ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

ENVIRONMENTAL IMPACT OF TOURISM IN THE MOUNTAINOUS AREAS OF PAKISTAN

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A study on the environmental impact of tourism in the mountainous areas of Pakistan was undertaken in response to the request of the Government of Pakistan, with financial assistance from the Government of Japan. This publication is based on a report prepared by Farooq Ata and Zafarullah Siddiqui, consultants.

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INTRODUCTION

Geographical and climatic diversity are two of many features that attract international tourists to Pakistan. History, cultural diversity and religion also contribute to the country's potential as a tourist destination. The northern area, with its high altitude mountains of the Himalaya, Hindu Kush and Karakoram ranges, attract a particular group of tourists: mountain trekkers and mountain climbers.

Tourism in Pakistan is not yet a large-scale sector, which means that it plays a limited role in the economic development of the country. Its main economic role is to help solve short-term foreign exchange imbalances. Moreover, that segment which might be categorized as "adventure tourism" is only a small part of the tourism industry. It includes mountaineering and trekking in the northern areas of the country.

In recent years, a greater number of tourists have been seeking recreation and adventure in the mountainous areas of a number of Asian countries, including Pakistan. At the same time, the mountain environment has been found to be very fragile and susceptible to disruption, not only by some of the tourists but also by local people who may be engaged in tourism-related work.

Damage to the mountain environment would affect not only tourism but also water flows, agriculture, the general ecology of the area and ultimately the whole economic system of the country. The interdependence of the wider social and ecological balance in Pakistan and the fragile mountainous northern areas deserves greater attention and better understanding on the part of policy makers.

While the economic role of adventure tourism may not now be significant in Pakistan, its role in degrading the environment has been found to be very significant. Experience in several South Asian countries has shown that there is a relationship between the level of pollution and the number of visitors who engage in trekking and mountaineering. That relationship needs to be analysed more clearly. Such an analysis would cover the pollution patterns of mountaineers, the effect of seasonality, types of pollution at different locations, and the relationship between pollution, the environment and mountain tourism behaviour.

Study and analysis of the various issues and problems related to mountain tourism in Pakistan will help in the formulation of recommendations about policy options and measures that can be included in action programmes to halt or reverse trends of environmental degradation in mountainous areas. At the same time, such policies, measures and action programmes must be considered in the context of future mountain tourism and whether this part of the tourism industry should be expanded or restricted.

I. BACKGROUND

The rugged mountainous area in northern Pakistan comprises three mountain ranges, the Himalaya, the Hindu Kush and the Karakoram. The area is rugged and hilly, with steep, heavily dissected slopes. The landscape is extremely irregular due to secondary and tertiary incisions, landslides and erosions. The geology is characterized by a mixture of igneous and metamorphic sedimentary rocks consisting of slate, mica-rich gneiss and crystalline schist. The terrain is naturally unstable with landslides and rock-falls are common occurrences. The soil is mixed with stones and boulders and is very low in clay and organic matter.

The area is in a partial rain shadow just outside the zone of the monsoon rainfall. Inhabited parts, up to elevations of 3,100 metres receive an annual precipitation of 100 to 500 millimetres, mainly snow in the winter months. The climate is best described as an arid continental Mediterranean type where temperature and precipitation vary significantly according to altitude and topography.

The total population in the area was estimated in 1992 to be about 1.1 million people who are generally the permanent, settled population living at altitudes below 3,500 metres. The population growth rate was 3.8 per cent per year, with a density of about 12 persons per square kilometre. The permanent population has an impact on the environment through cutting of forests for timber and firewood and through grazing of animals.

The focus of this study is on the transient population travelling in the area for purposes related to mountain tourism, although the permanent population does affect the mountain environment as well. Over the five-year period from 1987 to 1992, total annual mountain tourist traffic averaged between 317 and 449 persons.

This situation in the mountainous area of the north must be seen in the national socio-economic context. In 1990, the total population of Pakistan was about 112 million and was growing at an annual compound growth rate of 3.1 per cent. Population density was reported to be 106 persons per square kilometre. The small population in the northern areas was about 1 per cent of the total population, while its growth rate was 3.8 per cent in 1990. The mountainous area is sparsely populated because much of it is above 3,100 metres and not suitable for habitation or cultivation. The average population density in the four main districts in the northern areas was 12.4 persons per square kilometre. The people have settled in the alluvial plains and river terraces along the river valleys.

In the context of national socio-economic development, tourism in general and mountain tourism in particular have received less emphasis compared with development strategies based on agriculture in rural areas and industrialization in urban areas. The development strategy is aimed at employment and overall economic growth. The tourism sector is viewed mainly in terms of its contribution to foreign exchange and helping to solve foreign exchange imbalances.

The gross national product (GNP) in 1990/91 was estimated to be Pakistan rupees (PRs.) 903.9 billion, with a growth rate (at factor cost) of 5.2 per cent. Agriculture accounted for about 26 per cent of gross domestic product (GDP) at factor cost. Manufacturing accounted for about 18 per cent of GDP; wholesale and retail trade for about 17 per cent; transport, storage and communication for about 10 per cent; services for almost 8 per cent; public administration and defence, 7 per cent; ownership of dwellings, 5 per cent; construction, 4 per cent; electricity and gas, 3 per cent; and banking and insurance, 2 per cent.

In 1990/91, exports consisted mainly of cotton and its manufactures, rice, machinery and equipment. The main imports were petroleum, edible oils, tea, machinery and other capital goods. Imports and exports combined accounted for about 20 per cent of GNP. There was a large deficit in the

balance of trade, which was financed mostly through remittances from abroad and from capital borrowing.[1]

The priority accorded to agriculture and industry in Pakistan's development has meant that less attention is given to tourism, except in terms of its contribution to foreign exchange. Moreover, prevailing socio-cultural norms accord less status to tourism in economic development. Thus, while Pakistan is rich in mountain resources, development of mountain and trekking tourism has had a very short history. Attention was first given to marketing mountain tourism in 1981 when Pakistan's first International Trekking Convention was held at Rawalpindi.

Despite the small number of mountain and trekking tourists and the very recent attention to developing mountain resources for tourism, the Government of Pakistan has been aware of the adverse experiences and negative impacts that could result from uncontrolled promotion of mountain tourism. Pakistan has sought careful study and investigation of the recent situation and the nature of the problems in order better to plan for the future. Any future plans should find appropriate policies and programmes to solve problems of environmental degradation while avoiding adverse effects on the local economy. The result should be aimed at maintaining ecological balance in the mountain areas.

[1] Finance Division. *Pakistan Economic Survey 1990-91* (Islamabad, 1991).

II. PURPOSE AND METHODOLOGY

A. PURPOSE

This study is intended to investigate the situation of mountain tourism in Pakistan in terms of the environmental impact. The focus is on the following:

1. To identify and assess the recent tourism traffic in various mountain ranges and trekking areas of the country;
2. To assess the present level of environmental degradation;
3. To suggest ways for controlling and possibly stopping environmental destruction without having a negative impact on the local economy;
4. To prepare and propose an action plan.

B. METHODOLOGY

1. Definition of terms

Several important terms are defined in order to aid in the analysis and the interpretation of the results of the investigation. "Tourists" are defined as temporary visitors to a country which is not their usual place of residence (for reasons not related to any occupation remunerated in that country), who stay at least 24 hours for the purpose of leisure (recreation, holiday, health, study, religion or sport); or on account of business, family, missions or meetings[2]. There are two components of mountain tourism, mountaineering and trekking.

Mountaineering is defined as climbing mountains above an altitude of 6,000 metres. Trekking is defined as climbing up to a maximum height of 6,000 metres for the purpose of sight-seeing and recreation. In Pakistan, two types of routes are available for trekking: (a) open routes; and (b) restricted routes. No permits are required for trekking in open zones and open routes in all areas of Pakistan. Certain districts in the northern area, however, are in a restricted zone. Any trek in a restricted zone or by restricted routes requires that the expedition or trekking party be issued permits. All international trekkers and mountaineers are required to register at checkpoints, regardless of whether zones or routes are open or restricted.

Two groups of people have been identified as having an impact on the environment of the mountainous northern areas. First is the permanent population, who mostly inhabit areas below the mountaineering and trekking zones at altitudes below 3,500 metres, although there are also some nomadic groups of people in the higher elevations. Virtually all of the settled permanent population construct their housing with wood and use brushwood for cooking fuel. There has been heavy unauthorized cutting of forests for these purposes. This results in large-scale deforestation and has contributed to degrading the environment at the higher altitudes. Once wood becomes unavailable at the lower altitudes, the permanent population begins felling trees at higher elevations. The permanent population has been increasing at a very rapid rate, which results in pressure on the environment as more land is needed for agriculture and grazing animals. Population pressure has reduced the extent of natural mountain areas. In addition, people from the permanent population participate in mountain and trekking expeditions as porters.

[2] Economic and Social Commission for Asia and the Pacific, *Guidelines on Input-Output Analysis of Tourism* (ST/ESCAP/836). The definition is based on the terminology of the United Nations Conference on Trade and Development (UNCTAD).

The second group is the transient population which includes the mountaineers in expeditions, the trekkers in trekking parties, the government liaison officers and porters. The transient population is defined as those who stay in the mountains for more than 24 hours and less than 180 days for purposes of mountaineering, trekking, hiking, sight-seeing or any other purpose, except for remunerated employment. Although porters might be remunerated for their services, they are also mentioned in certain sections of this study. The environmental impact of these groups as part of the transient population is the focus of this study.

2. Methodology

The research was designed to provide two sources of data, including statistics on past patterns and reports giving the history of conditions related to mountain tourism and its impact on the environment. The first source of data is descriptive statistics reported over a period of time. Such data give a picture of the recent situation and the conditions or relationships that have developed. Statistical data of this descriptive type were collected from reports of the Tourism Division, Government of Pakistan.

The records of the Tourism Division were the source of data on three important dimensions of mountain tourism in Pakistan. One dimension was the land-use pattern and focused on the transient population, particularly the mountain tourists organized into parties and expeditions. Land-use patterns of the permanent population were not the direct focus of this study, but it is important to acknowledge that their activities have significant environmental impact. Since the elevations higher than 3,500 metres are not heavily inhabited by any permanent population, it is clear that the transient group, which is comprised of international tourists and porters, will be the source of pollution. Most pollution is found at base camps and along the routes for ascending various peaks. The base camps are usually established at heights ranging from 3,700 to 5,300 metres. Therefore, the focus of study is the pollution generated by mountain tourists around base camp altitudes and beyond, along the routes up the mountains.

The second dimension of mountain tourism is the volume and socio-economic characteristics of the mountaineers and trekkers. The third dimension is the geographic pattern of the mountaineering and trekking activities. This information can be used to determine which are the most frequently used routes and which peaks are most popular. The statistical data from the Tourism Division was supplemented by interviews with government liaison officers.

3. Surveying participants in mountain tourism

The second source of data was obtained from people who have been directly involved in mountain tourism, because they can report their observations and assessments about pollution due to mountain tourism.

Three types of participants were identified and several approaches were used to investigate their assessments of the environmental impact of mountain tourism.

One type of participant is the liaison officers of the Pakistan Government. A government liaison officer accompanies every expedition as a climbing member and is required to report on the environmental activities and conduct of the expeditions. Liaison officers were requested to make reports about the level of pollution, type of pollution, location, seasonality, etc. However, only a small number of liaison officers reported.

The second type of participant was the expedition team leaders. One general requirement for mountaineering and trekking in Pakistan is to have expedition leaders submit debriefing forms after the expedition and before they leave the country. It was found, however, that these forms were not complete. While information was supplied on routes used, peaks ascended, time and dates, most expedition leaders did not record observations about environmental conditions and pollution.

In order to fill the information gap, researchers sent a short questionnaire to people who had served as expedition leaders over a 10-year period. The response rate was not very high as many questionnaires were returned as undeliverable and many expedition leaders did not reply.

In order to develop an adequate amount of data for analysis, the researchers conducted special interviews with expedition leaders who had visited Pakistan during the period from May to July 1991.

