and conducting interviews (Saunders, Lewis, & Thornhill, 2012). This type of investigation is quite important and beneficial in determining the current situation, analyzing fresh information in a different way, seeking knowledge and concepts, and enquiring about deeper phenomena (Saunders, Lewis, & Thornhill, 2012). Exploratory research aids when we encounter challenges in formulating a statement for the research topic, when we lack the necessary information to construct theories and test hypotheses, and when we are trying to grasp the research problem (Samouel, Money, Babin, & Hair, 2003).

Defining the study problem's features would be the next step in understanding it. A descriptive study defines the situation that often provides the steps to various actions and events in order to achieve this goal (Samouel, Money, Babin, & Hair, 2003). Descriptive research gives researchers the rules and lists they need to know what to assess (Samouel, Money, Babin, & Hair, 2003). The researcher may thus comprehend the profile of the survey and interview participants as well as methods and the data collection conditions since they have a better notion of how and what data must be obtained (Saunders, Lewis, & Thornhill, 2012). By examining a condition or an issue, explanatory research helps in identifying and establishing the basic links between key dimensions of the object of inquiry (Saunders, Lewis, & Thornhill, 2012). An explanatory study explains clarifies if are interrelated (Samouel, Money, Babin, & Hair, 2003).

### **3.2. Research Approach**

The main outcomes of the study are based on residents, entrepreneurs, tourists, and public officers' opinions. Using qualitative methods, this study examined the perspectives of the respondents. It

was challenging to get enough interviewees for the study implemented during the pandemic and confinement periods. A qualitative research approach is flexible and inductive in nature, encouraging participants to contribute in a more detailed manner and active interaction with the investigator, and allowing new information to emerge that could not have been predicted (Creswell, 2009).

Qualitative research is a sort of study that frequently uses fieldwork and a case study approach to report findings. It aids the researcher's comprehension and investigation of the circumstances and occurrences present in specific contexts (Creswell, 2009).

This approach, which is based on a variety of data gathering techniques, may be used to gather information from stakeholders. Stakeholders are here understood as groups or individuals that have an interest in the actions and outcomes in a specific domain and upon whom the collective relies to achieve its own objectives (Harrison, 2016). Instead of changing the results, research aids in getting new knowledge, finding, and understanding (Bowen, 2008). In qualitative research, the exploratory nature allowed for a deeper understanding of the material, which also aided in the interpretation of the secondary quantitative data. This is an appropriate strategy for a study like this one since it offers the researcher with the detailed information needed to gain an in-depth comprehension of the research issue (Sayre, 2001; Saunders, Lewis, & Thornhill, 2012).

In this project, semi-structured interviews are employed as a research approach that can provide additional details on the subject. As the respondents may express themselves with their answers, the interview creates a space for conversation on the issue. Because the goal of this study is to get a more in-depth knowledge of the perspectives of locals, visitors, enterprises, and local and national tourism boards on Mount Everest's rising rubbish, a qualitative approach was used. Perspectives of key stakeholders are quite relevant as they suggest common world views and understandings of a given phenomenon and development trajectory (Pinto et al., 2021).

### **3.3. Interview as a Research Method**

The research conducted is based in the interview, with a snow ball sampling, using face to face interview and digital version of the interviewing procedure (e-interview), a special type of discussion that forms the basis of qualitative research. In this study, the data gathering method was an interview. The major vehicles of inquiry used in this study were these interviews with local residents, entrepreneurs, visitors, government officers, complemented with the insights from the literature official tourism figures and news published in reference media. Additionally, the researcher performed, participant observation of all these activities with impact in the waste in Everest Region.

The goal of the research interview is to explain the significance of major themes in the interviewees' daily lives. The key ambition is to collect the interviewee position about the problem in discussion (Kvale, 1996). They are helpful for understanding the background to the respondent's experiences and for further examining their answers (Kvale, 1996). Along with the telephone interviews, open-end and closed-end interviews were conducted with the respondents. The purpose of the gathering was to discuss waste management practices, pollution concerns, and upcoming waste management plans and projects.

The interview was organized to assess residents' and businesspeople', visitors', and local and national tourism boards' attitudes about waste management and its influence on the community and sustainable tourism. Stakeholder problems are frequently contextual and localized, as highlighted in the literature, and conducting interviews seems to be an option to gain insights into the stakeholder's unique work and perspectives. The interview questions were wide in nature to invite participants to convey their own views on tourism, sustainability, and collaboration in the destination. The focus of the questions was altered depending on the respondent's job and the organization he or she represented. The information was obtained through interviews to obtain a transversal understanding of the phenomena.

Three semi-structured interview scripts were prepared, with a common structure and specific questions.

A first script regarded the interviews of residents and entrepreneurs. We spoke with locals and business owners about their sentiments regarding the effects of mass tourism and how rubbish on Everest affects their lives. The questions asked are listed here.

1. Is Mount Everest really the world's highest rubbish dump, as some outsiders claim?
2. Does Everest's mass tourism have an impact on the lives of locals (socially and economically)?
3. How is pollution on Everest harming local people's lives (aesthetic, environmental, health issues, others)?
4. Who is mainly responsible for generating the waste (quantity) and who do you think is mainly responsible for its management?
5. Do you believe that it's your personal responsibility to manage waste?
6. Do you believe that local people need to be educated about what is going on in their own community and how to safeguard it from the pressures of outside visitors?
7. Do you have any suggestions for garbage management as a local?
8. Are you an active member of any environmental conservation organization?

A second script regarded the interview of tourists. Interviews with travelers were centered on tourism projects and attitudes toward garbage management and sustainable tourism. The questions asked are listed here.

1. Is Mount Everest really the world's highest rubbish dump, as some outsiders claim?
2. Where mostly have you seen a lot of waste (along the trails, in the forest, riverbed, villages)
3. What kind of waste did you see? (plastic, paper, metal, glass, human waste)
4. What kind of food and equipment do you take to Mount Everest that generates trash and where do you dispose of your generated waste?
5. Do you have any suggestions for trash management as a visitor? How can you help proper waste management in practice?
6. Do you believe that untrained tourists are also to blame for mountain trash?

A third script regarded the interviews of tourism officers. This final segment is about local and national tourist officers' perceptions of the economic, socio-cultural, and environmental

implications, as well as trash management in the Everest region. The questions asked are listed here.

