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in Sagarmatha National Park, Nepal.

Understanding Tourists' Perceptions, Attitudes and Behaviours“

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Solid Waste Management
in Sagarmatha National Park, Nepal.
Understanding Tourists' Perceptions, Attitudes and Behaviours



Eva Posch
Diploma Thesis
2013

Statutory Declaration

I declare that I have authored this thesis independently, that I have not used other than the declared sources / resources and that I have explicitly marked all material which has been quoted either literally or by content from the used sources.

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Acknowledgments

There are a number of people I wish to thank for their assistance and support throughout my field research and thesis writing.

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Preface

This thesis is an original, independent product of the author, Eva Posch. The data was collected by the author herself in April and May 2013. Chapter 2.1.2.1/ 2.1.5/ 2.3.1/ 2.3.2 partly build up on my own Bachelor thesis (BSc in Geography) conducted at University of Vienna, under the title *“Sustainable Solid Waste Management in Sagarmatha National Park and Buffer Zone, Nepal. Analyzing interactions between landfill sites and the geo-environment”* (2013). The bachelor thesis concentrated on the physical aspects of the solid waste issue in Sagarmatha National Park, while this diploma thesis is focused on the social behaviour pattern of individuals. A CD-ROM of supporting supplementary material is included in the backcover of the thesis containing the raw data and full statistical analysis results. The supplementary CD is not considered as essential for understanding of the work.

During my internship for EcoHimal in Nepal in 2011, I gained hands-on experience in social research, while working within the scope of the project *Saving Mount Everest*. From that time on I became very interested in the issues of tourism and waste management in countries of the Global South, but especially in isolated mountain regions. Doing research in the Himalayas of Nepal was an intense, but incredibly valuable experience. On the one hand, I benefitted academically by experiencing practical field research, and on the other hand I had the opportunity to see the world from a different perspective. I'm confident that this research project enhanced my independence and flexibility, and contributed not only to my academic, but also to my personal development. I sincerely hope that the results of my thesis can be used in a meaningful way.

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1. INTRODUCTION

1.1. Introduction and Purpose of this Thesis

The Himalayas of Nepal, with their unique landscape and fascinating peaks, attracts people from all over the world. Ever since Nepal first opened its borders to foreigners in the 1950s, tourism has grown exponentially. The high influx of tourists, mostly attracted to mountaineering expeditions and trekking, has generated many positive and negative impacts for the country. Local people and work-related migrants have benefitted from economic development, international exposure, and cross-cultural exchange, however, dramatic expansion of the tourism industry has increased pressures on the environment. Continuous trail degradation, exacerbated by soil erosion on high-traffic treks, is compounded by deforestation and land-use changes arising from firewood excavation. Furthermore, solid waste generation and non-biodegradable litter accumulation impose substantial environmental burdens. Increased amounts of garbage accumulating along popular trekking routes pollute water and land, inducing serious environmental degradation in sensitive mountain environments (cf. NEPAL, 2003).

As one of the poorest countries in the world, Nepal's tourism sector represents an important source of income and employment. Tourism is a major focus of Nepal's development planning and one of the leading income sectors of the country's economy. Due to an unstable political environment and the overwhelming focus of policy initiatives on maximizing economic benefits, tourism development has been achieved in an unrestricted and unplanned manner. A number of potential problems have become visible through Nepal's touristic expansion and diversification. Socioeconomic and environmental problems have arisen from shortcomings in developmental planning approaches for tourism. Shortcomings in planning approaches to tourism development have resulted in socio-cultural and environmental problems (cf. ANDRIOTIS, 2000; STEVENS, 1993).

Still, tourism in remote mountainous regions and protected areas, particularly in developing countries, is often the only way to generate income for local populations and to protect the environment – an objective claimed by many national parks (cf. NEPAL, 2003).

Behaviour mediates interactions between the social system and the ecological system in positive and negative way. Environmental damage is generally rooted in human behaviour and thus can be managed by changing relevant behaviour. Thus, understanding and conceptualizing the social and ecological context of environmental behaviour is essential to promote sustainable resource management and to change relevant critical behaviours. (BYERS, 1996, pp. 1-3)

Tourism-induced waste generation, which is seen as one of the major threats to environmental sustainability in remote mountainous regions and protected areas in the Himalayas, can be reduced if individuals adopt pro-environmental behaviour patterns. The necessary acquisition of pro-environmental behaviour is undermined by the assumption that changes in behaviour on a personal level can have huge impacts on environmental sustainability. The challenge lies in examining, analyzing, and understanding various factors and processes that determine behaviour. Only when there is a clear understanding of what factors influence behaviours solutions to environmental problems which require behavioural change can be applied through the successful implementation of policy initiatives. Particularly sensitive mountainous regions and protected areas are heavily affected by human-induced environmental problems, making a detailed understanding of individuals' behaviour in these regions of utmost importance. (STEG & VLEK, 2009, p. 309; EILAM & TROP, 2012, p. 2213; CLARK, et al., 2003, p. 237)

This thesis will examine Nepal's Himalayan region and will attempt to determine factors which influence behaviour towards waste and waste management among tourists. Based on the critical environmental situation caused by a high influx of tourists, I have chosen to study one of the most popular Himalayan sites: the "Everest National Park." This region attracts thousands of tourists every year and is

experiencing substantial socio-economic and environmental impacts like no other in the Himalayas. *Sagarmatha (Everest) National Park and Buffer Zone (SNPBZ)* is among the most popular destinations for trekking tourism in Nepal, ranking number two behind the Annapurna area in tourist popularity (LUGER, 2000, p. 19; MINISTRY OF CULTURE, 2013).

The national park, a protected area since the 1970s, is heavily affected by the impacts of expanding trekking tourism. Significant amounts of solid waste are being generated and are now posing serious threats to the fragile biodiversity and ecosystem of *Sagarmatha National Park and Buffer Zone*, as well as to local populations. (BYERS, 2005, 2007; STEVENS, 1993, 2003; SHERPA, 1979, 2009)

This thesis sees itself embedded within the broader arena of social science. It will concentrate on the current state of knowledge, attitudes and awareness regarding solid waste, solid waste management and its problems among visitors through the determination of factors which are influencing behaviour. Built on the Theory of Reasoned Action, Planned Behaviour and the Norm-Activation Model, an explanatory model was developed to predict waste behaviours in the SNPBZ and to assess the extent to which certain factors determine waste behaviour.

To understand which factors influence behaviours, quantitative social research was conducted in Nepal from April to May 2013. The obtained results regarding visitors' behaviour from the Everest region can be applied to other parts of the Himalayan region and represent an example of how the waste management situation in national parks can be improved by determining factors that influence waste generation behaviour, in order to better identify strategies and policies that change current waste behaviour among tourists. This thesis is meant to act as a contribution to behaviour-environment research in Development Studies. Environmental issues in countries of the Global South are continuously growing. Thus, applied research approaches are particularly desirable in industrially less advanced countries where a need for sustainable development exists.

1.2. Review of Relevant Literature

The Everest region has attracted many researchers involved in wideranging disciplines. A considerable amount of literature has been published over the last decades addressing environmental and social changes in *Sagarmatha National Park and Buffer Zone*.

Several authors discuss land use and land cover changes in the Himalaya (e.g. BYERS 1986, 1987b; VUICHARD 1986; STEVENS, 1993). Some studies reflect the various environmental problems in the Himalaya region, including: natural resource management, fuelwood shortage, deforestation, vegetation change and pastoralism (e.g. BROWER 1987; BYERS 1987b; STEVENS, 1993); soil and trail erosion (e.g. BYERS, 2005; NEPAL, 2003; BYERS 1987b); or natural hazards (e.g. BYERS 1986, 1987b; VUICHARD 1986; ZIMMERMANN, et al., 1986). Other studies focus on the impacts induced by climate change such as glacier retreat, glacier lake increases, and glacial lake outburst floods (e.g. BYERS, 2007; BAJARACHARYA and SHRESTHA, 2007; YAMADA, 1992; CENDERELLI & WOHL, 2003).

A large and growing volume of published studies have investigated the impact of tourism in many places within the Himalaya, but especially in the Everest region (e.g. Bjørnness 1980b, 1983; STEVENS, 1993; NEPAL, 2003; STEVENS, 2003; STEVENS, 1993; SPOON, 2012; SPOON, 2011). Several studies have been conducted in the past years using a natural-science based approach to analyze the solid waste management practices in the *SNPBZ* (i.e. ZUSER et al. 2011; MANFREDI et al. 2010; SALERNO et al. 2010; BORTOLETO, et al., 2012; KUNIYAL, 2002, 2005, 2008). However, far too little attention has been paid to the social science perspective of this multidimensional issue.

Theories of behaviour such as Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), or the Norm-Activation Model (NAM) have been successfully applied in various scientific fields over the years. Of specific interest to the current study is the fact that both the TRA and the TPB are excellent theories within environmental behavioural research that have been employed to explain and predict a broad range of environmentally associated behaviours. They have been applied to illustrate and

predict people's recycling behaviour (cf. CHEUNG, et al., 1999; ITTIRAVIVONGS, 2012; KARIM GHANI, et al., 2013; MARANS & YUNG-JAAN, 1993; SCHULTZ, et al., 1995) household waste prevention behaviour (cf. BORTOLETO, et al., 2012), green electricity behaviour (cf. CLARK, et al., 2003), consumer behaviour (cf. DEMBKOWSKI, 1998), or littering behaviour (cf. SCHULTZ, et al., 2013). Moreover, there are many studies on theoretical approaches to explain the relationship between behaviour and the environment (cf. KAISER, et al., 1999a, 1999b; KAISER, 1998; KOLLMUSS & AGYEMAN, 2002), environmental attitudes and behaviour (cf. HEBERLEIN, 1981; BARR, 2007; HARLAND, 2007; HINES, , et al., 1986/87; EILAM & TROP, 2012) environmental knowledge (cf. GODFREY, et al., 2012; GODFREY, 2011), or cross-cultural environmental behaviour (cf. CORDANO, et al., 2011).

1.3. Research Questions and Objectives

The major objective of this thesis is to investigate tourists' behaviour patterns towards solid waste in Sagarmatha National Park and Buffer Zone, Nepal. Three main objectives have been determined in this study: (1) to identify tourists' behaviours, attitudes, knowledge and consciousness towards solid waste, solid waste management and its possible affects on the SNPBZ, (2) to determine factors that have the greatest influence on tourists' waste behaviour, and (3) to develop an explanatory model to predict waste behaviours.

In this context, the research questions of this study can be summarized as follows:

- *What are tourists' behaviours, attitudes, and consciousness towards solid waste, solid waste management and its associated problems in the SNPBZ?*
- *Which factors have the greatest influence on tourists' behaviour towards solid waste and solid waste management in Sagarmatha National Park and Buffer Zone?*
- *How reliably can a model explain waste behaviour patterns among tourists?*

1.4. General Outline

The following chapter of this thesis starts with a description of the research background. After giving a short introduction to Nepal, the research region, Sagarmatha National Park and Buffer Zone, is discussed in more detail. An overview of its geographical setting and physical aspects will be provided; socio-economic and socio cultural aspects will be discussed in more detail. The tourism development and its impacts on the environment will be analyzed. A focus is set on the waste management situation in the SNPBZ, where current waste management practices and issues are discussed. *Chapter Three* will provide information on the the theoretical framework and theoretical dimensions of the research. It will first give a short review of relevant theories and concepts and will then present the developed research model. *Chapter Four* starts by describing the research methods. It provides information on the research design, hypotheses, indicators, questionnaire, study site, sample size, data collection and data analysis. *Chapter Five* presents the most important results of the data analysis ranging from general respondents characteristics to various question categories. Also, the results of the regression analysis are included. The following *Chapter Six* discusses the results, but also points out limitations of the study. This thesis ends with a concluding chapter, which provides final perspectives and research recommendations for sustainable waste management in the SNPBZ. The final conclusion highlightes key observations.

2. RESEARCH BACKGROUND

2.1. Research Region

This chapter starts with a brief introduction to Nepal and moves on to a detailed overview of the study site, the Everest (Sagarmatha) National Park and Buffer Zone, to provide a comprehensive contextual analysis.

2.1.1. Nepal

The mystical Himalayan kingdom on the roof of the world excites the imagination of foreigners and evokes exotic picture-perfect visions. The , fascinating peaks and fertile valleys attracts people from all over the world, determined to find the hidden Shangri-La in Nepal (STRONG, 1989, p. 1). Yet Nepal is one of the industrially less advanced countries in this world and faces several challenges ranging from social problems, political instability, and a variety of environmental issues.

Nepal is located on the southern slope of the Himalayas, situated between two big economic powers. To the north it is bound by the Tibetan Autonomous Region of the People's Republic of China and to the south and west by India. Based on its topography and climate, Nepal can be divided into four ecological zones: Lowland (*terai*), Midland (*pahad*, hills), Highland (*himal*, mountains) and Trans-Himalaya. (DONNER, 2007, p. 9)

The Lowland plains are comprised of a narrow area along the southern part of the country on the border with India. About 50% of the total population lives in the Terai. The altitude ranges from 60 to 280 meters above sea level and the climate is mainly tropical. The region is characterized by large rivers and flood plains, as well as tropical forest and extensive areas of agricultural land. (DONNER, 2007, p. 10; NEPALI & SHRESTHA, s.a., p. 1)

The Midland includes a large series of hill ranges, valleys and basins stretching across the middle of the country. The altitude ranges from 1000m to 3500m and the climate is subtropical to temperate. The two main cities, Kathmandu and Pokhara, are located in the valleys of this zone. Decreasing employment and education opportunities in the mountain regions has spurred migration into the valleys, leading to increased population pressure in recent decades. Extensive deforestation has taken place in the center and east of the country and soil erosion and landslides are increasing frequently during the heavy rains of the summer monsoon. (DONNER, 2007, p. 15; NEPALI & Shrestha, s.a., p. 1)

The Highland occupies all of the northern regions of Nepal from about 2,750m up to the highest summits on earth. In lower elevations there are coniferous forests, while rhododendron, birch and alpine meadows can be found at higher elevations. Barren rocky slopes and perpetual snows in the high mountain ranges make up almost one third of the total area of the country. Many areas in this zone are extremely remote, with access proving difficult; therefore, tourism is often the only way for the local population to generate income. (DONNER, 2007, p. 16; NEPALI & SHRESTHA, s.a., p. 1)

The relatively small Trans Himalayan Zone is situated in the northern part of Nepal. The region is significantly drier than the other zones, because it is located at the edge of the great Tibetan Plateau and in rain shadow of the Himalayas. (DONNER, 2007, p. 16; NEPALI & SHRESTHA, s.a., p. 27)

Nepal is not only a rich country in terms of geographical and climatic variations, but also has diverse varieties of ethnic, culturale, and social customs. The population of the 2011 census is about 26,5 million, with an annual average growth rate of 1.3%. The fastest decadal population growth rate (61%) and highest population density (4416 person/km²) is found in the nation's capital and largest city, Kathmandu. (NATIONAL PLANNING COMMISSION SECRETARIAT, 2012, p. 3)

Nepal is a country of mixed races, religions and languages. There were 125 caste and ethnic groups reported in the 2011 census. Chhetri is the largest caste (16,6%), followed by Brahman-Hill (12,2%), Magar (7.1%), Tharu (6.6%), Tamang (5.8%), and

Newar (5%). Nepal has more than 123 different languages and dialects; the majority of the Nepalese population practices Hinduism. (NATIONAL PLANNING COMMISSION SECRETARIAT, 2012, p. 3)

Poverty is very high, with an average gross national income of 700 USD per capita in 2012 and 25% of the population living under the poverty line in 2011 (INTERNATIONAL MONETARY FUND, 2012). Despite some improvement in reducing poverty in recent years, Nepal still remains one of the poorest countries in the world.

According to the 2012 Human Development Report (HDI), Nepal is ranked 157th out of 187 with an average Human Development Index of 0,463 (HUMAN DEVELOPMENT REPORT, 2012). However, the HDI can be criticized on a number of grounds including huge regional disparities within countries.

Nepal suffers from wide disparities across certain geographic areas and social groups (WORLD BANK, 1998). Living standards are worse in rural than in urban areas as the growing population has put heavy pressure on agricultural land. Especially women and people belonging to certain social groups and castes live a hard life in Nepal in terms of access to health care, nutrition, education and participation in decision-making. Literacy rates serve as indicators of these growing disparities, with illiteracy far more prevalent among women (42,6%) than men (24,9%). (NATIONAL PLANNING COMMISSION SECRETARIAT, 2012, p. 4; cf. INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT, 2012)

Politically, major changes have taken place in the 1990s. Nepal transformed into a constitutional monarchy with a pluralist system of political parties, but soon the system collapsed bringing chaos and political instability. This led to the Nepalese Civil War, which lasted from 1996 until 2006, claiming thousands of lives, displacing people and destroying livelihoods. In 2007 the monarchy was officially abolished and elections were held in 2008. Still, the country's state of political deadlock and confusion endures. (DO & IYER, 2010, p. 740)

Economically Nepal is characterized by backwardness caused by its topography, land locked position, weak infrastructure and lacking resources, modern institutions and policies. Nepal relies heavily on its neighbors for trade and is highly dependent on imports, as it hardly has any industry. Agriculture is Nepal's principal economic activity and provides livelihood for three quarters of the population. The major source of foreign currency is the tourism industry. In 2012 about 800.000 people visited Nepal with an annual growth rate of 9,1% (see Figure 2.1). (SCIENCE AND RESEARCH CENTRE, s.a.; WORLD BANK, 2013; MINISTRY OF CULTURE, 2013, p. 6)

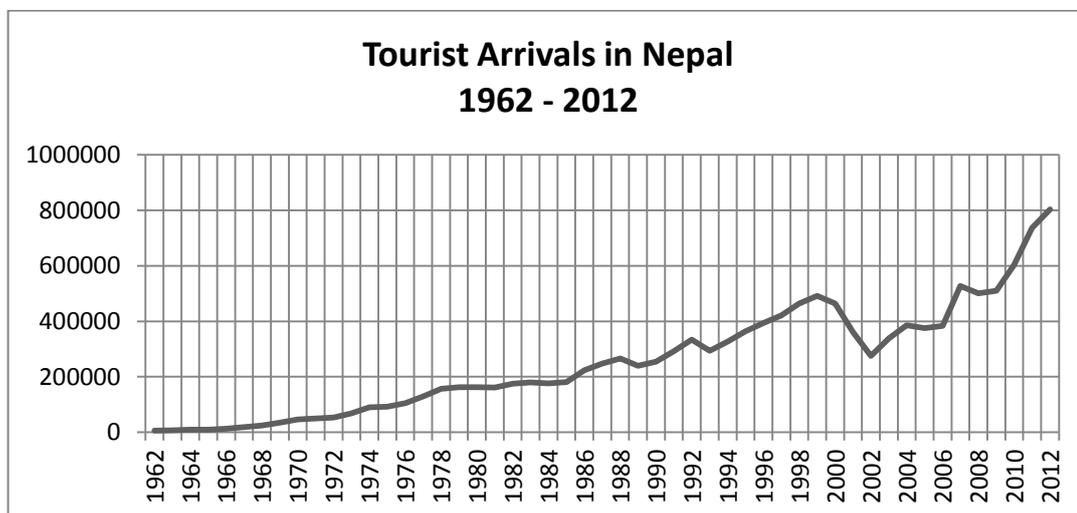


Figure 2.1: Tourist Arrival Nepal 1962 - 2012 based on MINISTRY OF CULTURE, 2013, p. 5

The increasing number of tourists provides a great opportunity for southern countries to develop their local economy and minimize poverty. It also has the potential to negatively affect the social and natural environment. Poorly-managed mass tourism can have devastating impacts, such as high dependence on the tourism industry and the development of ecological problems. Thus, it is important to manage tourism properly and promote long-term sustainability.

2.1.2. Sagarmatha National Park

This section will examine the physical features of Sagarmatha National Park and present an analysis of socio-economic and socio-cultural aspects.

2.1.2.1. *Physical Aspects*

Sagarmatha National Park is located in the northeastern part of Nepal and includes the world's highest mountains: Mt. Everest and several other peaks above 7000m. *Sagarmatha National Park (SNPBZ)* was officially created by the government of Nepal in 1976 and designated a UNESCO World Heritage Site in 1979. In 2002 the National Park was extended by a Buffer Zone with an area of 275 km², creating *Sagarmatha National Park and Buffer Zone* (cf. ZUSER, et al., 2011, p. 1; HKKH, 2009, p. 20).

Sagarmatha National Park and Buffer Zone is located in the administrative district of Solu-Khumbu in the north-eastern region of Nepal, which is part of the Great Himalaya massif. To the north it follows the international border with the Tibetan Autonomous Region of China. (see Figure 2.2) (STEVENS, 1993, p. 23).

The park and its Buffer Zone encompass an area of 1.148km², also known as "Khumbu" (HKKH, 2009, p. 11). The park is divided by four main river valleys, which are fed by long glaciers at the head of each valley: the valleys of the Dudh Kosi and the Bhote Kosi, and the two forks of the Imja Khola, the northern Lobuche Khola and the eastern Imja Khola (STEVENS, 1993, p. 23). While the park's core area covers the upper catchment of the Bhote Kosi, Dudh Kosi and Imja Khola river systems, the buffer area reaches down the Dudh Kosi valley to Lukla (SHERPA, 1985, p. 5). The Dudh Kosi is fed by the melting of the Ngozumpa glacier and the waters of several lakes which are situated at the foot of Cho Oyu and Gyachung Kang. The Dudh Kosi River crosses the entire Khumbu and is joined by the Imja Khola (which drains the eastern part of the Khumbu) and the Bhote Kosi of western Khumbu, before flowing into the Nepal midlands (STEVENS, 1993, p. 24).

The park is characterized by a rugged terrain of high mountains, glaciers, deeply incised valleys and constricted fluvial terraces with elevations ranging from 2,842 metres at Lukla, to 8,848 meters at the summit of Mt. Everest. Some of the world's highest peaks, such as Mt. Everest/ Sagarmatha (8,848m), Lhotse (8,501m) and Cho Oyo (8,153m) are situated within the national park boundaries. (cf. NEPAL, 2003, p. 34)

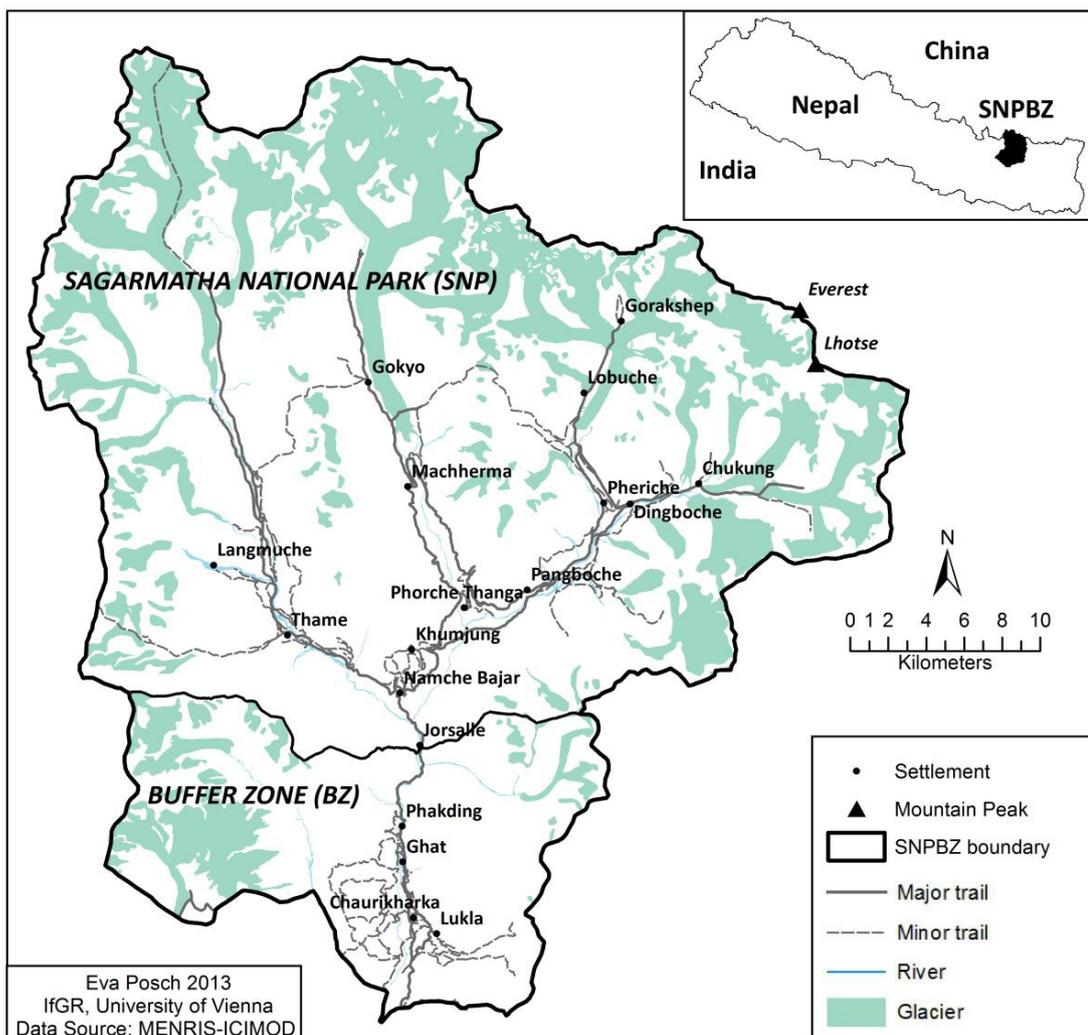


Figure 2.2. Sagarmatha National Park and Buffer Zone - Overview (based on Posch 2013)

Many of the two dozen glaciers in the SNPBZ show signs of retreat and as a consequence several glacial lakes have formed in recent decades (cf. RICHARDSON & REYNOLDS, 2000; SOLOMON, et al., 2007).