The third type of participant was international mountain tourists – mountaineers and trekkers – who had gone on expeditions in Pakistan. Questionnaires were mailed to 308 mountain tourists, and 56 people responded. The responses from all types of participants in expeditions were compiled and adapted to a standard format. Table 1 summarizes the data sources for the survey used to assess mountain pollution according to those who participate in expeditions and are familiar with conditions at the base camps and along the routes. The sample size and response rate are also indicated in table 1.

Table 1. Responses to reports, surveys and interviews about the environmental impact of mountain tourism

Source of data	*Sample size*	*Number responding*	*Response rate (percentage)*
Debriefing forms by expedition team leaders	188	6	3.2
Reports of liaison officers	49	4	8.2
Questionnaires mailed to international participants in expeditions	308	56	18.2
Interviews with expedition team leaders	63	16	25.4
Total	608	82	13 . 5

The replies from all sources gave an overall response rate of 13.5 per cent which can be considered as a fairly satisfactory result, at a confidence level of 80 per cent.

4. Questionnaire survey design

A questionnaire was developed in order to provide a standardized approach to the assessment of pollution and the environmental impact of mountain tourism. The opinions of liaison officers, expedition leaders and international tourists participating in expeditions were used. Their opinions were compiled from interviews, reports and returned responses to the questionnaires.

The opinions were categorized and weighted using a modified Likert scale. A Likert scale can provide summated ratings by using a five-point scale[3]. For research purposes, the opinion scale about degree of pollution ranged from (1) negligible, (2) low, (3) moderate, (4) high and (5) very high. The numbers in parentheses are the weights given according to the opinion given about pollution.

Pollution was categorized into seven kinds. Respondents could express an opinion on the degree of each kind of pollution. The following categories were used in the questionnaire:

Human waste and trails of animal litter.

2. Left-over mountaineering gear, including tents, bedding, ropes, shoes, clothing, other equipment etc.

[3] D. Luck and others, *Marketing Research*, fifth ed. (Englewood Cliffs, NJ, Prentice-Hall, Inc., 1978), p. 263.

3. Containers (empty or filled), bottles, food packing, polyethylene bags/sheets etc.

4. Damage to forest areas due to cutting, destruction of vegetation, effects on wildlife as a result of human intrusion.

5. Stone-cutting, rock falls/landslides, graffiti, destabilized soil due to tourism.

6. Noise disturbance.

7. Congestion.

These kinds of pollution were identified and selected because they had been mentioned most frequently in interviews and reports of expedition leaders and liaison officers.

As mentioned, the opinions were weighted and assigned a number on a scale from 1 to 5. The next step was to sum the results and derive a combined (summated) rating of all seven categories of pollution for each range, peak and route identified by respondents. Results of the questionnaire yielded a total of 36 peaks and routes about which opinions were expressed. A 37th item was a category of peaks and routes designated as "other". The overall score for each peak and route would identify the extent of pollution and environmental degradation. The overall score, or combined rating of all seven types of pollution, yielded the scoring range shown in table 2 with the five degrees of pollution.

Table 2. Range of combined questionnaire scores and rating scale

Range of combined scores	*Rating scale*
0 – 5	Negligible
6 – 10	Low
11 – 15	Moderate
16 – 19	High
20 – 25	Very high

For the total of 308 questionnaires, there were 56 respondents. The results presented in chapter IV are thus based on the opinions scored from 56 respondents.

III. CHARACTERISTICS OF MOUNTAIN TOURISM AND USE PATTERNS IN THE MOUNTAINOUS NORTH

A. PROFILE OF INTERNATIONAL MOUNTAIN TOURISTS

At the most general level, the volume of mountain tourism provides the context for more detailed analysis of the characteristics of international mountain tourists. Table 3 gives a picture of mountain tourism for the period covering 1985 to 1990, according to the total number of expeditions and the number of people who were members of the expeditions.

Table 3. Volume of mountain expeditions, 1985-1990

Year	*Number of expeditions*	*Total number of members in expeditions*
1985	54	398
1986	52	422
1987	47	317
1988	57	450
1989	43	318
1990	56	449

Source: Pakistan Tourism Division.

The number of expeditions has fluctuated from year to year over the five-year period, but on average there have been about 52 per year. The year in which there was the greatest number of expeditions was 1988, and this was also the year with the greatest number of people participating in expeditions. The following year, 1989, had the smallest number of expeditions. But the number recovered in 1990 almost back to the high number of 1988, in terms of both number of expeditions and number of people participating. For each year, the average size of each expedition was about seven to eight people.

Information about the nationality of mountaineers participating in expeditions during 1990 showed that the Japanese had the highest number. Other expedition groups were from Germany, the Republic of Korea, Spain, Sweden, and the United Kingdom of Great Britain and Northern Ireland. About 81 per cent of the mountaineers were 15 to 40 years old, and 90 per cent were men.

Information about the occupations of mountaineers showed that in 1990, 22 per cent were professionals, 13 per cent were teachers, 13 per cent were sportsmen, 12 per cent were executives, 6 per cent were businessmen, 2 per cent were technicians. The remaining 32 per cent did not have their occupations classified.

Most of the mountaineering expeditions took place during the summer months of June, July and August. According to available information, all of the peaks which they attempted to ascend were above 6,000 metres. However, out of the 449 mountaineers, only 46 succeeded in climbing to the peaks in 1990.

Trekking takes place throughout the northern areas of Pakistan, and general information was provided covering the five-year period from 1985 to 1990. As presented in table 4, the number of trekking parties and the number of people participating are somewhat less than the numbers involved in mountaineering. As with mountaineering, the number of trekking parties and number of people have fluctuated from year to year. However, 1990 was the year of the greatest number of trekking parties, and this was almost a 28 per cent increase over the number in 1989. There was almost a 50 per cent

increase in the total number of people in the trekking parties over the total in 1989.

Most trekking parties conducted their activities over a six-month period covering May to October.

Table 4. Volume of mountain trekking, 1985-1990

Year	*Number of trekking parties*	*Total number of people in trekking parties*
1985	30	174
1986	37	247
1987	38	212
1988	49	299
1989	54	272
1990	69	400

Source: Pakistan Tourism Division.

The average size of trekking parties was about six people. The parties varied in size according to nationality. The largest size parties were from Japan, the United Kingdom, and the United States of America, each with nine people in the trekking party. Italy was next, with five people. People from Australia, Austria, Germany, Spain and Switzerland formed trekking parties of three people.

B. COMPARING MOUNTAIN TOURISM WITH GENERAL TOURISM

It was previously pointed out that international mountain tourism, comprised of both mountaineering and trekking, was a very small part of total tourism to Pakistan. As the data in table 5 show, comparison of the number of people and the income received from overall tourism and mountain tourism shows how minor a segment mountain tourism is.

Table 5. Comparison of overall international tourism with mountain tourism in Pakistan, 1985-1990

	Numbers of people		*Receipts (Thousands of US dollars)*	
Year	*Total*	*Mountain*[a]	*Total*	*Mountain*[a]
1985	440 500	1 150	186 000.0	127.7
1986	431 300	669	180 200.0	65.0
1987	424 900	537	172 800.0	69.6
1988	460 100	699	142 700.0	103.9
1989	494 600	571	159 300.0	80.4
1990	423 800	849	156 200.0	126.8

Pakistan Tourism Division.

[a] Including both people participating in mountain expeditions and trekking parties.

In 1990, for example, when the overall number of mountain tourists was the greatest, their number represented less than 1 per cent of all tourists. The receipts from mountain tourism were also less than 1 per cent of total tourism receipts for Pakistan in 1990.

There are a number of factors that help explain the very minor role of mountain tourism in overall tourism. First, the general profile of the majority of tourists to Pakistan shows that most tourists were from India and the United Kingdom. In addition, the main reason given by half of all tourists for travelling to Pakistan was to visit friends and relatives. Only 18 per cent of all tourists said they came to Pakistan for holiday and recreation. Moreover, the average length of stay for all international tourists was only 1.3 days in 1990. About 41 per cent of international tourists visited only Karachi, Islamabad/Rawalpindi or Lahore.

Both types of tourism showed fluctuations in the number of people travelling to Pakistan, while the revenue from overall tourism had declined. On the other hand, revenue from mountain tourism had fluctuated, and by 1990 had recovered to a level slightly higher than the receipts reported for 1985.

Apart from earning foreign exchange, tourism in Pakistan has not received much attention and there has not been much analysis about the nature of Pakistan's advantages in the worldwide tourism market. It is important to consider that Pakistan probably has an absolute advantage in terms of mountain tourism, and this advantage should be capitalized upon. Once an assessment of the environmental impact of mountain tourism is made, it would then be possible to achieve a balance between appropriate tourism development and preservation of the mountain environment.

C. USE PATTERNS IN THE MOUNTAINOUS NORTH

1. Patterns of mountaineering

There are almost 200 peaks with routes from Pakistan into the three principal mountain ranges, according to the listing in annex table 1. Among these peaks and routes, over 100 have been ascended by expedition parties accompanied by government liaison officers. Annex table 2 gives a complete listing of the three ranges, peaks and routes used by international mountain tourists over the 10-year period from 1981 to 1990.

The year-by-year information shows that the number of expeditions had fluctuated from 33 in 1981 to 59 in 1984. The second highest number of expeditions was in 1988. The total number of people participating in expeditions increased steadily from 1981 to 1986, and then tended to fluctuate in the following years.

In terms of environmental impact, the most significant pattern was in the peaks and routes that are most popular and where expeditions are most frequently conducted. It is clear that ecological disturbances and the possibility of greater environmental degradation will be in those places where larger numbers of people are found and where use is expected to be most extensive and intensive.

Table 6 gives a listing of the ranges, peaks and routes where there were 10 or more expeditions over the 10-year period, as derived from annex table 2. Among the three mountain ranges, the Karakoram range clearly had the largest number of expeditions overall and accounted for about 81 per cent of the most frequently used peaks and routes. This predominance of the Karakoram range as the location of expeditions is a function of its greater number of accessible peaks and routes when compared with the Himalaya and Hindu Kush.

In the Himalaya range, the most frequently visited peak was Nanga Parbat. Mountaineers approached it through several different routes, the two most popular being the South-West Ridge and Diamir Face. Over 10 years, the two routes were followed by 35 and 16 expeditions, respectively. The total number of mountaineers on both routes numbered 233 and 135. These routes were used continuously during the period 1981 to 1990, while other routes were used intermittently. For example, the south-east route was used in 1981 and 1985, the north-west route only in 1990 and the north-east route in 1983 and 1990.

Table 6. Ranges, peaks and routes most frequently visited by expedition parties, 1981-1990[a]
(Number of people in expedition parties)

Range, peak and route	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*Total*
THE HIMALAYA											
Nanga Parbat											
Diamir Face		2	5	4	9	2	3	5	--	4	35
	(16)	(21)	(30)	(26)	(46)	(10)	(24)	(28)	--	(32)	(233)
Rupal Face	1	--	1	4	--	--	1	3	3	3	16
	(15)	--	(11)	(19)	--	--	(4)	(24)	(27)	(35)	(125)
	--	--	--	--	1	1	1	2	3	4	12
Normal	--	--	--	--	(7)	(7)	(8)	(9)	(14)	(45)	(90)
HINDU KUSH											
Tirich Mir	--	3	1	1	4	3	--	--		--	12
(3 peaks and routes)	--	(21)	(4)	(20)	(52)	(19)	--	--		--	(116)
KARAKORAM											
K-2	2	3	3	2	3	6	6	3	3	1	32
(12 peaks and routes)	(19)	(45)	(29)	(30)	(31)	(60)	(59)	(26)	(22)	(5)	(326)
Broad Peak	1	5	6	7	5	4	7	4	4	5	48
(9 peaks and routes)	(5)	(23)	(34)	(61)	(34)	(43)	(41)	(39)	(34)	(33)	(347)
Gasherbrum I	2	4	3	1	5	4	3	4	3	6	35
(9 peaks and routes)	(16)	(26)	(16)	(4)	(33)	(21)	(24)	(31)	(33)	(50)	(254)
Gasherbrum II	3	6	2	4	11	4	8	7	5	5	55
(8 peaks and routes)	(14)	(34)	(15)	(30)	(67)	(30)	(58)	(83)	(32)	(34)	(397)
Gasherbrum IV	1	1		2	4	4	--	--	--	--	13
	(5)	(8)	(8)	(16)	(4)	(24)	--	--	--	--	(65)
Masherbrum	4		1	--	2	--	--	1	1	--	10
(4 peaks and routes)	(22)	(4)	(5)	--	(15)	--	--	(10)	(8)	--	(64)
Rakaposhi	1	--	1	2	2	1	3	--	1	1	12
	(10)	--	(12)	(14)	(22)	(5)	(20)	--	(6)	(4)	(93)
Diran	1	--	1	--	3	2	--	--	4	--	11
	(7)	--	(4)	--	(29)	(17)	--	--	(25)	--	(82)
Trango Tower	--	--	1	2	--	2	2	3	3	3	16
	--	--	(4)	(12)	--	(13)	(11)	(14)	(18)	(18)	(90)
Other peaks	9	9	7	17	--	11	5	16	6	5	85
	(72)	(58)	(69)	(52)	--	(113)	(21)	(103)	(44)	(25)	(557)
GRAND TOTAL	33	43	44	59	54	52	47	57	43	55	488
	(230)	(305)	(333)	(385)	(398)	(422)	(317)	(450)	(318)	(449)	(3 607)

Note: [a] Refer also to annex table 2. An en dash (--) indicates that the amount is nil or negligible.