1. Is Mount Everest really the world's highest rubbish dump, as some outsiders claim?
2. Why is there a waste problem in the mountains in Nepal in comparison with other countries?
3. What kind of garbage does Everest have?
4. Is the reason related with an excessive number of permits to mountaineers that somehow reason for increment on trash on Mount Everest?
5. Do you believe that untrained tourists are also to blame for mountain trash?
6. How is Everest pollution influencing water sources in the valley? (is there any planning regarding human waste (urine, feces) that is contaminating local water sources?)
7. What do you do with the generated waste? And how often do you use the collection service?
8. How penalties and rewards for bringing and not bringing Everest garbage can work if there are strict rules in place?
9. What are the further plans for waste management by the Ministry of Tourism and the Mountaineering Association?

The interviews were fully transcribed for helping a (soft approach to) context analysis. Transcription is the process of creating a written statement for the spoken words. It is the process of giving a voice to interviewees by the written transcripts (Given, 2008). Writing while keeping up with the interviewee's pace is challenging, thus audio recordings are necessary for later usage to collect crucial information. The researcher can rewind and collect the essential data (Saunders, Lewis, & Thornhill, 2012). The transcriptions have been made for the researcher to comprehend what was being said.

### **3.4. Participants**

Participants from the government, travel, and tourist industries who had varying expertise of the research problem were included in the interview. Additionally, the visitors that participated in the poll were visiting the Everest region. They were thoroughly informed of the situation and the

garbage disposal system. Since they lived and worked in the area and were present for changes to the system and policies of managing wastes, it was much more pertinent to speak with the residents about the issue of waste management in the area.

The substantial part of the research is based on fifteen individual interviews. It provides an overview of current activities and concerns related to the transition to a more integrated and sustainable system. Stakeholder groups, on the other hand, are not homogeneous, as all stakeholders have various functions and requirements, as stated in earlier chapters. This implies that, while the dissertation might reflect the viewpoints of people questioned, their individual perspectives should not be generalized and need to be interpreted in the context of the case study.

The sample contains influential stakeholders who have been recognized as having a significant impact on the destination. Because not many individuals were included in the study, it is vital to address the limits of that selection. Their actions and coordination are critical to the destination's long-term viability. However, owing to time constraints and accessibility, integrating more stakeholder groups, particularly operators (such as small tourism firms) and the local community, is outside the scope of this work.

The interviews included a total of 15 people from various fields. They were between the ages of 20 and 57 (Table 2).

*Table 2: Age of participants*

<b>Age</b>	<b>Number of participants</b>
20-30	4
30-40	3
40-50	4
50-60	4

Source: Own elaboration.

Five of the participants have a business experience and are currently or have previously worked in the Everest region's tourist sector. The other three participants were all locals. The bulk of the people in this category worked in the tourist industry. Meanwhile, five domestic tourists who had just visited the region were interviewed. Only two government officers were able to granted an interview due to their unavailability and hectic schedules. Below is a list of the interviewees.

Table 3: List of interviewees and their entity

Serial Number	Type of interview	Venue	Type of Interviewee
1.	E-Interview	Nepal	Local
2.	E-Interview	Nepal	Local
3.	E-Interview	Nepal	Local
4.	Face to Face	Kathmandu, Nepal	Entrepreneur
5.	Face to Face	Jhapa, Nepal	Entrepreneur
6.	E-Interview	Nepal	Entrepreneur
7.	Face to Face	Nepalgunj, Nepal	Entrepreneur
8.	Face to Face	Kathmandu, Nepal	Entrepreneur
9.	Face to Face	Biratnagar, Nepal	Tourist
10.	Face to Face	Inaruwa, Nepal	Tourist
11.	Face to Face	Katahari, Nepal	Tourist
12.	Face to Face	Chitwan, Nepal	Tourist
13.	Face to Face	Kathmandu, Nepal	Tourist
14.	E-Interview	Nepal	Public Officer
15.	E- Interview	Nepal	Public Officer

Source: Own elaboration.

The interviews were taped with the respondents' agreement to ensure that no information was lost. Respondents were assured of anonymity during the interviews. To evaluate the acquired data, conceptual categories were developed from emergent themes and replies from the conducted interviews after transcription.

## Chapter 4 - Results and Discussion

### 4.1. The Case Study: Nepal as a Tourism Destination

Nepal is a nation located on the Asian continent, in the Himalayan Mountains; to the north its border meets the territory of China; at the other ends, east, south and west, it borders India. This financially deprived country has the city of Kathmandu as its capital. Nepal is considered a lower middle income country to World Bank, having one of the lowest per capita incomes in South Asia. A quarter of the Nepalese population is below the poverty line. The country's Gross Domestic Product (GDP) is US\$36.32 billion, with the largest share (around sixty per cent) coming from the tertiary sector, which comprises trade and services activities (World Bank, 2022). Tourism is growing considerably in Nepal in the last decades (Figure 1).

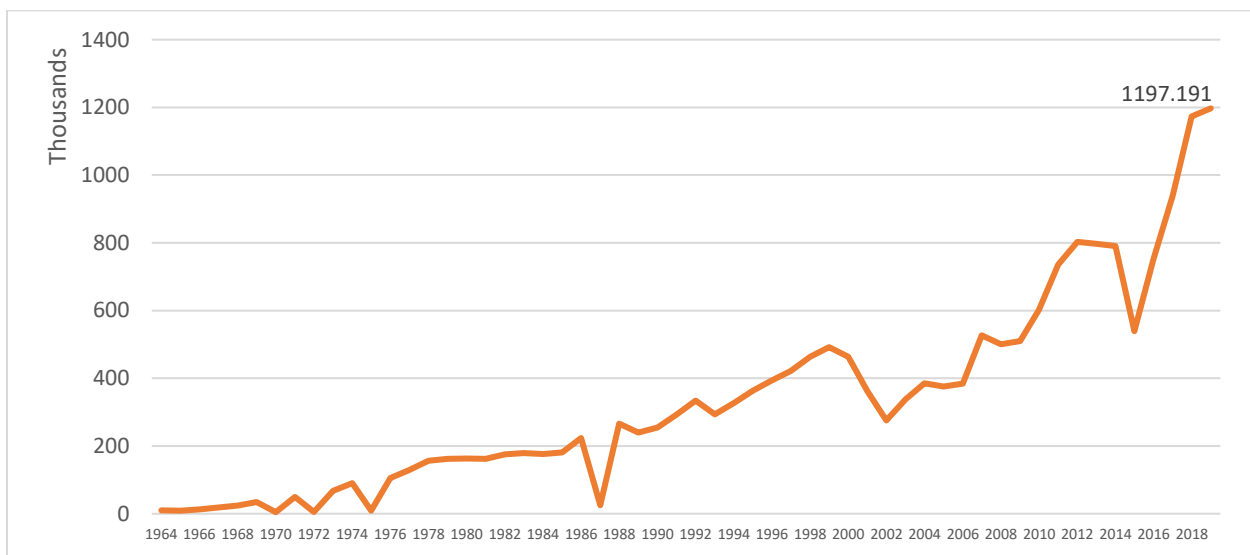


Figure 1: Total number of tourists in Nepal (in thousands)

