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Managing Sanitation in Protected Areas: Problems and Challenges in Sagarmatha (Mt. Everest) National Park, Nepal

Paul Lachapelle

The management of sanitation and the protection and provision of drinking water are formidable challenges in even the most modern and sophisticated national park. Sagarmatha (Mt. Everest) National Park (SNP) located in the Khumbu region of Nepal is no exception. Past reports have documented high counts of fecal coliform bacteria in several of the drinking water sources in the park (Garratt 1981; Khadka 1990; Clark 1995). Both the local Sherpa population and park management officials recognize the aesthetic and public health problems associated with sanitation and water quality in the park (Garratt 1981; MN Sherpa 1985; LN Sherpa 1993; World Wildlife Fund-Nepal Program 1993; National Productivity and Economic Development Centre 1995). Although no direct correlation has been made between the recent increase in visitation (both porters and tourists), water quality and the occurrence of gastrointestinal illnesses, undoubtedly the increase in visitors, porters, and the local population puts additional pressure on locals and managers alike to safeguard drinking water. Unfortunately, no epidemiological data exists to identify the source of contamination, the health effects or the changes over time in the park. Regardless, the Khumbu Sherpa, tourists and those concerned with the protection of this national park recognize a problem.

In this paper, it is argued that four distinct issues have prevented adequate management of toilets, water quality and sanitary conditions in SNP. First, numerous interest groups, both government and non-governmental, have apportioned work requirements and responsibilities for the infrastructural obligations in the park thereby drawing accusation and criticism for unmet needs. Second, there lacks a strong sense of community in several of the densely populated and/or popular tourist sites and therefore these areas are either ill-equipped, do not have the necessary community will or all-together neglect certain public sanitation needs. Third, there is no regulatory body that consistently enforces sanitary rules from the original park management plan. Lastly, various development initiatives in the park have created a cycle of dependency and the expectation that sanitation structures will be built and maintained.

Stevens (1991) follows many others in describing the cultural changes generated by tourism as enormous, warning that the resulting economic development can undermine "local environmental knowledge and cultural values on which it was based" (Stevens 1991:43).

Further, he describes the Sherpa as "perhaps the most well-to-do people in the upper regions of the Himalaya (Stevens 1991:53). While the Khumbu Sherpa may well be one of the most affluent people in all the high Himalaya, they have not dealt with the barrage of sanitary management issues that accompany tourism.

General Discussion

SNP supports an indigenous year-round population of about 2500 people, most of them Sherpa (Stevens 1993). The SNP region attracts about 20 percent of all trekkers and nearly half of all mountaineering expeditions to Nepal (Stevens 1993) and was visited last year (July 1996 to June 1997) by 17,412 tourists (Sagarmatha Pollution Control Committee 1997a) who spent an average of 24 days in the park (Robinson 1992). It has been calculated that every tourist comes accompanied by as many as three Nepali support staff and/or pack stock (Bjønness 1980). Visitors are concentrated in two distinct trekking seasons, March to May and September to December, and primarily travel two routes along the valleys of the Dudh Kosi and the Imja Khola rivers.

Tourism has influenced almost everyone in the park. In 1985, 65 percent of all Khumbu families derived income from trekking (Stevens 1993). The total number of trekking lodges in SNP, constructed primarily in the existing village areas, has increased over tenfold in the last 25 years, from 7 in 1973 to over 80 in 1993 (Stevens 1993). Odell and Lama (1998) report that trekking in the SNP region generates Nrs 140 million (US \$2.4 million) annually to the local economy with independent trekkers spending an average of \$10 a day and trekking companies spending \$7-8 a day per trekker for supplementary food, incidentals and portering.

Namche Bazaar (Namche), one of the largest settlements in the region with an approximate population of 700 (SG Sherpa 1998, pers. comm.), has received the greatest concentration of trekking lodges over the past 20 years. Because of its strategic location in SNP, Namche has been described as a "requisite stop for all Khumbu visitors" (Brower 1991).