The most frequently attempted peaks in the Hindu Kush range were Tirich Mir and Istoro-O-Nal. The Tirich Mir peak was attempted via Tirich Mir main route and Tirich Mir West. Istoro-O-Nal was approached through its main route. From 1981 to 1990, 6 out of 12 expeditions attempted Tirich Mir by the main route and 5 by the west route. Only one expedition attempted the Tirich Mir East route.

Mountaineering in the Karakoram range was concentrated on 23 peaks in six main areas: K-2, Broad Peak, Gasherbrum I, Gasherbrum II, Masherbrum, Trango Tower and others. There were a total of 32 expeditions on K-2 over 10 years. Twelve expeditions approached K-2 via Abruzzi Ridge and four expeditions followed the normal route. There were three expeditions each on the south and north-west routes, and two expeditions each on the East and South-West Ridge.

From a total of 326 mountaineers taking part in the various expeditions to the K-2 peak over the last 10 years, 133 (41 per cent) made the attempt through Abruzzi Ridge and another 36 followed the normal Main Route. The Abruzzi Ridge was used every year, except in 1981 and 1990. Other routes had considerable intervals between expeditions.

A total of 48 expeditions with a total of 347 mountaineers ascended Broad Peak from 1981 to 1990. Expeditions were made in each of the 10 years using the normal route. Other routes were used intermittently.

Gasherbrum I was attempted by a total of 35 expeditions with a total of 254 mountaineers. There were expeditions by the normal route in every year, except 1982. The other eight routes were used intermittently over the 10-year period, usually by only one or two smaller expeditions. Gasherbrum II was attempted by 56 expeditions of 397 people. About two thirds of all expeditions were by the normal route, and these were conducted in each of the 10 years. Each of the seven other routes to Gasherbrum II were taken by only one or two expeditions intermittently, sometimes only once or twice over the 10 years.

Trango Tower in the Karakoram range was ascended by 16 expeditions with a total of 90 mountaineers from 1981 to 1990. About 75 per cent of these expeditions used the normal route in 8 out of the 10 years. Gasherbrum IV was climbed by 13 expeditions over a six-year period from 1981 to 1986; Diran by 11 expeditions of 82 persons; and Masherbrum by 10 expeditions of 64 persons. Other smaller peaks listed in the annex table 2 were attempted through the main routes.

The impact of mountain tourists on the environment is not affected only by the size of expeditions and their concentration in certain areas. The yearly patterns of use, or seasonality, are also an important variable. If the activities of expeditions are concentrated over a short period of two or three months every year, then there might be a greater amount of pollution that accumulates at more concentrated levels, not leaving enough time for the mountain environment to recover. This might be the case with biodegradable waste and refuse in particular; especially when compared with lesser amounts of pollution and waste that might accumulate if expeditions were spread more evenly throughout the year. Table 7 indicates the seasonal pattern of all expeditions in the three mountain ranges during the 10-year period.

Table 7. Number of expeditions by month, 1981-1990
(Number of persons in expeditions)

	January	*February*	*March*	*April*	*May*	*June*	*July*	*August*	*September*	*October*	*November*	*December*	*Total*
1981	1			4	6	13	8			1		--	33
	(4)			(32)	(46)	(74)	(69)			(5)		--	(230)
1982			--	3	21	12	7			--	--		43
			--	(21)	(135)	(97)	(52)			--	--		(305)
1983		--	--	3	15	10	12	3	1	--	--		44
		--	--	(28)	(111)	(64)	(103)	(23)	(4)	--	--		(333)
1984		--		4	16	27	6	1	5			--	59
		--		(34)	(149)	(120)	(41)	(6)	(35)			--	(385)
1985	--	--	--	4	21	17	12	--	--	--	--	--	54
	--	--	--	(30)	(148)	(111)	(109)	--	--	--	--	--	(398)
1986	--		--	1	9	32	10			--	--	--	52
	--		--	(16)	(77)	(251)	(78)			--	--	--	(422)
1987		--	--	1	9	19	16	2	--	--	--		47
		--	--	(9)	(60)	(113)	(125)	(10)	--	--	--		(317)
1988	--	--		2	18	23	10	2	1		1	--	57
	--	--		(29)	(136)	(172)	(86)	(10)	(4)		(13)	--	(450)
1989	--		--	1	9	22	9	2		--		--	43
	--		--	(4)	(60)	(152)	(88)	(14)		--		--	(318)
1990			--	2	13	21	17	--	1	--	2		56
			--	(15)	(122)	(131)	(152)	--	(5)	--	(24)		(449)
GRAND		--	--	25	137	196	107	10	8	1	3	--	488
TOTAL		--	--	(218)	(1 044)	(1 285)	(903)	(63)	(48)	(5)	(37)	--	(3 607)

Note: An em dash (--) indicates that the amount is nil or negligible.

The table clearly shows the seasonal concentration of expeditions in the three months of May, June and July. These three months accounted for 90 per cent of all expeditions throughout the 10 years as well as 90 per cent of all members of expedition parties. The greatest number of expeditions and the largest number of mountaineers overall was during the month of June in 7 out of the 10 years. In three years (1983, 1984 and 1985), the greatest number of mountaineers on expedition was in May. The months of May and June taken together account for about two thirds of all expeditions and all mountaineers. Given such a concentrated and limited period of time during which mountaineers are active in the mountains, it can be expected that large amounts of garbage and filth will quickly accumulate. Under these conditions, it will be necessary to have regular, efficient and systematic clean-up operations in place.

The general picture of the use patterns for mountaineering in the northern areas shows that although the numbers of mountain tourists are not very great compared with other types of international tourists, their activities are highly concentrated on specific peaks and routes during a very short period of the year. The distinctive patterns of use and seasonality have direct implications for strategies and policies for mountain tourism development and for developing a balance between promotion of mountain tourism and preservation of the mountain environment.

2. Patterns of trekking

The Tourism Ministry specifies various routes for trekking in restricted zones. The number of trekking parties and the number of people in the parties is presented in table 8.

There are seven main trekking routes in the districts of Skardu, Gilgit and Chitral. The year-by-year data show that most trekking expeditions were in Skardu. In fact, Skardu accounted for 82 per cent of all trekking parties and 78 per cent of all trekkers. All three routes in Skardu had been in use every year since 1981. There had been a steady annual increase in the number of trekking parties and number of members, showing the area's popularity. One route in Skardu, to Chogoliza, was the most popular. Over half of all trekking parties used this route. Within the district about 70 per cent of all trekking was also done on this route.

The one route with data reported from Gilgit accounted for 14 per cent of all treks over the 10-year period and 19 per cent of all people participating in treks. The route was used in every year, except 1988. The number of parties had generally become smaller in the late 1980s when compared with the earlier period of 1981 and 1982.

There were three routes used by trekking parties in Chitral, although their combined number of treks, as well as the number of people in the trekking parties, was much lower than Skardu and Gilgit. The number of trekking parties in each year was usually only one or two, although in 1983 there were three parties that made treks. Over the 10 years, treks were made intermittently on all three routes. In the case of one route, there were no treks during the entire period from 1981 to 1990.

The general use pattern of trekking in Pakistan shows that it is highly concentrated in Skardu where the number of trekking parties and their members was significantly greater than in the other districts and routes reported on. As is likely to be the case with both trekking and mountaineering, when many numbers of people and expeditions are concentrated in specific areas, the chance for pollution and environmental degradation becomes much greater. An analysis of the opinion survey can help give a better picture of the nature of the relationship between pollution and the concentration of mountain tourists in specific areas.

Table 8. Patterns of participation in trekking by districts and routes, 1981-1990
(Number of people in trekking parties)

District and route	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*Total*
SKARDU											
Islamabad-Skardu-Baltoro-Dassu-Chakpo-Chango-Askole-Koro-Fang-Bardomal-Plan-Riliwa-Urdocads-Groro-Concordia-Chogoliza and return	5 (25)	13 (91)	13 (72)	7 (33)	17 (118)	21 (122)	27 (142)	36 (230)	37 (185)	45 (263)	221 (1 281)
Islamabad-Skardu-Khaplu-Haldi-Khani-Hushe-Ghandoro Glacier-Chandogoro Pass-foot of Biarchondi peak, Battoro Glacier and back via trek number 1 or return route	(4)	3 (17)	3 (14)	1 (6)	4 (20)	5 (35)	5 (38)	6 (29)	6 (31)	10 (53)	44 (247)
Islamabad-Skardu-Shigar-Dassu-Askab-Korophon-Panmah-Panmah Glacier-Chiring Glacier-Drenmang Glacier-Nobande-Soleande Glacier-Skom Pass-Simagang Glacier-Sim Pass-Choktoi Glacier and return	1 (4)	3 (17)	3 (15)	3 (16)	5 (27)	4 (27)	4 (21)	7 (40)	10 (53)	10 (45)	50 (265)
Subtotal	7 (33)	19 (125)	19 (101)	11 (55)	26 (165)	30 (184)	36 (201)	49 (299)	53 (269)	65 (361)	315 (1 793)

Table 8. (*Continued*)

District and route	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*Total*
GILGIT											
Islamabad-Gilgit-Yesin-Harpan Hushk-Shoraling-Thai Ann Pass-Gazin-Dobar-Gar-Lasht-Short-Ishpro-Shah Jinah-other side of pass, Shah Gran Ystoro, Chitral	12 (118)	22 (127)	6 (61)	2 (23)	1 (6)	5 (41)	2 (11)		1 (3)	4 (39)	55 (429)
CHITRAL											
Islamabad-Chitral-Naroi-Nal-Barum-South Barum Glacier-North Barum Glacier, foot of Tirich Mir peak and return	2 (14)	1 (7)	2 (10)		2 (2)	1 (16)					9 (50)
Islamabad-Chirtal-Lasht Shoghar Magh-Hot Spring (Garam Chashma), trek along Shishgol to Purisht and return		1 (8)	1 (5)	1 (1)		1 (6)					4 (20)
Islamabad-Chitral-Birmogh Lasht Utok Pass-Bashagalian, Rumber Bamboret and return to Chitral via Ayan, or trek in Reverse order, or trek in Bamboret Barier and Ruambure Village											
Subtotal	2 (14)	2 (15)	3 (15)	1 (1)	2 (2)	2 (22)				1 (1)	13 (70)
GRAND TOTAL	21 (165)	43 (267)	28 (177)	14 (79)	30 (174)	37 (247)	38 (212)	49 (299)	54 (272)	69 (400)	383 (2 292)

Note: Two dots (..) indicate that data are unavailable or are not separately reported.