Source: Ministry of Culture, Tourism & Civil Aviation (2020)

Foreign trade is of fundamental importance to supply the domestic market and Nepal's incipient industry. Given the relative scarcity of natural resources and raw material sources, imports are crucial and come mostly from India and China, consisting of fuel, construction materials, metals such as iron, and communication equipment. Exports are mostly from the primary sector and consist of rice, soybean oil and palm oil. Agriculture and livestock employs a huge proportion of the workforce, around 70%,

but accounts for less than 30% of the country's GDP. Industry, which corresponds to the secondary sector, accounts for only 13% of the GDP and is concentrated in the processing of agricultural products, textile production and in the tobacco, jute, brick and cement industries (World Bank, 2022).

Mountain tourism has a long tradition in Nepal and plays a significant role in its development as a tourism destination. Mountain tourism is currently a popular activity among visitors to Nepal, and is particularly relevant in the attraction of foreign visitors. Mountain tourism is, in fact, a subset of mountain-based adventure tourism. Mountain tourism comprises activities such as mountaineering, hiking, rafting, skiing, mountain biking, rock climbing, horseback riding, cultural studies, and social and economic reflections of mountain people and communities, among others. Mountaineering expeditions and trekking are the primary activities covered by mountain tourism in Nepal (Nepal, 2016). Figure 2 shows that, in 2019, 65 percent of the tourists visited Nepal with the purpose of holiday celebration and pleasure, 16.52% tourist came for adventure including trekking and mountaineering, 14.36% for pilgrimage and remaining for other purposes (4.12%).

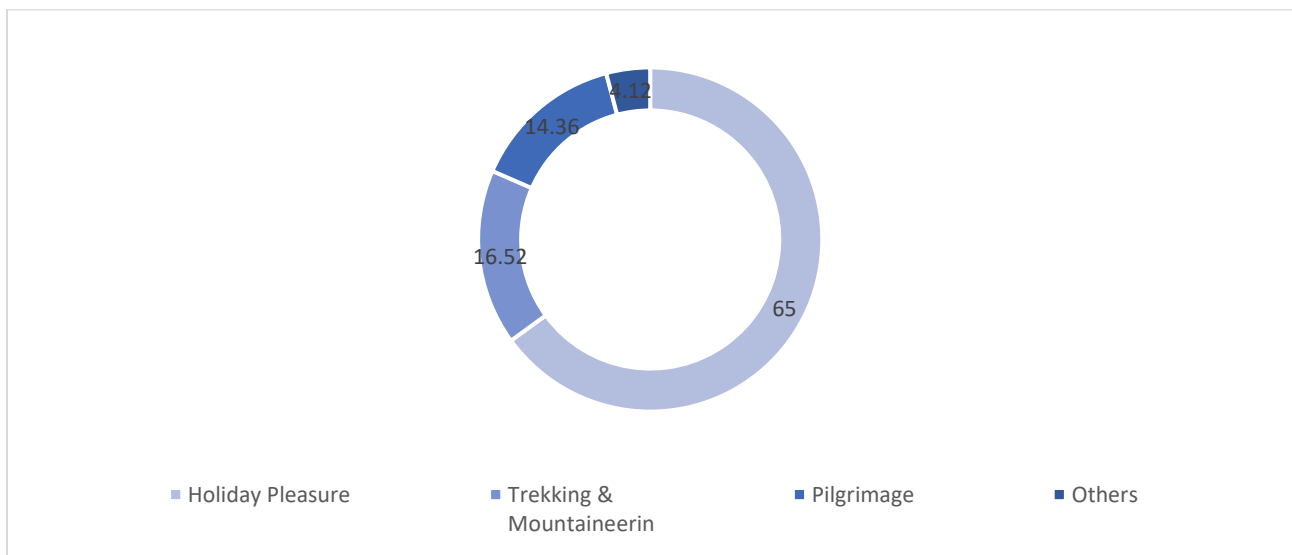


Figure 2: Types of tourism motivations in Nepal

Source: Ministry of Culture, Tourism & Civil Aviation (2020)

Tourism in the modern sense did not begin in Nepal until the 1950s. Mountain tourism was the first form of tourism in Nepal. In 1949, Nepal became the first country in the world to open its

doors to climbers. Many mountaineers were drawn to Nepal after the successful ascent of Mount Annapurna I (8,091m) by French nationals Maurice Herzog and Louis Lachenal on June 3, 1950. It was the first successful ascent of the world's fourteen 8,000m peaks. In this regard, the ascent of Mount Annapurna I marks a watershed moment in mountaineering history. Three years later, in 1953, after Sir Edmund Hillary of New Zealand and Tenzing Norgay Sherpa of Nepal successfully conquered Mount Everest (Sagarmatha (8,848m)), Nepal was widely popularized and introduced to the world as a mountain tourism destination (Lama, 2003). Similarly, all of Nepal's other six summits exceeding 8000 meters were successfully conquered by climbers from various countries in the 1950s.