About 69% of the Park consist of barren land above 5,000m, 28% is grazing land, and only <3% is forested. Although the national park is small in size, it encompasses a broad range of bio-climatic conditions, including temperate, sub-alpine, alpine, and nival zones (HKKH, 2009, p. 20). According to NEPAL and BYERS, the SNPBZ can be roughly distinguished into five ecological zones based on altitude: (a) between 2800m and 3200m there is a small area consisting of lower montane temperate forest, (b) between 3200m and 3800m there is a lower belt consisting of temperate forests and woodlands, (c) between 3800m and 4200m there is the middle zone consisting of sub-alpine forests and shrubland, (d) and above 4200m there is the upper zone consisting of tundra vegetation with limited tree growth due to low temperatures and less precipitation (NEPAL, 2003, pp. 34-35; BYERS, 1986, p. 86). The high alpine meadows are followed by fir, birch, rhododendron, and juniper subalpine forests, which grow as high as 400m. Due to the warm and moist climatic conditions, the valleys below 2800m are either thickly wooded with temperate forests of fir, birch, and rhododendron or with grassland, shrubland, and open temperate woodlands of juniper and fir (STEVENS, 1993, p. 24). Among the population of wild animals found in the park, several are considered rare and endangered including the musk deer, red panda, Himalayan black bear, Himalayan tahr and snow leopard (NEPAL, 2003, p. 35; HKKH, 2009, p. 24). Additionally, many inhabitants and mountaineers believe that the yeti, a mystical creature and part of Buddhist people's history and mythology, wanders around the Khumbu Mountains (SPOON & SHERPA, 2008, p. 69).

The Everest Region is strongly influenced by the subtropical Asian monsoon regime in summer, as well as the dry winter snowfall (ZIMMERMANN, et al., 1986, p. 31; OSTI, et al., 2011, p. 1211). Summers are generally moist and cool, and on average, about 80% of the annual total precipitation occurs during the summer months from late May to mid-September (THOMPSON, et al., 2012, p. 2). During the winter months strong winds are common in higher elevations. Snowfall is not usually heavy and below 5,000m most precipitation falls as rain (STEVENS, 1993, p. 26). The rest of the year is fairly dry; October and May being the clearest weeks.

Himalayan glaciers are rapidly and increasingly retreating because of climate change (cf. RICHARDSON & REYNOLDS, 2000; SOLOMON, et al., 2007). Since several decades, the average air temperature rose by 1°C in the Himalayas, leading to receding glaciers and the development of glacial lakes in recent decades. (THOMPSON, et al., 2012, p. 1; UNESCO WORLD HERITAGE CENTRE, 2007) Potential consequences of glacier changes include the development of geo-hazards such as glacier-lake expansion and outburst floods.

The extremely fragile geological condition, and monsoonal precipitation regime make the Sagarmatha National Park and Buffer Zone a hazardous region. Natural hazards such as landslides, debris flows, rock falls and flooding occur, as well as frequent earthquakes and avalanches occur frequently (ZIMMERMANN, et al., 1986). In recent years Himalayan glaciers have attracted a great deal of public attention as glacial retreat and rapid glacial melt due to climate change increases cf. (RICHARDSON & REYNOLDS, 2000; SCHILD, 2008; SOLOMON, et al., 2007). The melting of glaciers leads to the formation and rapid expansion of glacial lakes, which are made of loose glacial debris and unstable moraine dams. Sudden and destructive outbreaks of these glacial lakes may occur any time, as the dam may collapse (THOMPSON, et al., 2012, p. 1). The sudden discharge of large volumes of water is known by a variety of terms but is often referred to as Glacial Lake Outburst Floods (GLOF) in the Himalayas. These GLOFs present a serious hazard to the region and are increasing in number and volume because of the continuing recession of glaciers in the context of climate change. (RICHARDSON & REYNOLDS, 2000, p. 32; SOLOMON, et al., 2007)

Continuing population growth, accelerated tourism development, and construction of unplanned settlements in high-risk zones further increase the vulnerability of this region to natural hazards.

2.1.2.2. Socio-economic and socio-cultural aspects

Having defined the physical aspects of the research region, I will now discuss its socio-economic and socio-cultural background.

Population, Ethnicity and Demography

The Khumbu region is traditionally inhabited by the Sherpas, who migrated from Tibet some 500 years ago and settled in Khumbu (BYERS, 2005, p. 115). They are the largest ethnic group in Khumbu and constitute about 90% out of the total population (TAMANG, 2011, p. 24).

The National Park is also home to other ethnic minorities such as the Rai, Tamang, Magar and Gurung, who have migrated to the region from the middle hills and lowland areas of eastern Nepal in search of employment and economic opportunities (SPOON, 2012, p. 46). Currently, more than 3000 to 4000 people live in the Khumbu region, about 2800 of these are permanent residents (SPOON, 2012, p. 44). Solu-Khumbu Sherpas speak Sherpa, a language distinct from the national language, Nepali, which is closely related to Tibetan (STEVENS, 1993, p. 33). Their culture and social structure has strong ties and many similarities to those of their Tibetans neighbors in the north, although both the Tibetans and the Sherpa consider themselves to be a distinct peoples (STEVENS, 1993, p. 34). Originally Sherpas were nomads and engaged in transhumance herding. After the introduction of the potato in 1850, they began to settle permanently (TAMANG, 2011, p. 23). Subsistence agriculture and trans-Himalayan trade became their main source of income, until tourism brought major changes to the region in the 1960s (see Chapter 2.2). The Sherpas of Khumbu are highly regarded as strong and brave mountaineers and are internationally respected. They gained this renowned reputation in climbing and mountaineering primarily in British expeditions during the first half of the 20th century. (STEVENS, 1993, p. 31)

Settlements and Infrastructure

In total there are about 60 to 100 small and large settlements within the park and eight major settlements, most in altitudes between 3,400m and 4,000 meters. The main permanent villages occupy some of the few reasonably flat areas at 3400–4000m and include: Lukla, Namche Bazaar, Khumjung, Tengboche, Pangboche, Phortse, and Jorsalle. The smaller subsidiary settlements have been transformed to permanent or semi-permanent tourist villages (HKKH, 2009, p. 20).

Lukla is situated at 2860m at the gateway to the Everest region, as it is connected by regular air service. The nearest road is at least six to seven days walking distance from Lukla. Located on a hill slope at 3440m, Namche Bazar is the main economic center of the region, a major settlement, and a major stop-off point for trekkers and expeditions. Namche has prospered immensely from the tourist trade and is one of the wealthiest villages in Nepal, despite being physically isolated by mountainous terrain (STEVENS, 1993, p. 53; LUGER, 2000, p. 14).

From the 1970s on, several significant institutional changes were introduced in the SNPBZ. One of the most important was the establishment of Sagarmatha National Park in 1976. With increasing trekking tourism in the 1960s, the standard of living improved quickly, leading to the establishment of schools, hospitals, a bank and post office. Other important developments include the construction of the Lukla airstrip in the 1960s and the arrival of electricity to the region in the 1980s. (STEVENS, 1993, p. 56)

Profound changes in the Sherpa's economy and standard of living led to a significant increase in the number of households in many villages of the SNPBZ since 1957. According to Stevens, 73 households were found in Namche, swelling to 123 in 1991 (STEVENS, 1993, p. 41).

Local Economy

The traditional Sherpa economy is based on pastoralism and subsistence agriculture, supplemented by trading with people of the middle hills of Nepal and Tibet. For many centuries these were the main sources of income for communities. They relied on high

altitude crop varieties such as potatoes, barley and buckwheat and on yaks for wool and meat, which was traded for salt from Tibet. Since the 1950s a number of factors have profoundly changed the economy and lifestyle of the Sherpa. The traditional trading route between the Tibetan and Sherpa people was closed due to Chinese occupation, forcing the Sherpa to look for new sources of income. This coincided with the opening of Nepal's borders to foreigners— soon the local economy became more and more dependent upon mountaineering and trekking tourism. The impacts of tourism on the Khumbu have been dramatic, leading to a quick transition from a traditional subsistence economy to a great reliance upon supplementary cash income. Activities such as the provision of guides and porters, and the construction of shops and lodges, enabled the Sherpa people to earn cash income. (DONNER, 2007; Luger, 2000, p. 17; MILLER, 1997, p. 19; Nepal, 2003, p. 37; SHERPA, 1985, p. 9; SPOON, 2011, p. 659; STEVENS, 1993, p. 43ff)

Religion and Culture

The Sherpa are followers of Tibetan Buddhism with different elements from folk and Bon Buddhism. Sherpa Buddhism respects divinities and powers in the natural landscape such as *beyul* (sacred valley), *lu* (spirits of springs and trees), and *yul lha* (regional mountain gods). The main local protector of Khumbu is said to be the powerful mountain god Khumbu Yul-Lha, considered too sacred to be climbed. (STEVENS, 1993, p. 34; SPOON, 2011, p. 660f)

The Khumbu was traditionally used for meditation retreats by Tibetan people; now several religious buildings including monasteries or gompas, temples, and chorten or stupas are scattering the mountain sides (TAMANG, 2011, p. 27).

2.2. Tourism Development in the SNPBZ

This chapter highlights the impacts of tourism development on *Sagarmatha National Park and Buffer Zone*. A short overview of tourism development and the current management situation will be provided.

2.2.1. Early Years of Tourism

Tourism is a recent phenomenon in Nepal, as the country's borders were closed to foreigners until 1951 (SPOON, 2012, p. 45). After the first successful ascent of Mt. Everest in 1953, mountaineering became strongly established in the Khumbu region. During the ban of foreign mountaineering expeditions from 1965 until 1969 by the government of Nepal, several mountain areas, including Khumbu, were opened to ordinary trekking tourists. In the late 1960s, when mountaineering started to flourish again, tourist numbers began to increase rapidly because of improved access, promotion, and publicity. Himalayan trekking tourism was born. (cf. STEVENS, 1993; NEPAL, 2003; HKKH, 2009)

After the first airport was constructed in Lukla, access to Khumbu was much easier and the tourism economy grew exponentially – from a mere twenty trekkers in 1964 to over 20.000 in 2000 (see Figure 2.3) (STEVENS, 2003, p. 259). The tourism industry suffered considerably during the Nepalese Civil War, when political unrest and violence hit the country from the 1990s until 2006. Fewer than 14.000 visitors reached Khumbu in 2001/02, but soon trekking tourism recovered, with more than 35.000 people visiting in 2012 (see Figure 2.4) (MINISTRY OF CULTURE, 2013, p. 52; SPOON & SHERPA, 2008, p. 95; STEVENS, 2003, p. 259).

Today, tourism ranging from organized or individual trekking groups to professional climbing and expedition groups is the main source of income and employment in Khumbu.

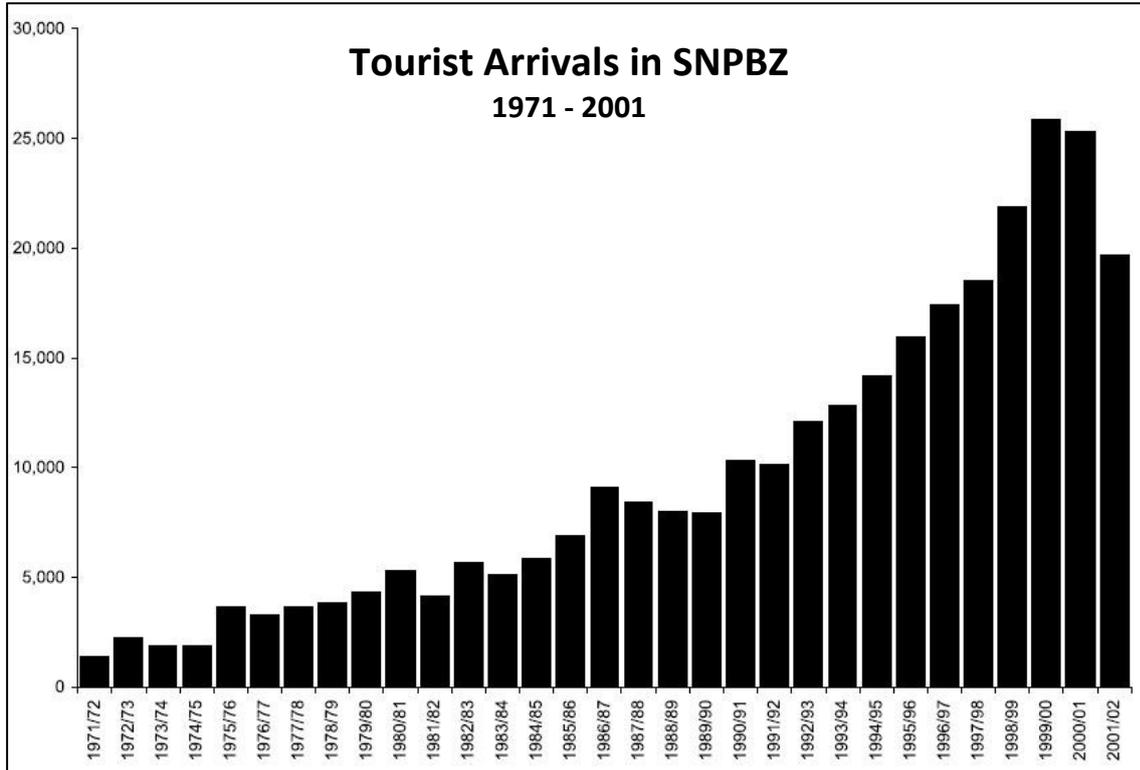


Figure 2.3: Tourist Arrivals, Khumbu 1971-2001 (STEVENS, 2003, p. 259)

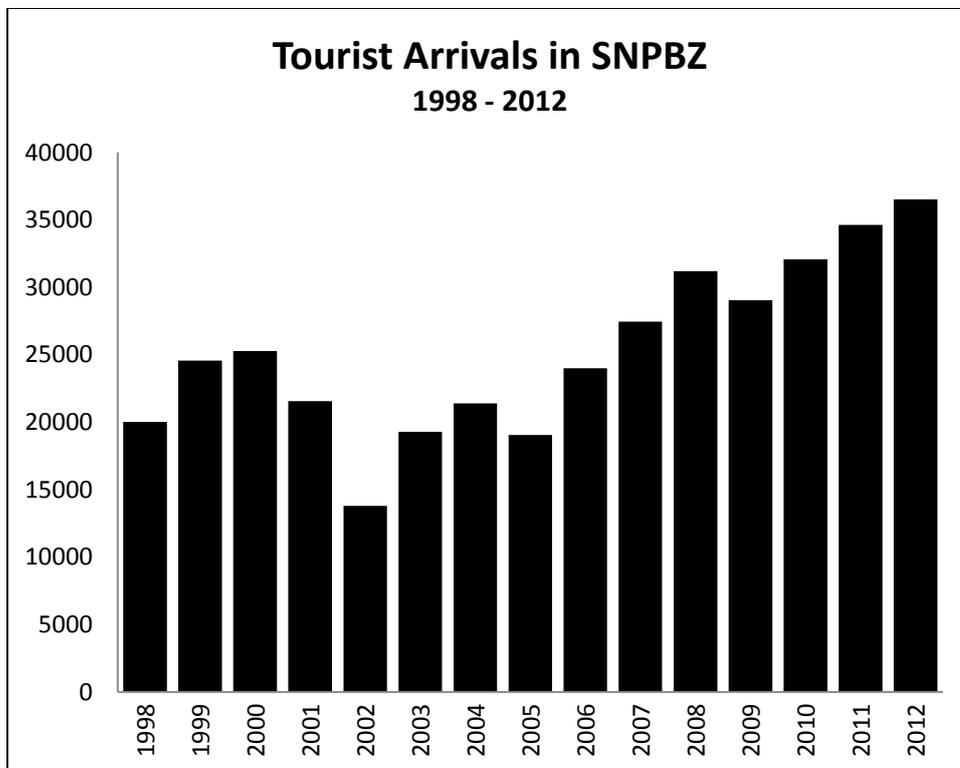


Figure 2.4: Tourist Arrivals in the SNPBZ 1998-2012
(based on MINISTRY OF CULTURE, TOURISM & CIVIL AVIATION 2012:53)

2.2.2. Characteristics of Tourism in the SNPBZ

The National Park is accessible by foot or plane, although the vast majority of visitors arrive by plane from Kathmandu to Lukla. The nearest road is six to seven days walk away. During the high season up to 60 flights per day land in Lukla, transporting up to 500 people (HKKH, 2009, p. 43). The most popular times of year to visit this area are between October-November and April-May because the weather remains clear. Most of the trekkers originate from United States, Western Europe, Australia, New Zealand and Japan, although the total number of nationalities entering the park is quite large (SPOON, 2012, p. 45; PAWSON, et al., 1984, p. 240). The main age group of tourists to SNPBZ is 30-39 (GHAZALI, et al., 2004, p. 308). The average length of stay for a tourist is between 13 and 15 days, corresponding to the number of days needed for the popular Everest Base Camp Trek (HKKH, 2007, p. 49). Generally, there are two major groups of visitors: those trekking in an organized group and those trekking independently. While more than 80% are trekking in a group, only about 15% trek individually. (HKKH, 2007, p. 52) Modes of travel, expenditure patterns, and required guide and portering services differ widely between these two types of trekkers (NEPAL, 2003, p. 62).

Currently, tourist destinations in *Sagarmatha National Park* are heavily concentrated in places such as Tengboche, Kala Pattar and Everest Base Camp in the Imja Khola Valley. These congregated settlements tend to make their access routes overcrowded in peak seasons (HKKH, 2009, p. 43). It is not surprising that with an average of 400 tourists entering the park every day in the peak season, “traffic jams” along the main trails are often encountered (GHAZALI, et al., 2004, p. 310). The Lukla-Namche corridor is an especially used route, as it provides the main access to the Park (NEPAL, 2003, p. 64). Fewer tourists visit the Dudh Kosi and Nangpa Valleys (SPOON & SHERPA, 2008, p. 95). Situated on the trail to the Base Camp of Mount Everest, Namche Bazar has developed into a main tourist center and is the most frequented place within the region (see Figure 2.2).

2.2.3. Changing Local Economy and Settlement Characteristic

An increase in visitors has led to great changes in the Sherpa's economy, which traditionally relied on animal husbandry, agriculture and trading activities (STEVENS, 1993). When the political situation in Tibet brought an end to trans-Himalayan trade in the 1950s, this coincided with the rise of mountaineering and trekking tourism (LUGER, 2000, p. 24). Khumbu Sherpas became soon very involved in the trekking industry, particularly during the two main trekking and expedition seasons in October-November and April-May (STEVENS, 1993, p. 362). Trekking tourism takes three different forms: offering porter and guide services, keeping a lodge and a restaurant, or running a tourist shop (NEPAL, 2003, p. 38).

Providing accommodation and food has been the most important way to generate income for most local households in the park, and is a highly lucrative business. Especially in traditional pastoral settlements such as Pheriche, Gokyo or Lobuche, the hospitality business has replaced the traditional farming and herding activities for many locals, transforming private homes into tourist lodges (HKKH, 2009, p. 21). Existing services and facilities available to trekkers and mountaineers are steadily increasing as demand for more and improved accommodation increases (NEPAL, 2003, p. 38). New lodges are still being constructed, and existing ones modified and expanded despite the increased costs of construction due to remoteness. The number of lodges has increased from only a handful in 1973 to 17 in 1980, 74 in 1990 and 224 by the end of 1997 (TAMANG, 2011, p. 39). Now there are more than 500 lodges (as of 2008) in the SNPBZ, concentrated in Namche Bazaar and Lukla, where 25 per cent of lodges can be found (NEPAL, 2003, p. 66; HKKH, 2009, p. 46). To satisfy diversified tourist demands, several service-based enterprises have been established in the park such as art and cultural centers, bakeries, laundry services, video halls, snooker halls, massage parlors, internet cafés, restaurants and a huge number of various shops with imported consumer goods (NEPAL, 2003, p. 73f)

2.2.4. Impacts on socio-economic and socio-cultural Aspects

Tourism generates much revenue in Nepal and is the cornerstone of the local economy in the SNPBZ. According to NEPAL (2003, p. 38), tourism provides income and employment opportunities for 60 to 80 % of the local population. Besides the improvement of living standards, educational facilities and general health conditions, there are also negative aspects of tourism expansion. An economic monoculture has been established and revenue has become concentrated exclusively in a few households. As SPOON (2011, p. 662) remarks, distribution of significant benefits from tourism depend on specific demographics: *“households who lived on the tourist route benefited more from their increased market integration in the form of lodges, teashops, shops and tourism services”*. To contrast, households living off-trek were generally less integrated, working only as seasonal porters, and relying on income from animal husbandry and subsistence agriculture (SPOON, 2012, p. 95; TAMANG, 2011, p. 26). People living off the trekking route suffer from overpriced food products, which are now almost twice as high as in Kathmandu (LUGER, 2000, pp. 14, 19).

With improved living standards and new employment opportunities in the tourism sector, work-related migration from neighboring highlands by ethnic groups such as the Rai and Tamang has taken place, posing new socio-cultural challenges (NEPAL, 2003, p. 39). In general, Sherpa people tend to be more involved in lucrative asset-holding and higher-level management employment (e.g. owning or renting a lodge, teashop or a shop) than in basic low-wage positions such as hauling water, collecting firewood, cooking, cleaning and portering. The latter positions are often stigmatized as lower-level tourism positions (SPOON, 2011, p. 662; SPOON, 2012, p. 46). As SPOON (2011, p. 662) summarizes: *“integration into the tourism economy has brought a level of economic security for some tourism operators and insecurity for many others”*.

Only a limited number of villages, such as Namche Bazar and Lukla, significantly benefit from the increasing flow of tourists into Sagarmatha National Park due to its prime location on the trekking route to Everest Base Camp. Tourism based activities have

exacerbated income inequality, as not all households are involved in high paying trekking or mountaineering employment due to their location off the main tourist trek. Other negative impacts of tourism development affect the whole region. A considerable amount of literature has been published on the social transformation of traditional Sherpa culture in recent decades. Many authors argue that social patterns and structures had changed, including the loss of cultural values, local identities and local languages. However, several studies claim that Sherpas adapted successfully without losing their main cultural values. (TAMANG, 2011, p. 40; LUGER, 2000, p. 25; STEVENS, 1993)

2.2.5. Environmental Impacts

Not only does tourism generate economic benefits, but also many environmental impacts on the fragile alpine environment. Tourism now dictates land-use in the National Park. In order to accommodate tourism activities, settlement development and expansion patterns were heavily influenced and resource collection and grazing systems changed (SPOON & SHERPA, 2008, p. 95). The influx of trekking tourists is highly seasonal and unevenly distributed throughout the region; both infrastructure and the environment are unable to deal with the invasion of visitors.

STEVENS (1993, p. 399) highlights that *“tourism has both accentuated old pressures on Khumbu's natural resources and environment and introduced new ones”*. Further, STEVENS (1993, p. 399) identifies that *“the impact of tourism on Khumbu forests and the increasing accumulation of trash along the trails and at camping and lodge sites have been among the most widely reported Himalayan environmental problems”*.

With rising tourism in the late 1960s and early 1970s came an increased demand for firewood, which was used as a main energy source for cooking and heating. The increased use of wood resulted in a thinning of forests, especially in and around the

villages of Namche Bazaar, Khumjung and Khunde. The impact tourism had on forests was severe and led to problems of rapid deforestation. (NEPAL, 2003, p. 38; STEVENS, 1993, p. 404)

In the late 1970s expeditions were banned from using fuel wood for cooking and heating and local inhabitants were banned from using trees for construction purposes. Initiatives have been taken to develop alternative sources of energy and reduce fuel use (for example hydroelectric projects, installation of solar water heaters). Still, the demand for more and improved lodges continues to increasing in order to cope with peak tourist seasons. Lodge development, expansion, upgrading, and remodeling often requires wood as the main construction material. As cutting trees in the national park is prohibited, forests outside the park boundary are put under more and more stress. (NEPAL, 2003, p. 39; SALERNO, et al., 2010, p. 116; STEVENS, 1993, p. 405; STEVENS, 2003, p. 4)

It is reasonable to assume that building more lodging is not a sustainable solution (HKKH, 2009, p. 43). Another problem caused by heavy tourist traffic and overcrowding is increasing erosion of trails in the Everest region (c.f. BYERS, 2005; NEPAL, 2002; 2003). Concentrated visitor activity in the national park generates considerable amounts of solid waste, which may pollute water and soil through improper storage and disposal. As the number of tourists increases each year, so does the accumulation of rubbish (NEPAL, 2003, p. 40). The next subchapter analyzes this growing environmental problem in detail.

2.3. Solid Waste Management in the SNPBZ

Thus far this paper has focused on the physical, socio-economic and cultural aspects of the research region and has highlighted its tourism development. The following section will provide an outline of solid waste issues in the study region. As population and tourism growth increases, so do waste management problems. Developing countries face especially serious challenges in waste management. As ZURBRÜGGE (2002, p. 2) summarizes, typical problems can be identified: *“inadequate service coverage and operational inefficiencies of services, limited utilization of recycling activities, inadequate landfill disposal and inadequate management of hazardous and healthcare waste”*.

In mountainous areas with high concentrations of tourism, waste which is not properly and effectively managed is one of the major environmental issues (MANFREDI, et al., 2010, p. 127). The increasing amount of litter, solid waste and garbage produced by trekking tourists, mountaineering groups and local shop and lodge owners diminishes the attractiveness of the region to tourists. Further, it also poses a significant environmental threat to human health and the fragile ecosystem of Sagarmatha National Park and Buffer Zone causing air, soil and water pollution (NEPAL, 2003, p. 40; STEVENS, 1993, p. 401).

During the 1980s the accumulation of rubbish worsened dramatically due to the increasing number of mountaineering expeditions and trekking tourists. Renowned tourist stops such as Namche Bazaar and Tengboche Monastery have been particularly affected by the waste issue (cf. NEPAL 2003). As a result of the uncontrolled and accelerated growth of the tourist industry, Everest Base Camp Trek was labeled *“garbage trail”* and the Everest region soon gained the reputation of being *“the world’s highest junkyard”* (HILLARY, quoted by SHARMA in NEPAL, 2003, p. 39).

2.3.1. Solid Waste Categories, Generation Patterns and Proportions

This thesis has focused on solid waste, including garbage generated by households, shops, markets, offices, open areas, and treatment plant sites; however, it has excluded human waste management. (UNITED NATIONS, 2000, p. 6)

The accumulated waste left behind by trekkers and mountaineers ranges from food packages, wrappers, bottles, glass and metals to hazardous waste items such as batteries, medical supplies and light bulbs. All of these materials accumulate quickly and pose serious disposal problems. Waste characterization enables one to understand the different categories, compositions and proportions of waste in the SNPBZ in order to identify appropriate management options (KUNIYAL, 2008, p. 186). Based on the findings of ZUSER et al. (2011) and MANFREDI et al. (2012), solid waste in the SNPBZ can be grouped into the following categories: burnable waste, non-burnable waste and kitchen waste (see Table 2.1). The latter is not taken into account, as it is normally used as fodder for livestock and therefore ideally treated (ZUSER, et al., 2011, p. 5).

Table 2.1: Waste composition in the SNPBZ according to ZUSER, et al., (2011) and MANFREDI, et al. (2010)

burnable waste	non-burnable waste
paper	metals
plastics	glass
textiles	batteries
plastic bottles	compact fluorescent lamps
	medical supplies

As the names imply, burnable waste is burned, and non-burnable waste is dumped. Batteries, compact fluorescent lights (energy-saving lamps), and used/unused medical supplies generated by tourists and hospitals are often termed hazardous waste.