Sanitation Issues

The SNP Management Plan was drafted in 1981 as a cooperative agreement between His Majesty's

Government (HMG) Nepal and the New Zealand Department of Lands and Survey to outline a specific framework to deal with various issues including sanitation. The plan noted that the "maintenance of drinking water quality within the park is a significant problem" (Garratt 1981:part 2.10). More than a decade ago, SNP's first Sherpa Warden, Mingma Norbu Sherpa, declared, "the state of the sewage systems and sanitation is very poor or nonexistent and requires serious consideration of what few toilet facilities there are along trekking routes are in a poor state of repair and are unhygienic. . . and even contaminate surrounding rivers and streams" (MN Sherpa 1985:143). In 1993, HMG Nepal, Department of National Parks and Wildlife Conservation (DNPWC) reported that "streams and rivers in the main tourist areas such as Namche, Lobuche and Pheriche are contaminated. Many more streams and rivers are at grave risk of contamination. One of the biggest threats is the installation of long-drop toilets at the edge of rivers and streams" (LN Sherpa 1993:44). An independent evaluation found, "budgets, staffs and technical assistance for toilet projects and maintenance are lacking and will have to take precedence in the future" (National Productivity and Economic Development Centre 1995:21). The topic of sanitation in villages has been discussed at Village Development Committee (VDC) meetings and was described as "serious problems with sewage that should be investigated" (World Wildlife Fund-Nepal Program 1993:37).

Concerning potable water, Garratt (1981 part 2.10) found up to 1,100 coliform bacteria per 100 ml in areas of the Dudh Kosi directly below Namche and concluded from other sampled areas that "no coliform concentrations, even from springs at 5200 m (Gorak Shep) indicated concentrations with less than 3 organisms per 100 ml (114 org./gal.)." Khadka (1990) reported that the examination of drinking water in the Everest region revealed up to 4,000 coliform bacteria per liter of water. Clark (1995) used a portable autoclave and incubator to document fecal contamination at Mt. Everest Base Camp and found that although temperatures and UV intensity were extreme, fecal organisms could still be detected in melt water some distance from areas of contamination. The study also revealed that the spring in Namche contained >300 fecal coliform bacteria per 100 ml.

Few of the houses in Namche have running water. The majority of lodges and households hire someone to collect water from a communal spring that surfaces near the lowest elevation of the village. This water is not filtered or disinfected. During the height of the trekking season, up to 1,000 people a day depend on this one source. Water is used for drinking, cooking, showers and the stone-lined or cement septic tanks that are located uphill of the spring. There are no local criteria for the design or installation of these septic tanks (Lama 1997, pers. comm.). Approximately half of the lodges in Namche now use some type of water toilet and septic

tank (SG Sherpa 1998, pers. comm.). Seven toilets in Namche are located less than 30 meters from the public spring, a violation of the "Himalayan Code of Conduct" (SPCC 1997b). The largest public toilet in the park is located adjacent to the weekly outdoor market and was built primarily for porters. The toilet is a pit that openly leaks and has been described as "a major health hazard" (LN Sherpa 1993:39).

A recent study of school children attending the Khumjung school revealed that 37 percent of those sampled suffered from parasitic infection (either protozoan or helminthic) resulting from improper sanitary practices (Basnet 1998, pers. comm.). While this and other sanitary issues may constitute a major health hazard in the West, it has not initiated much reaction beyond discussion among park managers and the Khumbu Sherpa.

Reasons for Inadequate Sanitation Management

1. Apportionment of Responsibilities

Responsibilities for park management are apportioned among the key conservation players working in the area. These players are the local VDCs, the locally based non-governmental organization (NGO) Sagarmatha Pollution Control Committee (SPCC) and the Department of National Parks and Wildlife Conservation (DNPWC) within the Ministry of Forests and Soil Conservation.