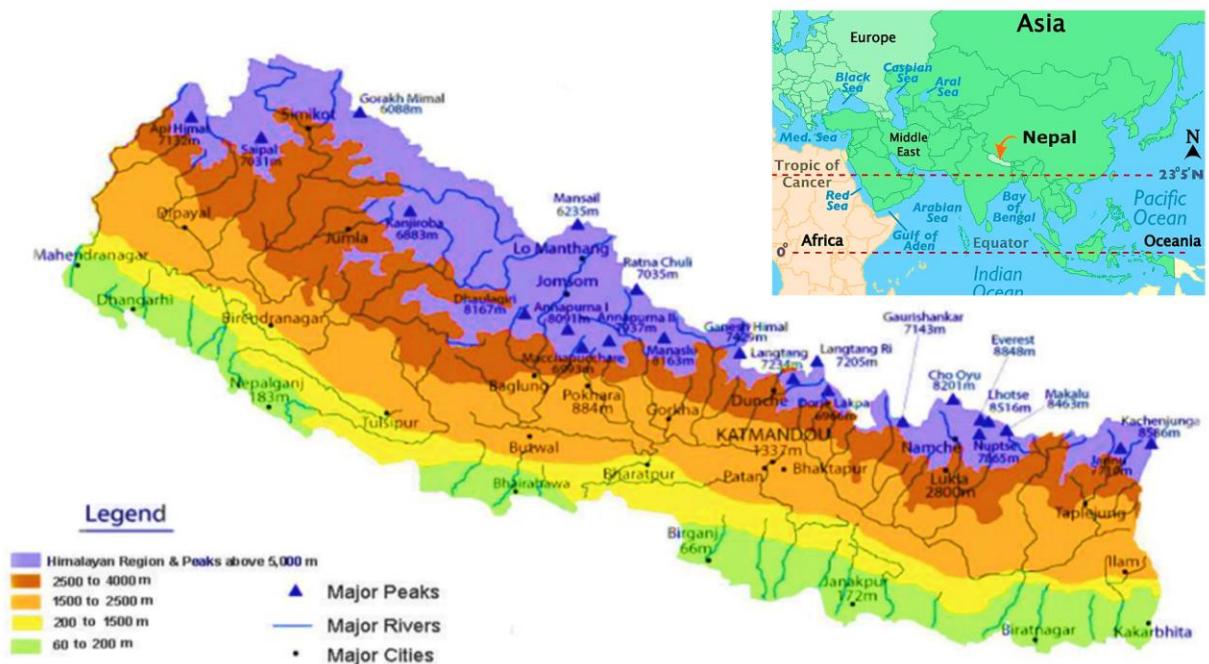


Figure 3: The geography of Nepal

Source: Pant (2016) and <https://www.worldatlas.com/maps/nepal>

Various activities and facilities were held to honor notable mountaineers from around the world who congregated in Kathmandu. In 2003, the Mount Everest Golden Jubilee was celebrated. The presence of Sir Edmund Hillary, one of the Everest conquerors, drew media attention. Other notable Everest summiteers such as Ms. Junko Tabei, the first woman to scale the highest peak, Reinhold Messner, Peter Habler, Jamling Tenzing Sherpa, Tashi Tenzing Sherpa, and other

notable Everest summiteers were also present. On this occasion, Nepal's then-Prime Minister conferred honorary citizenship on Sir Edmund Hillary, and Mount Everest Golden Jubilee medals were awarded to 180 summiteers from across the world.

Mount Cho Oyu's Golden Jubilee Celebration was held on October 19, 2005, Mount Makalu's Golden Jubilee Celebration was held on May 15, 2005, Mount Kanchanjunga's Golden Jubilee Celebration was held on May 25, 2005, Mount Manaslu's Golden Jubilee Celebration was held on December 11, 2006, and Mount Lhotse's Golden Jubilee Celebration was held on December 11, 2006. Even though Mt Annapurna I's Golden Jubilee was not commemorated, it was planned to commemorate its 55th anniversary in Pokhara on June 3rd, 2005. These ceremonies drew many notable mountaineers, mountain lovers, and media representatives (Shrestha, 2007).

Because of the famed and highest mountain peaks found in Nepal, India, China, Pakistan, and other Asian countries, the Asian continent is the world's largest playground for mountain tourists. Nepal is one of the most well-known mountaineering countries in the world. It is an important climbing destination since it offers a vast range of Himalayan peaks, including the world's highest peak and a slew of other high summits. Nepal has the potential to be a pioneer in adventure tourism, with trekking and climbing being particularly popular. As a result, mountain tourism is extremely important in Nepal (Shrestha, 2007).

Mountaineering trips are one of the most exciting and dangerous aspects of mountain tourism. Mountaineering is the broad term for climbing rugged and snowy mountains. It begins at the base camp and continues to the summit of a specific mountain.

According to Nepal's Tourism Act 2035 B.S., "a mountaineering expedition means an act of expedition on any peak of a mountain range, by any team, with the objective of reaching the top" (Ministry of Law, Justice, and Parliamentary Affairs, 2006). Mountaineering is a difficult and risky sport that should only be undertaken by experienced and professional climbers. As a result, mountaineering is characterized as a technical art of climbing mountain peaks that is carefully pre-planned. Even though mountaineering is a difficult and risky activity, mountaineers are urged to participate in it because of the delight, glory, and fame it brings.

One of the most important parts of mountain tourism is trekking. Because of its vast natural beauty, Nepal is a popular destination for trekking tourists. Trekking in Nepal allows to see and appreciate deep canyons, snowy peaks, glacier moraines, waterfalls, rocky and green slopes, and national parks with stunning scenery. As a result, trekking has grown in popularity, and the number of tourists and trekkers visiting Nepal from all over the world has increased rapidly (Shrestha, 2008).

Trekking is a journey made on foot from one location to another for the purpose of sightseeing in areas where modern transportation is not generally available. It entails day-to-day hiking on mountain trails for periods ranging from one-to-many days. Trekking is a moderate walk on mountain routes to discover the hamlet, villages, valleys, mountains, and interiors with the goal of getting the most fun with the least amount of suffering. Trekking can be done for a variety of reasons, including religious, cultural, natural sightseeing, and others. Trekking, on the other hand, should be done for the sake of adventure and fun, not for financial benefit (Lama, 2003). Trekkers can observe villages, villagers' lifestyles, customs, cultural aspects, natural sceneries, landscapes, jungles, rivers, waterfalls, birds, flora and fauna, and other natural phenomena while trekking.

Mountain Everest is a preferred destination. For many tourists, trekkers, and mountaineers, mountains are the main source of interest. Because Nepal has various well-known low, middle, and high mountains, mountain tourism in Nepal has a lot of potential. The 'Continent of the Highest Mountains' has been coined for Asia. The highest and greatest mountains in Asia are the Hindukush, Himalaya, Karakoram, and Pamir. The Himalaya are a massive mountain range that stretches 3,000 kilometers west to east through northeastern Pakistan, north India, southern Tibet, and northern Nepal. The Himalaya range in Nepal is the world's longest and highest mountain range, spanning 800 kilometers and containing eight peaks above 8,000 meters, including the world's highest peak, Sagarmatha (Mount Everest). As a result, it is fortunate that Nepal is home to the youngest, longest, and highest Himalaya (Lama, 2003).

The 14 snow-capped summits over 8000 meters in height, including Mount Sagarmatha. Nepal is home to eight peaks: Kanchanjunga, Lhotse, Makalu, Cho oyu, Dhaulagiri, Manaslu, and Annapurna I. Nepal also has 1,310 peaks higher than 6,000 meters. There are 3,310 peaks in Nepal's Himalayan range, according to estimates. Among Nepal's countless summits, the government has opened 326 for mountain sports, and there are yet 120 peaks that have yet to be

climbed (Ministry of Culture, Tourism and Civil Aviation, 2007). Aside from the height, Nepal is home to some of the world's most spectacular peaks, including Mount Amadablam (6,812m) and Mount Machhapuchhre (6,993 m.).