Hazardous waste is not separately treated in the SNPBZ and is presently added to landfill sites. (ZUSER, et al., 2011, p. 5)

Daily average waste generation in the SNPBZ depends upon the number of visitors and permanent residents, which consequently depends on the time of year. Therefore, the waste accumulation pattern is unequally distributed. Considering the seasonal fluxuations of the tourism industry, solid waste amounts to around 4,6t/day during the tourist season and only 2t/day during the off season (MANFREDI, et al., 2010, p. 134).

ZUSER et al. (2011) and MANFREDI et al. (2010) conducted waste quantification surveys during the tourist seasons in October-November and April- May, when a high number of visitors are present in the park. According to ZUSER et al. (2011, p. 13), the average amount of solid waste produced in a lodge by one trekker in one day is calculated to 213g/(trek*d), whereas MANFREDI et al. (2010, p. 134) calculated 123g/(trek*d). Permanent residents in the park produce 15-20% less, with the average amount of solid waste generated totalling 109g/d (MANFREDI, et al., 2010, p. 134).

The spatial distribution of waste generation differs widely. Major settlements in the park such as Namche Bazaar, Lukla and Tengboche host a high number of lodges and shops and consequently produce more waste. MANFREDI et al. (2010, p. 136) provides a detailed investigation of total daily waste generation in the SNPBZ. Selected examples are provided in Table 2.2, showing the total number of households in one settlement and their total daily waste generation per day. As can be seen, daily waste generation is highest in the two major settlements, Namche Bazaar and Lukla.

According to ZUSER et al. (2011, p. 16), the daily average composition of waste generated by tourists consists mainly of residues (a mixture of small pieces of paper), plastic, kitchen waste (organic waste not useable as fodder), brushing (mineral dust), and a significant amount of used toilet paper (see Table 2.3). The share of glass items is relatively small (5,2%) due to the import ban on glass bottles into the park some years ago. Plastic items and PET bottles compromise together 21.4% of collected waste and are currently the most problematic waste type in the SNPBZ, as they accumulate in large quantities and are widely spatially distributed. (ZUSER, et al., 2011, p. 16)

On a different aggregation scale, this means that 87% of the waste is currently considered as burnable waste and 13% is considered to be non-burnable waste.

Table 2.2: Waste generation in different settlements in the SNPBZ (MANFREDI, et al., 2010, p. 136)

Settlement	Total households per settlement	Total daily waste generation (kg day⁻¹)
Lukla	153	501
Phakding	84	351
Monjo	18	47
Namche Bazaar	141	835
Tengboche	11	60
Pheriche	22	105
Dingboche	52	426
Khumjung	230	469
Thame	45	265

Table 2.3: Solid waste composition in the SNPBZ according to ZUSER, et al., 2011, p. 16

Plastic Other	13.8%	Metal Other	5.6%
PET	7.6%	Paper/Cardboard	22.4%
Aluminium	2.1%	Textiles	3.6%
Glass	5.2%	Residues	39.7%

2.3.2. Solid Waste Management Practices

According to its classification, there are different disposal methods and treatment options for solid waste in the SNPBZ. Classified burnable waste is either burned in incinerators or open landfill sites to reduce volume, while non-burnable waste is dumped and buried at landfill sites. Waste can also be assigned to other disposal

methods such as reusing, recycling and relocation; however, these methods are only implemented for expedition waste, such as empty LP gas bottles.

The Sagarmatha Pollution Control Committee (SPCC) and other local community initiatives are responsible for the collection, separation and treatment of solid waste. The SPCC is a Sherpa-run nonprofit organization and was established in the early 1990s to help control pollution. Proper waste management is their main activity, including the regular collection of rubbish and its separation into burnable and non-burnable waste items from lodges in Namche Bazaar and Lukla. Other activities include: the supervision of returned waste from expedition groups, the management of several clean-up campaigns, the construction of waste pits, the placement of rubbish bins along trekking routes, the employment of staff, the environmental education of youth, the publication of booklets and brochures, and the creation of tourist information centers. (DHAKAL, 2009, pp. 79-81; RGS, 2009)

Since the mid-1990s every expedition group has to register their climbing permit, equipment, and list of food items at the SPCC office in Namche. They are responsible for bringing back rubbish accumulated during their expedition, which is checked and collected by SPCC staff (DHAKAL, 2009, pp. 79-80). Each expedition must make a refundable deposit to the Ministry of Tourism, which will be returned along with accumulated waste¹.

The existing waste management system in the SNPBZ is rudimentary, with limited resources and capacities, leading to improper management. Classified non-burnable waste items are often dumped and burned in open landfill sites, posing a serious hazard to environmental and human health. The potentially harmful effects of these currently inadequate waste disposal practices include surface and groundwater pollution, soil contamination and air pollution. Due to poor incineration practices, significant emissions of heavy metals and hazardous organic compounds are generated. Another disadvantage of the incineration approach is that a large number

¹ <http://www.tourism.gov.np/>

of landfill sites are uncontrolled and scattered throughout the park, with no regard for the geo-environment. (cf. ZUSER, et al., 2011; MANFREDI, et al., 2010, pp. 139-140)

The establishment of a sustainable waste management system is one of the key challenges for the SNPBZ. New waste management practices must be carefully developed, not only to avoid pollution, but also to avoid alienating local religious beliefs. Burning waste items is considered dangerous by many Sherpa peoples, as it might insult mountain spirits (STEVENS, 1993, p. 401). Regional infrastructure planning of landfill sites is one important step toward sustainable waste management. A reduction in the number of dumping and landfill sites is advisable and proper location analysis and management for the remaining sites should be applied, as labor migration and tourism development is expected to exacerbate the waste management situation. Another important step is increasing public awareness and promoting knowledge about waste management among visitors and local inhabitants.

2.3.3. Waste Issues

There are several options for solid waste disposal including landfilling, open burning, incinerating and uncontrolled dumping. Problems associated with dumping and landfilling can be classified into three generalized categories: land scarcity, health impacts, and environmental impacts.

Incinerating describes the process of reducing waste to inert residues by high temperature combustion. Advantages arising from the use of this technology include waste volume reduction and rapid disposal. However, this method has the potential to produce negative environmental impacts, including severe air pollution if abatement mechanisms are not implemented. These problems arise from a high release of pollutants and the creation of harmful substances, such as dioxins, during the incineration process. (LETT SOME, 1998, pp. 191-193; UNITED NATIONS, 2000, p. 5)

The accumulation of solid and human waste not only causes severe environmental pollution and degradation, but is also harmful for humans through health problems associated with pollution of ground and surface water and hazardous hygienic conditions. Another problem is air pollution caused by toxic gas emission from the burning of plastic and synthetic materials. Due to poor burning practices in open pits, considerable amounts of PCDD/PCDF are emitted into the surrounding air and soil. The burning of plastic bottles leads to the release of dioxins and furans into the environment and should be avoided. (MANFREDI, et al., 2010, pp. 129, 134; ZUSER, et al., 2011, p. 22)

Accumulated waste also leads to a reduction in the visual and aesthetic value of the landscape (KUNIYAL, 2005, p. 193). Another major issue is the contamination of water resources. This occurs due to insufficient management capacities and inadequate disposal and wastewater treatment facilities. Landfill sites are situated close to seasonal water courses which are subsequently prone to regular flooding during the monsoon season, facilitating contamination of water sources. Furthermore, human waste contaminates streams and rivers. Sewage and wastewater contributes significantly to the degradation of water quality due to microbiological contamination and fecal pollution (MANFREDI, et al., 2010, pp. 128-130). Several studies indicate a strong microbiological contamination linked to improper human and animal organic waste disposal (AMORUSO, et al., 2011, p. 2). Toilets are built too close to streams and drinking water sources, and septic tanks are either missing or prone to leaching (GHIMIRE, et al., 2013, p. 27). Studies on human waste in the SNPBZ are provided in AMORUSO, et al., 2011; MANFREDI, et al., 2010; GHIMIRE, et al., 2013. This paper will focus mainly on the impact of solid waste on the environment.

2.3.4. Waste Hierarchy

A fundamental aspect in general waste management discourse is the waste hierarchy. The concept of waste hierarchy is a classification of preferred waste management options such as reduction, reuse, recycling and recovery (EUROPEAN COMMISSION, 1997, p. 13) (see Figure 2.5). It must be recognized that there is not a "package solution" for solving waste problems. Moreover, it seems apparent that *"the waste hierarchy is too rigid to be relevant for waste management in countries with developing economies"* (McDOUGALL, et al., 2001, p. 26). Still the waste hierarchy represents the fundamental and principal aspects of waste management, such as waste avoidance and minimization, and should be acknowledged in waste management decisions (ZURBRÜGG, 2002, p. 11).

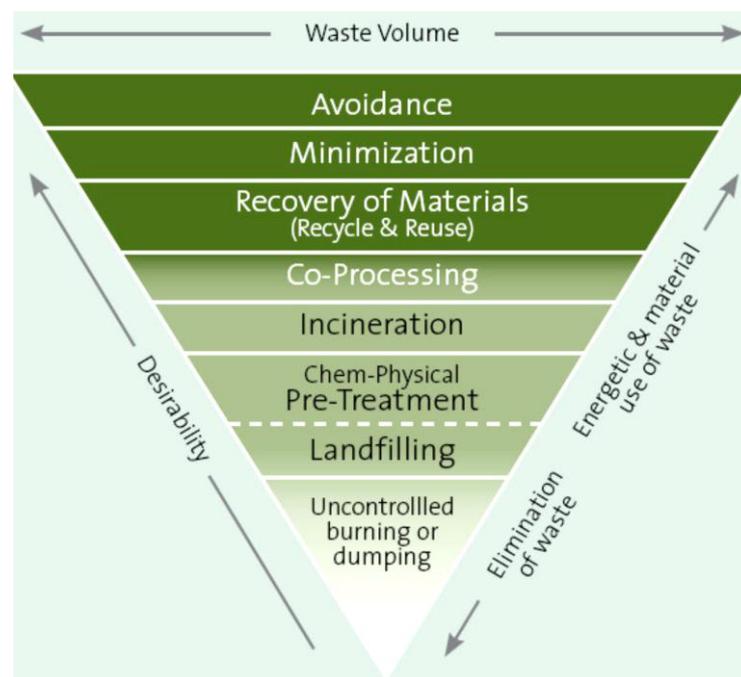


Figure 2.5: Waste Hierarchy (Source: HOLCIM, 2005, p. 9)

The application of the waste hierarchy may point the way toward *Integrated Sustainable Waste Management (ISWM)*, which has been developed out of experience, to address waste problems in low and middle income countries. This

approach provides a comprehensive waste management framework for the region (cf. KLUNDERT & ANSCHÜTZ, 1999; *ibid.* 2001). As waste generation is linked to the life-cycle of products and materials, *reusing* and *recycling* is desirable. This includes activities such as encouraging visitors to bring their own water bottles, instead of buying plastic bottles, in order to reduce waste and antimony emissions (cf. ZUSER, et al., 2011, p. 37). Additionally, awareness raising initiatives need to be implemented to educate visitors and local inhabitants.²

² EcoHimal, an Austrian based NGO, is the major actor in SNPBZ for several years and successfully implementing several environmental projects (cf. www.ecohimal.org)

3. THEORETICAL FRAMEWORK

3.1. Review: Theories of Behaviour

Over the last decades, theories of behaviour have been developed that are mainly rooted in the disciplines of psychology, sociology and economics. Theoretical frameworks are useful in explaining people's behaviour and provide valuable insight for planning interventions; however, no definitive answers have been identified (TIMLETT & WILLIAMS, 2011, p. 1382).

Three social-psychological theories developed in the United States during the 1960s are most frequently used to explain how individuals behave, particularly where environmental problems exist (KOLLMUSS & AGYEMAN, 2002, p. 240). Unlike economic theories, which declare that an individual's actions are rational choices, social-psychological behavioural models acknowledge the context of the actor's environment and the importance of social factors (TIMLETT & WILLIAMS, 2011, p. 1382). The next sections provide an overview of the main theories, which are used as a theoretical foundation for this thesis.

3.1.1. Theory of Reasoned Action

The Theory of Reasoned Action (TRA) was proposed by AJZEN and FISHBEIN (1975, 1980) in the context of social psychology and is widely used and respected. A number of authors have successfully used the theory to predict behaviour patterns and to examine the relationship between attitudes, subjective norms, intentions and behaviour (see Figure 3.1) (BORTOLETO, et al., 2012, p. 2195; BARR & GILG, 2005, p. 230)

The theory suggests that individual behaviour is driven by *behaviour intentions*, which is a function of two factors: an individual's attitude toward the behaviour and the subjective norms of the behaviour. An individual's *attitude* relates to his/her perceived

positive and negative feelings toward performing the behaviour in question, its desirability, and his/her subjective evaluation of these consequences. Attitudes do not determine behaviour directly, rather they influence behaviour intentions, which are also influenced by social pressures. *Subjective norm* refers to social pressure and can be defined as an individual's perception of whether people think the behaviour should be performed. The influence of an individual's opinion is weighed by the motivation to comply with a given act. If the behaviour in question is evaluated positively and if a reference group's perceived power wishes to comply with the behaviour, this will result in a higher degree of intention. The stronger the intention to perform the behaviour, the greater the probability that this behaviour will be performed. Thus, an individual's intention to perform a certain behaviour has been considered the best predictor of a single action. (BORTOLETO, et al., 2012, p. 2195) (GODFREY, et al., 2012, p. 2164)

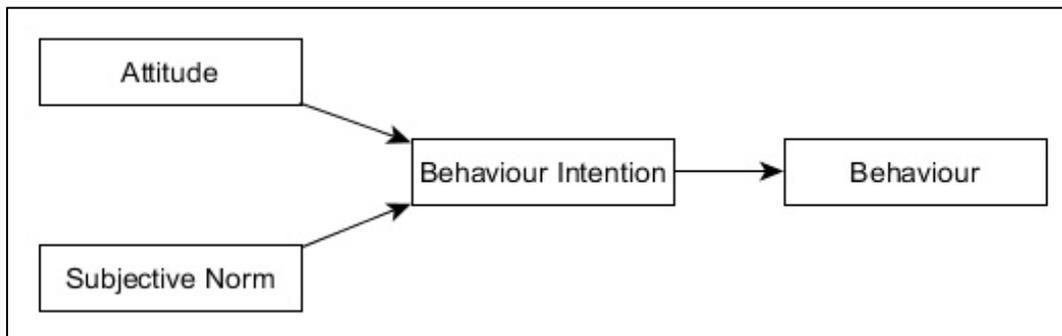


Figure 3.1: Theory of Reasoned Action (based on FISHBEIN & AJZEN, 1975)

One problem is that there are too many variables influencing behaviour and the intention to act. Second, people do not always behave in accordance with their intentions even if willingness is present. Several studies have questioned the relationship between intention and behaviour (cf. Barr, 2007, p. 442; Godfrey, et al., 2012, p. 2165) and these limitations suggest that the TRA may not be the most appropriate framework for examining environmental behaviour.

3.1.2. Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) was adapted by AJZEN in the 1985 and can be seen as an improved version of the TRA. The theory is considered one of the most influential models in social psychology and is probably the most frequently and successfully applied for explaining a broad range of environmental behaviour. (STEG & VLEK, 2009, p. 311; KOLLMUSS & AGYEMAN, 2002, p. 2164; KARIM GHANI, et al., 2013)

According to the TPB (illustrated in Figure 3.2), behavioural intention is only determined by attitudes toward behaviour and subjective norms, but is extended by a third variable, perceived behavioural control. *Perceived behavioral control* is defined as one's perceived ease, difficulty or perception about the existence of factors that facilitate or hinder the performance of a certain behaviour (AJZEN, 1991, p. 188). As AJZEN (1991, p. 188) states: *"the more favorable the attitude and subjective norm with respect to a behavior, and the greater the perceived behavioral control, the stronger should be an individual's intention to perform the behavior under consideration"*. Additionally, AJZEN (1991) proposed that perceived behavioural control may not only have an impact on behaviour intentions, but also a direct effect on behaviour. GODFREY et al. (2012, p. 2165) adds that when a person does not possess required knowledge, skills or ability, there is little correlation between behavioural intention and actual behaviour.

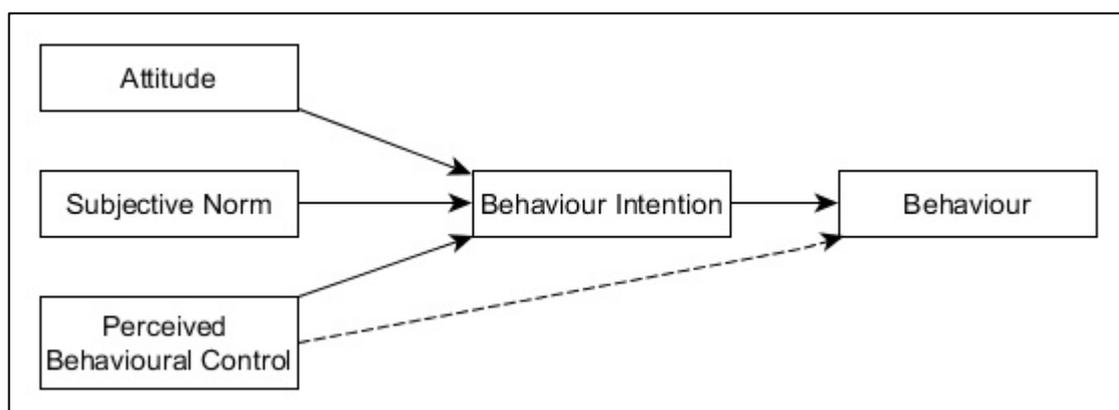


Figure 3.2: Theorie of Planned Behaviour (based on AJZEN, 1991)

Despite the empirical support TPB has received over the years, questions have been raised concerning the conceptualization of perceived behaviour control. Another fundamental issue is related to predicting behaviours from intentions. Most studies are limited by what they can discover through questionnaires or interviews. Actual behaviours are rarely measured and predicted behaviours have generally been interpreted as intentions.

Other measurement discrepancies occur in the relationship between attitude and behaviour. KOLLMUSS & AGYEMAN (2002, p. 242) give an example when comparing attitudes toward climate change and driving behaviour. Usually there is no correlation, because attitudes toward climate change are not closely related to the behaviour itself. Thus, even people who are very concerned about climate change tend to drive. (KOLLMUSS & AGYEMAN, 2002, p. 242)

The TPB and TRA are based on the assumption that people behave rationally, reasonably and under volitional control. Consequently, their actions are assumed to be dependent on intention. However, FIEDLER (2004) reminds us that intentions and behaviours cannot be logically independent and there are reasons to be skeptical (FIEDLER, 2004). Although the TPB certainly has its limitations, it still can be considered very useful when it comes to predicting environmental behaviour because of its clarity and simplicity (KOLLMUSS & AGYEMAN, 2002, p. 243).

3.1.3. Norm-Activation Model

The Norm-Activation Model (NAM) was developed by SCHWARTZ in the 1970s. The theory focuses on moral obligations of behaviour and emphasizes the relationship between norm activators, personal norms, and behaviour (SCHWARTZ, 1977). Its original motivation was to provide a framework for understanding pro-social and altruistic behaviours such as blood donations, volunteering, and environmental behaviours such as recycling, energy conservation, and waste management. Four main constructs are

applied: personal norms, social norms, awareness of consequences, and the feeling of responsibility. (STEG & VLEK, 2009, p. 311; BORTOLETO, et al., 2012, p. 2169)

In SCHWARTZ'S model the issue of personal or moral obligation, also called *personal norms*, is central. Personal norms can be described as behavioural self-expectations and are direct determinants of pro-social behaviours (see Figure 3.3) (HARLAND, 2007, p. 323). Personal norms are influenced by the "*feeling of responsibility* and [the] *awareness of consequences*" (SCHWARTZ, 1977). That means that an individual who feels morally obliged to act according to the behaviour in question is more likely to act if he or she believes in the consequences of his or her act. This increases if the person feels personally responsible for the consequences of the given behaviour. (BORTOLETO, et al., 2012, p. 2169; KAISER, et al., 1999b, p. 61; JACKSON, 2005, p. 54) Feelings of responsibility are in turn shaped by values and attitudes (KOLLMUSS & AGYEMAN, 2002, p. 256).

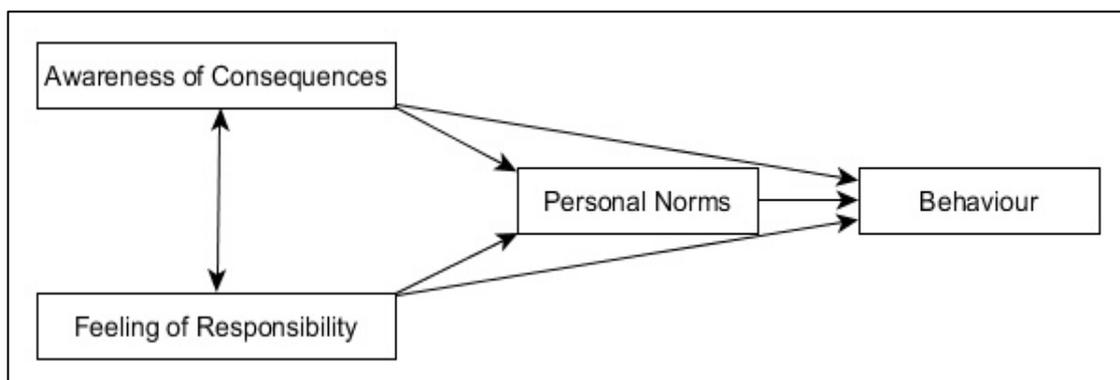


Figure 3.3: Norm-activation Model (based on SCHWARTZ, 1977)

The findings from numerous studies which have utilized the NAM approach are mixed and its significance is debated. However, most research results suggest that the feeling of responsibility is crucial for predicting ecological motivation. (KAISER, et al., 1999b, p. 61; JACKSON, 2005, p. 56)

3.2. A Model to Understand Environmental Behaviour in the SNPBZ

Having discussed the main theories of environmental behaviour, the final section of this chapter presents a modified model to determine factors that influence tourists' waste management behaviours in the SNPBZ. The model draws from revisions of TRA, TPB and Schwartz's norm-activation model. Although the models and theories discussed above still provide the logical framework and foundation for a holistic understanding of environmental behaviour, additional variables are incorporated which are believed to influence waste behaviour in the SNPBZ.

Figure 3.4 shows the theoretical and conceptual framework that was adopted for this study. Together with its indicated hypotheses, it helps to explain behaviours and guides the statistical analysis. The hypotheses are defined in detail in the next chapter. The conceptualisation of the theoretical framework was derived from extensive literature review of environmental behavioural research, particularly waste behaviour issues (e.g. BORTOLETO, et al., 2012; GODFREY, et al., 2012; KOLLMUSS & AGYEMAN, 2002; KAISER, et al., 1999a; 1999b).

The environmental behaviour of interest represents the dependent variable and is defined as *the individual's good solid waste behaviour in the SNPBZ*. The proposed operational definition of a good solid waste management practice was adopted from the definition of GODFREY, et al. (2012, p. 2167) and states the following: *“waste activities that are compliant with waste and environmental legislation; that promote the waste hierarchy and support waste avoidance, minimization, reuse, and recycling; and that minimize the impact of waste and possible associated pollution on the environment and human health”*.

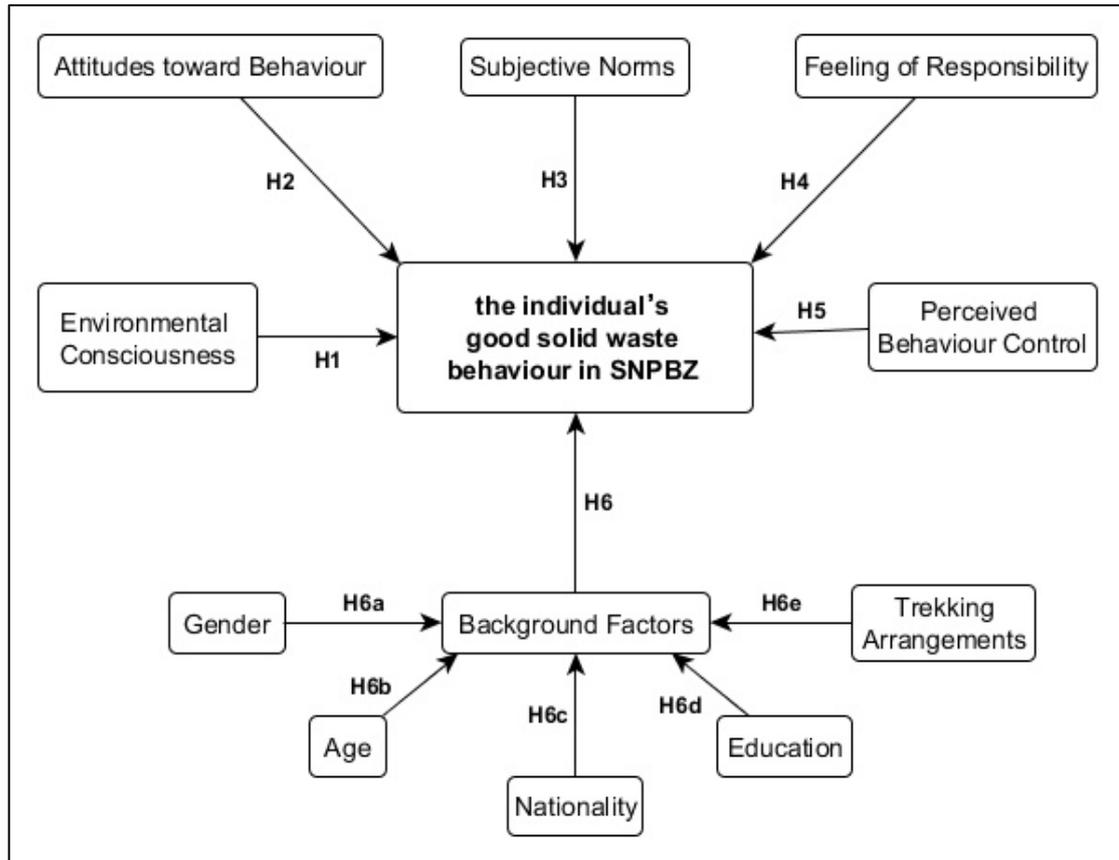


Figure 3.4: Theoretical Framework for waste behaviour in the SNPBZ

As seen in Figure 3.4, several constructs precede environmental behaviour in this model. Environmental consciousness, attitudes toward the behaviour, perceived behaviour control, feelings of responsibility, subjective norms, and background factors are suggested as the conceptual skeleton of this model.

