M. Apollo PhD Summary

Title: Environmental impacts of mountaineering (based on selected areas of the Himalayas)

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The present thesis aims to provide a comprehensive and systematic description of major environmental impacts of mountaineering. It is also designed to formulate certain practical suggestions for high mountain area management to meet the needs of all the actors (government administration, local communities, environmental organisations, and tourists) that come into contact with mountaineering. Only a comprehensive approach will meet the needs of all stakeholders without discriminating against any of them. High mountain area administrators, environmental organisations, local communities, tourists, and even researchers must not forget about other actors and their goals while creating their development visions. This thesis presents comprehensive research outcomes and also serves as a platform for more detailed studies.

Chapter One discloses *the research problem* and provides a definition of *mountaineering*. This eponymous term is often erroneously translated into Polish as 'alpinizm'. English-language sources provide a broad definition of mountaineering that covers both climbing (rock and ice climbing) and trekking. Estimated at tens of millions of enthusiasts, mountaineering is pursued by two groups of people: pilgrims and adventurers. In order to formulate the research problem, mountaineering was presented in the light of the theory of Himalayan environmental degradation. This is incredibly important because according to the theory tourism is one of the main driving forces behind the process of mountain degradation. The chapter is focused on the dynamics involving three actors: mountaineering, mountain environment, and local communities. It also provides a definition of the research subject and the purpose behind this project, i.e. research outcomes and their practical application. 1) **Cognitive goal:** to establish the character (specificity) and trends (processes, directions, regularities) of the changes within the environment of high mountain areas of the Himalayas, including natural and socio-cultural environments, due to the impact of various forms of mountaineering. The aim of this project is to answer two crucial questions: has the impact of mountaineering on high mountain areas been positive or negative? Has the impact of mountaineering on economic and social and cultural conditions of local communities been positive or negative? 2) **Methodological goal:** to develop a complex research methodology to investigate the impact of mountaineering on high mountain environment; 3) **Practical goal:** to put forth practical recommendations on the practice of various kinds of mountaineering in order to optimize mutual influences within the mountaineering/high-mountain-environment system.

Chapter Two primarily aims to establish *the natural character of Himalaya's high mountain areas*. The chapter thoroughly covers the geological structure, terrain, geomorphological processes, rivers and

lakes, vegetation, fauna and soil. All aspects of natural environment of Himalayan high mountain areas covered in this chapter are meant to demonstrate its distinctiveness and uniqueness, the highly dynamic nature of the impact and the extreme sensitivity of the environment to the external impact. The latter results from biotic scarcity of the geosystem (landscape) of high mountain areas, due to factors such as rough climate and adverse topography. Flora and fauna and soil act as principal intermediaries within the material and energetic exchange between various components of the geosystem (ecosystem and landscape), and so they 'bind together' those components and make the geosystem stable, sustainable and homeostatic. The geosystem with scarce biotic content is much more sensitive to the impact by externally generated factors. Another cause of this high sensitivity is the "high energetic activity" (large height differences – the energy of the terrain, convection and active air mass exchange – the supply of heat from the ground up and cold air downflow), responsible for the highly dynamic nature of geological, geomorphological, hydrological and climatic processes. All of those features of high mountain nature are as consistent across the Himalayas as in other mountain ranges around the world.

Chapter Three *defines the characteristics of the socio-cultural environment of high mountain areas in the Himalayas, i.e. human communities living in those areas.* Himalayan communities are described in the light of their historical variability and of socio-economic and cultural conditions. The settlement process of Himalayas' high mountain areas is investigated within the following dimensions: 1) Environmental dimension – living conditions within a unique natural environment (extreme altitude, harsh climate and scarce vegetation) and 2) Political, economic and cultural dimension – the peripheral geographical location, although subject to influences coming from the growing centres located in the vicinity of mountain ranges and the expansion of foreign civilizations, and cultural interactions. The chapter covers four major ethnicities making up the Himalayan community of today: 1) Indic people – practicing mainly Hinduism, speaking Indo-Arian and practicing and propagating Indo-Arian arts; they practice the fallow (sedentary) system of farming; 2) Tibetan people – practicing Buddhism, speaking Buddhism-related languages and practicing/consuming Buddhism-related arts; they practice agropastoralism; 3) Afghan-Iranian people – Muslims, whose art and culture are strongly related to Islam; they are committed to herding and farming; 4) Burman/Southeast Asian peoples – following animism and shamanism along with related arts; practicing slash-and-burn and fallow techniques of farming and, in some cases, also herding. Isolated for many centuries, Himalayan communities are now exposed to cultural supermarketization, i.e. adoption of various forms of cultural practice, conventions, believes, rites, ideas and values. It is a dangerous process since the cultural wealth of this part of the world is disappearing under the weight of incoming globalization, partly with the influx of tourists. The main field of activity among peoples of high mountain areas in the Himalayas is still the traditional form of labour-consuming agriculture (crop growing and husbandry), forestry and hunting, although tourism and consumption and commerce are increasingly important. This chapter concludes with a description of interactions between people and nature of the Himalayan high mountain

areas. Resulting from the dynamic population growth, the excessive use and ill-conceived activities involving the already limited resources lead to the degradation of natural environment of Himalayan mountains. Even the high zones, including the hardly accessible nival zone, have been exposed for the past 50 years to the adverse impact related to alpinism, trekking, rafting and other types of adventure tourism.