Nepal's primary trekking locations are the Everest Region, Annapurna Region, and Langtang Region. Trekking around Manaslu and Gorkha, Lower and Upper Dolpa, Mustang and Upper Mustang, Rara Lake, Dhorpatan circuit, Kanchanjunga, BC, and Kathmandu valley trekking are also popular (Lama, 2003).

The official figures of the government of Nepal (Ministry of Culture, Tourism & Civil Aviation, 2020) evidenced that in 2019 the number of expedition permitted teams has reached 1921, involving 8,202 people. The climbers came mostly from USA, UK, China, India, Germany and Japan. Tourists who come to Nepal for trekking and mountaineering are drawn to the Annapurna, Sagarmatha, and Langtang regions. As a result, these are considered the primary tourist destinations in the mountains. Among the three main attractions, the Annapurna region attracts the most trekkers and mountaineers. Annapurna region attracts around 60 percent of trekkers and mountaineers, compared to around 25 percent for the Sagarmatha region, near 8 percent for the Langtang region, and only around 6 percent for the rest of the country (Shrestha, 2008). Regions such as Mustang, Lower Dolpa, Upper Dolpa, Humla, Manaslu, Kanchenjunga, and others, on the other hand, have been designated as restricted areas by the Nepalese government, and any trekker or mountaineer who wishes to visit them must first get a specific permit. The number of trekkers and mountaineers who frequent these places, however, is insignificant. To increase the number of tourists that visit the mentioned places, both the government and the commercial sector must work together (Shrestha, 2008).

#### **4.2. Climbing the Everest**

Before the Great Trigonometric Survey of India, conducted by the British Empire, declared Mount Everest to be the highest peak in the world in 1852, this peak was largely unknown (Brunner, 2014). George Everest, who served as India's surveyor general for the British Empire from 1830 to 1843, is the man for whom it was named. Mount Everest is referred to as Chomulungma, or

"Goddess Mother of the World," in Tibet and Sagarmatha, or "Head of the Earth Touching the Heaven" in Nepal. When the monarchy of Tibet opened its borders to outsiders in 1921, the history of climbing Mount Everest officially began (Brunner, 2014).



*Figure 4: Mount Everest view*

Source: Photo by Jean Woloszczyk on Unsplash

Tenzing Norgay Sherpa and Edmund Hillary used the South Col route on the Nepal side to become the first climbers to reach the summit of Everest on May 29, 1953. Since then, more than 5,000 climbers from several nations have succeeded in reaching the summit (Jenkins, 2013). For Nepal's government, climbing Mount Everest has become a relevant income generator. Permits to climb Mount Everest bring in roughly Rs. 270 million (US\$3.33 million) every year for the government. Table 4 contains the permit costs for the Southeast route. For up to seven people, the permission price for alternative destinations is around \$70,000 USD.

*Table 4: Mount Everest climbing royalty*

<b>Member of Expedition</b>	<b>Climbing Fee (US\$)</b>
1	25,000
2	40,000
3	48,000
4	56,000
5	60,000
6	66,000
7	70,000

Source: Mountaineering Regulations, 2059 BS.

One of the most spectacular and dramatic Himalayan excursions is the walk to Everest Base Camp. The scenery is considered stunning and diverse, the interactions with the local Sherpas are remarkable, and the path is maintained to a very high degree. The journey to the Base Camp affords the observer a breathtaking view of Mount Everest. Travelers enjoy the various natural splendor of the area, such as the valleys, woods, waterfalls, and rivers, in addition to the view of the tall mountains and peaks.



*Figure 5: Climber enroute to summit Mount Everest*  
Source: Public domain photograph from defenseimagery.mil.

This is one of the grandest hikes in the world. A tourist will come across some of the world's four highest peaks while on the path, such as Mount Everest, Mount Lhotse, Mount Cho Oyu, and Mount Makalu. The trek starts at Lukla, and from there, passengers must follow in the footsteps of illustrious mountaineers to arrive at Everest Base Camp. Travelers will pass through some of the most breathtaking alpine scenery in the world as well as quaint communities with a vibrant culture.

The Everest trekking also exposes the tourists to the rich heritage and culture of the locals, who are commonly referred to as "born Sherpas". The Everest Base Camp climb might become too complicated to finish. The passengers must exert a lot of physical effort throughout the way. Therefore, it is only advisable that experienced climbers attempt the challenge. The Sagarmatha National Park, a heritage-listed location that is home to a diversity of flora and animals, is also accessible to visitors and demands a smaller physical preparation.

### **4.3. The Garbage in Everest**

#### *4.3.1. Garbage in the Everest: Highlights from the recent media attention*

This section reflects on the many types of data that gathered through the media news and also the interviews. Because the dissertation is centered in the waste management issue, the text discusses existing garbage management practices along the Everest trekking route. In addition, it attempts to clarify the role of stakeholders in waste management. We will go through the findings and make some suggestions and recommendations for resolving the problem.

Because globalization is unavoidable and the number of tourists is expanding worldwide, the number of tourists in the Everest area is increasing every year. As a result, more and more resources are consumed, resulting in a rise in waste and rubbish production. Even though storage bins and containers are placed alongside the walking trail in the Everest region with clearly written information about the bins, most tourists and porters do not follow the information and throw trash and waste wherever they want, which could be due to a lack of awareness among the public.

In addition, after collecting the waste, the containers must be emptied and transported to the disposal locations. However, due to a shortage of vehicle transportation, humans and animals are utilized. Humans and local government employees carry out a small portion of the work, while animals transport the bulk of the garbage. A biogas plant, known as Everest Biogas Plant, is utilized for waste processing and recovery. Nonetheless, due to a lack of smooth transportation infrastructure, it cannot be used to its full capability.

The interviews and observant participation also showed that when it came to eventually disposing of the trash, there was a recycling option, which included returning the bottles and cans to the firms, making a souvenir out of them. Making a souvenir was a good idea to reuse and expand the life cycle of the garbage, but due to a lack of advertising, these firms are unable to sell it. To summarize, for an efficient waste management process, all stakeholders must collaborate, and their responsibilities are critical in this regard.