The VDCs are based in Namche, Khumjung and Phakding and address political, economic and social issues while supervising all of the villages and small agricultural settlements in the park. Members are local residents democratically elected to five year terms. Created in 1991 to "preserve both the natural and cultural heritage of the Sagarmatha (Mt. Everest) region of Nepal" (SPCC 1997a:2), SPCC acts as the local conservation watchdog group. The responsibilities of the SPCC include solid-waste management, trail construction and maintenance, afforestation projects, toilet initiatives, community-support projects and visitor education. SPCC is responsible for the construction and maintenance of most of the public toilets in the park. These toilets are few and far between, irregularly maintained, and frequently unusable. In addition, as mandated by the Ministry of Tourism and Civil Aviation (MTCA), the SPCC must regulate the transportation of human waste from popular base camps in the park to be "collected in portable plastic drums or barrels and brought down to the proper disposal site. . . designated by SPCC" (SPCC 1997a:4). In the spring 1997 season, this amounted to over 2000 kg of human waste brought from Mt. Everest and Pumori base camps (SPCC 1997a:annex 5). The SPCC board is made up of the Chief Warden and 15 members from local VDCs. The responsibilities of the Department of National Parks and Wildlife Conservation include poaching and fuel wood control,

afforestation projects, trail construction and maintenance outside of VDC jurisdiction, and issues related to micro-hydro and telecommunications projects.

Ill-planned and managed toilet structures built by the SPCC, DNPWC and other organizations have undermined local trust and aggravated the issue. The disagreements that exist between these three key players as to who should build, maintain and regulate toilets is a major obstacle in resolving this issue and other sanitary initiatives throughout the park. According to former SNP Warden Pandey "all the public toilets in the Park should be maintained by the SPCC; after all, their name is pollution control" (Pandey 1995, pers. comm.). LN Sherpa (1993:44) believes the task of "the design and placement of existing and future toilets should be subject to rigid inspection and approval by the park and Village Development Committee."

2. Lack of Community Involvement

Banskota and Sharma (1998) declare that one of the main areas of conflict in Nepal between local people and parks is the absence of local people's participation in the management of the area. They note that services and facilities accompanying tourism tend to be demand-driven while supply-side development has been poor. Indeed, it appears that no sanitation infrastructure can be commissioned or maintained without community will and involvement.

Both tourists and locals are primarily concentrated into the eight villages and in several dozen of the more than 100 seasonal settlements in the park. The concentration of people, animals and buildings in Namche, Tengboche, and Khumjung creates a particularly difficult situation regarding sanitation, toilet construction and maintenance, and the protection of water sources. Most of the water in these areas is available from only one source. Areas that were traditionally seasonal settlements are now inhabited, and frequented by tourists year-round. These areas include Gokyo, Gorak Shep, Lobuche and Chhukhung and they are particularly susceptible to ill-managed toilets because of the lack of community alliance.

Namche is traditionally not a farming community but rather one based on trading and business. This village is surprisingly cosmopolitan, containing several bakeries, a billiard room, private telephones in five different offices and residences and the "highest dental clinic in the world." Namche presents perhaps the most difficult challenge regarding sanitation. Rapid development has compromised community-based resource management as it pertains to sanitation. Sophisticated lodges complete with satellite dishes, microwave ovens, and refrigerators, have been built here and throughout the region; virtually all the big Namche lodges have been built with financial assistance from foreign sponsors (Stevens 1993). Stevens (1993:380) notes that families who own popular lodges "are becoming wealthy to an extraordinary degree in

comparison to their fellow villagers" and that this "will probably continue to translate into status and power as well as increasingly different lifestyles." Further, he observes that regional economic differentiation and out-migration resulting from tourism are threats to social and cultural continuity and the differentiation seems likely to continue to deepen. This economic differentiation may lead to animosity between the "haves" and the "have-nots" and could further disrupt local community-based resource management.

Namche's economic growth affects sanitation in other ways: the weekly outdoor market, started in 1965, presents a difficult challenge as hundreds of people come to buy and sell goods on the day of the market and may remain for several days.

In the nearby monastic settlement of Tengboche, overcrowding and human waste management remain a persistent challenge. A development initiative, involving the VDCs and resident monks, has begun construction on an extensive water collection and distribution system (Schmitz 1995); unfortunately, a proper public toilet maintenance system has not yet been effective, despite a number of attempts, including Peace Corps volunteer Bill Schaeffer's in 1984.