As previously mentioned, the relationship between intention and behaviour is dubious, as people do not always behave in accordance with their intentions even if willingness is present. Therefore, the measurement of behavioural intention was excluded from this study, as its assessment by questionnaire surveys is unreliable. (BORTOLETO, et al., 2012, p. 2197)

3.2.1. Theoretical Definitions

The following is a description of the most important variables used in this model and the justifications for including them.

3.2.1.1. *Pro-environmental Attitude*

Most researchers in environmental fields agree that there is a relationship between environmental attitudes and behaviours. Still, pro-environmental attitudes do not necessarily lead to pro-environmental behaviours and there is little understanding of which factors are most likely to influence said behaviours. As HEBERLEIN (1981, p. 241) states: *“environmental attitudes are fundamentally important, widely discussed, frequently measured, and poorly understood”*. The attitude-behaviour inconsistency is commonly referred to as the *“value-action-gap”* (DARNTON, et al., s.a., p. 13). Despite the ambiguity surrounding the usefulness of environmental attitudes as predictors of ecological behaviour, this thesis argues that attitude *do* influence pro-environmental behaviour indirectly (KOLLMUSS & AGYEMAN, 2002, p. 252). Although differences of opinion still exist, the author will acknowledge the important and powerful role of environmental attitudes in determining environmental behaviour, as indicated by previous studies (cf. KAISER, et al., 1999a; 1999b; MARANS & YUNG-JAAN, 1993; EILAM & TROP, 2012; KOLLMUSS & AGYEMAN, 2002).

In general, attitudes can be loosely defined as *“the enduring positive or negative feeling about some person, object, or issue”* (KOLLMUSS & AGYEMAN, 2002, p. 252). HEBERLEIN (1981, p. 242) describes attitudes as *“a hypothetical construct about a mental state which is inferred from verbal reports and behavioral observation”*. The concept of attitudes is slippery and difficult to precisely define. In this paper, the term environmental attitude will use the definition proposed by KAISER et al. (1999, p. 2), which suggest that two types of environmental attitudes exist (see Figure 3.5): (1) attitudes toward the environment, and (2) attitudes toward ecological behaviour.

The latter refers to the definition used in Ajzen's Theory of Planned Behaviour, as it appears to moderately influence behaviour (KAISER, et al., 1999, p. 3). To contrast, the first definition is part of the concept of environmental consciousness. Environmental consciousness is used as a multiple component approach in this model and is considered separately in this thesis (see Chapter 3.2.1.2). The multiple component approach of environmental consciousness distinguishes between an affective, cognitive, active, and dispositional dimensions. The dispositional dimension signifies attitudes towards the environment.

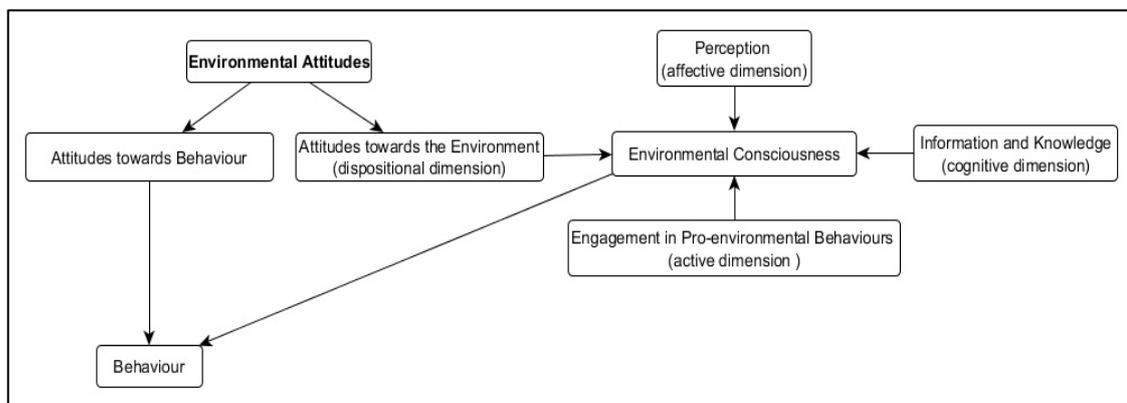


Figure 3.5: Theoretical Framework: Environmental Attitude

3.2.1.2. Environmental Consciousness

The term *general environmental consciousness* is used interchangeably with other concepts, such as environmental concern or value (BARR, 2007, p. 437). According to a definition provided by ZELEZNY and SCHULTZ, environmental consciousness refers to “*psychological factors that lead people to act in pro-environmental ways*” (ZELEZNY & SCHULTZ, 2000, p. 367). BARR (2007, p. 437) defines environmental consciousness as the “*underlying orientations held by individuals toward the physical environment*”, while KOLLMUSS & AGYEMAN (2002, p. 253) define it as “*knowing of the impact of human behavior on the environment*”. According to SANCHEZ and LAFUENTE (2010, p. 732), an environmentally conscious person is “*someone who engages in a wide range of pro-*

environmental behaviours as well as holding certain values and attitudes that different theories have associated to this type of conduct”.

SANCHEZ and LAFUENTE (2010, p. 733) developed an operationalization of environmental consciousness, which covers four dimensions: affective, cognitive, dispositional and active (see Figure 3.6). The affective dimension describes the perception of environmental conditions and the approval of pro-environmental values; the cognitive dimension deals with the level of individual information and knowledge; the dispositional dimension reflects an individual’s personal attitude; the active dimension deals with engagement in pro-environmental behaviours (cf. SANCHEZ & LAFUENTE, 2010).

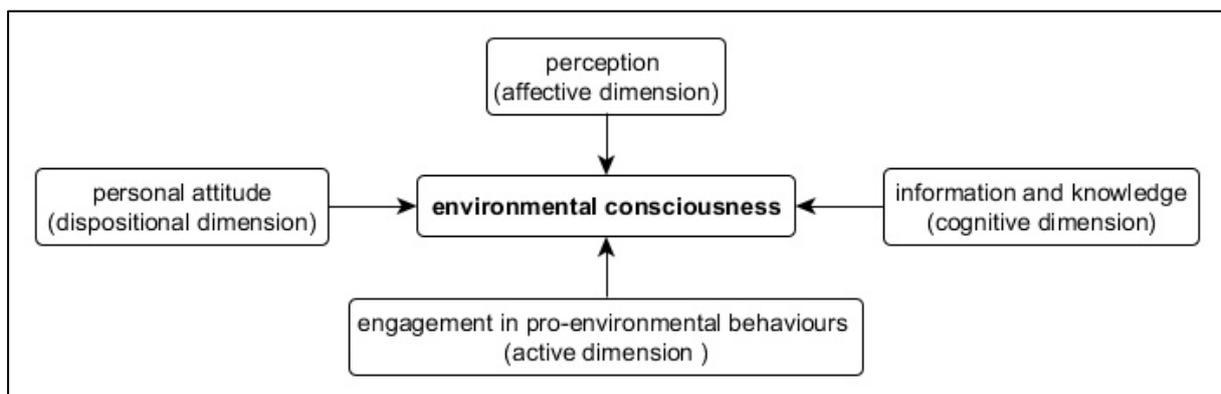


Figure 3.6: Theoretical Framework: Environmental Consciousness (based on SANCHEZ & LAFUENTE, 2010)

3.2.1.3. Pro-environmental Behaviour

The term pro-environmental behaviour is described as *“actions intended to lessen the impact of human behaviour on the natural environment”* (ZELEZNY & SCHULTZ, 2000, p. 367). STERN (200, p. 408) proposes an intent-oriented definition of environmentally significant behaviour that *“focuses on people’s beliefs, motives, and so forth in order to understand and change the target behaviours”*. According to a definition provided by STEG and VLEK (2009, p. 309), pro-environmental behaviour refers to *“behaviour that harms the environment as little as possible, or even benefits the environment”*.

3.2.1.4. Environmental Knowledge

Numerous studies have attempted to explain the impact of knowledge on behaviour, but only a few have tried to explain how knowledge influences actions. Knowledge is based on information and data. The terms information and knowledge are often used interchangeably although they are not synonymous. (GODFREY, et al., 2012, p. 2164)

Previous research findings have been inconsistent and contradictory; while some studies have suggested that data and information influence actions and behaviour, other studies have found that the relationship between “*knowing what to do and acting on that knowledge*” is tenuous (GODFREY, et al., 2012, p. 2164). KOLLMUSS & AGYEMAN (2002, pp. 240-241) claim that environmental knowledge per se cannot be directly linked to pro-environmental behaviour.

The author supports the view of GODFREY et al. (2012), who point out that information and experience are the basis for generating knowledge and raising awareness. The level of knowledge has been found to play a significant part in indirectly influencing environmental behaviour (CHEUNG, et al., 1999, p. 594). When combined with values, beliefs and attitudes, it may influence people’s behaviour particularly where environmental problems exist. Knowledge can be seen as a precondition to people’s perceived behavioural control, subjective norms and attitudes (GODFREY, et al., 2012, pp. 2164-2466), but it plays no direct role in the TPB. It is hard to distinguish between correct factual information (knowledge) and attitudes; therefore, a direct correlation between knowledge and behaviour cannot be expected. The model presented in this thesis will only acknowledge the assumed influence of environmental knowledge on environmental consciousness as proposed by BARR (2007, p. 439) (see Figure 7).

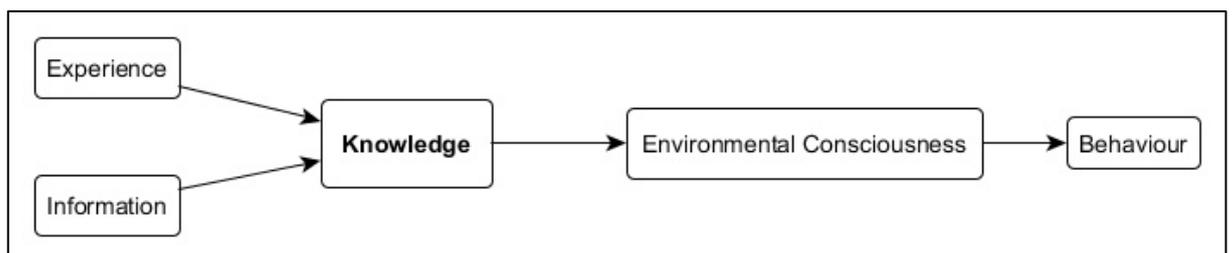


Figure 3.7: Theoretical Framework: Knowledge

3.2.1.5. Perception and Values

How we perceive the environment and environmental problems, and if this influences our behaviour, are crucial questions. There is a consensus among scientists that perception of environmental problems is significant in predicting behaviours (BARR & GILG, 2005, BARR, 2007). According to SANCHEZ and LAFUENTE (2010), perception and values belong to the affective dimension of environmental consciousness. Thus, this thesis aims to analyze the individual's perceptions of environmental problems.

3.2.1.6. Subjective Norms

The theories of reasoned action, planned behaviour, and the norm-activation model are built on the concept of subjective norms (see Chapter 3.1). While SCHWARTZ refers to social norm, AJZEN (1991) characterizes the same external normative expectations as subjective norm (HUNECKE, et al., 2001, p. 833). Subjective norm refers to social pressures, expectations and moral principles and can be defined as an individual's perception of whether people think a behaviour should be performed (KAISER, et al., 1999, p. 3). Social pressures may come from families, neighbours, peers, communities, politics or society (BORTOLETO, et al., 2012, p. 2198). Several studies show that behaviour is strongly influenced by social norms (GODFREY, 2011; HUNECKE, et al., 2001).

3.2.1.7. Feeling of Responsibility

Several authors point out that the feeling of responsibility appears to be promising in predicting environmental behaviours (cf. KAISER, et al., 1999b; ITTIRAVIVONGS, 2012; KOLLMUSS & AGYEMAN, 2002; HUNECKE, et al., 2001). According to a definition provided by DEMBKOWSKI (1998, p. 65), the feeling of responsibility is "*the ascribed personal responsibility for the development and/or elimination of environmental problems*". HINES et al. (1986/87, p. 5) use the term to refer to an "[...] *individual's duty or obligation. This obligation was either expressed in reference to the environment as a whole [...] or in reference to only one facet of the environment*".

ITTIRAVIVONGS (2012, p. 23) agrees that the feeling of responsibility influences pro-environmental behaviour (in this case recycling), as those who felt more responsible were more likely to have participated in responsible environmental behaviours. KOLLMUSS & AGYEMAN (2002, p. 256) add that “*our feelings of responsibility are shaped by our values and attitudes and are influenced by our locus of control*”. Furthermore, environmental consciousness influences the feeling of responsibility (DEMBKOWSKI, 1998, p. 65).

3.2.1.8. Perceived Behaviour Control

Perceived behaviour control is also used in the theory planned behaviour as a predictor of behaviour. Perceived behaviour control can be described as one’s perceived ease or difficulty regarding personal control over factors that facilitate or hinder the performance of a certain behaviour (AJZEN, 1991, p. 188). Also, GODFREY (2011, p.88) elaborates, defining the term “*as the presence and extent of factors that either facilitate or hinder performance (controllability)*”. Perceived behaviour control has strong similarities to the concept of self-efficacy and is used interchangeably in this thesis (KAISER, et al., 1999). Studies on the influence of perceived behaviour control on environmental behaviour vary widely. Some claim the relationship between perceived control and ecological behaviour is inconsistent (e.g. OSKAMP, et al., 1991), while others believe the relationship to be very positive (e.g. GODFREY, 2011; KAISER, et al., 1999).

3.2.1.9. Background Factors

Human behaviour does not depend on intra-personal factors such as attitudes, norms, and feelings of responsibility alone, but also on many moderators and contextual factors which influence motivations and behaviours. Several studies have comprehensively documented the influence of such factors on behaviour (cf. SCHAHN & HOLZER, 1990; LYNNE & ROLA, 1988; SCHULTZ, et al., 1995).

In relevant literature, the term background factors commonly refers to individual characteristics including gender, socio-economic status, education, and nationality (KAISER, et al., 1999, p. 6; BARR, 2007, p. 439). According to previous studies, gender and educational level particularly influence environmental attitudes and pro-environmental behaviours. Women are typically more emotionally engaged and show more concern about environmental issues. Education is responsible for knowledge of environmental issues, but does not necessarily result in increased pro-environmental behaviour. Economic factors also have a strong influence on people's behaviour, but are poorly studied to date. (KOLLMUSS & AGYEMAN, 2002, p. 248) Several researchers identify the need to pay more attention to demographic determinants that underlie environmental behaviour. This suggests that examining the importance of moderators for predicting individual's behaviour would be a significant aim within this study. (CLARK, et al., 2003, p. 237).

4. METHODS

4.1. Research Design

This study is based on a hypothetic-deductive research process and cross-sectional quantitative research design. One purpose of this study is to assess the extent to which factors determine tourists' behaviour towards solid waste and solid waste management in the Sagarmatha National Park and Buffer Zone. A slightly modified model of the theory of planned behaviour (AJZEN, 1991) is seen as an overall theoretical framework for this study (see Chapter 3.1). Using the hypothetical model presented in Chapter 3.2, the quantitative research design includes the collection of data at one point in time via a written three-page questionnaire. (DAVID & SUTTON, 2004).

4.2. Defining Hypotheses

A behaviour of interest is defined as *the individual's good solid waste management practice/behaviour in the SNPBZ* and represents the dependent variable. The proposed operational definition of good solid waste management practice was adopted from the definition of GODFREY, et al. (2012, p. 2167) and states the following:

“waste activities that are compliant with waste and environmental legislation; that promote the waste hierarchy and support waste avoidance, minimization, reuse, and recycling; and that minimize the impact of waste and possible associated pollution on the environment and human health”.

The independent variables are represented by: (1) environmental consciousness, (2) attitudes toward behaviour, (3) subjective norms, (4) feeling of responsibility, (5) perceived behaviour control, and (6) moderators.

The relationship between the independent variables and good solid waste management practices in the SNPBZ is explored by eight hypotheses. The following hypotheses are based on the theoretical framework discussed in Chapters 3.1 and 3.2. Figure 4.1 shows the hypothetical model of good solid waste behaviour in the SNPBZ.

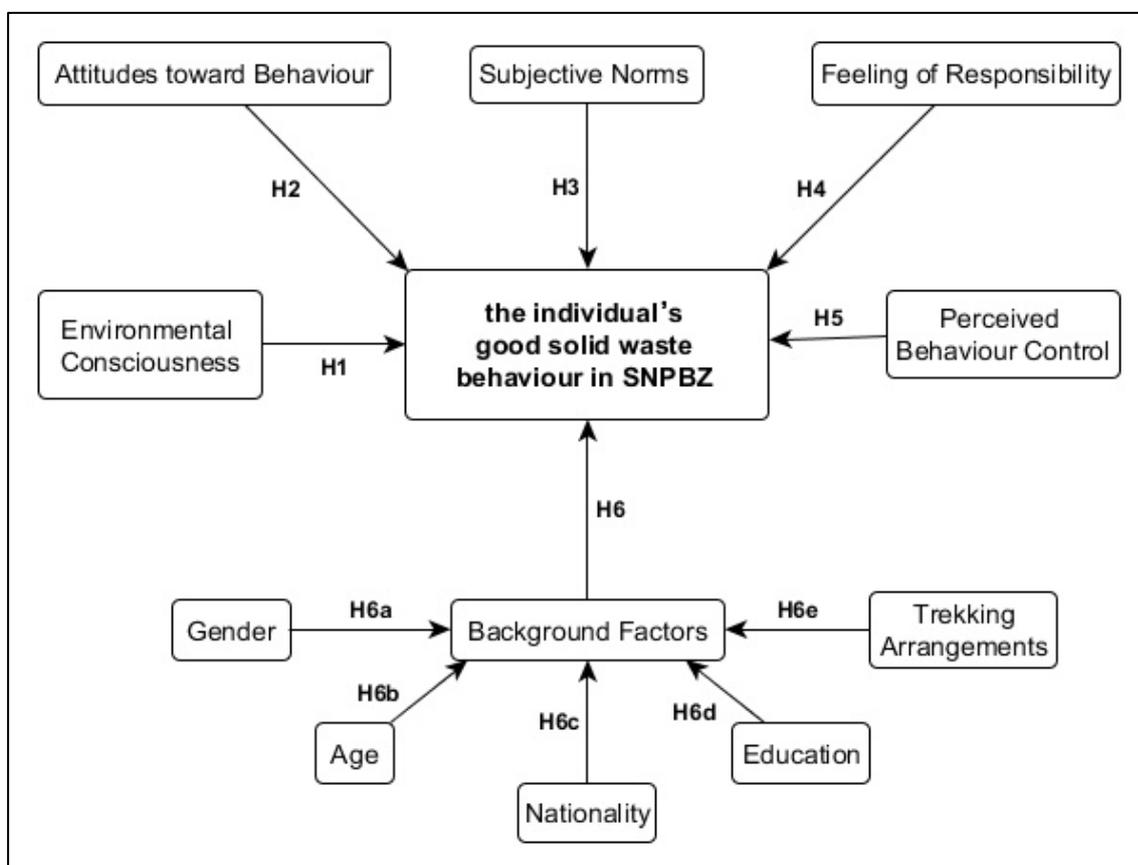


Figure 4.1: Hypothetical Model of good solid waste behaviour

Hypothesis 1: The individual's **environmental consciousness** has a positive and direct effect on the individual's good solid waste management practice in the SNPBZ.

Hypothesis 2: The individual's **attitudes toward behaviour** have a positive and direct effect on the individual's good solid waste management practice in the SNPBZ.

Hypothesis 3: The individual's **subjective norms** towards solid waste and solid waste management in the SNPBZ have a positive and direct effect on the individual's good solid waste management practice in the SNPBZ.

Hypothesis 4: The individual's **feeling of responsibility** towards solid waste and solid waste management in the SNPBZ has a positive and direct effect on the individual's good solid waste management practice in the SNPBZ.

Hypothesis 5: The individual's **perceived behavioural control** towards solid waste and solid waste management in the SNPBZ has a positive and direct effect on the individual's good solid waste management practice in the SNPBZ.

Hypothesis 6: Background Factors, such as gender (H6a), age group (H6b), nationality (H6c), level of education (H6d), and trekking arrangements (H6e) have a positive and direct effect on the individual's good solid waste management practice in the SNPBZ.

4.3. Defining Indicators and Variables

For measuring visitors' attitudes, behaviours, subjective norms, perceived behavioural control, perceptions, values, and knowledge a questionnaire was used. The questionnaire was developed on the basis of the adopted model (see Chapter 4). Reliable and accurate items, which reflect the different variables used in the model, were selected (BHATTACHERJEE, 2012, p. 25). To fulfill these requirements, one or more questions were formulated to address each element of the model. Since there is extensive research done in the field of environmental behaviour, items, which scientists assessed to be appropriate, were derived from extensive literature review. (REED & ROBINSON, 1998, p. 112)

A mind map was created using a mind mapping software³ to provide an overview and coherence between the research and questionnaire design (cf. RENZI & KLOBAS, 2008). An overview of the mind map is provided in Figure 4.2, while the full version can be found in Appendix B.

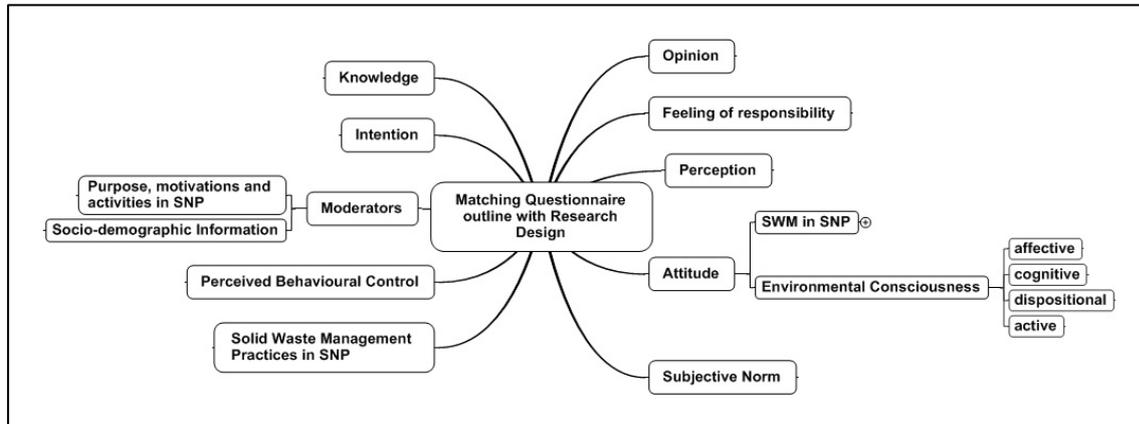


Figure 4.2: Overview Mind Map

4.3.1. Environmental Consciousness

The first hypothesis of this study believes that environmental consciousness is influencing good solid waste management practice in the SNPBZ. For measuring environmental consciousness the proposed operationalization by SANCHEZ & LAFUENTE (2010) is used (see Chapter 4). A combination of 10 indicators was used based on a survey of SANCHEZ and LAFUENTE (2010, pp. 739-740) in which these indicators proved to be reliable for measuring the different dimensions of environmental consciousness (affective, cognitive, dispositional and active).

Four items rated the respondent's **environmental perceptions** and values using three response categories ("Yes, No, Don't know"). The participants' **environmental knowledge and information** regarding solid waste management in the SNPBZ, **environmental attitude**, and **engagement in pro-environmental behaviours** were

³ Mindjet, URL: vision.mindjet.com, 2013

measured by two items using a five-point Likert scale (“strongly agree” to “strongly disagree”) (see Table 4.1).

These items measure several constructs (perceptions, knowledge, attitudes, pro-environmental behaviours) and are the “sub-factors” of the major composite – environmental consciousness. The separate composites were then averaged into one composited variable. Missing values were either treated as if participants answered neutrally, or as “Don’t know” responses, assuming that participants did not care about the outcome.

Table 4.1: Indicators of environmental consciousness (based on SANCHEZ & LAFUENTE, 2010, p. 740)

affective dimension	Have you seen a lot of waste in SNPBZ?
	Have you seen waste pits?
	Have you seen waste incinerators?
	Have you seen illegal dumping sites?
cognitive dimension	I often talk with friends about environmental issues.
	I'm well informed about environmental issues.
dispositional dimension	Environmental conservation needs to be more important.
	There is need to conserve resources for future generations.
active dimension	When possible in nearby areas I use public transport, walk or ride a bike in my home country.
	I recycle waste in my home country.

4.3.2. Attitudes toward behaviour

Generally speaking, attitudes determine whether individuals are in favour or against conducting certain behaviours (BORTOLETO, et al., 2012). In this study participants were asked about their attitudes concerning solid waste and solid waste management in the SNPBZ. Six items were used to measure individuals’ attitudes using a five-point Likert scale ranging from “Strongly Agree” to “Strongly Disagree” (see Table 4.2).

Items were then averaged into one composited variable. Missing values were treated as if participants answered neutrally.

Table 4.2: Indicators of specific attitudes towards waste in the SNPBZ

I believe that incinerating waste harms the environment in SNPBZ.

I believe that waste separation reduces the amount of waste in dumping sites in SNPBZ.

I support a higher entrance fee to improve waste management in SNPBZ.

I support a ban of plastic bottles in SNPBZ.

I believe that Sagarmatha National Park is overall clean.

I believe that the overall solid waste management system in SNPBZ is good.

4.3.3. Subjective Norms

Two items were used to measure perceived external normative pressure by a five-point Likert scale ranging from “Strongly Agree” to “Strongly Disagree” (see Table 4.3). The indicators are based on a survey by BORTOLETO et al. (2012, p. 2199). Items were then averaged into one composited variable. Missing values were treated as if participants answered neutrally.

Table 4.3: Indicators of subjective norms

Most people I know contribute to help the environment.

I like people to think of me as being environmentally friendly.

4.3.4. Feeling of Responsibility

Three indicators measured respondents' perception regarding proper waste production and management on a five-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree" (see Table 4.4). Items were then averaged into one composited variable. Missing values were treated as "Don't know" responses, assuming that participants did not care about the outcome.

Table 4.4: Indicators of feeling of responsibility

Trekkers and/or expedition groups produce the largest quantities of solid waste.
 I believe that it's my personal responsibility to manage waste properly in SNPBZ.
 Individuals are responsible for solid waste management in SNPBZ.

4.3.5. Perceived Behaviour Control

Perceived behaviour control towards solid waste management in the SNPBZ was determined by three indicators and reported on a five-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree" (Table 4.5). Items were then averaged together into one composited variable. Missing values were treated as if participants answered neutrally.