Waste generation, according to Momoh and Oladebeye (2010), entails a variety of operations in which no-longer-usable items are discarded. One of the biggest environmental challenges in mountain locations with large tourism densities is the development of solid trash due to significant imports of packaged consumer products (Posch, 2015). The genuine procedure of garbage collection and storage is to collect and store waste properly before disposing of it to make it safe and effective (Tchobanoglous & Theisen: and Vigil, 1997).

Recent news in reference journals from Nepal pay significant attention to the problem of waste generation and management problem in Everest. Some of them are mobilized below to underline some of the specificities of the situation. The growing amount of solid waste generated by trekking visitors, climbing groups, and local store and lodge owners not only detracts from the region's beauty, but also poses a serious environmental threat to the delicate ecosystem and human health.



*Figure 6: Garbage seen in route to Mount Everest*  
Source: Photo of Sylwia Bartyzel, Unsplash

The lack of standardized containers to keep waste before pickup is a serious issue for many mountain regions, as it attracts animals and pests or is blown away. Outside Buddha Lodge in this tiny village near Mount Everest, a team of Sherpas assembled to pack fabric sacks loaded with

hundreds of pounds of waste onto a turboprop aircraft (Schultz, 2018). Sixteen garbage dumping facilities, forty-six trash cans, and three restrooms have also been installed along the paths (Schultz, 2018).

Around 4,010 kg of cooking garbage and at least 12,995 kg of human waste were removed from Everest Base Camp in 2018. In that season, climbers generated 32,241 kg of waste, which was collected by garbage management workers from Everest base camp and Camp II. The team delivered 13,501 kg of combustible garbage from base camp and 1,941 kg from Camp II to a Namche waste treatment facility (Pokhrel, 2018).

According to Yeti airlines local operator, the goal was to transfer 200,000 pounds of waste to Kathmandu by the end of the year, where it would be recycled. Approximately 24,000 pounds of waste was collected so far (Schultz, 2018). According to the director general of the Department of Tourism, 2,000 kilograms of waste have been transferred to Okhaldhunga and the remaining 1,000 kilograms have been brought to Kathmandu for disposal using Nepali Army helicopters (Times, 2019).

Processing and recovery required various technology equipment and facilities to improve the efficiency of other operational elements and to assist in recovering usable materials as well as recovering conversion product and energy. 2,245 kg of non-combustible rubbish is being hauled to Kathmandu for recycling, 1,735 kg from Everest Base Camp and 510 kg from Camp II (Pokhrel, 2018). A trekking event formally ended as a cleaning mission, with the group carrying down 5,000 kg of 11,000 kg assembled. Some of the biodegradable garbage was deposited at Namche Bazaar, a well-known bazaar near the Everest's gateway (Mint, 2019).

#### *4.3.2. General Perspectives of Stakeholders on the Garbage Management*

To be a sustainable tourism destination, the Everest area, like any other tourist destination, requires the active commitment of stakeholders. Stakeholders' roles include not only their high level of expertise or how available and active they are in the region, but also how they contribute to the development of a certain tourism destination (Getz & Timur, 2012).

Local communities are also seen as relevant players to address the waste problem in the Everest (Hardy & L., 2002). Respondents stated that the local community gathers their trash in bags, and are assisted in collection by various local groups and local government officers.

Tourists are a key part of this problem since the outcome will be determined by how they handle the situation. It depends on how they approach the waste management issue, how they respect the local community and diversity, and how they can support the local community by simply following the steps outlined in the walking trail for sustainable waste management (Eraqi, 2007).

Whatever the other parties do, the governing body is ultimately responsible for making and approving all decisions. Government also plays a vital role in providing a very significant proportion of the financing for the projects that must be completed, and in this region, the funding that is used to expand waste management services (Rodic-Wiersma, 2010).

Most responders believe that the government is the main responsible for waste management in the Everest area. They stressed that it is the government's responsibility to take strong measures and to enact rigorous waste management laws, plans, and strategies.

The interviews also attempted to elicit stakeholders' opinions on how successful the waste management process was. Some interviewees stated that more garbage storage facilities are needed to collect the waste. Because glass bottles are prohibited in the Everest region, the usage of cans and plastic bottles is significant, and despite the existence of collecting stations for can bottles, they are ineffectively employed. One respondent stated that individuals toss rubbish wherever they want, maybe due to a lack of awareness.

All the waste that has been kept in the appropriate containers must be removed, and hence transportation to disposal locations is necessary. However, due to geographical conditions, climate, and infrastructure, vehicles are unable to operate effectively, leaving animals and people as the primary way of transporting garbage to disposal locations. Local authorities referred that the locals, with the support of local governing bodies and in coordination with one of Nepal's domestic commercial airlines, brought rubbish to Kathmandu to be disposed of.

People discard away materials that no longer have any value to them or that they can no longer utilize, resulting in waste (Momoh, 2010). Based on several interviews, the responses received claimed that trash management has improved in recent years compared to what it was previously. One of the participants stated that while the management is better than previously, there is not enough of an awareness campaign in place for the residents who are uninformed of the waste's implications. In addition, the garbage cans along the road were insufficient. Others, such as business people and residents, agreed, but said that it would have been ideal if all types of bottles were recycled efficiently.

According to a local trader, tourists exhibit more moral conduct than potters do. He adds that visitors are cooperative and put all their trash in the appropriate bins. Local community gathers its trash in bags with the assistance of several local organizations, including women's groups, mother's groups, and local government employees. These organizations are also paid a monthly salary.

Another local resident concentrated more on awareness-raising initiatives. She claims that after starting a program to add more trash cans to the mountain range's walking trails, they later discovered that the cans were not being used and that the information written on them had been erased. As a result, there is need for more awareness campaigns for all stakeholders so that they understand the significance of waste management.

A national visitor also concurred that more education and awareness campaigns on garbage management are required. According to him, the issue is not with the location of the trash cans or the lack of trash cans or containers; rather, it is with people's ignorance of the effects and potential repercussions of pollution brought on by garbage. Later, he emphasized the necessity for locals to

actively participate in the cleaning of the territory and that they should take this problem more seriously.

A tourist claimed to have frequented the Everest trek for the past ten years. He stated that he has witnessed improvements in garbage management in the Everest region over the last years, but he also underlined that the locals are less well-informed about waste management than visitors.

On the other side, other interviewees assert that training programs would assist to resolve the problem. They concentrate on arguing that teaching tour guides, potters, chefs, and restaurant cooks about trash disposal and effective methods would alter the persistent behavior and ensure that everyone is aware of how to deal with the trash.