3. Lack of Monitoring and Enforcement

The original Sagarmatha National Park management plan called for health authorities to produce practical and reasonable hygiene requirements, provide water, toilet and refuse disposal facilities where a specific need is apparent and "prevent the pollution of water supply sources" (Garratt 1981 policy 26.3). Unfortunately, poor monitoring and enforcement of this requirement are apparent. Although villages have been the most vulnerable to sanitary impacts from tourism, park regulations do not apply to the 63 settlements within the park (Green 1993).

While there are approximately 120 DNPWC staff stationed in the park, the SPCC is staffed by just 13 local employees. Members of the SPCC believe that considering their responsibilities, they are understaffed and underfunded (Lama 1997, pers. comm.). Although the park warden has sometimes been from the nearby community, the majority of the DNPWC staff are from outside of the park, many of whom have little experience or desire to work in the cold Khumbu climate (SG Sherpa 1998, per comm.).

Funding is usually cited as the main issue behind the inability of various players to undertake sanitation initiatives. Until recently, all park-generated revenue was returned to Nepal's central treasury. A Worldwide Fund for Nature (WWF) tri-partisan agreement with the MTCA and SPCC now returns 30 percent of the Mt. Everest climbing royalties to the park (The Mountain Institute 1997). Royalties are now being generated from the \$50,000 (US) fee per expedition. Since 1993, the MTCA has been the major source of funding for SPCC which in fiscal year 1993/1994 was Nrs 2.3

million (\$40,000 US). However, in the same fiscal year and much to the dismay of SPCC staff, more than 30 percent of this money was allocated for an airstrip in Kangel, outside of SNP boundaries (National Productivity and Economic Development Centre 1995). LN Sherpa (1993:44) suggests the SPCC play a more active role in monitoring and controlling violations and that "the quality of drinking water sources should be tested and monitored regularly and information on contamination should be made available to users."

4. Dependency on Development Initiatives

Numerous development initiatives have greatly benefited the Khumbu Sherpa. These sources of income and assistance include bridges, schools, health clinics, hydro-electric projects and airports that have come from numerous NGO's including the World Wildlife Fund, the Himalayan Trust, British Water Aid, American Himalayan Foundation, Himalayan Adventure Trust-Japan, Association Environment Insertion Economic-France, Oko-Himal, the World Heritage Committee of the United Nations Educational, Scientific and Cultural Organization and the International Union of the Conservation of Nature.

While several attempts have been made to ameliorate water pollution by building toilets in Namche and Tengboche, the projects have since fallen into disrepair, in part because locals believed the initiatives would be further backed and maintained by the supporting organizations. Some believe that various development projects in the park have excluded the people they were to benefit and that the local people have had little or no input in many project designs or implementations of the past (AR Sherpa 1998, pers. comm.).

Conclusion

Sanitation issues in Sagarmatha National Park remain a persistent problem. Past studies have found high counts of fecal coliform in potable water sources, particularly in settled areas. The concentration of people living and traveling in the park has created public health risks for locals and visitors alike. The issue of maintaining existing toilet structures and providing for and safeguarding, as reasonably as is possible, potable water sources remains primarily one of management, and does not require a technical solution.

It is interesting that while a large percentage of individuals within the Sherpa Khumbu community have benefited economically and to a certain degree have embraced western amenities and paradigms, any local and park-wide sanitation infrastructure remains ill-planned and managed. Given the economic benefits directly resulting from tourism, the dependence on tourism and foreign exchange, and the amount of financial assistance and guidance from development organizations, the Khumbu region might be expected to possess an effective sanitation infrastructure.

Encouragingly, sanitation education has since been included as a standard curriculum in both the local primary and secondary school system (AR Sherpa 1998, pers. comm.). The government of Nepal is now hoping to increase the total number of tourists to Nepal from the present 300,000 to 1,000,000 by the end of the century (Ali 1994); the allure of gazing upon the southwest face of the tallest mountain in the world will always draw visitors. Unfortunately, until tourists react negatively to improper sanitation, all who come to or live in Sagarmatha National Park will continue to be plagued by chronic sanitation problems.

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Note

All geographical names, unless quoted, are taken from the Schneider Khumbu Himal 1:50,000 map 1993 edition.

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Namche Bazar, c. 1985 (Barbara Brower)