IV. ASSESSING THE ENVIRONMENTAL IMPACT OF MOUNTAIN TOURISM IN PAKISTAN

A. OVERVIEW

The description of the use pattern of peaks and routes for both mountaineering and trekking sets the stage for assessing the pollution in the mountainous north. The assessment focuses on the types of pollution and opinions about the degree to which each type had been observed at the most frequently used peaks and routes. Five sources of information were used: (a) reports of government liaison officers, (b) opinions expressed by expedition leaders, (c) interviews with expedition team leaders, (d) debriefing forms, and (e) field visits by the researchers.

The information is generally based on the direct observations and experiences of those most familiar with the mountain environment. Mountaineers, liaison officers and porters have climbed a variety of peaks by several routes at different times over the years. These experiences enable them to report on the ecological conditions authoritatively and to make comparisons over time and place.

Their responses to written questionnaires, interviews and reports in official forms were standardized, assigned weights and scaled to be more easily interpreted.

B. OPINIONS ON OBSERVED MOUNTAIN POLLUTION

From a total of 56 respondents, opinion scores were gathered about seven types of pollution that had been observed on 36 specific peaks and routes, plus an additional residual category of peaks and routes designated as "other". The results of the opinion scores for each type of pollution were then added together to obtain one overall, combined score for each specific peak and route. The scores were scaled for interpretation as noted previously in table 2 and discussed in the section on methodology.

Table 9 reports on the opinion scores for the seven different types of pollution and the overall combined score for the most frequently used peaks and routes of the three mountain ranges.

The scores in table 9 provide a general picture about the perceived degree of pollution for 37 peaks and routes in the three mountain ranges. First, it is important to note the distribution of the total number of peaks and routes reported on. Three were in the Himalaya, three were in Hindu Kush and the majority, 31 out of 37, were in the Karakoram range. However, when averages of the overall scores are taken for each of the three ranges it is possible to start making some comparisons. The overall combined score for all types of pollution was 17.5 for the Himalaya, 11 for Hindu Kush and 14.7 for Karakoram. According to the rating scale for these scores, both Hindu Kush and Karakoram were seen as having moderate levels of pollution while the Himalaya scored a combined average which could be considered a high level of pollution.

Among the three routes to Nanga Parbat in the Himalaya, Kinshofer route received an overall score of 21, which meant that the pollution was rated as very high. The type of pollution which contributed most to this high score was human waste and trails of animal litter, followed by pollution from containers, food packing, polyethylene bags, sheets etc. and congestion.

The Rupal route to Nanga Parbat received the second highest overall score for the Himalaya, receiving the highest score for pollution due to left-over mountaineering gear and equipment. Three other types of pollution received the score 3: (1) human waste and animal litter; (2) pollution from discarded containers, packing, bags and sheets; and (3) damage to the forest due to cutting and other forms of destruction.

Table 9. Opinion scores about seven types of pollution and degree of pollution of selected peaks and routes[a]

Range, peak and route	*Type of pollution*[b] *1*	*2*	*3*	*4*	*5*	*6*	*7*	*Overall combined score*[c]
THE HIMALAYA								
Nanga Parbat (of which)								
Diamir	2.8	2.8	2.4	2	2.2	1.2	2.2	15.6
Rupal	3	4	3	3	2			16
Kinshofer	5	3	4	3	1		4	21
HINDU KUSH								
Istoro-O-Nal	2	2	4	1	1		2	13
Saraghrar	1	1	2	3	1		1	10
Udren Zom	1	1	2	2	2		1	10
KARAKORAM								
K-2 (of which)								
Normal	2	3	3.5	3.5	1	1	1	15
Abruzzi Ridge	3.8	3.3	4	3.3	1.8	.3	2	19.5
West Ridge	3	3	3	3	1	1	1	15
South Face	3	4	4	2	3	3	4	23
Broad Peak (of which)								
Normal	3.4	2.8	3.2	2	1.8	2.4	2	17.6
West Ridge	2	2	4	5	3	1	2	19
Gasherbrum I (of which)								
Normal	2.5	3.3	2.8	3.5	2.3	1	1.3	16.5
North Ridge	4	4	4	5	3	2	2	24
Gasherbrum II (of which)								
Normal	2.6	2.3	2.7	3.1	1.4	1.3	1.7	15.
East Ridge	3	3	4	3	4	2	2	21
S.W. Ridge	3	1.7	2.7	2.7	2	1.3	1.7	15
Distaghil Sar	1	1	1	2	1		1	8
Rakaposhi (of which)								
N.W. Ridge		1	3		2		1	10
Baintha Brakk	3		4		4		3	22
Latok III	4	2			3		2	16

Table 9. (*Continued*)

Range, peak and route	*Type of pollution*[b] *1*	*2*	*3*	*4*	*5*	*6*	*7*	*Overall combined score*[c]
Latok I (of which)	1	3	2	1	1	1	1	10
North Ridge								
Batura	1	1	1	4	1	1	3	12
Trango Tower (of which)								
N.E. Face	5	1	2	4	2	1		16
West Ridge	1	1	1	2	1	1	1	8
Spantik	3	2	2	4	5	2	2	20
Chogolisa	3	5	4	5	2	3	3	25
Hidden Peak	3	2	2	3	1	2	2	15
Trinity	2	2	3	3	2	1	1	14
Bularung Sar	1		3	1		1	1	9
Kunyang Sar	2	1	1	1	1	1		7
Uli Bisho	3	2	3	3	1	1	2	15
Chongra	3	2	3	3	1	1	2	15
K-7		1	2	3	1	1	1	10
Diran Peak (of which)								
N. Ridge	1	3	1	1	1	1	1	9
Normal	2	1	1	1	1	1	1	8
Other peaks	1	1	1	2	1	1	1	8

Notes: [a] Refer also to table 6 and annex table 2.

[b] The numbers correspond to the following seven types of pollutin identified for this study:

1. Human waste and trails of animal litter
2. Left-over mountaineering gear, including tents, bedding, ropes, shoes, clothing, other equipment etc.
3. Containers (empty or filled), bottles, food packing, polyethylene bags/sheets etc.
4. Damage to forest areas due to cutting, destruction of vegetation, effects on wildlife as a result of human intrusion
5. Stone cutting, rock falls/landslides, graffiti, destabilized soil due to tourism
6. Noise disturbance
7. Congestion

Five ranges of scores were developed to define a rating scale of different degrees of pollution, as follows:

0 - 5	Negligible
6 - 10	Low
11 - 15	Moderate
16 - 19	High
21 - 25	Very high

The Diamir route to Nanga Parbat received a lower overall score than the other two routes. However, two types of pollution shared the highest score: (1) human waste and animal litter, and (2) left-over gear, equipment and personal belongings.

In general, it would appear from the opinion scores about types and degree of pollution in the Himalaya that the most serious pollution was directly due to the activities of mountaineering expeditions. One route, Kinshofer, was reported as more highly polluted than the other two routes, and this route had the highest scores for at least three types of pollution.

The three peaks in the Hindu Kush range which received opinion scores had much lower scores both overall and for particular types of pollution when compared with the Himalaya. Istoro-O-Nal had the highest overall score among the three peaks, and this was due to a high score for pollution due to discarded containers, bottles, packing and plastic items of the mountaineering expeditions. The other two peaks had low scores for almost all types of pollution, except for Saraghrar which had a somewhat high score for pollution due to damage to the forest from cutting and destruction of vegetation.

Opinion scores were reported for 30 peaks and routes of the Karakoram range, plus one residual category for "other peaks". It is clear that the Karakoram range was the most frequently visited of the three ranges and accounted for over 80 per cent of the locations about which opinions were expressed. Given the large number of peaks and routes reported on and the wide range of scores, the average overall combined score for the Karakoram range was 14.7, which was lower than the Himalaya (17.5) and higher than the Hindu Kush overall combined average of 11. The range of scores for the overall combined scores of each peak and route was from a low score of 7 for Kunyang Sar to a high score of 24 for the North Ridge route of Gasherbrum I.

Average combined scores were obtained for six important peaks with two to four different routes in the Karakoram range: K-2 with four frequently used routes; Broad Peak with two routes; Gasherbrum I with two routes; Gasherbrum II with three routes; Trango Tower score with two routes and Diran Peak with two routes.

The combined average for Gasherbrum I was the highest at 20, indicating a very high level of pollution overall. The high score of 24 for the North Ridge route contributed to this result. Four types of pollution had very high scores: (1) damage to the forest due to cutting and destruction of vegetation, (2) human waste and animal litter, (3) left-over gear, and (4) discarded containers, packing and plastic items.

The two routes to Broad Peak yielded a combined average of 18.3, the second highest score among this group of important, frequently visited peaks. In particular, the West Ridge route had a maximum score of 5 for pollution as a result of perceived damage to the forest environment from cutting and destroying vegetation. The overall combined score from all seven types of pollution on the West Ridge route was 19.

The four routes of K-2 had a combined overall average of 18 as a result of high pollution scores for the South Face route (with a score of 23) and for the Abruzzi Ridge route (with a score of 19.5). Three types of pollution had high scores for the South Face route: (1) left-over mountaineering gear, (2) discarded containers, packings etc., and (3) congestion. The types of pollution receiving the highest scores as being most observed on Abruzzi Ridge were (1) discarded containers, packings, plastic etc., and (2) human waste and animal litter.

The three routes of Gasherbrum II had an overall combined score of 17, and this included the East Ridge with a high overall score of 21. This score resulted from high scores on two types of pollution: (1) discarded containers, packings etc., and (2) stone-cutting, rock falls, landslides, etc.

The two routes to Trango Tower peak had an overall combined average of 12, indicating moderate pollution. However, the N.E. Face route had an overall score of 16 which included a score of 5 for human waste and animal litter and a score of 4 for damage to the forest environment. By comparison, the West Ridge route to Trango Tower had an overall score of 8 indicating low levels of pollution.

Diran is the final of the six important peaks of the Karakoram range, and its two routes had a fairly low overall average score of 8.5. Both the normal route and the N. Ridge route had low total scores, with opinion scores of 1 or 2 for almost all the types of pollution. N. Ridge route, however, did receive a score of 3 for pollution in the form of discarded containers, packings, plastic etc.

The summary rating system for combining the opinion scores on each type of pollution was based on a 25-point scale, divided into five ranges for degrees of pollution. A general summary picture of overall pollution is given in table 10 for all three mountain ranges. This summary can be compared with the data in table 11 showing the total number of mountaineers and porters in expeditions according to the level of pollution.

Table 10. Distribution of peaks by degree of pollution, according to overall score range

	0-5 Negligible	*6-10 Low*	*11-15 Moderate*	*16-20 High*	*21-25 Very high*	*Total*
Karakoram	--	10	9	7	3	29
Himalaya	--	--	--	2	1	3
Hindu Kush	--	1	1	--	--	2
Total	--	11	10	9	4	34

An em dash) indicates that the amount is nil or negligible.

Table 11. Distribution of mountain tourists by degree of pollution according to overall score range

	0-5 Negligible	*6-10 Low*	*11-15 Moderate*	*16-20 High*	*21-25 Very high*	*Total*
Karakoram						
International tourists		76	84	181	28	369
Porters		405	643	950	193	2 191
Subtotal		481	727	1 131	221	2 560
Himalaya						
International tourists				27	12	39
Porters	--	--	--	177	80	257
Subtotal	--	--	--	204	92	296
Hindu Kush						
International tourists		16	6			22
Porters	--	59	20	--	--	79
Subtotal	--	75	26	--	--	101
Grand total						
International tourists		92	90	208	40	430
Porters		464	663	1 127	273	2 527
TOTAL		556	753	1 335	313	2 957

An em dash (--) indicates that the amount is nil or negligible.

The general picture about the distribution of peaks by level of pollution covers 34 peaks and routes in the three mountain ranges. About 32 per cent of all the peaks received opinion scores indicating low degrees of pollution, and 29 per cent received scores indicating moderate degrees of pollution. Among all mountain ranges, only 9, or 27 per cent, were perceived to have high levels of pollution. A total of 4 peaks and routes (12 per cent) were considered very highly polluted.

In the Karakoram range, 34 per cent of the peaks and routes were rated as having a low degree of pollution and about 10 per cent had a very high level. Nine of the 29 peaks and routes (about 31 per cent) received scores indicating a moderate level of pollution. Only 3 of the 29 had a score that designated having moderate levels of pollution.