Table 4.5: Indicators of perceived behaviour control

I believe that my consumer behaviour is influencing the waste situation in SNPBZ.
 I have plenty of opportunity to dispose of solid waste in SNPBZ.
 I believe that adequate information to visitors before and during their visit to SNPBZ about solid waste management is provided.

4.3.6. Background Factors

A selection of moderators and contextual variables were used that may influence individuals' good solid waste management practices in the SNPBZ, or may help to characterize respondents. This assumption is based on various studies (cf. SCHAHN & HOLZER, 1990; LYNNE & ROLA, 1988; MESEKE, 1994). The tourist's travel background is referred to a contextual variable, while the term moderator includes the individual's socio-demographic information (see Table 4.6).

Table 4.6: Indicators of different moderators

Are you trekking with an organized tour group?

If not, do you have a guide?

How did you make your travel arrangements?

Sex

Age

Nationality

Education

Employment

4.3.7. Self-reported waste behaviour in the SNPBZ

Given the impossibility of observing actual solid waste management practices in the SNPBZ, self-reported behaviour was used to determine the dependent variable (BORTOLETO, et al., 2012). Six items used a five-point Likert scale and four used categorical response categories to measure individuals' *solid waste management practice in the SNPBZ* (see Table 4.4). These items were then averaged into one composited variable. Missing values were treated as if participants answered neutrally.

Table 4.7: Indicators of self-reported waste behaviour in the SNPBZ

During your visit in SNPBZ, what do you do with paper/ plastic/ plastic bottles / batteries?

I pick up waste on the trails.

I buy things that are produced with as little package as possible.

I do not buy bottled water; instead I look for alternative 'safe drinking water (water purification tablets, boiled water etc.)

I avoid package intensive products (i.e. made of tins/cans) and prefer local products.

I prefer safe drinking water from springs instead of buying water bottles.

For shopping, I use paper bags instead of plastic bags.

4.4. Questionnaire Design

A questionnaire was designed after the theoretical model was conceptualized, hypotheses defined, and indicators determined. As indicated in Figure 4.3, the questionnaire was tested and revised (see next Chapter), before used for data collection.

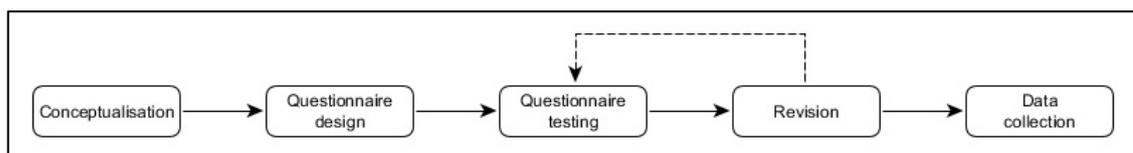


Figure 4.3: Research Process

The three-page questionnaire was written in English (see Appendix A). The first paragraph shortly explained the purpose of the survey and the author's motivation. The questionnaire primarily included closed-ended questions. Two open-ended questions were included, which were coded and tallied later on. A five-point Likert scale (strongly agree, agree, neutral, disagree, strongly disagree), categorical responses (yes/no/don't know) and multiple-choice responses were used to elicit a large amount

of information. Once questions were defined, they were grouped into homogeneous thematic sections. Items addressing the elements of the model were distributed randomly throughout the questionnaire.

The questionnaire consisted of seven parts: 1) the respondents' purpose, motivation and activity in the SNPBZ, 2) the respondents' perceptions of waste in the SNPBZ, 3) the respondents' general environmental attitudes, 4) the respondents' own behaviour, 5) the respondents' attitudes/experiences, and 6-7) general socio-demographic information. Respondents were provided with space at the end of the questionnaire for further comments and remarks. Reference to the author's webpage, which supplies information on waste issues, waste management in the SNPBZ and the research project in question, was also provided.

4.5. Testing the Questionnaire

A pre-test of the questionnaire was conducted to establish validity and reliability (BHATTACHERJEE, 2012, p. 80). The questionnaire was administered to a small sample group who had previously visited the SNPBZ. The author measured the time it took to complete the questionnaire, observed the respondents' reactions, and obtained individual feedback. Wording and response categories were revised wherever necessary.

4.6. Study Sites

The survey was conducted at one study site in the Sagarmatha National Park and Buffer Zone. Lukla (at 2860m above sea level) was selected, as it is one of the bigger villages in the research region and possesses a central function. Lukla is an important trading center for the Khumbu region, with several shops, lodges, banks and a post office. Most importantly, it is the gateway to the Everest region and is connected by regular air service. The majority of tourists enter and leave the SNPBZ through Lukla, often spending several days in town due to frequent flight cancellations caused by inclement weather. The village gives access to a broad cross-section of visitors, including individual trekkers, organized trekking groups, private guides, and their clientele.

Tourist surveys were conducted in lodges, with permission obtained from lodge owners beforehand. After tourists arrived, they usually relaxed in the lodge's dining room. The author determined this to be an ideal time to approach a large cross-section of tourists without being too intrusive.

4.7. Sample Size and Data Collection

A representative sample of visitors to Sagarmatha National Park was selected at random on site. Sample size was dependent upon population, confidence interval, confidence level, and standard deviation. The sample was selected to represent a larger population, the approximate number of tourists visiting the SNPBZ each April and May. An online sample size calculator was used to calculate the sample size⁴.

⁴ <http://www.raosoft.com/samplesize.html>

The survey was conducted from April-May 2013. A total of 380 questionnaires were distributed to foreign tourists at major lodges in the study site. The contact and collection method used provided excellent response rates. The author approached the lodges, made contact with tourists, and introduced herself as a researcher from the University of Vienna. If the respondent agreed to participate in the survey, he/she was asked to fill out the questionnaire. The author left the respondent to complete the questionnaire but remained at the lodge to answer questions and for clarification purposes. Most respondents completed the survey in less than 20 minutes and the questionnaires were collected after completion. While the surveys yielded very high cooperation and low refusal rates, the method was extremely labour intensive and comparatively slow as compared to postal, telephone or electronic surveys. 352 questionnaires were answered, yielding a response rate of 92,6%.

4.8. Data Analysis

This chapter explains the statistical analyses that were applied in the current study. SPSS version 20 was used to analyze survey results. Data analysis included the following steps: enter, clean, describe, transform, and analyze data. Figure 4.4 shows the steps necessary to create a dataset ensuing data collection. The following statistical tests were conducted: Chi²-Test and Cross-tabs, Shapiro-Wilk Test, Reliability Analysis, T-Test, One-way ANOVA, and Regression Analysis. The methodology utilized in data analysis is described in detail below.

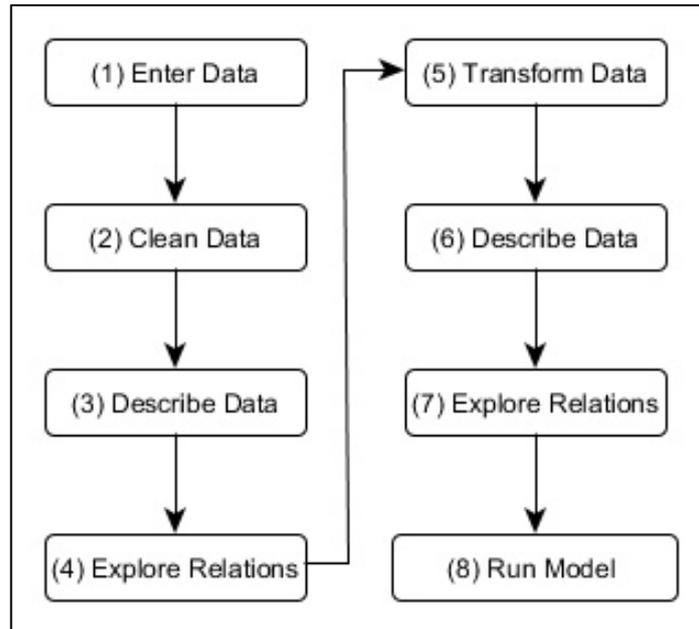


Figure 4.4: Workflow (based on MOOI & SARSTEDT, 2011, p. 78)

(1) After data entry and coding in Microsoft Excel, the survey data was extracted into SPSS 20. An important point to consider is coding. Coding means assigning values to all variables or answers in the survey. The survey did mainly include close-ended questions and coding was simple, as response scales (e.g. Likert scale) corresponded with number values.

(2) To avoid errors in data entry or those arising from missing values, data cleaning was performed to ensure accuracy. **Descriptive statistics** were used to look at the minima and maxima of the data and to correct data entry mistakes such as out-of-range values. Respondents do not provide answers to all questions and item non-response is a common mistake. Typically up to 10% of questions remain unanswered. Missing values are either random or non-random. The latter applies when surveys are complex and long, or the appropriate answer choice is not provided. Furthermore, respondents may be reluctant to answer because of social desirability concerns. (MOOI & SARSTEDT, 2011, p. 82)

(3) Data was described one variable at a time (**univariate descriptives**) or by determining the relationship between two variables (**bivariate descriptives**) using graphs, charts or tables (MOOI & SARSTEDT, 2011, p. 83).

Univariate descriptives include the mean (or average), mode (most frequently occurring value in the dataset), and median (the value that separates the lowest 50% of cases from the highest 50% of cases). The minimum and maximum can be measured, indicating a variable's highest and lowest values. The range is the difference between the highest value and the lowest value, while the variance (variability) measures the sum of squared differences. (MOOI & SARSTEDT, 2011, pp. 85-86)

Normality was tested, as most statistical tests (e.g. parametric tests) rely upon the assumption that data is normally distributed. A histogram was created and a **Shapiro-Wilk Test** was conducted to test normality. If the test is not significant ($>0,05$), data are normally distributed. (BRYMAN & CRAMER, 2005, p. 161)

(4) In bivariate descriptives, a key measure in analyzing relations between non-continuous variables is a chi-square-test. The **chi-square test** (χ^2 -tests) is a non-parametric test used to show a significant relationship between two variables. If the p-value of the test statistic is less than 0,05, there is a significant association between two variables. **Crosstabs** are useful when describing data, particularly if variables are not continuously scaled. Both χ^2 -tests and crosstabs are appropriate when describing categorical variables. (MOOI & SARSTEDT, 2011, p. 115)

(5) It is necessary for some analysis techniques to transform data. This may include simple transformations, such as coding a variable into two categories (dichotomous), standardizing variables (by using z-transformation or log transformation), creating dummy (binary) variables, reversing coding items, or creating new constructs (or composites). Missing values were treated as if participants answered neutrally, or as "Don't know" responses, assuming that participants did not care about the outcome (KAISER, et al., 1999b, p. 62).

Constructs cannot be directly observed when they consist of multiple items. Constructs are captured by calculating the average or sum of individual variables into a new composited variable. Before creating a construct, it is important to determine if it is appropriate to create a composite and if internal consistency is present. (MOOI & SARSTEDT, 2011, pp. 89-91)

A **Reliability Analysis** was conducted in order to show internal consistency. The outcome of the reliability analysis is Cronbach's Alpha, which ranges from 0 to 1. The higher the number, the stronger the item's consistency. Unfortunately, the size of the sample limits the efficacy of this analysis tool. Fewer inter-correlations are present in a smaller sample size, therefore a Factor Analysis was conducted. (KAISER, 1998, p. 400; MOOI & SARSTEDT, 2011, p. 220)

Factor Analysis is a method of data reduction and "*identifies unobserved variables (factors) that explain patterns of correlations within a set of observed variables*" (MOOI & SARSTEDT, 2011, p. 202). There are different types of factor analyses such as exploratory factor analysis, confirmatory factor analysis, and maximum likelihood and different types of rotations. Each of these analyses can be applied additionally. In this case, a Principle Components Analysis method (PCA) was conducted to examine the used variables for commonalities or differences, to check if variables belong to specific factors as stated in previous studies, and to reorganize constructs in order to ascertain construct validity of the underlying constructs when necessary. (WALKER & MADDAN, 2009)

(6) After creating composites, a descriptive analysis of the composite variables was conducted and (7) relations to other variables measured by using a t-test or ANOVA.

The **t-test** is used for comparing the means of two samples (BROSIUS, 2010, pp. 219-222). The sample can either be independent (two distinct groups; e.g. males and females) or paired (the same subject but at different points in time) (MOOI & SARSTEDT, 2011, p. 131). In this case, we are interested if the two distinct groups (males and females) are significantly different in terms of certain key composites (e.g. waste behaviour, environmental consciousness and attitudes). There are two assumptions

underlying a t-test: data should follow a normal distribution and there should be interval or ratio scale of measurement. Still, the t-test is considered robust for violations of normal distribution, meaning that the assumption can be violated without serious error being introduced into the test result. The test of homogeneity is called Levene's Test. If Levene's test is significant ($p < 0,05$), then equal variances are not to be assumed. (BROSIUS, 2010, p. 219; BRYMAN & CRAMER, 2005, p. 180)

The **ANOVA** or "analysis of variance" is used to compare mean differences between more than two groups. There are several types of ANOVA such as the one-way or two-way ANOVA. ANOVA has many similarities to the t-test and the same assumptions can be made: the variable is measured at interval or ratio scale and data is normally distributed. In terms of violations of these assumptions, ANOVA is also rather robust. If the Levene's test shows, data is significant ($<0,05$), equal variances are not to be assumed. (MOOI & SARSTEDT, 2011, p. 137)

A **correlation** is a measure of how strongly two variables relate to each other and which direction of the linear relationships exists (positive or negative). It is frequently used to describe data because they provide a lot of information and are easy to use. Correlation tests rely on the assumption that the data is linear and normally distributed. A scatterplot is created to illustrate some of the fundamental features of correlation such as showing the strength and direction of the relationship between the variables. (BRYMAN & CRAMER, 2005, p. 161) A Pearson correlation coefficient is appropriate for calculating correlations between two intervals or "ratio scaled variables". A Spearman's correlation coefficient is used when at least one variable is ordinal scaled. (MOOI & SARSTEDT, 2011, p. 88)

(8) **Regression analysis** is one of the most widely used methods for conducting multivariate analysis. It is a way of expressing relationships among pairs of variables and analyzing relationships between one independent and one dependent variable.

Three data requirements must be considered before regression analysis can be performed. According to MOOI & SARSTEDT (2011, p. 165), the number of observations is at least $50 + 8 \times$ the number of independent variables, meaning the sample size must

be sufficiently large to accommodate this limitation. Secondly, the dependent variable needs to be interval or “ratio” scaled and finally, no or little multicollinearity must be present. Multicollinearity arises if two independent variables are highly correlated, but can easily be detected by calculating the tolerance level. If tolerance is below 0.10, multicollinearity is a problem. (MOOI & SARSTEDT, 2011, pp. 166-167)

When more than two independent, continuous variables are involved, multiple linear regression analysis is used (BRYMAN & CRAMER, 2005, p. 301).

5. RESULTS

5.1. Respondents Characteristics

A total of 352 people participated in the survey. Of the 352 questionnaires, 335 (95,1%) questionnaires were used for further analysis. Uncompleted surveys and surveys with unusable answers were excluded from the analyses. Some cases were also excluded because of data errors and missing values. Fortunately, missing values are quite small in this survey and they were left in place as composites of the items were created by averaging them together into a new variable.

A test of normality was conducted using the Shapiro-Wilk test. In our case, the results were not above 0,05, meaning that data are non-normally distributed. The sample size is large (N=335), so the significance of the Shapiro-Wilk test may indicate only slight deviations from the significance level. (BRYMAN & CRAMER, 2005, p. 161)

Table 5.1 shows the demographic characteristics of the study sample. The sample consisted of 335 participants, with more men (N=182, 54%) than women (N= 153, 45,7%). The survey showed that visitors from all different age groups enter the park. The sample has a mean age of 35,5 years, the youngest participant being 15 years old, and the oldest 89. Age groups have been created and data was rearranged. Out of 335 respondents, 8,1% were less than 19 years of age, 30,1% of them were between 20 and 29 years of age, 23,6% of them are between 30 and 39 years of age, 31% are between 40 and 59 years of age, and 7,2% are above 60 years of age. The table given below shows the information about the distribution of ages of the respondents. Previous studies have shown that SNPBZ has a great capacity to attract people from many different countries (HKKH, 2009). Thirty-five different nationalities were recorded during the research period (see Appendix B-1). The distribution of these nationalities is uneven. The majority of participants comes from the United Kingdom (20%), New Zealand (11,3%) and Australia (11,6%). Canada (5,1%), Germany (7,2%) and

USA (8,5%) are also among the most common countries of origins. Respondents from other European countries are grouped together in one variable (Other (European)) and constitutes 24,2%.

For comparison purposes, respondents' highest level of education attained was divided into three groups: postgraduates (master/PhD), undergraduates (bachelors/associate degree/diploma), and lower education (primary school/secondary school/high school). As indicated in Table 5.1, 25,1% of the respondents have a lower education (N=84), 44,2% are undergraduates (N=148), and 30,7% are postgraduates (N=103). An exhaustive list of the participant's nationalities, ages and highest levels of education can be found in Appendix B-1.

Table 5.1: Summary of respondents demographic characteristics (N=335)

		Frequency	Percent
Gender	Male	182	54,3
	Female	153	45,7
Age	<19	27	8,1
	20-29	101	30,1
	30-39	79	23,6
	40-59	104	31,0
	>60	24	7,2
Nationality	Australia	39	11,6
	Canada	17	5,1
	Germany	24	7,2
	New Zealand	38	11,3
	United Kingdom	67	20,0
	USA	28	8,4
	Other (Europe)	81	24,2
	Other (Asia)	29	8,7
	Other	12	3,6
Level of Education	lower education	84	25,1
	undergraduate	148	44,2
	postgraduate	103	30,7

Almost all respondents were visiting the SNPBZ to go trekking (N=322, 96,1%). 89,9% (N=301) of the respondents had not previously visited the SNPBZ. Another major factor is the length of stay. The survey shows that the average length of stay for a tourist is 14,24 days. The median and mode are both 14. Most visitors stayed in the SNPBZ between 12 and 18 days (N=223, 66,6%), while only 12,5% stayed more than 18 days and 20,9% stayed less than 12 days (see Figure 5.1)

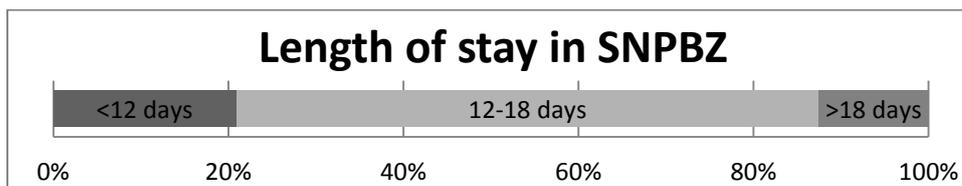


Figure 5.1: Length of stay in the SNPBZ

Visitors can be divided in two major groups: those trekking with a guide (75,2%, N=252) and those trekking alone (47,2%, N=158). This has many implications ranging from the use of resources, the impact on local economy, and the employment level of guides and porters (HKKH, 2009, p. 53).

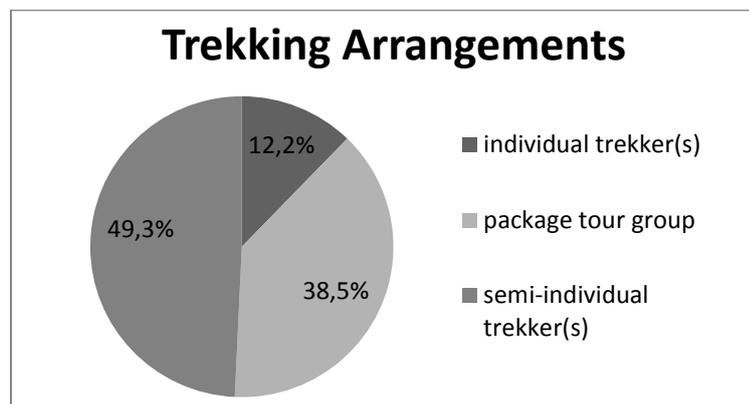


Figure 5.2: Trekking Arrangements in the SNPBZ

For comparison purposes, respondents were divided into three different categories based on their trekking arrangements (see Figure 5.2). 12,2% (N=41) of the respondents organized their trek individually and didn't have a guide or porter during their trek. 38,5% (N=129) trekked in an organized package group including guides and

porters and booked their trek through an agency in their home country or in Kathmandu. The majority of the respondents (49,2%, N=165) were semi-individually organized trekkers meaning that they had a guide and/or a porter and organized their trek individually by a travel agency in Kathmandu, but did not travel in a package tour. The entering groups are of different sizes, ranging from three to more than 41 members. The group mean is composed of 11 people, while the mode is two, which indicates that the majority of groups consist of a couple, two friends, or two parents. An exhaustive list of the respondent's trekking profile can be found in Appendix B-1.

Figure 5.3 shows respondents' environmental characteristics based on their environmental behaviour in their countries of origin and their general environmental attitudes. Most people strongly agree with the statements below. Only a few statements received less support such as "Most people I know contribute to help the environment" and "I often talk with friends about environmental issues".

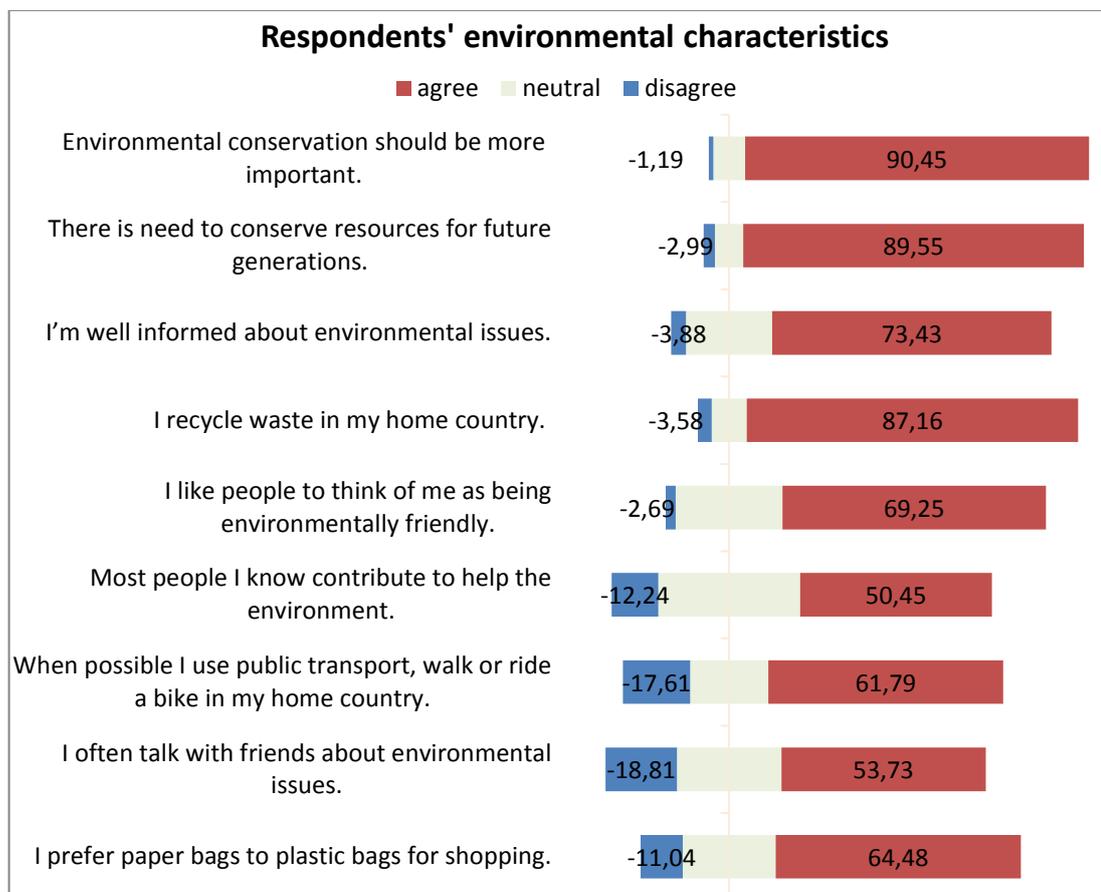


Figure 5.3: Respondents' environmental characteristics

5.1.1. Exploring Relations

A chi-square test and cross-tabs verified that there was a significant relationship between the respondents' nationality and their travel arrangements ($\chi^2=44,5$, $p=0,000$). Visitors from the United Kingdom were significantly more likely to book a trekking package tour than visitors from other nationalities. Almost one third of the respondents (27,9%) who booked a package tour came from the United Kingdom (see Appendix B-2)

There was also a significant relation between the respondents' age and their travel arrangements ($\chi^2=29$, $p=0,000$). Individual trekkers were significantly more likely to be between 20 and 19 years of age. Almost half of the respondents (46,3%) who trekked individually were between 20 and 19 years of age (see Appendix B-2.5).

There was also a significant relationship between the respondents' nationality and several environmental characteristics such as preferring paper bags ($\chi^2=27,3$; $p=0,038$), using public transport ($\chi^2=32,8$; $p=0,008$), and recycling ($\chi^2=49$; $p=0,00$). More than two thirds of the respondents from New Zealand (76,3%) and Australia (74,4%) strongly agreed that they preferred paper bags. 70,4% of the European respondents strongly agreed that they use public transport or ride the bike if possible. All respondents from Canada (100%) and most respondents from Australia (97,4%) and New Zealand (94,7%) strongly agreed that they recycle in their home countries.

5.2. Various question categories

About 57% of the respondents said that they saw a lot of waste in the SNPBZ, while almost 70% believe that solid waste poses a problem in the SNPBZ (see Figure 5.4).

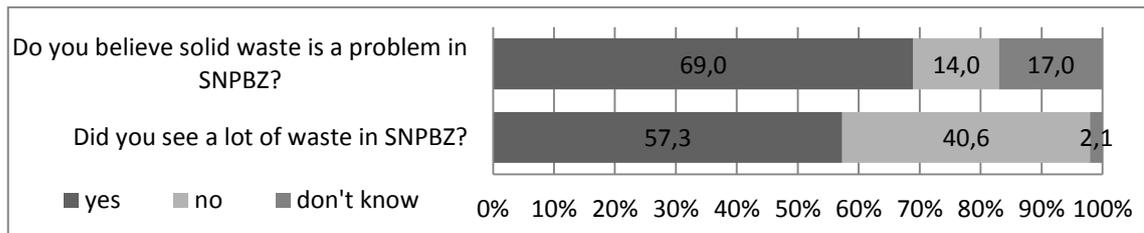


Figure 5.4: Perceptions of SWM in the SNPBZ

Respondents were asked who they believe is mainly responsible for solid waste management in the SNPBZ (multiple answers possible). The majority of respondents (69,6%) believed that individuals are mainly responsible for solid waste management in SNPBZ, while around 48,7% of respondents believed that the national park administration is responsible for solid waste management in the SNPBZ (see Figure 5.5).