A business man blamed to the government organization for failing to grant incentives to private sector firms, for example through legal licenses, to handle garbage. According to him, many firm such as some commercial airlines truly wish to assist by contributing to and delivering the rubbish for various waste-related projects. However, many stakeholders often do disagree in this matter. For example, one interviewee from the public sector claims that it is private sector the one that is unwilling to directly participate in the procedures of garbage management.

According to other interviewee, the government oversees managing rubbish in the Everest region and must implement strict measures. It should create severe laws, plans, and strategies for handling the garbage. Furthermore, he said, local government agencies in Nepal are doing an excellent job of controlling the rubbish in this area and along the Everest trek. According to a public officer, they have significantly reduced waste and made improvements, but he also noted that occasionally, it may be expensive to remove the corpses of victims and the wreckage from wrecked helicopters. Government should thus handle those issues more effectively. A local resident underlined the importance of establishing a governmental organization to address the problem of garbage disposal and to oversee the sustainable growth of tourism in the Everest area.

On the other hand, another public officer revealed one of the crucial details, namely that climbers heading for the summit, or any expedition groups are required to deposit a sum of \$4,000 USD. The money is intended to be used in properly managing the waste, but, according to him, this is not the case. He therefore wants to establish a mutually beneficial partnership between the private

sector, local governing bodies, the local population, and the government to use the money collected in a proper manner.

Inspired by the interviews and the remaining empirical work, some actions can be suggested to help the mitigation of the problem of garbage disposal in Everest. We organized these in six dimensions as detailed below:

- *Physical aspects of garbage management*: this regards actions to improve the effectiveness of the collection of waste (for example, with the availability of more containers and bins in the routes to the summit); transportation (in particular, providing machinery that can help this task that is currently assumed by human and animal power); processing (introducing larger locations to store and recycle the waste, introduce principles of circular economy in the process, such as the reutilization of plastic).
- *Cleaning campaigns*: increase the reach of cleaning campaigns, mobilizing trekkers and other tourists, have regular collection of heavy garbage by helicopter and other mechanical means.
- *Awareness campaigns*: Education, research and training actions to obtain knowledge and inform not only the tourists, but also the locals, particularly tour guides and local business owners, about the dimension of the problem and its negative consequences to the sustainability of the Everest.
- *Institutional articulation*: the creation of a dedicated agency, involving public and private stakeholders and national and international NGOs, as the main animator of the awareness campaigns and with a pivotal role in the waste management process and dedicated infrastructures.
- *Regulation*: define and implement a clear legal framework to waste management, distributing responsibilities among different stakeholders, with a strong incentive structure to stimulate and eliminate specific behaviors.
- *Funding*: create an effective linkage between the income generated by the permits to access the mountain and the necessary financial resources to implement the necessary actions and the above mentioned agency.

Optimistically, these actions being implemented could help the mitigation of the garbage problem in Everest and stimulate the sustainability of this tourism destination.

## Conclusion

Tourism impacts in the economy but also in the ways of living and in the environment. This is the case of the mountain tourism in general, and in particular, in Nepal. This dissertation contributed for the discussion of mountain tourism, highlighting the sustainability concerns based in the case study of Everest. The document presented mountain tourism as a relevant tourism product and with socioeconomic potential for many deprived mountain areas. These mountain tourism destinations face particular concerns regarding sustainability challenges as highlighted by UNWTO (Romeo et al., 2021). The work tried to introduce the subject of garbage as a limiting aspect for the development of the mountain tourism sustainability, particularly evident in Everest. The empirical study, based in a qualitative approach to available official data and interviews to key stakeholders assessed Everest tourism and the challenges posed by the garbage in the mountain and made suggestions of important lines of action, to influence policy-making, concerning the mitigation of garbage in Nepalese mountain tourism destinations.

The empirical study underlined the growing concern about garbage in the area, and that the waste management system in that region is now a developing issue. No one knows exactly how much garbage is on the mountain, but it is reaching important levels that may restrict the future equilibria of natural and social ecosystems, and then, the potential of the mountain as a tourism product. Glaciers are erupting with trash, while camps are overflowing with human garbage. Snow and ice are melting because of climate change, revealing even more waste that has been hidden for decades. All this rubbish is degrading the ecosystem and endangering the health of everyone who lives in the Everest watershed.

The interviews underlined the importance of the entire process of waste management from how it is generated to how residents and stakeholders create a location to store the garbage, collect it from the entire region, transport it, and dispose it. The lack of information among potters and some tourists has made dealing with the problem even more challenging. The Everest also lacks trash storage facilities based on the kind of garbage, which makes disposal problematic. More resources and training, according to the local, are needed in this area. The biogas plant, which aids in the disposal of human waste and from which energy can be generated, is also underutilized owing to a shortage of trash transportation from nearby locations to the biogas plant.

In an attempt to resolve the garbage issue, the Nepalese tourism ministry has enacted several laws to guarantee that mountain climbers do not leave trash on the mountain. In 2013, a progressive restriction was enacted, requiring every climber who ventured beyond base camp to return with at least 17.6 pounds (8 kilograms) of personal garbage, which had to be turned up to officers stationed at various places. The order was to make sure no additional waste was dumped on the mountain. The new rubbish regulation was a good concept, but the instructions were unclear. To begin with, it was unclear when the rubbish should be returned. There was also no documentation indicating which camp brought down its garbage and how much it weighed.

Tourists, the government, residents, the whole community, and social businesses, as well as the commercial sector, all play a vital part in keeping the name of the area good, ensuring Everest region sustainability, and making Nepal a more sustainable tourism destination. To address the environmental issues that have arisen on Mount Everest, mountaineers, locals, and the Nepal government must work together to solve the situation. Mountaineers should consider it their personal obligation to bring the rubbish they bring up the mountain down. Locals should participate in garbage cleanups, and the government should adopt laws and regulations to reduce additional dumping. Even if it means fewer tourists, the regulations should be enacted so that the government can protect the natural location for future generations. It should, however, ensure that all the waste that is presently accumulated *in situ* is collected.

This study shows that the Mount Everest region is having major waste management issue. There are several reasons for this. Among them, it can be highlighted: the rise in tourist numbers, lack of knowledge particularly by locals, lack of relevant waste management infrastructures, and the limited participation of stakeholders. Stakeholders do not appear to be doing their part to make the site viable, and this is something that must be addressed. Locals believe they are doing their best to deal with the crisis, but they are not receiving enough assistance from other parties. Also the government believes it is giving attention and implementing adequate measures. Local business owners believe they are not part of the problem and do not seem to be engaged with the design or implementation of any mitigation action. Tourists, that are seen as the source of the problem, are at the same time referred by the other types of interviewed stakeholders as the ones that are more aware of the actual garbage problem and engaged in taking action to address it.