Only three peaks and routes of the Himalaya received scores, but the result showed that two of the three were considered as having high levels of pollution. One scored a very high level of pollution. There were two peaks and routes which received scores for the Hindu Kush range. As shown in table 10, one scored in the low range and the other scored in the moderate range.

It is usually assumed that high scores on levels of pollution would be positively related to the number of tourists; that is, the more tourists there are, the more the environment will be degraded. The data presented in table 11 are set out to examine this assumption and give a picture of the relationship between number of tourists and level of pollution.

The distribution of mountain tourists includes two types of participants in mountain expeditions: the international tourists and the porters. For the most part, the porters are local people from the northern mountainous areas. Many are members of minority tribal groups.

According to table 11, the greatest overall number (1,335) of international tourists (208) and porters (1,127) conducted their expeditions on routes and peaks classified as having high levels of pollution. The second greatest number of both groups (753), of which 90 were international tourists and 663 were porters, undertook expeditions on routes and peaks with moderate pollution. The smallest total number (313) were active on the routes and peaks with the highest pollution levels. This total included 40 international tourists and 273 porters. This pattern is, of course, also a function of the number of routes and peaks in each category of pollution levels. Only four peaks and routes were in the category of very high pollution, and three out of the four were in the Karakoram range.

The patterns in the Karakoram range are of particular interest, since this is where 29 of the 34 peaks rated for pollution are located. About 44 per cent of the total number of people on expedition in the Karakoram range were on routes and peaks with high pollution levels. But these peaks and routes with high pollution comprised only 24 per cent, 7 out of 29 peaks and routes in the range. By contrast, 10 out of the 29 peaks and routes (34 per cent) were in the low pollution category, but only 19 per cent of the mountaineers were on expeditions at these places. Nine out of the 29 peaks and routes (31 per cent) in the Karakoram range were in the moderate pollution category, but this is where 28 per cent of the tourists and their porters were active.

When the ratio of porters to international tourists was examined for the Karakoram range, the highest ratio, 8 porters to 1 tourist, occurred on peaks and routes with moderate pollution. A ratio of 7 to 1 occurred in the three peaks and routes with very high pollution levels. A ratio of 5 porters to 1 tourist was found for those peaks and routes with high pollution as well as those with low pollution in the Karakoram range. The mean ratio for all 34 peaks and routes in the three mountain ranges was 6 porters to 1 international tourist.

The pattern in the three peaks and routes of the Himalaya is also interesting, especially since they had pollution scores of high and very high. The two peaks with a rating of high pollution levels accounted for about 70 per cent of the international tourists and 69 per cent of the porters on expedition in the Himalaya range. The balance of the international tourists and porters was on expedition on the one Himalayan peak and route with the very high pollution ranking. In both cases of high and very high pollution ratings for the three peaks and routes, it was found that the ratio of porters to tourists was 7 to 1.

By comparison, the two peaks and routes of the Hindu Kush range which received scores of low and moderate for pollution had ratios of porters to tourists of 4 to 1 and 3 to 1, respectively. In addition, of the total number of mountaineers on the two peaks and routes of the Hindu Kush range (101 people), 74 per cent were on expedition on the one peak and route with the low level of pollution. Among the international tourists in the Hindu Kush range, 73 per cent of them were mountaineering on the peak and route with low pollution. About 75 per cent of the porters were also on expedition at these low pollution locations.

The information presented here suggests that the relationship between levels of pollution and numbers of tourists might be more complex than the simple assumption of a direct, positive relationship as mentioned above. In the case of the Karakoram range, where more peaks and routes were reported on and where most of the international tourists and porters were on expeditions, there was a relationship between a high level of pollution and greater numbers of tourists. However, this was not the case for the very high levels of pollution on four of the peaks and routes. The Himalaya range had the second largest number of mountaineers and they were active on three peaks and routes with high and very high levels of pollution. Once again, however, like in the Karakoram range, most of them were on expedition where the pollution level was rated high. Lower shares of both the international tourists and the porters were active on the one peak and route with very high pollution. Finally, of the two peaks and routes in the Hindu Kush range, the one with low pollution had the bigger share of the international tourists and porters.

Clear support is not available, therefore, to affirm that higher numbers of tourists tend to produce more pollution. More detailed study would be required, particularly since larger samples of international tourists would be needed for a greater number of peaks and routes, especially in the Himalaya and Hindu Kush ranges. More systematic reporting and direct observation by government liaison officers and researchers could help provide a more detailed and more representative picture of the complex nature of the relationship between tourism and pollution.

In fact, a more detailed study could examine the patterns of behaviour of both the international tourists and the porters. The discussion of the data presented here suggests that there could be a link between levels of pollution and the ratio of porters to international tourists in the expedition teams. Several of these points have important implications for the analysis of current government policies and regulations, as well as for proposals on future plans of action, policies and programmes.

V. CONCLUSION: POLICIES, OPTIONS AND PROPOSED ACTION PLAN

A. OVERVIEW OF CURRENT POLICIES, PRACTICES AND MEASURES

The Government has had policies and measures in effect since 1983 in order to control environmental degradation in the northern mountainous areas. In addition, the policies and measures have been adjusted at various times in order to make them more effective and responsive to the changing conditions of mountain tourism. Current policies and practices are described in this chapter while keeping in mind the main findings presented in chapter IV, "Assessing the environmental impact of mountain tourism in Pakistan".

Based on the opinion scores in chapter IV, the most serious types of pollution in order of severity were reported to be physical pollution generated by human and animal filth, left-over mountaineering equipment, discarded containers and plastic items and deforestation. Noise and congestion did receive mention as types of pollution in the mountain areas, but these were not rated as severe pollution problems.

The Government of Pakistan has been in the process of framing a national conservation strategy based on re-thinking development options from the viewpoint of future sustainability and the need to re-order goals and priorities[4]. At the same time, the Tourism Policy was launched in June 1990 based on a strategy of growth, without any reference to the efforts or expenditures needed in order to restore, manage and sustain natural resources as well as cultural resources. This is an example of where a particular government agency assumes it can automatically discharge its responsibilities concerning the environment. In fact, the tourism policy should be a component of the national development strategy. Moreover, the tourism policy will not be implemented automatically, but will require coordination, comprehensive management, careful estimates of the resources needed, proper enforcement of rules and regulations and a strong institutional base. An evaluation of the present situation concerning mountain tourism and conservation in the mountainous areas shows that these features are generally lacking.

A set of three basic mountaineering rules and regulations were framed in 1983 in an effort to control pollution. The first rule stated that an expedition party shall leave a campsite clean by dumping all garbage in a hole. The liaison officer, who usually is from the army, shall furnish a certificate upon returning from an expedition, showing that the expedition party has complied with these conditions. The second rule stated that the expedition party and its porters shall not damage the forest or the animal wealth in the area. The liaison officer shall furnish a certificate that this condition has been fully complied with by the expedition party.

The third rule stated that in case the rules were breached, the expedition party or all of the members of such a party and any sponsor of such a party would be disqualified from any future mountaineering expedition to Pakistan for a period of four years. In addition, procedures could be taken against them under the relevant rules.

The responsibility for enforcing the rules and ensuring the cleanliness of the areas where mountaineering expeditions are active is with the leaders of expedition parties and the liaison officers. They are required to certify that the rules about pollution have not been violated. However, actual practice and experience have shown a complete variance with the rules and pollution provisions. Only a few expedition parties properly complete the space provided in the debriefing forms that are required as reports on mountain tourism activities.

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[4] National Conservation Strategy Secretariat, "N.C.S. Implementation Arrangements", draft report (Islamabad, 1990).

In an effort to overcome lack of reporting, the introduction of a group leader (Sardar) for every 50 porters was established. The Sardar would be held responsible for pollution and/or depletion caused by the porters. This was also expected to prevent any activities of the expedition party which might adversely affect the ecology.

Porters have been required to register with the local administration, but the system has not worked owing to strong tribal loyalties. Expeditions continue to hire local non-registered porters. Such non-registered porters tend to ignore the rules. For example, human waste becomes a problem when porters refuse to use trench toilet facilities.

Another example is the requirement under mountaineering rules that the expedition parties supply kerosene oil to the porters. But owing to different cooking practices and economic necessity, most of the porters sell the kerosene in the market and proceed to cut down the trees and vegetation for fuel. In this way, porters in expedition parties engage in activities that lead to destruction of the forest and vegetation.

In 1988, it was decided that every international expedition would be charged $US 200 to contribute to clean-up operations in the mountain areas. The money would be used to build toilet facilities along and near the frequently-used base camps and stopping points along the routes. An initial scheme called for construction of eighteen toilets with a budget of PR 800,000 allocated. It was reported that about PR 34,000 had been spent to construct toilets at five sites in the Skardu area. Subsequently, it was reported that local people had stolen the toilets and the construction materials from the site.

Another effort has aimed at giving encouragement to those expedition parties that show strong interest in clean-up operations. For example, an Italian expedition party working in collaboration with the Agha Khan Foundation helped clean refuse in the K-2 area of the Karakoram range using the most modern technology for the purpose.

In 1990, a new rule was instituted to enforce reporting and certification procedures. It was decided that in cases where a liaison officer submits a false certificate, the matter would be brought to the proper authorities for disciplinary action. If the liaison officer is a civilian, then his or her registration as a guide would be cancelled, thus disqualifying that person from serving as a guide for a period of four years.

The Tourism Division has made a request to Army Headquarters seeking proposals on how the services of military personnel could be used to help ensure cleanliness in the mountainous area. Army Headquarters was requested to arrange suitable training to educate army liaison officers about pollution control and environmental improvement.

In addition to existing penalties, new mountaineering rules were put into effect from 1991 to require that expeditions make a cash deposit of $US 1,000 with the Tourism Division. In the event of a complaint from the liaison officer that an expedition failed to observe environmental instructions, the deposit could be forfeited, in part or in full, depending on the nature of the violation. All international expeditions applying to conduct clean-up operations for identified peaks, routes, base camps and stopping points would be exempted from paying the royalty on the condition that they would not ascend the identified peak.

As another effort to control pollution, the administration in the northern area would be requested to issue a conduct book to every porter at the time of porter registration. Porters would be required to hand the conduct books to liaison officers during an expedition. At the end of the expedition, the liaison officer and the expedition leader would make an entry into the book about the porter's conduct in maintaining cleanliness, preserving forest wildlife and behaving with care towards the environment. In the event that a porter violates the rules, he could be disqualified from being a porter for a period of from one to three years, depending on the nature of the violation.

An evaluation of the rules and measures described indicates that most are drawn up on an ad hoc basis, usually unsystematically in response to particular problems as they arise. In view of the

apparent increase in pollution over recent years, it would seem that the policies, regulations and actions had not produced the desired results. There are several possible reasons for this.

First, efforts have not been focused and responsibilities have not been clearly defined. Second, a specific core programme with actions directly related to conserving the environment and natural resources has been either lacking or impractical and without an appropriate time-frame for implementation. Third, those who make decisions and take action have not been strongly motivated. This is partly because their responsibilities have not been clearly spelled out. People in both the public and the private sector need to be more aware of their interest in conserving environmental resources and using the environment wisely, and then be motivated to devise strategies and implement conservation policies and programmes.

Fourth, in a broader context there is the need for plans at the national, regional and sectoral levels within which core mountain conservation programmes can fit. A broader national commitment would strengthen the sense of responsibility of individuals and agencies that must take action to balance mountain tourism with the need to preserve the environment in the northern areas. It is thus necessary to have an institutional development plan.

Fifth, there have not been enough financial resources or adequate financial planning in the absence of cost estimates or determination of who will pay. Expenditures mandated or recommended in policies have always exceeded the available resources.

Sixth, a monitoring and evaluation programme has been lacking, even though it is necessary for ongoing and periodic assessment of progress in implementing policies and related measures.

It is clearly a major task to promote and develop behaviour that acknowledges the need to sustain and protect the mountain environment. The requirements for this task include political will, far-sighted policies, more efficient institutional structures, better social partnerships and increased participation of the people. Even if the work is started now, it will continue to be the work of several generations.