Chapter Four investigates *mountaineering as a human impact factor within high mountain areas*. This chapter provides an insider view of mountaineering as practiced in high mountain areas. It takes a closer look at equipment (clothing and mountaineering gear of *a mountaineer*) and types, styles and difficulty grades of touristic routes, *via ferratas,* climbing routes, bouldering problems, ice-climbing routes, snow climbing sections, mixed climbing routes and aid climbing routes. Since high mountain environment is *highly adverse* in that it may impact human functions, the process of adapting to the conditions and acclimatization and potential diseases a mountaineer is likely to suffer from are also covered in this chapter. As high altitude is not the only limitation to the availability of mountaineering in high mountain areas, the chapter also discusses real factors that condition the availability of mountaineering in high mountain areas, the so-called *true accessibility* of mountaineering. What best demonstrates the process of conquering the mountains is the history of alpinism as its emergence and transformation have impacted all of human activity in high mountain areas. The author distinguishes and characterizes 5 stages within the development of alpinism: pre-alpinism (until 1786), early alpinism (1786-1869), classical alpinism (1864-1900), modern alpinism (1900-1964) and contemporary alpinism (since 1964). As it has developed, mountaineering lost some of its once elite nature. Unfortunately, it manifests in the disregard for established cultural and ethical standards also highlighted in the chapter. Additionally, Chapter Four also explores major, or most popular, mountaineering areas of the High Himalayas (geophysical mesoregions). The last section covers areas subject to inquiry. Prior to describing the said regions, the space of impact that mountaineering exerts on high mountain areas needed to be defined. This space may be thought of either as three zones (hiking, trekking and climbing) or four specific spots (the last settlement, base camp, advanced base camp and the peak area). The typology of impact within each of those two ranges regards two realms: 1) Components of the natural environment and 2) Components of the socio-cultural environment, i.e. local communities. The study investigates three specific regions with the consideration of the respective stages of touristic growth (justified as part of the project): 1) The early stage: Miyar Valley in Western Himalayas (India); 2) Intermediate stage: Jamunotri Valley (the upper section of the River Jamuna) in Western Himalayas (India); and 3) Final stage: Bhurungdi Valley in Central Himalayas (Nepal). The regions in question are described in detail in terms of their natural environment, local human communities and mountaineering practiced there.

Chapter Five investigates *the consequences of the impact of mountaineering on natural environment*. The causes of environmental transformations are divided into three groups: 1) Transformations due to the traveller's, or other people's, stay in a mountaineering region;

2) Transformations due to the traveller's travelling through a mountaineering region, with the consideration of the ground type (rock; rock and grass; grass; residual soil; snow; ice), and 3) Transformations due to the use of mountaineering equipment. Each of the three groups of impact are examined individually for direct environmental interference, i.e. the *proper* activity of climbing, trekking and hiking of the traveller (in the case of both elite and mass mountaineering) and *indirect* interference due to auxiliary activity (in the case of mass mountaineering only). Auxiliary activities, such as guide service, transport of equipment, camp base facilities and the delivery of artificial support equipment, support the proper activity. The consequences of the impact of mountaineering on natural environment are characterized with the consideration of: individual components of the natural environment (terrain; soil; vegetation; fauna; and landscape) and location/zone of impact that are related to the nature of activity (hiking, trekking and climbing).

Chapter Six evaluates *the effects that mountaineering has on components of socio-cultural environment and the lives of local communities living in the areas in question*. This chapter takes off from a detailed presentation of survey methodology and proceeds to identify certain limitations and characterize survey respondents. The community of the Himalayas is described on the basis of each respondent's personal details and the data on the number of children, profession, the size of plot owned and types of crops and animals owned. The data concerns both the respondents and their parents and grandparents. The first section of the chapter discloses *status quo* in the three locations subject to the project and discloses the dynamics of changes within the community across three generations – with a breakdown into individual locations and phases of touristic growth. Tourism impacts all components of human life, thus observations and opinions of the local community are described and briefly summarized within three dimensions: socio-economic, cultural and landscape-related one. The outcomes of the research are presented based on the well-known models by R. Butler, G.V. Doxey and G. Budowski, covered in Chapter Four. Each of the valleys in question showed a different growth stage, subject to a model used. With the insights into the progressive nature of changes, directly related to the rate of visitors, it will be easier to define a sustainable development plan. The author's analysis shows that the choice of research areas (the valleys) for the research project on the progressive impact of mountaineering was correct. The remaining part of the chapter discusses the outcomes and characterizes individual growth phases. The evolution of behaviours and attitudes in local communities following the initial encounter with *the other* are also thoroughly discussed.