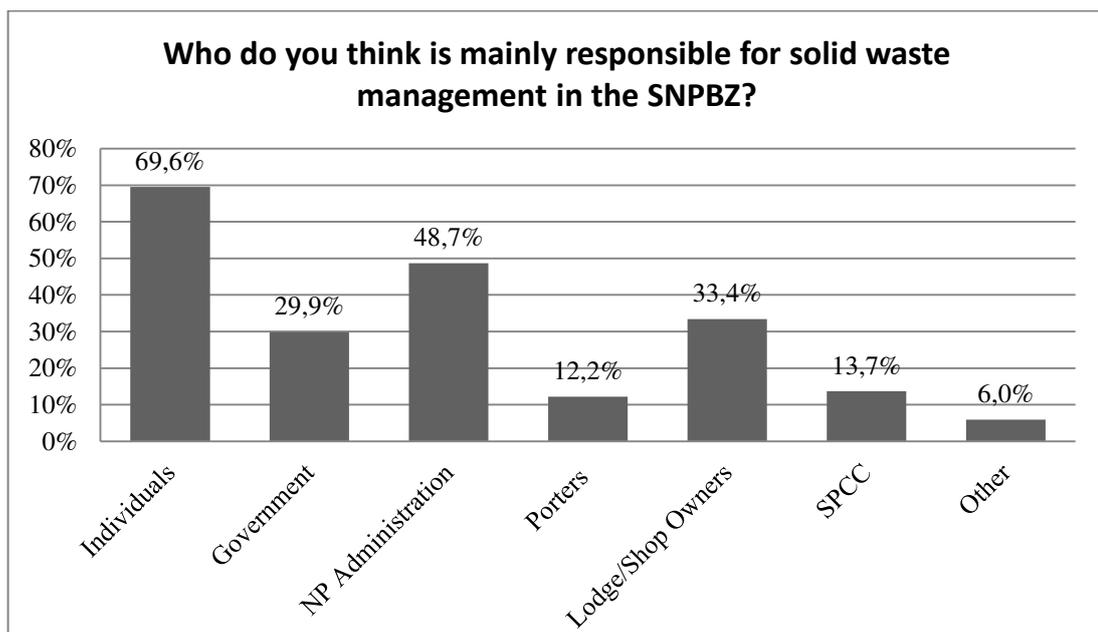


Figure 5.5: Responsible for SWM in the SNPBZ

The majority of respondents (71,2%) believe that trekkers produce the largest quantities of waste, while 39,2% believe that expeditions groups produce most waste (see Figure 5.6).

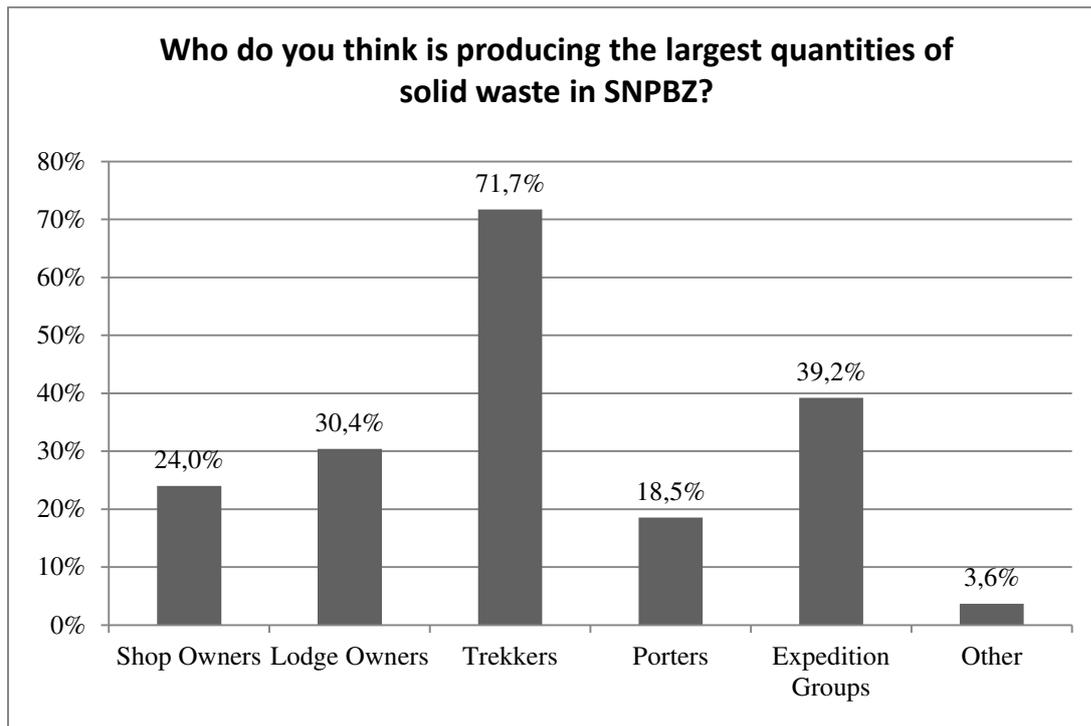


Figure 5.6: Waste Generation

Various opinions and attitudes toward solid waste and solid waste management were recorded on a five-point likert-scale (see Figure 5.7), but afterwards were transformed into a three-point likert scale. Opinions show significant variability. Almost 55% of the respondents disagree that adequate information is provided to visitors about SWM. The majority agrees that waste separation reduces the amount of waste in landfill sites in SNPBZ (65,1%), while 38% of respondents neither agree nor disagree that incinerating harms the environment. Most people agree that their consumer behaviour is influencing the waste situation in SNPBZ (68%) and that it's their personal responsibility to manage waste properly in SNPBZ (83%).

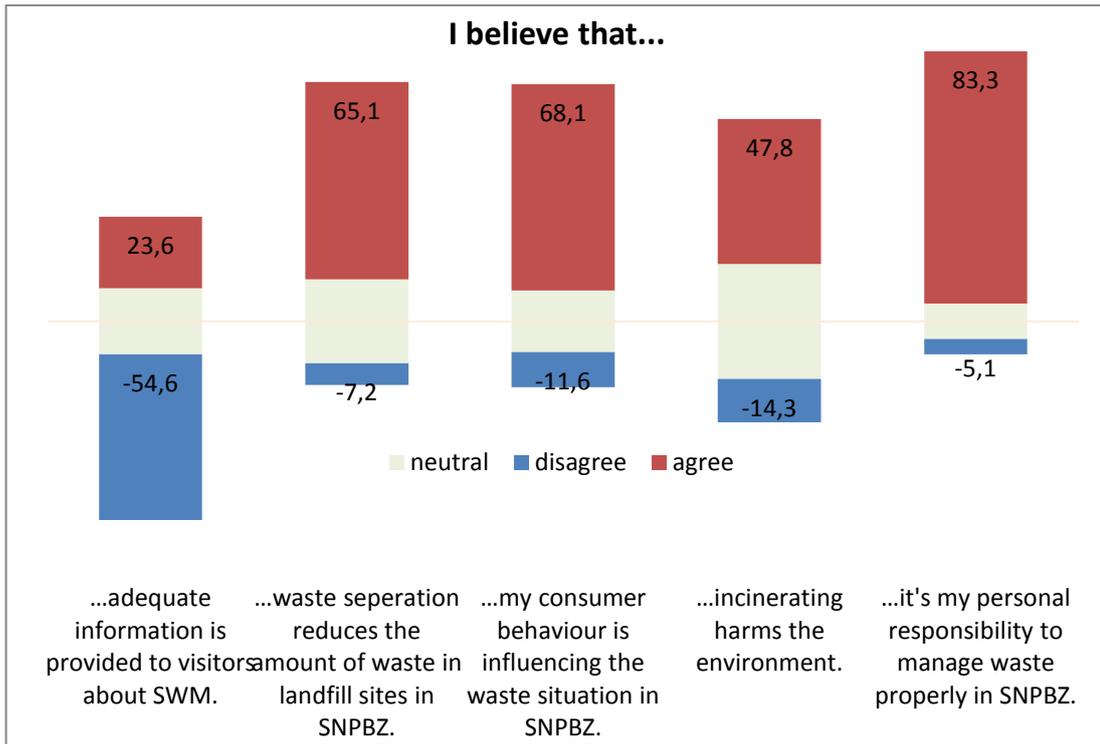


Figure 5.7: Opinions toward SMW

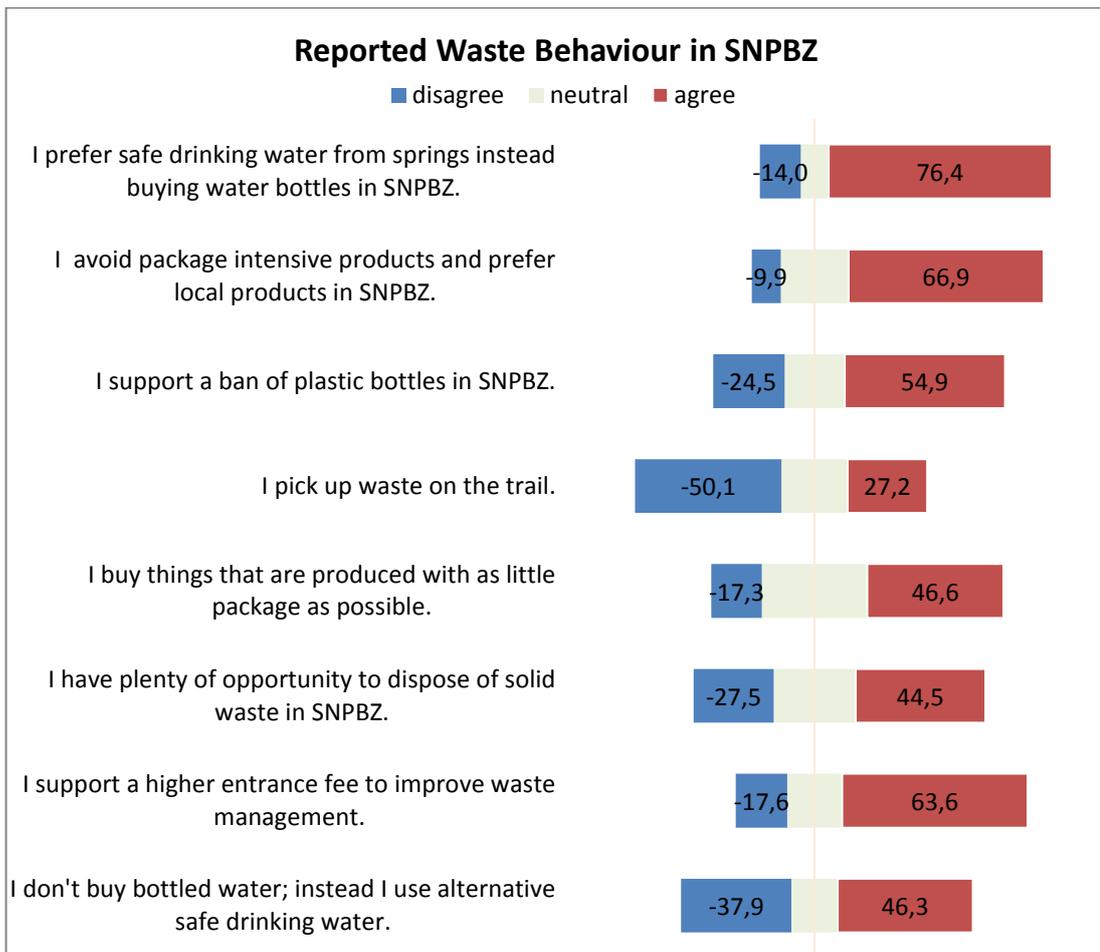


Figure 5.8: Reported Waste Behaviour 1 in the SNPBZ

Respondents were questioned about their waste behaviour in the SNPBZ on a five-point likert-scale (see Figure 5.8). The majority of respondents (76,4%) agreed that they prefer safe drinking water from springs instead buying water bottles, but also disagreed that they pick up waste on trails (50%). Most respondents agreed that they avoid package intensive products and prefer local products (66,9%), and that they support a higher entrance fee to improve waste management (63,6%).

Additionally, respondents were questioned what they do with certain waste items during their visit in the SNPBZ (see Figure 5.9). Almost 45,5% of the respondents said that they tried to avoid or reuse their batteries, while 34,6% took them back to Kathmandu. Almost 43% of the respondents gave their plastic bottles to the lodge owners; packaging and paper is primarily disposed of in waste bins (45,7%, 46%) or left in lodges (39,7%, 46,2%).

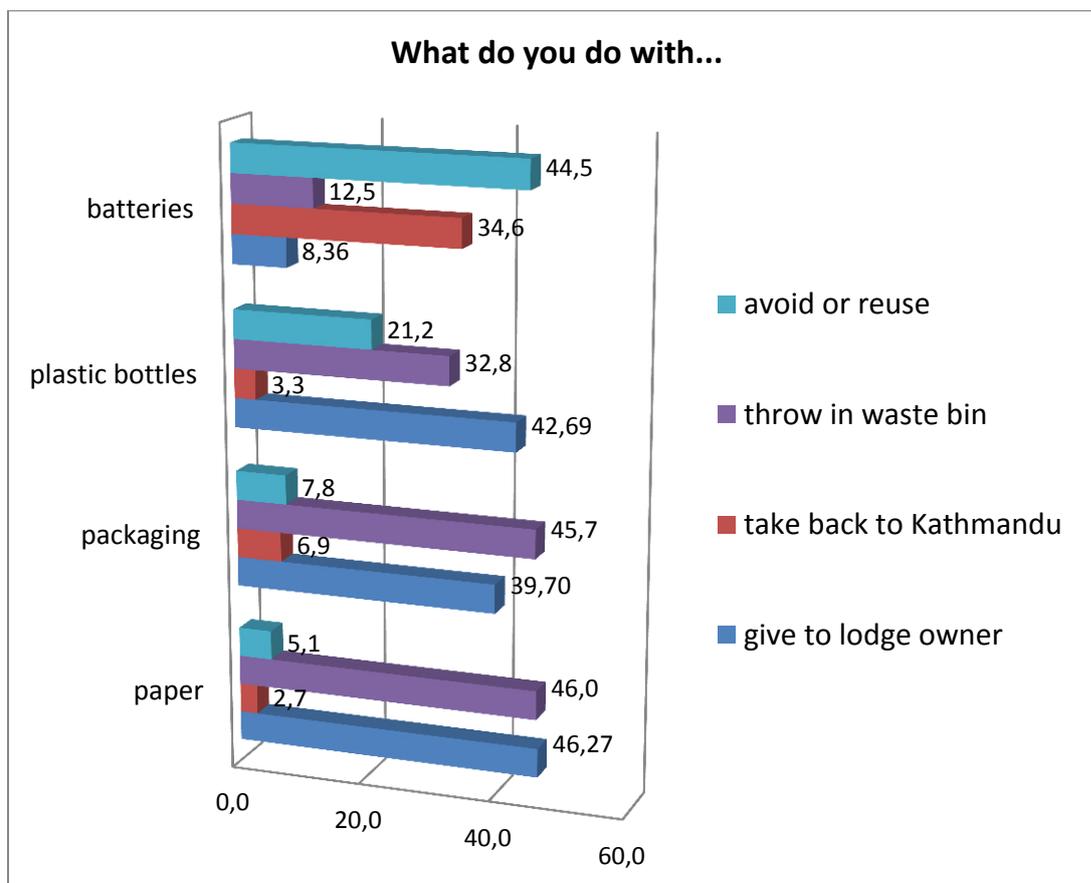


Figure 5.9: Reported Waste Behaviour 2 in the SNPBZ

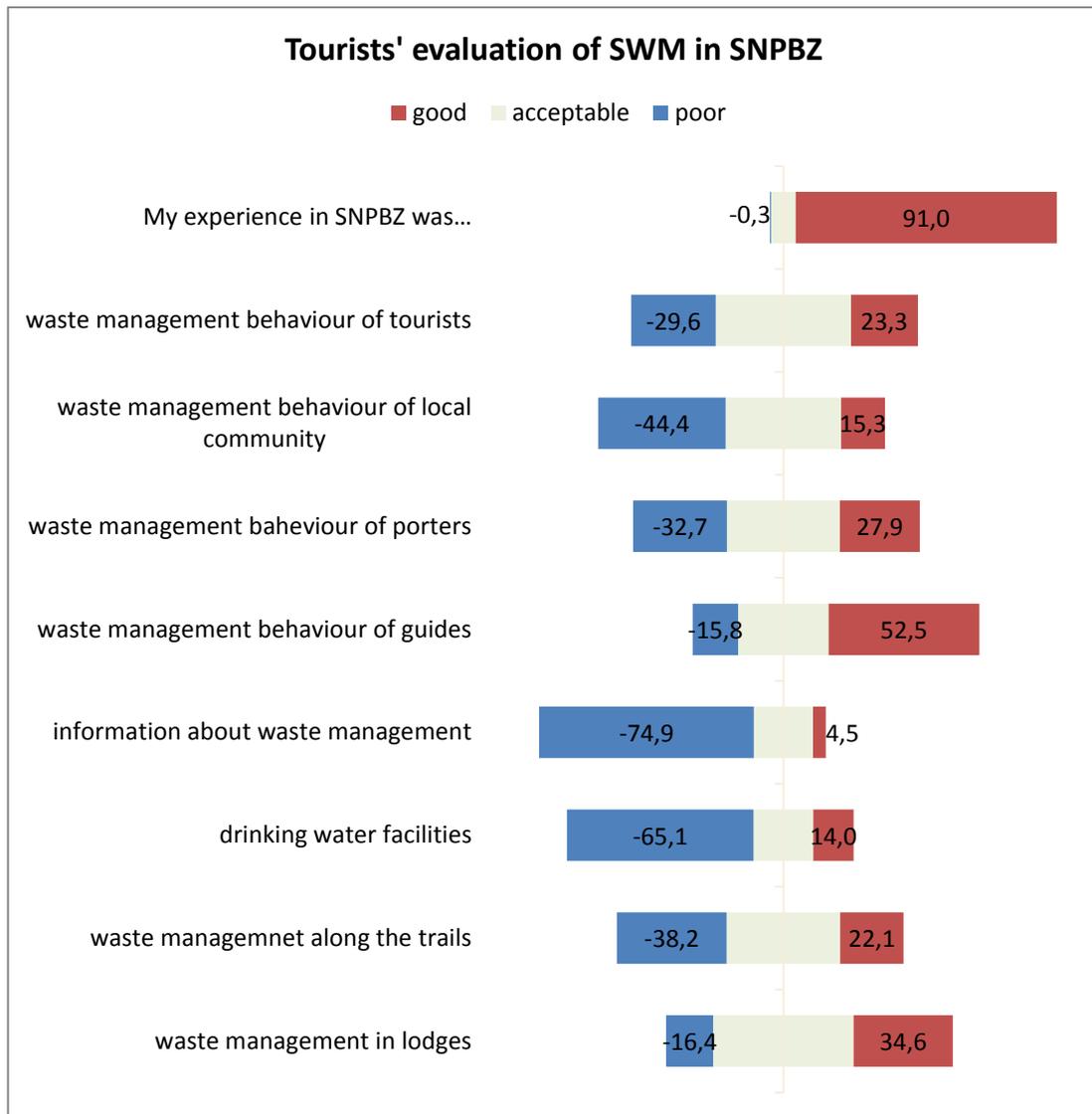


Figure 5.10: Tourists' evaluation of Solid Waste Management in the SNPBZ

Respondents were questioned about their personal evaluation of solid waste management in the SNPBZ (see Figure 5.10). The majority of respondents considered the waste management behaviour of their guides as positive (52,5%), but also rated the provided information about waste management (74,9%) and drinking water facilities (65,1%) as negative. An extensive list of results can be found in Appendix B.

5.2.1. Exploring Relations

A chi-square test and cross-tabulations verified several significant relationships between the respondents' nationalities and environmental attitudes or reported waste behaviours. Table 5.2 shows the significant results of the chi²-test.

An overview of the significant relationship between respondents' nationalities and their agreements with certain statements is presented in Figure 5.11. 82,1% of the respondents from the United States and 72,4% of the Asian respondents agreed that they do not buy bottled water, but look for alternative drinking sources. Respondents from the United States (50%) disagreed mostly that the overall SWM system is good, but agreed mostly that it's their personal responsibility to manage waste properly in the SNPBZ (96,4%). The majority of respondents from New Zealand (68,4%) and Australia (61,5%) agreed that incinerating harms the environment in the SNPBZ, while the majority of respondents from the United States (85,7%) agreed that waste separation reduces the amount of waste in landfills in the SNPBZ. The majority of respondents from South Africa and South America agreed that SNPBZ is clean overall. Most respondents from Asia (82,8%) and America (78,6%) supported a ban of plastic bottles in the SNPBZ.

Table 5.2: Significant chi²-results - nationality and attitudes and reported waste behaviour

	Value	Asymp. Sig.
I do not buy bottled water, but look for alternative drinking sources.	50,414	,000
The overall SWM system is good.	22,528	,032
It's my personal responsibility to manage waste properly in SNPBZ.	22,510	,032
Incinerating harms the environment in SNPBZ.	25,446	,013
Sagarmatha National Park is overall clean.	28,560	,005
I support a ban of plastic bottles in SNPBZ.	29,036	,004

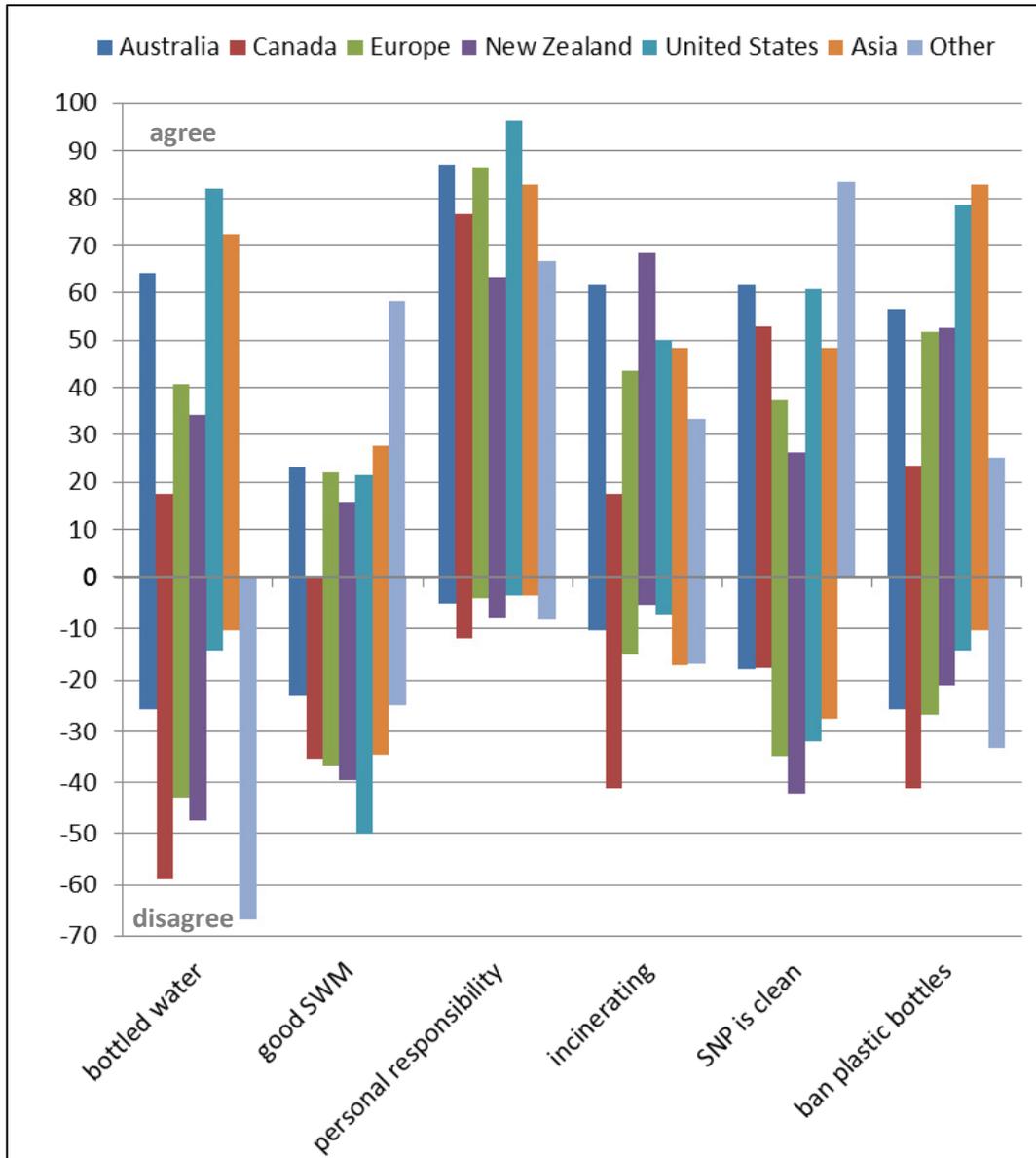


Figure 5.11: Nationalities agree or disagree to Statements

There was a significant relationship ($p < 0,05$) between the respondents' nationalities and reported waste behaviours. Figure 5.12 and Figure 5.13 show the graphical distribution of nationalities' waste behaviour in the SNPBZ. While 76,5% of the Canadian respondents left plastic bottles in lodges, 64,7% stated that they avoid or reuse batteries. 46,4% of the respondents from the United States stated that they take their batteries back to Kathmandu.