This dissertation suffered from several limitations. The first one was the controversy of the topic, with some key stakeholders having difficulties in understanding the goal of the research, and rejecting the interview. Also the number of interviewees could have been significantly expanded, even if the number achieved (15) is a result of great effort, considering the pandemic restrictions. Another problem directly regards the Covid-19 pandemic, that erupted during the preparation of the dissertation, and created huge challenges for performing the interviews, travelling to and within Nepal, and having the necessary focus to continue this effort in such a disruptive period. The research also has limitations regarding the data and document availability, often only in Nepalese, that made difficult to share with the supervisors.

There are many possibilities for future research about this topic in Nepal. Mountain tourism is a domain that intersects not only the traditional stakeholders of the tourism industry, but because it is based in a very sensible ecosystem it brings attention to emergent sustainability challenges. In this way, there are large avenues to study tourism in Nepal in general, both from the supply and demand side. In particular, understanding deeply the motivations and profiles of visitors and also the different types of offer and capacity to diversify and add value to the tourism product in a sustainable way. Also the questions of governance and power struggles of the sector are worth of future attention from research, because of the delicate balance between quite opposite views.

To sum up, Everest stakeholders need to work together and form a partnership to raise awareness, provide training, and implement various waste management activities. If the situation is not addressed quickly, this unique tourism destination may face significant consequences in the future. Solid waste management and disposal have surfaced as key concerns for high mountain locations all over the world, especially those with expanding adventure tourist businesses. Bringing the public, corporate, and community sectors together to build a shared vision of waste management is fundamental to a sustainable future in Everest.

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## Appendix 1: Socioeconomic Overview of Nepal

### Social

Poverty headcount ratio at \$2.15 a day (2017 PPP) (% of population) 8.2 (2010)

Life expectancy at birth, total (years) 69 (2020)

Population, total 30,034,989 (2021)

Population growth (annual %) 2.3 (2021)

Net migration 296,541 (2021)

Human Capital Index (HCI) (scale 0-1) 0.5 (2020)

Access to electricity (% of population) 89.9 (2020)

Individuals using the Internet (% of population) 38 (2020)

Proportion of seats held by women in national parliaments (%) 33 (2021)

### Economic

GDP (current US\$) 36.29 (2021 billion)

GDP per capita (current US\$) 1,208.2 (2021)

GDP growth (annual %) 4.2 (2021)

Unemployment, total (% of total labor force) (modeled ILO estimate) 5.1 (2021)

Inflation, consumer prices (annual %) 4.1 (2021)

Personal remittances, received (% of GDP) 22.6 (2021)

Central government debt, total (% of GDP) 39.0 (2020)

Statistical performance indicators (SPI): Overall score (scale 0-100) 53.6 (2019)

Foreign direct investment, net inflows (% of GDP) 0.5 (2021)

Source: World Bank data available at: <https://data.worldbank.org/country/NP>

## Appendix 2: Tourism figures (Last pre-pandemic year)

Indicators	2018	2019	% Change
<b>Tourist Arrival by:</b>			
Air	969287	995884	2.67
Land	203785	201307	-1.23
Total	1173072	1197191	2.01
Average Length of Stay	12.4	12.7	2.2
<b>Sex:</b>			
Male	624928	626866	
Female	548144	570325	
<b>By Age groups:</b>			
0-15 years	54870	57523	4.8
16-30 years	269648	254399	-5.7
31-45 years	360237	383155	6.4
46-60 years	303452	305651	0.7
61+ years	173299	176872	2.1
Not Specified	11566	19591	69.4
<b>Top Five Country of Nationality:</b>			
Rank 1	India	India	
Rank 2	China	China	
Rank 3	USA	USA	
Rank 4	Srilanka	United Kingdom	
Rank 5	United Kingdom	Srilanka	
<b>Purpose of Visit:</b>			
Holiday/Pleasure	703843	778173	10.56
Pilgrimage	187692	197786	5.38
Trekking & Mountaineering	169180	171937	1.63
Others	112357	49301	-56.12

**Table A2.1:** Figures of tourism in Nepal

Indicators	2018	2019	% Change
<b>Tourist Arrival by Major Five Airlines:</b>			
Rank 1	Nepal Airlines	Nepal Airlines	
Rank 2	Jet Airways	Qatar Airways	
Rank 3	Qatar Air	Fly Dubai	
Rank 4	Fly Dubai	Air India	
Rank 5	Air India	Air Arabia	
<b>Mountaineering Expedition:</b>			
Total Team	1910	1921	0.6
Total Person	8641	8202	-5.1
Royalty to Government (Rs.' 000)	467938	568269	21.4
<b>Revenue from Tourism:</b>			
Total Earning(US\$ ' 000)	703179	724337	3.0
Average expenses / Visitor / day ( US\$)	44	48	9.1
<b>Tourism Related Enterprises :</b>			
Hotel (star)	129	138	7.0
Hotel ( Non star)	1125	1151	2.3
Beds (total)	40856	43999	7.7
Travel Agencies	3508	3680	4.9
Trekking Agencies	2649	2764	4.3
Tourist Guide	4126	4200	1.8
Trekking Guide	16248	17625	8.5

**Table A2.2:** Figures of tourism in Nepal

Indicators	2018	2019	% Change
<b>Places Visited:</b>			
National Parks and Wildlife Reserve	395791	429764	8.6
Pashupati Area (excluding Indian)	163311	171937	5.3
Lumbini (excluding Indian Tourists)	169180	173083	2.3
Manaslu Trekking	7371	6070	-17.7
Mustang Trekking	4116	3739	-9.2
HumlaTrekking	10814	8670	-19.8
Lower Dolpa Trekking	1222	1360	11.3
Kanchanjunga Trekking	970	911	-6.1
Upper Dolpa Trekking	525	530	1.0
<b>International Airlines Movement:</b>			
Arrival	16964	16212	-4.4
Departure	16961	16213	-4.4
Total	33925	32425	-4.4

**Table A2.3:** Figures of tourism in Nepal

Source: Ministry of Culture, Tourism & Civil Aviation (2020)

### **Appendix 3: List of Interviewees**

#### *Name of the Interviewees*

Babu Sherpa

Binod Humagain

Bishal Rajbanshi

Dawa Sherpa

Kul Bahadur Gurung

Pharsa Magar

Prashant Karki

Puran Thapa Magar

Ramesh Neupane

Roshan Kayastha

Sagar Acharya

Shankar Pandit

Shauvagya Magar

Shekhar Poudel

Tapan Rajbhandari