B. POLICY OPTIONS FOR CONSERVING THE MOUNTAIN ENVIRONMENT

Policy options need to be based on careful study of the actual conditions in the mountainous northern areas. It is also important to establish priorities, and the findings presented in this study can provide a preliminary guideline. At least nine factors have been identified for policy consideration:

(1) Identification and ranking the seriousness of the main types of environmental degradation is required. This study has identified six main types of pollution, listed below in order of importance: (a) Human and animal waste, (b) Discarded mountaineering gear, (c) Discarded containers, (d) Damage to wildlife, (e) Cutting of forests, and (f) Soil erosion.

(2) Examination of the most heavily polluted areas is needed, with a focus on routes to Nanga Parbat in the Himalaya range; the normal route to Istoro-O-Nal, the normal route to Saraghara peak and the normal route to Urden Zom in the Hindu Kush; and three routes to K-2, two routes to Broad Peak, two routes to Gasherbrum I and three routes to Gasherbrum II in the Karakoram range.

(3) The rate of pollution needs to be assessed.

(4) Careful examination of the time-frame is required in order to have effective implementation. A short period of seven to eight years might be all that is available, given policies designed to expand mountain tourism up to the turn of the century. The Government's tourism policy targets a growth rate of 10 per cent a year from 1990 to 1995, and 12 per cent a year from 1996 to 2000.

(5) Linkages need to be established between the policies and the institutional structures in order to assure proper implementation as well as effective coordination.

(6) The role of the public sector and the private sector needs to be examined since both sectors are required if policies and programmes are to be successful.

(7) Relationships need to be developed with regional and international agencies, especially where there is an impact beyond national boundaries.

(8) Action plans must be complete and include strategies, responsible institutions, time-frame and cost estimates.

(9) A monitoring system is needed to evaluate the effect of policies over time in order to consider the need for adjustments.

A multi-faceted strategy clearly needs to be adopted in order to solve current problems and put mechanisms in place for the future. The principal aim should be to recover the mountain environment and totally eliminate pollution. A secondary aim should be to lessen the extent of the damage which has already occurred and to contain the damage so that it does not spread in the future.

C. PLAN OF ACTION

The plan of action set forth has been designed to achieve short-term objectives of controlling and reducing the amount of environmental degradation and to take actions that would help achieve long-term objectives of greater awareness and responsibility for environmental preservation balanced against the benefits from mountain tourism. There are six main categories of measures. Each contains specific actions that can be taken in a systematic way. The six measures and 28 actions are presented in table 12.

The six categories of measures were designed to address both the short-term and long-term objectives. At this time, however, details about the various types of action have been aimed at immediate and short-term solutions for existing problems already identified in the three mountain ranges. While all of the measures have an ongoing, long-term component, it is the management measures and some of the information measures that embody the long-term objectives. The management measures are designed to systematically develop appropriate organizations and agencies that institutionalize the commitment and responsibilities for recovering, monitoring, maintaining and preserving the mountain environment in consideration of the role played by mountain tourism.

At the same time, the six measures and each of their types of action can be adapted to address immediately and directly the environmental situation reported for the various peaks and routes. In table 13, those peaks and routes with problems due to pollution and environmental degradation are listed in order of the seriousness of their pollution problems. The peaks and routes are then matched with the measures and actions that could solve the present pollution problems.

In order for the measures and actions to become workable parts of an overall plan of action, the necessary inputs need to be identified and their quantities estimated. In the case of financial inputs, funding agencies both national and international can be identified. Agencies and organizations responsible for implementation also need to be identified, including those which will serve as lead agencies and those which will collaborate. A time-frame for implementation is also needed.

Financial inputs are required for two types of expenditure that are needed when applying the set of six measures to the peaks and routes as outlined in table 13: (a) recurring expenditures needed on an annual basis, and (b) non-recurring expenditures. Estimates have been made that about $US 1.85 million would be needed annually to cover recurring expenditures. About $US 2.62 million would be needed for non-recurring expenditures. The total cost for implementing the six measures would be $US 4.47 million. It should be possible to obtain the money from several sources and thus share the costs. The Government of Pakistan would be expected to play a central role in providing financial inputs. At the same time, the Government could cooperate with international aid-giving agencies, whether they are

Table 12. Measures and actions as part of a plan to maintain and preserve the mountain environment

Category of measure	*Type of action*
1. Preventive measures	a. Conduct periodic cleaning operations
	b. Provide alternative fuel to porters, instead of kerosene oil
	c. Establish refuse collection areas at base camps which are to be cleaned regularly in May and June under government supervision
	d. Construct micro hydro-electric power units, where feasible
	e. Use firewood saving technology
2. Improvement measures	Organize afforestation best suited to the local ecology
	Plant vegetation which cannot be used as fuel or wood
	Institute range management and control against over grazing by animals such as sheep and goats
	d. Construct latrines appropriate to the local style and disposal bins that suit local conditions
3. Information measures	a. Use electronic media to publicize environmental awareness
	b. Train people in local administration and in elected bodies through lectures, slide shows etc.
	c. Hold international conferences
	d. Prepare billboards, T-shirts and similar general information devices
	e. Train porters
4. Enforcement measures	Ban expedition parties who pollute
	Take action against liaison officers who fail to implement and enforce rules
	c. Use existing punitive policies selectively
5. Incentive measures	a. Give cash and/or certificates for individuals, parties and officers of the local administration for effective performance
	b. Publicize the positive work of people or parties who are effective in preserving the mountain environment
	c. Reward expedition parties who comply fully with rules and regulations about pollution
6. Management measures	a. Periodically close peaks and routes that are most heavily damaged due to over-use
	b. Charge variable rates of royalty to expedition parties based on the pollution factor for various peaks
	c. Gradually introduce peaks that have not generally been known and used through a variety of incentives
	d. Campaign to promote winter tourism in order to reduce congestion during the summer season
	e. Continue research in order to assess pollution levels and make arrangements for regular monitoring
	f. Promote close coordination among relevant agencies
	g. Share the distribution of royalty proceeds with local bodies, or allow them to impose a Cess to cover expenses for cleaning and restoring the environment
	h. Form an Environmental Agency for the North

Table 13. Adapting measures and actions according to existing pollution levels for specific peaks and routes

Peak and route	*Reference number of relevant measure and letter of relevant action*[a]
Nanga Parbat	
Diamir route	1. a, c, e 2. d 3. b, c, d, e 4. a, b, c 5. a, b, c 6. b, e, h
Rupal route	1. a, c 3. a, b, c, d, e 4. a, b, c 5. a, c 6. a, b, e, g
Kinshofer route	1. a 2. d 3. b, e 4. b, c 5. c 6. a, b, d, e,
Istoro-O-Nal	1. a, c 3. a, b, d 4. a, b, c 5. a, b, c 6. a, b, c, d, , f, g
Saraghrar	1. b, d, e 2. a, b, c 3. a, b, e 4. a, b, c 6 a, e, f
Udren Zom	Same as Istoro-O-Nal; plus 2. a, b, c
K-2, South Face	Same as Rupal and Istoro-O-Nal
K-2, Abruzzi Ridge	Same as Istoro-O-Nal
K-2, West Ridge	Same as Kinshofer, Rupal, Istoro-O-Nal, Saraghrar
Broad Peak, West Ridge	Same as Saraghrar
Broad Peak, Normal route	Same as Kinshofer
Gasherbrum I, North Ridge	Same as Saraghrar
Gasherbrum I, Normal route	Same as Saraghrar
Gasherbrum II, East Ridge	Same as Istoro-O-Nal
Gasherbrum II, Normal route	Same as Saraghrar
Gasherbrum II, S.W. ridge	Same as Kinshofer

Note: [a] See table 12 for detailed description of the coded measures and actions.

multilateral such as United Nations agencies, bilateral from major donor countries or non-governmental organizations (NGOs) such as the Agha Khan Foundation, and international mountaineering associations etc. Some actions outlined in table 12 can be funded through fees and royalties collected from expedition parties.

The time required to start up and implement the actions listed under the six measures can be set initially for a period of three years. The initial three-year plan of action and the various projects under the six measures should be scheduled to begin at the start of the mountaineering season.

Responsibilities at the national, district and local levels would have to be assigned for the 28 various actions under the six measures. The majority of the actions could best be implemented if the Tourism Division is the lead agency. Of equal importance as the lead agency for all 28 actions are the collaborating/cooperating agencies and organizations. These will include several government ministries, such as the Ministry of Forestry, provincial forestry departments, the armed forces, tour operators from the private sector, international mountaineering associations, international organizations, NGOs, private companies, the expedition parties, and so forth. Such varied and extensive cooperation would require high-level capabilities in management and coordination.

D. SUMMARY

This study contributed to the evidence that mountain tourism in Pakistan has had a significant effect on the mountainous northern areas and in some cases has been degrading the environment. The fragile nature of the ecological balance in the northern mountainous areas has been recognized by policy makers and officials, along with the need to balance mountain tourism with protection of Pakistan's natural resources in the northern areas.

Tourism had not been actively promoted or targeted for development by Pakistani policy makers. In the overall context, mountain tourism is a small part of the tourism sector. However, adventure tourism in the form of mountaineering and trekking has made Pakistan an attractive destination for this specialized group of international tourists. And despite their small numbers, mountain tourists have a significant impact on the mountain ecology and the natural resources of Pakistan.

The study affirmed the significant impact of mountain tourism by showing that mountaineering was concentrated on a few well-known peaks in the three mountain ranges, particularly in the Karakoram range. Mountain tourism was also found to be highly seasonal, with most mountain expeditions being active in two or three specific months during the year.

A questionnaire survey provided a standardized assessment of the impact of mountain tourism from the opinions of government liaison officers, expedition leaders and members of expedition parties. The results of the survey indicated that high and very high levels of pollution were found on particular peaks and routes, mostly in the form of human waste and animal litter, left-over mountaineering gear and discarded containers. The information gathered for this study did not clearly support the assertion that greater numbers of tourists tend to produce more pollution. This was true in the case of several peaks and routes of the Karakoram and Himalaya ranges. However, in the Hindu Kush range it was found that despite larger numbers of tourists, pollution was at low and moderate levels.

It was observed that porters accompanying mountain expeditions were a significant source of pollution for various reasons. In some cases, they tended to cut trees and vegetation indiscriminately and dispose of waste improperly. There was clearly a need to enforce greater responsibility on the part of expedition parties, including the porters, as part of an improved understanding of the importance of sound environmental management.

The National Tourism Policy has targeted a 10 to 12 per cent increase in the number of tourists up to the year 2000. At present, it is difficult to forecast exactly what the impact will be on the mountain environment. It is possible to presume that large increases in the number of expeditions would increase

the pollution levels, especially if the growth occurred in the absence of systematic, effective measures to protect the environment.

Some measures designed to control pollution of the mountain environment are already available, but they are mostly of an enforcement and administrative type. The existing measures have not been able to produce the desired results mostly because of the lack of coordination and clear delineation of responsibilities and the absence of a comprehensive plan of action that spells out the actions and resources that are required.

This study has developed a plan of action that consists of six measures and 28 essential actions, with suggestions about resources needed and the type of coordination required at the local, national and international levels. The measures and actions can be selected to fit with the actual conditions that prevail on particular peaks and routes. A three-year time-frame could also be applied to the plan of action in order to solve existing pollution problems as well as to create conditions necessary to sustain the mountain environment in balance with the economic benefits derived from mountaineering and trekking activities.