Chapter Seven aims to set forth *the rules for optimizing the operation of the* mountaineering/*high-mountain-environment system*. In order to define the correct concept for integrated management within naturally valuable areas of the Himalayas, one first needs to correctly assess the *status quo*. Based on the research conducted and reference sources, overall guidelines have been developed for the mechanism of regulating mountaineering traffic and the methods to manage the touristic traffic. The guidelines can be adopted in any high mountain environment, although in some cases they may need some alterations. The

chapter is composed of two sections presenting proposed guidelines for the natural environment and local communities, providing the foundation for further management plan. Implementation of the plan should consist in: 1) Development of even more specific guidelines (a preservation plan, a management plan, regulations) – before the rules are deployed, they should be consulted with all stakeholders so that the changes do not impact just one of them; 2) Communication – all guidelines should be readily comprehensible and unambiguous and communicated in a clear way. The information about standards of conduct and the consequences of non-compliance should be made widely available (e.g. websites, information boards and signs, in guides etc.); 3) Education – all actors should be updated on profits and losses of the policy implemented. Communication without a supporting educational policy may meet with disapproval from one of the actors; 4) Monitoring – the area should be closely monitored so that any deviations from the adopted plan (if one element improves too quickly, it may have a negative impact on another one) may be attended to; 5) Conducting (physical) preservation measures – as a last resort, physical activities may be adopted to prevent changes (e.g. redeveloping a trail or limiting the rate of tourists). The fact that all actors involved in mountaineering would co-create one common management plan for mountaineering traffic would be the greatest opportunity to facilitate sustainable development. Thus, all tasks posed before the managing actors should aim to make touristic growth more reasonable and beneficial to everyone rather than preventing or curbing it.

Chapter Eight provides *a summary and conclusion* for the entire study. The focal point of the chapter are two models. First of them determines *the impact that mountaineering has on various components of the natural environment (landscape of high mountain areas).* While the second shows *comprehensive manner of environmental effects of mountaineering development in the developing countries*. Because of the connections and interdependence between particular components of the environment (both natural and social), only committing to preserving each and all of them will bring desired effects, namely reduced negative impact of mountaineering.

The research conducted and reference sources show that mountaineering in high mountain areas in recent years has come to be a *mass* phenomenon. Sensitive to influences, the environment of high mountain areas, until recently cut off from civilization, has been exposed to it abruptly. Impacted by mountaineering, even with a small number of participants, the environment of high mountain areas has been clearly responding to the external impact. However, these are not unequivocally negative or positive reactions; the issue at stake is much more complex.

Within the populated high mountain areas, mountaineering always exerts a positive impact on natural environment, contrary to widespread opinions. Although mountaineering itself – as any other kind of touristic activity – usually results in some kind of losses within the natural environment, one should always also consider the balance of benefits and losses. Mountaineering supersedes traditional farming, and this has unequivocally negative impact on all components of natural environment. What best attests to this

argument is the shrinking acreage of farmland and the amount of livestock. This significantly expands the land available for wild animals and eliminates the interference with vegetative processes of plants (as opposed to herding, for instance). What follows is gradual regeneration of vegetation and animal habitats and the growing diversity of flora and fauna species.

Above *the populated areas* and the herding areas, mountaineering always adversely impacts natural environment. This argument is based on a simple assumption: anthropogenic activity generated in this zone comes exclusively from mountaineering. However, one should also take account of the *scale* of impact that mountaineering has on natural environment. Mind you, the impact of mountaineering on terrain is presented negatively yet it accounts merely for one per mile of the changes that occur in natural environment because of natural factors such as mass movements and torrential rains. Thus, attaching great importance to mountaineering seems unsubstantiated and vastly misguided.

Oftentimes the only external power (no 'regular' tourists, limited access to or no means of mass communication etc.), mountaineering impacts all spheres of local communities' lives. The contact with *the other*, even if belonging to the same culture, alters the lives of local communities within cultural, social and economic dimensions. *The other* may come as part of the less invasive elite group or the mass group, the latter brining significant changes. Evidently, the newly discovered high mountain areas (the early growth stage) are visited only by elite users but mass tourists soon show up and quickly dominate them. Mass tourists are dangerous because, being 'unconscious' participants of mountaineering activities, they have an adverse impact on autochthones and pollute the environment.

In the preface to *Capital,* K. Marks (1951, p.4) writes: "The country that is more developed industrially only shows, to the less developed, the image of its own future." To paraphrase his words, *the country that shows higher touristic development only shows, to the less developed, the image of its own future.* This sentence demonstrates the progressive nature of environmental changes resulting from tourism. Such knowledge makes it possible to manage the growth of regions at an early growth stage so that it can see their own future well in advance and that this future can be free from mistakes presently made by the region at the final growth stage.

This dissertation is 356 pages long and is divided into 8 chapters. It contains 33 tables and 130 figures, including 38 diagrams, 49 graphs, 25 maps and 102 photographs. The bibliography consists of 771 items.