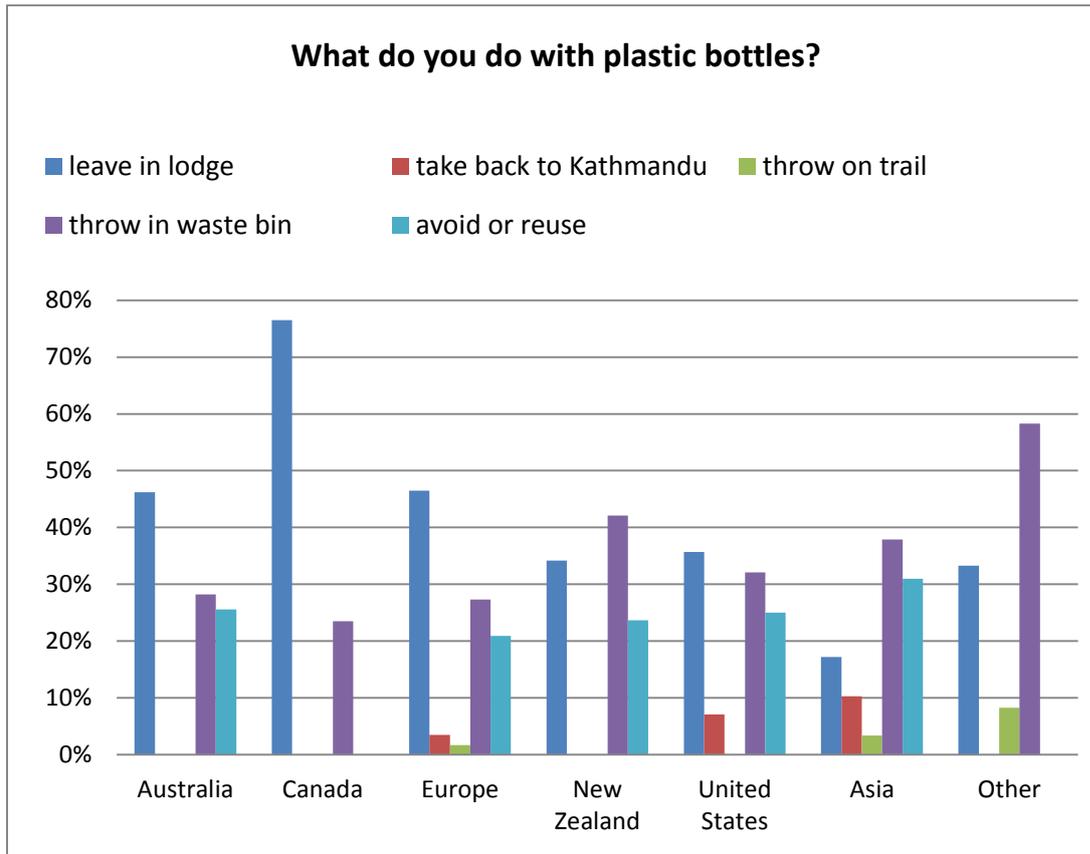


Figure 5.12: What do you do with plastic bottles?

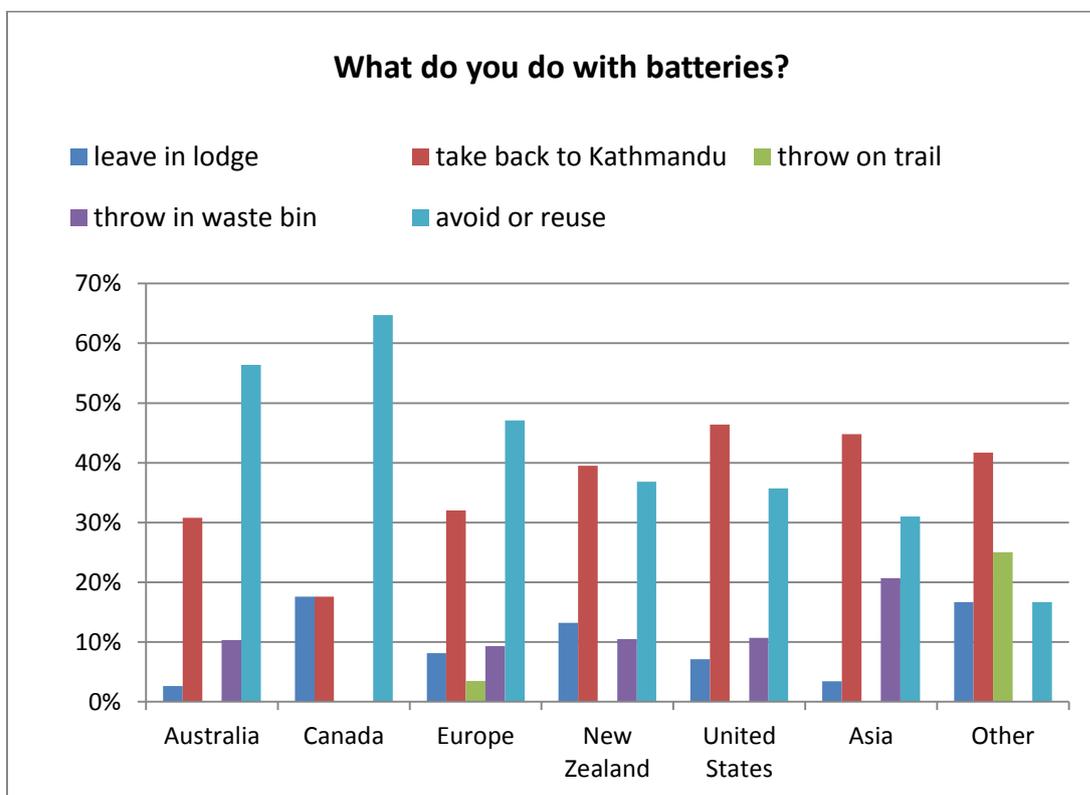


Figure 5.13: What do you do with batteries?

5.3. Creating Composites

For some analyses it was necessary to create new variables such as “trekking arrangements” which is a combination of several items (e.g. travel agency, guide, tour group). Before creating composites, a Reliability Analysis was conducted to determine if it’s appropriate to create the composite and if the single items measure the same construct. Cronbach’s Alpha coefficient is the most popular measure of internal consistency. It ranges from 0 to 1, whereas a generally agreed lower limit for the coefficient is 0.70. However, in small sample sizes a value of 0.60 is still acceptable because there are less data to identify correlations. SPSS provides Cronbach’s Alpha value but also suggests how this value could be improved by particular items. This provides valuable information on how to improve a scale’s reliability. (MOOI & SARSTEDT, 2011, pp. 220-221)

The reliability analysis of the factor waste behaviour in the SNPBZ, which is the dependent variable and the behaviour of interest, was carried out by calculating Cronbach’s Alpha of the variables listed in Table 5.3.

Table 5.3: Reliability Analysis - Waste Behaviour

	Cronbach's Alpha if Item Deleted
I pick up waste on the trails.	,692
I buy things that are produced with as little package as possible.	,649
I prefer safe drinking water from springs instead buying water bottles in SNPBZ.	,653
I avoid package intensive products (tins and cans) and prefer local products in SNPBZ.	,632
I do not buy bottled water, but look for alternative drinking sources.	,638
I prefer paper bags to plastic bags for shopping.	,664
do packaging	,687
do paper	,690
do batteries	,700
do plastic bottles	,665
Cronbach's Alpha 2	,692

The Reliability Test (Table 5.3.) shows that the Cronbach's Alpha value is below the acceptable standard of 0,70 at 0,692. Cronbach's Alpha relies heavily on sample size and number of used items. For the purpose of this study, the value is still acceptable. Additionally, Factor Analysis proved construct validity of the underlying construct (see B-6).

A Factor Analysis was conducted in order to ascertain construct validity of the underlying constructs. Although literature and previous studies showed that most constructs have a good construct validity and reliability, Cronbach Alpha values were not always acceptable.

Therefore, a Principle Components Analysis was conducted. It showed that the items loaded on less factors than previously expected. In order to make further use of the data, environmental attitude was not measured as a single construct, but added to the environmental consciousness construct. Some items were removed and two items were used to measure different constructs as literature and previous studies suggested.

The Kaiser–Meyer–Olkin (KMO) statistic, which is also called the measure of sampling adequacy, indicates whether there is an inter-correlation between variables in the dataset. The KMO statistic decides whether the data are appropriate for factor analysis. A value above 0,6 is acceptable, in this case there is a KMO value above 0,8, which is meritorious. (MOOI & SARSTEDT, 2011, p. 208)

The rotated component matrix can be found in Appendix B-5. The construct (attitude toward behaviour) was merged with environmental consciousness, as Cronbach's Alpha value for environmental consciousness was very low (0,504). The Factor Analysis suggested combining the items for environmental consciousness and attitudes toward behaviour to one construct. Also, the number of items was decreased from sixteen to nine, because Cronbach's Alpha value was unacceptably low. After removing several items (see B-5), the Alpha value improved steadily to 0,728 which is an acceptable standard (<0,70). Nine items are used to measure environmental consciousness and attitudes, which is now seen as merged construct and is internally consistent (see Table 5.4).

Table 5.4: Reliability Analysis - Environmental Consciousness and Attitudes

Cronbach's Alpha 1	,728
	Cronbach's Alpha if Item Deleted
I support a higher entrance fee to improve waste management in SNPBZ.	,727
Waste separation reduces the amount of waste in landfills in SNPBZ.	,721
I support a ban of plastic bottles in SNPBZ.	,710
I often talk with friends about environmental issues.	,680
When possible I use public transport, walk or ride a bike in my home country.	,724
I recycle waste in my home country.	,695
I'm well informed about environmental issues.	,699
There is need to conserve resources for future generations.	,692
Environmental conservation should be more important.	,683

The two items for subjective norm were internally consistent, with a Cronbach's Alpha value of 0,634 (see Table 5.5). The Cronbach's Alpha value for the three items for perceived behavioural control was very low (0,170). Previous studies suggested these items and the results of the factor analysis were acceptable (cf. GODFREY, 2011). The construct was accepted for the purpose of this study.

Table 5.5: Reliability Analysis - Subjective Norm

Cronbach's Alpha	,634
Most people I know contribute to help the environment.	
I like people to think of me as being environmentally friendly.	

After conducting Reliability Analysis and Factor Analysis, composites are created by summing up all the items of the constructs to form scales. The constructs and its items are indicated in Table 5.6. If the value is high, respondents agreed strongly. If the value

is low, respondents disagreed strongly. For example, a very low value for the reported waste behaviour in the SNPBZ indicates that the individual strongly agrees with the operational definition of good solid waste management behaviour in the SNPBZ (see Chapter 3.2). In Appendix B-7, a detailed frequency table can be found as well as a visual distribution of the frequencies.

Table 5.6: Composites and Items with Min, Max and Mean Values

	Min	Max	Mean
Waste Behaviour in SNPBZ (WB)	22	48	35,5194
I pick up waste on the trails.			
I buy things that are produced with as little package as possible.			
I prefer safe drinking water from springs instead buying water bottles in SNPBZ.			
I avoid package intensive products (tins and cans) and prefer local products in SNPBZ.			
I do not buy bottled water, but look for alternative drinking sources.			
I prefer paper bags to plastic bags for shopping.			
do packaging/ paper/ batteries / plastic bottles			
Environmental Consciousness and Attitude (ECA)	21	45	35,2388
I support a higher entrance fee to improve waste management in SNPBZ.			
Waste separation reduces the amount of waste in landfills in SNPBZ.			
I support a ban of plastic bottles in SNPBZ.			
I often talk with friends about environmental issues.			
When possible I use public transport, walk or ride a bike in my home country.			
I recycle waste in my home country.			
I'm well informed about environmental issues.			
There is need to conserve resources for future generations.			
Environmental conservation should be more important.			
Subjective Norm (SN)	2	10	7,2925
Most people I know contribute to help the environment.			
I like people to think of me as being environmentally friendly.			
Perceived Behaviour Control (PBC)	5	15	9,5075
My consumer behaviour is influencing the waste situation in SNPBZ.			
I have plenty of opportunities to dispose of solid waste in SNPBZ.			
Adequate information to visitors before and during their visit about waste management in SNPBZ is provided.			

Feeling of Responsibility (FOR)	1	5	4,0896
It's my personal responsibility to manage waste properly in SNPBZ.			
Background factors			
Gender			
Age			
Nationality			
Level of Education			
Trekking Arrangements			

5.3.1. Exploring Relations

Histograms and Probability-Plots (Q-Q-Plots) were created in order to describe whether the distribution of the composites approximates a normal distribution. Usually, normal distribution is theoretical and rarely exists in real life. Still, it is useful to look at distributions for examining the data. The histograms indicate that the distribution for the composite “feeling of responsibility”, “environmental consciousness and attitudes”, and “perceived behaviour control” more closely matched the normal curve than did the distribution for the composite “waste behaviour” and “subjective norm” (see Appendix B-8). The Probability-Plot is a graphical method for comparing two probability distributions. The linearity of the points from the different components suggests that the data are normally distributed. (see Appendix B-8)

The next step is to address whether there is a difference in the composite “waste behaviour” based on gender by using the independent samples t-test (H6a). Looking at the descriptive group statistics in Table 5.7, we can see that female respondents have a higher mean in waste behaviour (36,0719) than male respondents (35,0549). It can also be noticed that the confidence interval for females is longer than the confidence interval for males (see Figure 5.14). The results of Levene’s test are significant ($p < .05$), which means that equal variances are not to be assumed; the data is heterogenic

($t(294,857) = -1,719, p=0,004$) (see Appendix B-9). This suggests that women scored a better “waste behaviour”-value than men, but the difference is not significant.

Table 5.7: Means and Levene's Significance Value ($p>.05$)

	WB	ECA	SN	PBC	FOR
male	35,0549	34,5385	7,2088	9,4780	4,0330
female	36,0719	36,0719	7,3922	9,5425	4,1569
Sig.	0,004	0,051	0,080	0,288	0,038

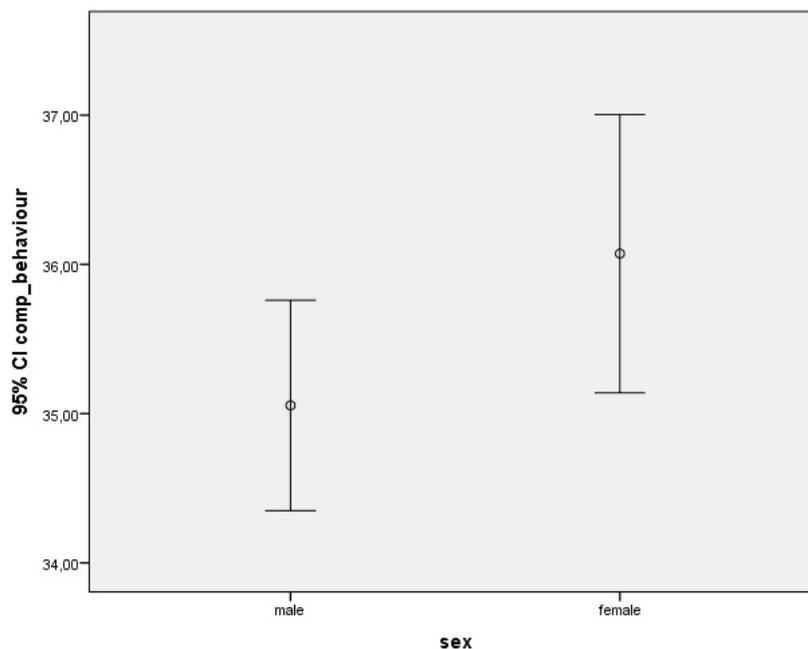


Figure 5.14: Error bar - Behaviour and Sex

The t-test was also applied on “environmental consciousness and attitudes” and gender. Again, the female respondents (36,0719) have a higher mean than the male respondents (34,3585). The confidence interval for women is longer than the confidence interval for men, suggesting that women have more variances in their responses (see Figure 5.15). The Levene value is not significant ($p > .05$) and equal variances can be assumed ($t(333) = -2,879, p=0,051$). This suggests again that women scored a better “environmental consciousness and attitudes”-value than men, but the difference is not significant.

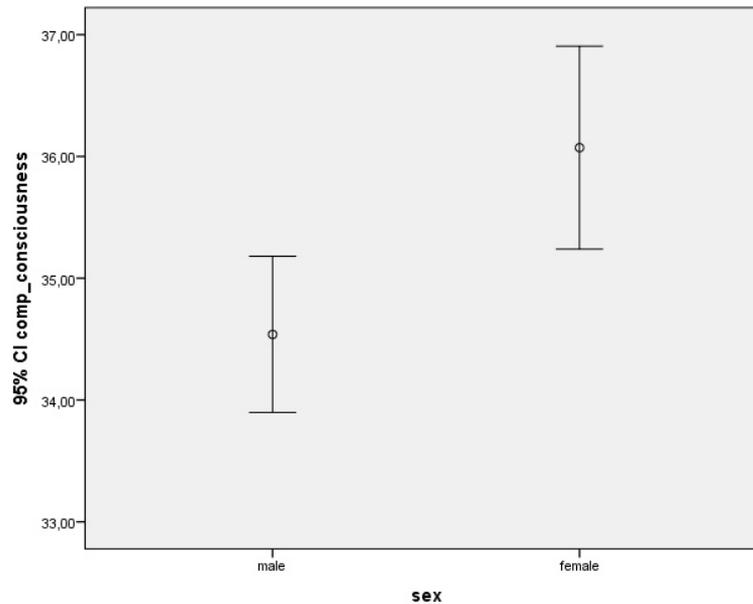


Figure 5.15: Error bar - Behaviour and Sex

While the t-test for “subjective norm” and “perceived behaviour control” is also not significant ($p > 0,05$) and homogeneity can be assumed, the value for the composite “feeling of responsibility” is significant ($p < 0,05$). Still, the confidence interval for women is longer than the confidence interval for men in both three composites (see Appendix B-9). The females have a higher mean than males but the difference is not significant. In summary, that means that females scored higher values for each composite than males did, but most differences are not significant.

One-way analysis of variance (ANOVA) was used to examine whether specific subgroups within the sample had significantly different views regarding the five constructs (H6b/c/d/e). The mean score for each of the five constructs were compared with nationality, age group, educational level and trekking arrangements (see Table 5.8).

Within age groups, the overall effect across the five constructs was significant ($p < 0,05$) for WB, ECA, SN, and FOR. This means that Levene’s test is significant and equal variances are not assumed. For WB and ECA, the mean of the age group >60 was significantly higher than for the other age groups. For FOR, the mean of the age group 20-29 was significantly higher than for the other age groups.

Within nationality groups, education level and trekking arrangements, the overall effect across the five constructs was not significant ($p > 0,05$). This means that Levene's test is not significant and equal variances are assumed. Still, it was indicated that respondents from the United States reached the highest mean for WB, ECA, and SN. The mean for FOR and PBC did not vary widely across respondents with different nationalities (see Appendix B-10). Individual trekkers and post graduates scored the highest mean value for WB and ECA, package tour groups and lower education respondents the least.

Table 5.8: Comparison of Mean scores of Background Factors for WB and ECA (it= individual trekker(s), ptg= package tour group, sit= semi-individual trekker(s); LE= lower education, U= undergraduate, P= postgraduate)

Background Factors	Mean score by group								Sig.
Nationality	AUS	CAN	EU	NZ	USA	Asia	Other		
	WB	36,23	33,23	34,98	36,31	37,67	37,48	31,5	No
	ECA	35,97	35,11	34,87	35,66	37,21	35,86	33	No
Age Group	<19	20-29	30-39	40-59	>60				
	WB	35,00	35,33	35,48	35,68	36,33			Yes
	ECA	32,70	35,75	35,38	35,07	36,21			Yes
Trekking Arrangements	it	ptg	sit						
	WB	36,26	35,17	35,61					No
	ECA	35,36	35,04	35,36					No
Education Level	LE	U	P						
	WB	35,52	35,14	36,07					No
	ECA	34,40	34,94	36,35					No

A correlational analysis was conducted to examine the direction and strength of relationships between the variables. Several significant relationships among variables exist ($p < 0,05$), but only three stronger relationships were detected ($> 0,4$). The correlation matrix in Table 5.9 shows the correlation between the variables WB, ECA, PBC and SN.

Table 5.9: Matrix of Spearmans Correlation Coeffiecient

	comp_ECA	comp_WB	Sig.
comp_WB	0,562		0,000
comp_SN	0,467		0,000
comp_PBC		0,412	0,000

5.4. Regression Analysis

Multiple regression analysis with “enter method” was conducted in order to determine the influence of the independent variable on the dependent variable (waste behaviour). The independent variables included ECA, FOR, PBC, and SN, but also age and sex variables were included as previous research has found that they can significantly affect environmental behaviour (CORDANO, et al., 2011, p. 645). It is a confirmatory analysis because the hypotheses are tested with regard to whether or not they can be confirmed. To identify Multicollinearity, collinearity diagnostic was conducted. Information about multicollinearity is given in the results of the regression analysis in the table with the heading “Coefficients”. When the Tolerance statistic is low (<0,1), multiple correlation is high and there is the possibility of multicollinearity. In our case the tolerances for the independent variables are high, suggesting that multicollinearity is unlikely.

The R^2 value assesses the overall model fit and indicates the degree to which the variance is explained by the independent variables. The R^2 value always lies between 0 and 1; a high R^2 indicates a solid model fit. (MOOI & SARSTEDT, 2011, pp. 178-179) In our case, the overall variance explained by the independent variables is 33,8%. The ANOVA value assesses if the overall model is significant. The p-value was below 0,05 which means that the overall model is significant and that it is highly likely that at least one or more variables will have a significant relationship to the dependent variable. The

next step is to interpret the effects of the various independent variables used to explain the dependent variable. If the regression coefficient's p-value is below 0.05, it can be assumed that the particular independent variable has a significant influence on the dependent variable. As can be seen in Table 5.10, only the variables ECA (0,000), FOR (0,017) and PBC (0,043) have a significant relationship on the dependent variable WB. This means that the other independent variables do NOT reliably predict the dependent variable WB.

Table 5.10: Significance Value and effect size Beta - Regression Analysis

	Sig.	Beta
Zscore(sex)	,833	,010
Zscore(Trekkingarrangm)	,308	-,046
Zscore(age)	,461	,033
Zscore(comp_consciousness) (ECA)	,000	,529
Zscore(comp_subjectivenorm) (SN)	,828	-,011
Zscore(comp_perceivedbehavcontrol) (PBC)	,043	,115
Zscore(comp_feelingofrespons) (FOR)	,017	,117

5.5. Qualitative Results

Respondents were given the possibility to express their thoughts and suggestions on waste management in the SNPBZ at the end of the questionnaire. Several participants used this opportunity to share their personal views. A selection of these personal suggestions is listed in Table 5.11.

Table 5.11: Respondents personal suggestions on waste managent

More public relation and information and culture about environment
Educate the Nepali people and the visitors. The world is our home, the world is our mother, Nepal is our paradise.
More information for the tourists before entering the park and during the trek. More information and support to the local people about how to manage and recycle solid waste.

More information! Especially before entering into the area!

Ban the use of disposable plastic bottles, fund UV water filters in lodges, more awareness through education of trekkers, guides and porters by NP

Possibility to fill in bottles with safe water, more informations about the amount of plastic to trekkers,

It makes me think! I left all my waste in lodges and I don't know hat thappened with it

Encourage trekkers to use boiled water instead of bottles water and increase awareness in trekking companies. Ban plastic bottles!

Better education for trekkers! Durung booking period advice water purifcation options! Battery waste disposal sites!

"Throttle the Bottle" - Ban Plastic Bottles and Provide Spring Water and filtered water sources for both locals and tourists

Assure all tourists are aware of what happens to waste - awareness could hopefully change consumer behaviour!

More information from guides and strong advertising to discourage littering!

Selling water purifiying tablets everywhere. Avoid buying canned soft drinks.

Biodegredable Prayer-scarves!

LNT (Leave no Trace) guidelines for tourists, guides, porters awareness

Guides need to inform trekkers very clearly what waste management situatuin is in the park. I trekked recently in Peru and my awareness was much better - we were not allowed to leave ANYTHING on the mountains. Should be made clearer.

6. DISCUSSION

6.1. General Discussion

The general results about the respondent's characteristics are consistent with those of other studies and suggest that mainly relatively well-educated people visit the SNPBZ (cf. HKKH, 2009). A possible explanation for this might be that the cost of an international flight to Nepal is quite high and that only wealthy people with a high level of education can afford to visit the SNPBZ.

It is also interesting to note that the majority of respondents originate from the United Kingdom (20%), New Zealand (11,3%), and Australia (11,6%). This result may be explained by the fact that regular and relatively cheap flights are available from New Zealand and Australia. It was expected that the differences in behaviour and attitudes between the nationalities to be more distinct than what was proven. However, the observed behaviours between different nationalities in this study were not significant.

Trekking arrangements of the respondents can be divided in three major groups: those trekking in a package tour, those trekking with a guide or porter, and those trekking alone. The type of trekking arrangement may have many implications on the local economy and environment, but may also influence individual's waste behaviour. However, no significant differences in behaviour were found between respondents' trekking arrangements.

There were more male than female respondents. In general women scored higher waste-behaviour and environmental consciousness values than men. Based on that result, it can be speculated that women care more about the environment. However, no significant differences were found between men and women.

The one-way analysis of variance suggested that age is a significant predictor for waste behaviour. The results showed that the age group >60 scored a better "waste behaviour-value" and "environmental consciousness and attitude-value" than the

other age groups. Thus, it can be speculated that this result reflects the fact that older individuals are generally more environmentally aware and behave in a more environmentally compatible manner than other age groups.

Conversely, the age group 20-29 scored the highest value for feeling of responsibility. Based on this, the tentative conclusion can be drawn that younger people feel more responsible towards the environment.

6.2. Discussion of the Model

Another aim of this thesis was to investigate the use of a revised theoretical framework of the Theory of Planned Behaviour and the Norm Activation Model for explaining waste behaviour in the SNPBZ. The use of the revised theoretical model is not fully satisfactory, as the variance (R^2) explained by the independent variables is only 33,8% and does not indicate a solid model fit.

Although the model is partly supported and of general utility, it is advisable to add alternative predictors into an extended model in future research.

Room for improvement might also be seen in the development of constructs. It is possible that the constructs were not measured accurately in the survey. Socially expected answers are an important issue to consider, as well as the fact that some questions were not detailed enough and therefore could have been interpreted differently by different individuals. Furthermore, respondents may be perplexed as to what the questions would have to do with waste management. Consequently, the results may have been obscured.

It is also arguable that the survey design, a questionnaire survey, is not the most accurate instrument to measure the factor behaviour. As STEG & VLEK point out (2009), it is preferable to measure actual behaviour instead of selfreported behaviour because

of validity and reliability issues. Thus, observation or interview techniques might be more useful to investigate how people actually behave in certain situations.

Unfortunately, a comparison with similar studies was not possible, as no previous studies have yet focused on the complex issue of waste behaviour in national parks in countries of the Global South.

In this study, the behaviour of interest was indicated by a simple sum index of different behaviours and it was assumed to represent one underlying general dimension. This is critical as one of the greatest controversies in environmental psychology is about how to measure ecological behaviour. While some authors claim that ecological behaviours are inconsistent and do not fall into a homogeneous set, others assume that ecological behaviours can be generally measured (cf. KAISER, 1998, p. 412).

6.3. Discussion of Hypothesis

One aim of this study was to investigate which factors influence visitor's waste behaviour. Therefore, hypotheses were formulated about the research model. The results indicate that only some factors have a great influence on tourist's waste behaviour in Sagarmatha National Park and Buffer Zone, thus only a few hypotheses were verified.