ANNEX

Annex table 1. Ranges, peaks and routes in the northern areas

Range and peak	*Altitude (metres)*	*Route*
The Himalaya		
Nanga Parbat/Diamir	8 126	Diamir, Rakhiot and Rupal
Nanga Parbat (NW)	8 108	Diamir, Rakhiot and Rupal
Nanga Parbat (lower summit)	7 925	Diamir, Rakhiot and Rupal
Nanga Parbat (NE summit)	7 910	Bazhin and Diamir
Nanga Parbat (little/NW II)	7 816	Rakhiot and Patro
Nanga Parbat (N)	7 809	Diamir
Unnamed	7 745	Rakhiot and Patro
Silver Crag (NE)	7 597	Rakhiot
Nanga Parbat (E)	7 562	Diamir
Silver Crag (SE)	7 530	Rakhiot and Bazhin
Nanga Parbat (E-I) Rakhiot-I	7 510	Rakhiot
Rakhiot No. II	7 074	Rakhiot and Bazhin
Hindu Kush Range		
Akher Chioh/Akher Tshang	7 020	Chikar and Kotogaz
Shakawar	7 125	North Atrak
Koh-I-Nadir Shah	7 116	North Atrak
Udren Zom (N)	7 108	North Atrak and Rosh Gol
Udren Zom (Central)	7 080	North Atrak and Rosh Gol
Udren Zom (S)	7 050	North Atrak and Rosh Gol
Saraghrar (Main)	7 349	Rosh Gol and Niroghi
Saraghrar (Central)	7 330	Rosh Gol and Niroghi
Saraghrar (S)	7 307	Rosh Gol and Niroghi
Saraghrar (NW)	7 300	Rosh Gol and Hushko
Saraghrar (SW-I)	7 250	Rosh Gol and Niroghi
Saraghrar (SE-I)	7 208	Rosh Gol and Niroghi
Saraghrar (SW-II)	7 200	Rosh Gol and Niroghi
Saraghrar (SS)	7 100	Rosh Gol and Niroghi
Langar (Main)	7 100	Rosh Gol and Hushko
Langar (SE)	7 061	Hushko and Rosh Gol
Urgent	7 038	Hushko and Shogor Dok
Saraghrar (N)	7 040	Niroghi and Rosh Gol
Tirich Mir (Main)	7 708	Upper and Lower Tirich Mir
Tirich Mir (E)	7 692	Upper and Lower Tirich Mir
Tirich Mir (W-II)	7 500	Upper and Lower Tirich Mir
Tirich Mir (W-I)	7 487	Upper and Lower Tirich Mir

Annex table 1 (*continued*)

Range and peak	*Altitude (metres)*	*Route*
Tirich Mir (W-III)	7 400	Upper and Lower Tirich Mir
Tirich Mir (W-IV)	7 338	Upper and Lower Tirich Mir
Nobaisum Zom	7 070	Upper Tirich Mir
Northern Spur of Tirich Mir	7 056	Upper and Lower Tirich Mir
Istoro-O-Nal (Main)	7 403	Upper Tirich Mir and South Atrak
Istoro-O-Nal (N-I)	7 373	Upper Tirich Mir and South Atrak
Istoro-O-Nal (N-II)	7 372	Upper Tirich Mir and South Atrak
Istoro-O-Nal (SE)	7 365	Upper Tirich Mir and South Atrak
Istoro-O-Nal (S)	7 303	Upper Tirich Mir and South Atrak
Istoro-O-Nal (W-I)	7 300	Upper Tirich Mir and South Atrak
Istoro-O-Nal (N-III)	7 300	Upper Tirich Mir and South Atrak
Istoro-O-Nal (W-II)	7 280	Upper Tirich Mir and South Atrak
Istoro-O-Nal (NE)	7 276	Upper Tirich Mir and South Atrak
Istoro-O-Nal (Rock Pinnacle)	7 200	Upper Tirich Mir and South Atrak
Istoro-O-Nal (E)	7 100	Upper Tirich Mir and South Atrak
Shingeik/Smoking Mountain	7 291	Darban and Upper Tirich Mir
Darban Zom	7 219	Darban and South Atrak
Noshaq Main	7 492	Noshaq and Shingeik
Noshaq (E)	7 480	Noshaq and Shingeik
Noshaq Central	7 400	Noshaq and Shingeik
Noshaq (W)	7 250	Noshaq and Shingeik
Karakoram Range		
Chogolisa No. II/NE	7 654	Abruzzi and Chogolisa
Sia Kangri No. 1 /(N)	7 422	Abruzzi and Siachen
Sia Kangri No. II/(E)	7 325	Abruzzi and Siachen
Sia Kangri No. III(W)/Austria Peak	7 315	Abruzzi and Siachen
Baltoro Kangri No. 1/Main/Golden Peak	7 312	Abruzzi and Siachen
Baltoro Kangri No. II	7 300	Abruzzi and Siachen
Baltoro Kangri No. III	7 280	Abruzzi and Siachen
Sia Kangri No. IV/Central	7 273	Abruzzi and Siachen
Baltoro Kangri No. V	7 260	Abruzzi and Siachen
Baltoro Kangri No. IV	7 254	Abruzzi and Siachen
Unnamed	7 150	Abruzzi and Vigne
Gasherbrum-VI	7 003	Abruzzi and South Gasherbrum
Unnamed	7 170	Biange and Braqpa
Unnamed	7 156	Biange and Braqpa
Unnamed	7 103	Savoia and Khal Khal
Unnamed	7 721	Broad and Godwin-Austen

Annex table 1 (*continued*)

Range and peak	*Altitude (metres)*	*Route*
Unnamed	7 470	Broad and Godwin-Austen
Unnamed	7 062	Broad and Godwin-Austen
Mustagh Tower (E)	7 273	Mustagh and Chagaran
Mustagh Tower (W)	7 270	Mustagh and Chagaran
Mustagh Tower (NW Ridge)	7 180	Mustagh and Chagaran
Pyramid/Thyor	7 058	Mustagh and Chagaran
Chogori/K-2	8 611	Godwin-Austen and Savoia
Falchan Kangri (Main)/Broad Peak (Main)	8 047	Godwin-Austen and Broad
Broad Peak Middle/Central	8 016	Godwin-Austen and Broad
Broad Peak (N)	7 550	Godwin-Austen and Broad
Skyang Kangri No. 1	7 544	Godwin-Austen
Skyang Kangri No. II	7 500	Godwin-Austen
Skil Brum	7 360	Praqpa and Savoia
Unnamed	7 060	Savoia and Godwin-Austen
Gasherbrum No. 1/Hidden Peak	8 068	West and South Gasherbrum
Gasherbrum No. II	8 035	South Gasherbrum and Abruzzi
Gasherbrum No. III	7 952	Abruzzi, South and West Gasherbrum
Unnamed	7 784	West and South Gasherbrum
Unnamed	7 772	West and South Gasherbrum and Abruzzi
Unnamed	7 504	South Gasherbrum and Abruzzi
Unnamed	7 069	Abruzzi and South Gasherbrum
Chogolise No. 1, SW/Bride Peak	7 665	Abruzzi and Chogolisa
Gasherbrum No. IV	7 925	Broad, West and South Gasherbrums
Gasherbrum No. V	7 321	Abruzzi, West and South Gasherbrums
Urdok No. 1	7 300	Abruzzi and Zbwa
Urdok No. II	7 082	Abruzzi and Zbwa
Batura No. 1/Peak No. 32	7 785	Batura and Passu
Unnamed	7 700	Baltar
Batura No. II	7 730	Batura and Passu
Unnamed	7 500	Batura and Passu
Unnamed	7 500	Batura and Passu
Kampiredior	7 143	Batura and Karambar
Unnamed	7 700	Batura and Baltar
Unnamed	7 600	Batura and Muchutsil
Hachindar Chish	7 163	Batura and Muchutsil
Sia Shish	7 100	Batura and Muchutsil
Shispare	7 619	Batura and Passu
Passu/Peak No 55	7 284	Passu and Hasanabad

Annex table 1 (*continued*)

Range and peak	*Altitude (metres)*	*Route*
Ghenta	7 100	Gulkin and Hasanabad
Ultar No. I	7 388	Ultar and Gulkin
Bojohagur Duanasir	7 329	Gulkin and Hasanabad
Ultar No. II	7 310	Ultar and Gulkin
Khunjut Sar No. 1/Peak No. 12	7 760	Khane Basa and Yukshin Gardaan
Distaghil Sar Main/Peak No. 20	7 885	Kunyang and Momil
Kunyang Kish/Main	7 852	Pumari Kish and Kunyang Kish
Distaghil Sar No. II/Middle/Central	7 760	Malanghutti and Momhil
Distaghil Sar (E)	7 700	Kunyang and Momhil
Kunyang Kish (W)	7 500	Kunyang Kish and Pumari Kish
Kunyang Kish (N)	7 108	Kunyang Kish and Pumari Kish
Kunyang Kish (S)/Tent Peak	7 620	Kunyang Kish and Pumari Kish
Kunyang Kish (E)	7 400	Pumari and Kunyang Kish
Kunyang Kish (SE)	7 320	Pumari and Kunyang Kish
Yakshin Gardaan No. 1	7 530	Yakshin Gardaan and Yazghil
Yakshin Gardaan No. 2	7 100	Yakshin Gardaan and Yazghil
Pumari Kish (W) Peak 11	7 492	Yutmaru and Yazghil
Yazghil Dome (N)	7 400	Yazghil and Malanghutti
Pumari Kish (S)	7 400	Yutmaru and Yazghil
Pumari Kish (N)	7 440	Yutmaru and Yazghil
Yazghil Dome (S)	7 440	Yazghil and Malanghutti
Yutmaru Sar (Main)	7 330	Hispar and Yutmaru
Kuran Kush	7 350	Islamabad-Gilgit-Karimabad-Passu-Murkhun-Kuarun Glacier; or Islamabad-Gilgit-Karimabad-Passu-Pikut-Karunpir Pass (4,850 m.)-Karun Glacier
Bularang Sar	7 200	Kunyang and Momhil
Unnamed	7 010	Lupghar Yaz
Malanghutti	7 320	Malanghutti and Momhil
Trivar/Peak No. 8	7 719	Charesa and Momhil
Momhil Sar/Peak 7	7 343	Trivor and Momhil
Lupghar Sar 1/(W)	7 200	Trivor and Lupghar Yaz
Lupghar 11/Central	7 100	Trivor and Lupghar Yaz
Latok No. I	7 151	Uzun Brakk and Baintha
Latok No. II	7 145	Uzun Brakk and Baintha Lurpur
Baintha Brakk/Ogre	7 285	Baintha and Uzun
Malubiting (NW)	7 300	Phuparash and Chogolungma

Annex table 1 (*continued*)

Range and peak	*Altitude (metres)*	*Route*
Malubiting (W)	7 458	Phuparash and Baskai
Malubiting Central	7 291	Phuparash, Baskai and Chogolungma
Malubiting (E)	7 010	Phuparash and Baskai
Haramosh No. 1	7 409	Ishkapal and Mani
Diran/Minapin/Peak No. 37	7 273	Minapin, Hinarchi and Baultar
Spantik/Ghenish Chish	7 027	Barpu and Garumbar
Rakaposhi	7 788	Minapin and Pisan and Biro
Rakaposhi (E)	7 290	Minapin and Pisan
Rakaposhi (EE)	7 010	Minapin, Pisan and Biro
Saltoro Kangri No. I/Peak No. 36	7 742	Dong Dong and Sherpi Gang
Saltoro Kangri No. II/Peak No. 35	7 706	Dong Dong and Sherpi Gang
K-12	7 469	Grachma and K-12
Unnamed	7 200	Grachma and K-12
Unnamed	7 100	Grachma and K-12
Unnamed	7 100	Grachma and K-12
Link Sar	7 041	Charakhusa and Kondus
Masherbrum NE/K-1/Main	7 821	Mundu, Yermanendu and Masherbrum
Masherbrum SW	7 806	Mundu and Yermanendu
Unnamed/Masherbrum Far East	7 200	Mundu and Yermanendu
Unnamed	7 200	Mundu and Yermanendu
K-6	7 282	Lachit, Charakhusa and Nangmah
Unnamed/Mangmah	7 100	Nangmah and Lachit
Unnamed	7 040	Nangmah and Charakhusa
Ghent (S)/No. 1	7 401	Kondus and Siachen
Ghent (N)	7 343	Kondus and Siachen
Sherpi Kangri No. I (Main) Rock Pinnacle	7 380	Sherpi Gang and P-36
Sherpi Kangri No. II	7 370	Sherpi Gang and P-36
Sherpi Kangri No. III	7 300	Sherpi Gang and P-36
Depak	7 150	Siachen and Kondus
Unnamed	7 093	Siachen and Abruzzi
Apsarasas No. 1	7 245	Siachen and Teram Shehr
Rimo (S) No. IV/Peak No. 48	7 169	South and Central Rimo
Teram Kangri	7 465	Singhi and Teram Shehr
Teram Kangri No. II	7 406	Teram Shehr
Teram Kangri No. III	7 382	Singhi and Teram Shehr
Teram Kangri No. IV	7 300	Singhi and Teram Shehr
Mt. Rose/Singhi Kangri	7 202	Singhi and Teram Shehr