The strongest and most significant factor for predicting waste behaviour in the SNPBZ was "environmental consciousness and attitude". This merged construct was created from the two single constructs "environmental consciousness" and "environmental attitude", which turned out to be completely redundant for the analysis of waste behaviour. This is consistent with the theory of planned behaviour, which argues that someone's attitude explains why he or she behaves in a certain way. The construct "feeling of responsibility" was significant for the analysis, therefore hypothesis 2 was verified. The construct of "perceived behaviour control" did not contribute significantly to the prediction of waste behaviour, but it was still considered slightly significant and Hypothesis 5 was verified. The remaining construct "subjective norm" turned out to be

insignificant for predicting waste behaviour, therefore Hypothesis 3 was falsified. Background factors take on weak magnitudes and different significances in the model. Overall they are poor predictors of waste behaviour for this study.

Mainly, there is not a strong relationship between background factors and behaviour patterns; only age (Hypothesis 6b) did make a significant contribution in predicting waste behaviour. Gender, Nationality, Education Level, and Trekking Arrangements did not contribute significantly in the model. The revised hypothetical framework for waste behaviour in the SNPBZ is shown in Figure 6.1.

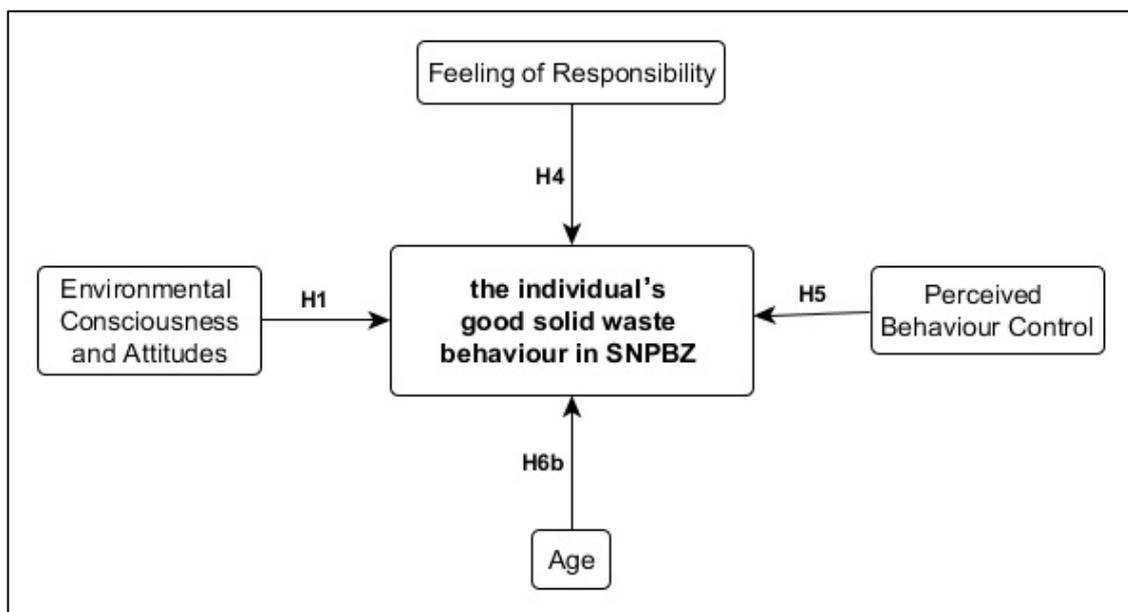


Figure 6.1: Revised hypothetical framework for waste behaviour in the SNPBZ

6.4. Limitations of the Study

There are several limitations to this study that are important to mention and must be considered when interpreting the results of this study.

First of all, data collection method may have led to a selective group of individuals, which may limit the generalizability of the results. On the one hand, it can be assumed

that individuals who are very interested in the environment or environmental conscious were willing to fill out the survey in the first place, thus excluding people with different opinions and attitudes. On the other hand, language selectivity(??) is an issue, which may affect the sample reliability. There is a large number of different nationalities trekking in the park which may lead to several communication problems. As the survey was only conducted in English, people without sufficient comprehension of the English language were completely excluded.

Secondly, as mentioned in the chapters before, the results of the analysis are not as accurate and reliable as expected. Several constructs in the present research design are limiting and need to be extended, such as revising the constructs for environmental consciousness and attitudes and specifying external factors.

Lastly, the diploma thesis research project has been very extensive. Some research tasks were quite time consuming and underestimated by the researcher in the first place (e.g. data entry).

7. Conclusion and Recommendations

7.1. Practical Implications and Future Perspectives

Waste behaviour in the SNPBZ was explained by the introduced research model only to a small extent. Future studies on the current topic are therefore recommended to be able to explain the results with high reliability and validity. In future studies it may be possible to extend the model with other factors that might influence waste behaviour. More research is also required on the effects of background factors on environmental behaviour. Moreover, it would be interesting to compare the effectiveness of different intervention strategies for encouraging pro-environmental behaviour in the SNPBZ. Current interventions need to be evaluated and changes in the relevant behaviours should be documented and compared to behaviour patterns before the implementation of an intervention.

It is obvious that the reductionistic tendency of this study to explain waste behaviour may pose great challenges to predict the reality of human action. Still, the findings may help to understand visitor's waste behaviour and consequently help to improve pro-environmental waste behaviour patterns. The findings of this study suggest several courses of action for improving waste management: It was significant that many respondents complained about poor information on waste management. Most respondents wish to be more informed about the waste issue in the SNPBZ, therefore a definite need for an improved information system is preferable. On the one hand, the National Park Administration could consider providing more information to visitors on waste management in the park. On the other hand, information on waste management could be provided before entering the park. For instance, the distribution of information brochures by travel agencies on how to avoid waste and how to manage waste properly in the SNPBZ could be organized.

As most respondents appeared open-minded, environmental conscious, and aware of waste problems, relatively simple measures such as providing more detailed information, could improve the waste management situation considerably. An important practical implication is that the vast majority of respondents required improved drinking water facilities. Many visitors would avoid using water bottles in the SNPBZ if safe and natural drinking water facilities from springs improved. Also, many respondents support a total ban of plastic bottles. These results suggest there is a need to improve environment-friendly drinking water facilities.

Another implication of these findings is that the large number of different nationalities trekking in the park should be taken into account. The broad range of visitors poses several unusual management problems which must be considered in developing waste management plans. Interestingly, it should be noted that the majority of respondents supports a higher entrance fee to improve waste management in the SNPBZ. This information can be used to develop targetted interventions and to define new courses of action.

7.2. Conclusion

This thesis has explored the relationship between behaviour and the waste issue as a consequence of the unsustainable tourism development in *Sagarmatha National Park and Buffer Zone (SNPBZ)*, Nepal. The study set out (1) to identify tourists' behaviours, attitudes, and knowledge towards solid waste, solid waste management and its possible problems in the SNPBZ, (2) to determine factors that have the greatest influence on tourists' waste behaviour, and (3) to develop an explanatory model to predict waste behaviours. A questionnaire survey was conducted in the SNPBZ from April to May 2013.

A research model was developed and partly supported. Hypotheses were formulated about the research model to explore important factors. While some expected factors

did influence waste behaviour (e.g. age, environmental consciousness, attitudes, and perceived behaviour control), others did not (social norms, gender, nationality).

These findings may help us to better understand visitors' waste behaviour in national parks in countries of the Global South and consequently to help achieving sustainable and significant changes. Individuals can contribute significantly to environmental sustainability by adopting simple pro-environmental behaviour patterns. The first step is to understand the factors and processes that influence behaviour and threaten the environment. In general, the results suggest that visitors are very concerned about environmental issues and aware of waste management problems in the SNPBZ. These findings suggest several courses of action, practical implications, and recommendations on how to improve waste management.

This research should serve as a basis for future studies as it has raised many questions in need of further investigation. This study made several noteworthy contributions to trans-disciplinary environment-behaviour research. There is little doubt that applied research approaches are particularly important in Development Studies. Application-oriented research is particularly desirable in providing sustainable tourism and acceptable environmental development in countries of the Global South.

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Appendix

Appendix A : Questionnaire

Appendix B : Table of Contents of supplemental CD-ROM

Appendix C : Abstract

Appendix D : Zusammenfassung

Appendix E : Curriculum Vitae

Appendix A: Questionnaire



Visitors' Perceptions on Waste Management in SNPBZ

Dear visitor,

I am a student from the University of Vienna, Austria and conducting research on the impacts of tourism and waste management in **Sagarmatha National Park and its Buffer Zone (SNPBZ)**, Nepal. As a part of my master's thesis project, I'm surveying visitors to gather information on what they think about tourism and waste management practiced in the SNPBZ. Please take a few minutes to tell me what you think about these topics.

Your responses will be completely anonymous and confidential. There are no correct or incorrect responses, as I'm only interested in your personal point of view. You do not have to answer any question you do not want to and you reserve the right to discontinue at any time. This survey will only take a few minutes to complete. *Your input is very important for my master's thesis in exploring strategies to protect the environment and promote sustainable development in Sagarmatha National Park.*

Thank you for your support!

Ms. Eva Posch

PART I: PURPOSE AND ACTIVITIES IN SNPBZ

1. What is the primary purpose for your visit to Sagarmatha National Park? (Check one only)			
<input type="checkbox"/> trekking	<input type="checkbox"/> research	<input type="checkbox"/> mountaineering	<input type="checkbox"/> culture <input type="checkbox"/> other
2. How did you make your travel arrangements to Nepal?			
<input type="checkbox"/> independently	<input type="checkbox"/> agency from my home country	<input type="checkbox"/> Nepali travel agency	<input type="checkbox"/> other
3. Are you travelling...			
<input type="checkbox"/> alone	<input type="checkbox"/> family or friends	<input type="checkbox"/> tour group	<input type="checkbox"/> other
3.1. If in tour group, how many tourists are in your tour group including you? _____			
3.2. If not in tour group, did you hire a guide? <input type="checkbox"/> Yes <input type="checkbox"/> No			
4. Have you visited Sagarmatha National Park before?		<input type="checkbox"/> Yes <input type="checkbox"/> No	4.1. If yes, how many times: _____
5. This is day number _____ of _____ (total number of days in SNP).			

PART II: WASTE MANAGEMENT IN SNPBZ

7. Have you seen a lot of waste in the National Park? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> don't know			
7.1. If yes, where mostly: <input type="checkbox"/> along the trails <input type="checkbox"/> in the forest <input type="checkbox"/> in the river bed			
<input type="checkbox"/> in the villages <input type="checkbox"/> other: _____			
7.2. If yes, mainly what kind of waste: <input type="checkbox"/> plastic <input type="checkbox"/> plastic bottles <input type="checkbox"/> paper			
<input type="checkbox"/> glass/ metal <input type="checkbox"/> human waste <input type="checkbox"/> other: _____			
8. Have you seen official waste pits? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> don't know			
9. Have you seen waste incinerators (= technical apparatus for burning waste at high temperatures)?			
<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> don't know			
10. Have you seen illegal dumping sites? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> don't know			

11. What happens mostly to solid waste (=paper, plastic, metal, glass, plastic bottles, textiles) in SNPBZ in your opinion? (max. 3 answers)	
<input type="checkbox"/> burned	<input type="checkbox"/> thrown in river/ forest etc.
<input type="checkbox"/> reused	<input type="checkbox"/> buried
<input type="checkbox"/> littered along the trails	<input type="checkbox"/> transported outside by air cargo
<input type="checkbox"/> incinerated (=burned in an apparatus at high temperatures)	<input type="checkbox"/> dumped in waste pits
12. Which consequences may wrong solid waste management and littering have?	
<input type="checkbox"/> degradation of water quality	<input type="checkbox"/> soil contamination
<input type="checkbox"/> health problems	<input type="checkbox"/> air pollution
<input type="checkbox"/> harmful effects on animals	<input type="checkbox"/> other: _____
13. Who is mainly responsible for solid waste management in SNPBZ?	
<input type="checkbox"/> individuals	<input type="checkbox"/> government
<input type="checkbox"/> National Park Administration	<input type="checkbox"/> porters
<input type="checkbox"/> lodge/ shop owners	<input type="checkbox"/> SPCC
<input type="checkbox"/> other: _____	
During your visit in SNPBZ, what do you do with...: (Mark the appropriate box.)	
14. ...paper / plastic	<input type="checkbox"/> give to lodge owner / leave in lodge
	<input type="checkbox"/> throw away
	<input type="checkbox"/> put in waste bin
	<input type="checkbox"/> take back to Kathmandu
	<input type="checkbox"/> avoid and reuse
	<input type="checkbox"/> other: _____
15. ...plastic bottles	<input type="checkbox"/> give to lodge owner / leave in lodge
	<input type="checkbox"/> throw away
	<input type="checkbox"/> put in waste bin
	<input type="checkbox"/> take back to Kathmandu
	<input type="checkbox"/> avoid and reuse
	<input type="checkbox"/> other: _____
16. ...batteries	<input type="checkbox"/> give to lodge owner / leave in lodge
	<input type="checkbox"/> throw away
	<input type="checkbox"/> put in waste bin
	<input type="checkbox"/> take back to Kathmandu
	<input type="checkbox"/> avoid and reuse
	<input type="checkbox"/> other: _____

Please look at the following statements and pick your level of agreement. (Mark the appropriate box.)

Statements	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
17. I pick up waste on the trails.	<input type="checkbox"/>				
18. I buy things that are produced with as little package as possible.	<input type="checkbox"/>				
19. I have plenty of opportunities to dispose of solid waste in SNPBZ.	<input type="checkbox"/>				
20. I support a higher entrance fee to improve waste management in SNPBZ.	<input type="checkbox"/>				
21. I do not buy bottled water; instead I look for alternative safe drinking water (water purification tablets, boiled water, water filter etc.).	<input type="checkbox"/>				
Statements: I believe that...	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
22. ...the overall solid waste management system is good.	<input type="checkbox"/>				
23. ...it's my personal responsibility to manage waste properly in SNPBZ.	<input type="checkbox"/>				
24. ...incinerating (=burning waste in an apparatus at high temperatures) harms the environment in SNPBZ.	<input type="checkbox"/>				
25. ...my consumer behaviour is influencing the waste situation in SNPBZ.	<input type="checkbox"/>				
26. ...waste separation reduces the amount of waste in dumping sites in SNPBZ.	<input type="checkbox"/>				

27. ...adequate information to visitors before and during their visit about waste management in SNPBZ is provided.	<input type="checkbox"/>				
28. ...Sagarmatha National Park is overall clean.	<input type="checkbox"/>				
29. ...that the SPCC contributes to the conservation and management of SNPBZ.	<input type="checkbox"/>				
30. I would prefer safe drinking water from springs instead buying water bottles in SNPBZ.	<input type="checkbox"/>				
31. I will avoid package intensive products (cans) and prefer local products in SNPBZ.	<input type="checkbox"/>				
32. I support a ban of plastic bottles in SNPBZ.	<input type="checkbox"/>				

33. Do you believe that solid waste is a problem in SNPBZ?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> don't know
33.1. If yes, which kind of problem mainly:	<input type="checkbox"/> aesthetic / visual	<input type="checkbox"/> environmental	
	<input type="checkbox"/> economical	<input type="checkbox"/> problem for human health	<input type="checkbox"/> Other: _____
33.2. If yes, which waste is the biggest problem?	<input type="checkbox"/> plastic	<input type="checkbox"/> paper	
	<input type="checkbox"/> human waste	<input type="checkbox"/> plastic bottles	<input type="checkbox"/> glass and metal
			<input type="checkbox"/> other: _____
34. Who do you think is producing largest quantities of solid waste? (max. 2)			
	<input type="checkbox"/> shop owners	<input type="checkbox"/> lodge owners	<input type="checkbox"/> trekkers
	<input type="checkbox"/> porters	<input type="checkbox"/> expedition groups	<input type="checkbox"/> other: _____

35. Your experience in the National Park is / was...	<input type="checkbox"/> very positive	<input type="checkbox"/> positive	<input type="checkbox"/> acceptable	<input type="checkbox"/> bad	<input type="checkbox"/> very bad
36. Please evaluate your experience in more detail. Use the following ranking: 1: excellent - 2: good - 3: acceptable - 4: poor - 5: very poor					
waste management in lodges		waste management behaviour of guides			
waste management along the trails (i.e. bins)		waste management behaviour of porters			
drinking water facilities		waste management behaviour of local community			
information about waste management		waste management behaviour of tourists			

PART III GENERAL INFORMATION

Statements	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
37. I prefer paper bags to plastic bags for shopping.	<input type="checkbox"/>				
38. I often talk with friends about environmental issues.	<input type="checkbox"/>				
39. When possible I use public transport, walk or ride a bike in my home country.	<input type="checkbox"/>				

40. Most people I know contribute to help the environment.	<input type="checkbox"/>				
41. I like people to think of me as being environmentally friendly.	<input type="checkbox"/>				
42. I recycle waste in my home country.	<input type="checkbox"/>				
43. I'm well informed about environmental issues.	<input type="checkbox"/>				
44. There is need to conserve resources for future generations.	<input type="checkbox"/>				
45. Environmental conservation should be more important.	<input type="checkbox"/>				

46. Sex: <input type="checkbox"/> male <input type="checkbox"/> female	47. Age: _____ in years
48. Nationality: _____	
49. Education: <input type="checkbox"/> Primary school <input type="checkbox"/> Secondary school <input type="checkbox"/> High school <input type="checkbox"/> Associate degree/Diploma <input type="checkbox"/> Undergraduate/Bachelor <input type="checkbox"/> Master/ Post graduate <input type="checkbox"/> PhD/DSc	
50. Employment/ activity status: <input type="checkbox"/> Student <input type="checkbox"/> Employed in Public Sector <input type="checkbox"/> Own Business <input type="checkbox"/> Employed in Private Sector <input type="checkbox"/> Homemaker <input type="checkbox"/> Retired <input type="checkbox"/> Other	
51. Are you an active member of any environmental, conservation or wildlife organizations? <input type="checkbox"/> Yes <input type="checkbox"/> No If 'Yes' please name _____	
52. Did you like this survey? <input type="checkbox"/> Yes <input type="checkbox"/> No Why / why not: _____ _____	
53. Your suggestions and ideas to improve waste management in SNP: _____	

Thank you very much for your cooperation. Enjoy your trip!

PS: If you wish to receive more information on waste management in Sagarmatha National Park, have a look at the following sites:

www.tumblr.com/himalaya-research

www.ecohimal.org

Appendix B: Table of contents of supplemental CD-ROM

Statistical Data (*.sav)

Statistical Analysis Output (*.sav)

Statistical Analysis Results (*.pdf):

- B-1: Respondents characteristics: Descriptives
- B-2: Respondents characteristics: Cross-tabs and Chi²-Test
- B-3: Various question categories: Descriptives
- B-4: Various question categories: Cross-tabs and Chi²
- B-5: Factor Analysis
- B-6: Reliability Analysis
- B-7: Constructs: Descriptives
- B-8: Constructs: Normality and Q-Q-Plots (Probability Plots)
- B-9: T-test
- B-10: ANOVA
- B-11: Correlation Analysis
- B-12: Regression Analysis

Questionnaire (Original Version) (*.pdf)

Mind Map (*.mm)

Appendix C: Abstract (English)

This thesis explores the relationship between behaviour and the waste issue as a consequence of the unsustainable tourism development in one of the most popular Himalayan sites: the “Everest (Sagarmatha) National Park” in Nepal. The Himalayas of Nepal attracts people from all over the world and tourism has grown exponentially since the 1950s. The high influx of tourists generated many positive and negative impacts for the country. Tourism-induced waste generation is seen as one of the major threats to environmental sustainability in remote mountainous regions and protected areas in the Himalayas.

As environmental damage is generally rooted in human behaviour and can be managed by changing relevant behaviour, the waste issue could be reduced if individuals adopt pro-environmental behaviour patterns. Thus, understanding and conceptualizing the social and ecological context of environmental behaviour is essential to promote sustainable resource management and to change relevant critical behaviours. The challenge lies in examining, analyzing, and understanding various factors and processes that determine behaviour. Only when there is a clear understanding of what factors influence behaviours, solutions to environmental problems which require behavioural change can be applied through the successful implementation of policy initiatives.

The study makes several noteworthy contributions to trans-disciplinary environment-behaviour research in Development Studies and is embedded within the broader arena of social science. Applied research approaches are particularly desirable in industrially less advanced countries where a need for sustainable development exists. It sets out (1) to identify tourists’ behaviours, attitudes, and knowledge towards solid waste, solid waste management and its possible problems in the Sagarmatha National Park, (2) to determine factors that have the greatest influence on tourists’ waste behaviour, and (3) to develop an explanatory model to predict waste behaviours.

Ajzen’s Theory of Reasoned Action, Planned Behaviour and Schwartz’s Norm-Activation Model were utilized to predict waste behaviours in the SNPBZ and to assess the extent to which certain factors determine waste behaviour. Therefore a quantitative social research was conducted in Nepal from April to May 2013.

The findings may help to better understand visitors' waste behaviour in national parks in countries of the Global South and consequently to help achieving sustainable and significant changes. Also, they suggest several courses of action, practical implications, and recommendations on how to improve waste management. The obtained results regarding visitors' behaviour from the Everest region can be applied to other parts of the Himalayan region and represent an example of how the waste management situation in national parks can be improved by determining factors that influence waste generation behaviour.

Appendix D: Abstract (Deutsch)

Diese Diplomarbeit beschäftigt sich mit den sozialwissenschaftlichen Aspekten der Müllproblematik im „Everest (Sagarmatha) Nationalpark“ in Nepal. Der Nationalpark zählt zu den beliebtesten Trekkingzielen im Himalaya und dementsprechend groß sind die Besucherzahlen in der Hauptsaison. Die stetig wachsende Zahl an Touristen führt nicht nur zu einer positiven Aufwertung der Region, sondern auch zu einer Vielzahl an v.a. ökologischen Problemen. Eine davon ist die wachsende Müllproblematik, welche vor allem in sensiblen, abgelegenen Bergregionen große Probleme mit sich bringen kann.

Eine Vielzahl an Umweltprobleme sind in menschlichem Verhalten verankert und könnten durch eine Änderung des jeweiligen Verhaltens vermieden werden. So ist auch die Müllentstehung auf das Verhalten der Touristen zurückzuführen und könnte verringert werden, wenn umweltfreundliche Verhaltensmuster beachtet werden würden. Um kritische Verhaltensmuster zu ändern, einen nachhaltigen Umgang mit den Ressourcen zu schaffen und umweltfreundliche Strategien umzusetzen, ist es von großer Bedeutung den sozialen Kontext der Müllproblematik genauer zu untersuchen und zu verstehen.

Die im Rahmen der Diplomarbeit durchgeführte Studie leistet einen wichtigen Beitrag zur transdisziplinären Mensch-Umwelt Forschung. Die Arbeit umfasst folgende Ziele: (1) Verhalten, Einstellungen und Wissensstand der Touristen im Bezug auf Müllentsorgung im Sagarmatha Nationalpark zu identifizieren, (2) Faktoren, welche den größten Einfluss auf das Verhalten haben zu bestimmen, und (3) ein Erklärungsmodell für die Vorhersage des Müllverhaltens zu schaffen. Dafür wurden Ajzen's Theorie des überlegten und geplanten Handelns, sowie Schwartz's Norm-Aktivierungs-Model eingesetzt. Eine Feldforschung in den Monaten April und Mai sicherte die benötigten quantitativen Daten.

Vor allem in Ländern des Südens spielt die wachsende Ressourcenproblematik eine immer größere Rolle. Ansätze der angewandten Forschung können einen wichtigen Beitrag leisten um Mensch-Umwelt-Interaktionen besser zu verstehen und nachhaltige Lösungsansätze zur Verbesserung der Müllsituation zu unterstützen.

Appendix E: Curriculum Vitae

CURRICULUM VITAE

EVA POSCH



PERSONAL INFORMATION

Born: October 15th 1988
 Nationality: Austria
 E-mail: eva.posch@gmail.com
 Telephone number: 0043 699 10169388
 Current address: Hartlgasse 14/2/44, A-1200 Vienna

EDUCATION

- 10/2008 – current **Master of Development Studies**
 University of Vienna
 Study Focus: environment and tourism, development in mountain regions, Himalaya, Central Asia, Qualitative and Quantitative Research Methodology
 Diploma Thesis: *Solid Waste Management in Sagarmatha National Park, Nepal. - Perceptions, Attitudes And Behaviours.*
- 10/2009 – 01-2014 **Bachelor of Science in Geography**
 University of Vienna
 Study Focus: human-environment interactions, natural risks in mountain regions and developing countries, alpine geomorphology
 Thesis: *Sustainable Solid Waste Management in Sagarmatha National Park and Buffer Zone, Nepal. - Analyzing interactions between landfill sites and the geo-environment.*
- 09/1999 – 07/2007 **General Certificate**
 AHS Bundesgymnasium, Bruck an der Mur, Austria

OTHER STUDIES

- 09/2011 – 02/2012 **Université de Genève, Geneva, Suisse**
Erasmus, Faculté des Sciences économiques et sociales
- 09/2007 – 02/ 2008 **Université Populaire du Canton de Genève, Geneva, Suisse**
intensive language course
- 01/2006 – 07/2006 **La Salle College, Perth, Australia**
Student Exchange

SCHOLARSHIPS

- 04-05/2013 **Short-term grant abroad (KWA) – University of Vienna**
grant for field research in Nepal
- 04-05/2013 **Research Scholarship - University of Vienna**
grant for field research in Nepal
- 09/2011 – 02/2012 **Exchange Scholarship**
for one semester at Université de Genève, Suisse

RESEARCH STAYS & WORK EXPERIENCE

- 07-08/2012 **Research Excursion - Kyrgyzstan and Tajikistan**
research stay with Department of Geography, University of Vienna
- 06-09/2011 **Internship - EcoHimal Austria**
field research in Nepal on waste management
- 08-09/2010 **voluntary engagement - Caritas Mariana, Kenia**
- 10/2008 – 02/2010 **voluntary engagement – Caritas/ Hospice Schönbrunn, Vienna**
- 02-06/2008 **voluntary engagement – Pokhara, Nepal**
- 08/2006 – 10/2008 **voluntary engagement – AFS Styria**

SELECTED QUALIFICATIONS**Languages**

German (mother tongue)
English (native level)
French (excellent)
Spanish (basic)
Russian (beginner)

Computer literacy

MS PowerPoint, MS Word und MS Excel (excellent)
ArcGIS 10 (advanced)
SPSS (advanced)
MySQL (basic)

PERSONAL INTERESTS

environment, tourism, mountains, sustainability, skiing, climbing,
skitouring, hiking, reading

Wien, 28. Dezember 2013