Annex table 1 (*continued*)

Range and peak	*Altitude (metres)*	*Route*
Apsarasas II	7 239	Singhi and Teram Shehr
Apsarasas III	7 236	Singhi and Teram Shehr
Apsarasas IV	7 227	Teram Shehr and Siachen
Apsarasas V	7 187	Siachen and Teram Shehr
Apsarasas VI	7 184	Teram Shehr and Apsarasas
Apsarasas (S)	7 117	Siachen, Teram Shehr and Apsarasas
Rimo (S) No. I/Peak No. 51	7 385	Siachen
Rimo (S) No. II/Peak No. 50	7 373	Siachen
Rimo (S) No. III/Peak No. 49	7 233	Siachen

Annex table 2. Number of expedition parties by range, peak and route, 1981-1990 (Number of people in expedition parties)

Range, peak and route	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*Total*
I. THE HIMALAYA											
A. Nanga Parbat											
S.E. Ridge	1	--	--	--	1		--	--	--	1	3
	(4)	--	--	--	(16)		--	--	--	(16)	(36)
S.W. Ridge	1	2	2	--	1	--	1		--	--	7
	(8)	(20)	(23)	--	(6)	--	(4)		--	--	(61)
Diamir Face	1	2	5	4	9	2	3	5	--	4	35
	(16)	(21)	(30)	(26)	(46)	(10)	(24)	(28)	--	(32)	(233)
Rupal Face	1	--	1	4	--		1	3	3	3	16
	(15)	--	(11)	(19)	--		(4)	(24)	(27)	(35)	(125)
N.W. Ridge							--			1	1
										(10)	(10)
N.E. Ridge			1	--		--	--	--	--	1	2
			(5)	--		--	--	--	--	(8)	(13)
West Face			--			2	--	--	1	1	4
						(19)	--	--	(4)	(8)	(31)
South Face		1	1	--		--	--	--	--	--	2
		(11)	(5)	--		--	--	--	--	--	(16)
Kinshofer			--							2	2
										(12)	(12)
Hanns Schell			1								
			(4)			--				--	(4)
Normal			--		1	1	1	2	3	4	12
					(7)	(7)	(8)	(9)	(14)	(45)	(90)
B. Rakhiot					--	--	--	1	--	--	1
					--	--	--	(5)	--	--	(5)
Subtotal	4	5	11	8	12	5	6	11	7	17	86
	(43)	(52)	(78)	(45)	(75)	(36)	(40)	(66)	(45)	(166)	(646)
II. HINDU KUSH											
A. Tirich Mir											
Main		2	1	1	--	2	--	--	--	--	6
		(16)	(4)	(20)	--	(13)	--	--	--	--	(53)
West I		1	--	--	4	--	--	--		--	5
		(5)	--	--	(52)	--	--	--		--	(57)
East		--	--	--	--	1	--	--	--	--	1
		--	--	--	--	(6)	--	--	--	--	(6)
B. Istoro-O-Nal						1	2	--	--	1	4
						(6)	(22)	--	--	(12)	(40)
C. Other peaks	1	2		2	--	--	--	--	--	2	7
	(4)	(14)		(20)	--	--	--	--	--	(15)	(54)
Subtotal	1	5	1	3	4	4	2	--	--	3	23
	(4)	(35)	(4)	(40)	(52)	(25)	(22)	--	--	(28)	(210)

Annex table 2 (*continued*)

Range, peak and route	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*Total*
III. KARAKORAM											
A. K-2	2 (19)	3 (45)	3 (29)	2 (30)	3 (31)	6 (60)	6 (59)	3 (26)	3 (22)	1 (5)	32 (326)
Normal	2 (19)	-- --	1 (12)	-- --	-- --	-- --	-- --	-- --	-- --	1 (5)	4 (36)
Abruzzi Ridge		2 (21)		2 (30)	2 (27)	1 (4)	3 (31)	1 (9)	1 (11)	-- --	12 (133)
West Ridge						--			1 (4)	-- --	1 (4)
E-Wall									1 (7)		1 (7)
South Ridge						1 (9)	1 (4)	(5)	-- --		3 (18)
South Pillar						--	--	(12)			1 (12)
South Face							2 (24)	-- --			2 (24)
South West Ridge						2 (20)		-- --			2 (20)
North West Ridge		1 (24)	1 (8)	-- --		1 (11)	-- --	-- --		-- --	3 (43)
South Spur						1 (16)	-- --			-- --	1 (16)
East Face					1 (4)		-- --		-- --	-- --	1 (4)
South East Ridge			1 (9)	-- --	-- --		-- --	-- --	-- --	-- --	1 (9)
B. Broad Peak											
Normal	1 (5)	2 (12)	3 (9)	6 (35)	5 (34)	4 (43)	1 (5)	1 (15)	4 (34)	3 (20)	30 (212)
North Ridge		1 (4)	1 (5)			-- --	1 (4)			1 (8)	4 (21)
Austrian German		--	--							1 (5)	1 (5)
East Ridge								1 (5)			
West Ridge		1 (4)	1 (15)	1 (26)		-- --	-- --	1 (6)	-- --	-- --	4 (51)
South West Face		--	-- --	-- --		-- --	3 (17)	1 (13)	-- --	-- --	4 (30)
West Face	-- --		1 (5)	-- --	-- --	-- --	1 (7)	-- --	-- --	-- --	2 (12)
Central Summit	--		--	--	-- --	-- --	1 (8)		-- --	-- --	1 (8)
N. W. Ridge		1 (3)		-- --	-- --		-- --		-- --		1 (3)

Annex table 2 (*continued*)

Range, peak and route	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*Total*
C. Gasherbrum I											
Normal	2 (16)	-- --	1 (6)	1 (4)	5 (33)	3 (13)	1 (6)	1 (4)	3 (33)	1 (6)	18 (121)
North Ridge			--	--		1 (8)	1 (16)	-- --	-- --	-- --	2 (24)
South Face						--			1 (2)	1 (5)	2 (7)
North Face		1 (4)	1 (3)	-- --	-- --	-- --	-- --	1 (3)	-- --	1 (13)	4 (23)
N. W. Face		2 (18)		-- --	-- --	-- --	-- --	-- --	-- --	1 (11)	3 (29)
S.W. Face		1 (4)		-- --	-- --	-- --	-- --	-- --	-- --	-- --	(4)
N.W. Ridge		--	1 (7)	-- --	-- --	-- --	-- --	-- --	-- --	-- --	1 (7)
West Face								1 (12)	-- --	1 (9)	2 (21)
South East Face								1 (12)	-- --	1 (6)	2 (18)
D. Gasherbrum II											
Normal	3 (14)	2 (12)	2 (15)	4 (30)	11 (67)	4 (30)	3 (21)	1 (11)	5 (32)	2 (8)	37 (240)
North Face								1 (11)	-- --	-- --	1 (11)
S.W. Face		1 (7)	-- --		-- --	-- --	1 (5)	-- --	-- --	-- --	2 (12)
S W. Ridge		2 (8)	-- --		-- --	-- --	2 (14)	-- --	-- --	2 (13)	6 (35)
East Ridge		1 (7)	-- --		-- --	-- --	1 (13)	(12)	-- --	2 (13)	5 (45)
South Face							1 (5)	2 (34)	-- --	-- --	3 (39)
South Ridge								1 (6)	-- --		1 (6)
South Spur								1 (9)	-- --	-- --	1 (9)
E. Gasherbrum IV	1 (5)	1 (8)	1 (8)	2 (16)	4 (4)	4 (24)		-- --	-- --	-- --	13 (65)
F. Masherbrum											
Normal					2 (15)		-- --	-- --	1 (8)	-- --	3 (23)
Far West								1 (10)	-- --	-- --	1 (10)

Annex table 2 (*continued*)

Range, peak and route	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*Total*
S.W. Face	2	--	1	--	--	--	--		--	--	3
	(12)	--	(5)	--	--	--	--		--	--	(17)
North East	2	1	--	--	--	--	--	--	--	--	3
	(10)	(4)	--	--	--	--	--	--	--	--	(14)
G. Yakshin Garbaan	1	--	3	--		--	--	--	--	--	4
	(6)	--	(25)	--		--	--	--	--	--	(31)
H. Rakaposhi											
Normal	1	--	1	2	1	1	3	--	1	1	11
	(10)	--	(12)	(14)	(7)	(5)	(20)	--	(6)	(4)	(78)
East Point					1	--	--	--	--	--	1
					(15)	--	--	--	--	--	(15)
I. Baintha Brakk I											
Normal	1	1	2	--	--	--	--	1	1	1	7
	(4)	(4)	(10)	--	--	--	--	(7)	(8)	(4)	(37)
South Ridge	--	--						--	--	1	1
										(5)	(5)
J. Diran											
Normal	1	--	--	--	3	2	--	--	4		10
	(7)	--	--	--	(29)	(17)	--	--	(25)		(78)
Minapin	--		1	--	--	--	--	--	--	--	1
			(4)	--	--	--	--	--	--	--	(4)
K. Trango Tower											
Normal			1	1	--	2	2	2	3	1	12
			(4)	(5)	--	(13)	(11)	(10)	(18)	(7)	(68)
Trango Tower Middle			--	1	--	--	--	--	--	--	1
				(7)	--	--	--	--	--	--	(7)
South Face				--				1	--	--	1
								(4)	--	--	(4)
Great Trango Tower								--		1	1
										(5)	(5)
Trango Nameless Tower							--	--	--	1	1
							--	--	--	(6)	(6)
L. Latok I							1	--	1	1	3
							(3)	--	(4)	(9)	(16)
M. Latok II		1	--	--		1	1	--	--	--	4
		(4)	--	--	(4)	(4)	(4)	--	--	--	(16)
N. Latok III	1	--	--	1	1	--	--	1	--	--	4
	(3)	--	--	(11)	(10)	--	--	(4)	--	--	(28)
O. Batura I	1	--	1	1	--	1	1	1	--	--	6
	(4)	--	(11)	(3)	--	(7)	(7)	(16)	--	--	(48)
P. Mustagh Tower			1	--	--	--	1	--	--	1	3
			(4)	--	--	--	(2)	--	--	(6)	(12)
Q. Distaghil Sar		1	1	--	--	--	--	2	--	--	4
		(6)	(20)	--	--	--	--	(14)	--	--	(40)
R. Chogolisa		--	1	1	--	1	1	1	--	1	6
			(6)	(8)	--	(5)	(6)	(12)	--	(13)	(50)

Annex table 2 (*continued*)

Range, peak and route	*1981*	*1982*	*1983*	*1984*	*1985*	*1986*	*1987*	*1988*	*1989*	*1990*	*Total*
S. Spantik				1 (7)		-- --	1 (6)	1 (15)	2 (24)	1 (18)	6 (70)
T. Hidden Peak				1 (10)	1 (22)	1 (5)	-- --	-- --		1 (7)	4 (44)
U. Unnamed				1 (5)	-- --	1 (14)	1 (7)	1 (10)	2 (15)	-- --	6 (51)
V. K-7		1 (6)	-- --	2 (12)	-- --	-- --	-- --		-- --	1 (10)	4 (28)
W. Other peaks	9 (72)	9 (58)	7 (69)	17 (52)	-- --	11 (113)	5 (21)	16 (103)	6 (44)	5 (25)	85 (557)
Subtotal	28 (183)	33 (218)	32 (251)	48 (300)	38 (271)	43 (361)	39 (225)	46 (384)	36 (273)	36 (255)	379 (2 751)
GRAND TOTAL	33 (230)	43 (305)	44 (333)	59 (385)	54 (398)	52 (422)	47 (317)	57 (450)	43 (318)	56 (449)	488 (3 607)

Note: An em dash (--) indicates that the amount is nil or negligible.