

# The Changing Face of the Himalaya

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TO mountaineers the Himalaya means the high snow-clad chain of peaks which stretches 2400 kilometers from Nanga Parbat to Namche Barwa. To the major governments of South Asia, however, the area of primary importance is the plains below the mountains. Here hundreds of millions of people, mostly rural and mostly poor, live sustained by the three great rivers of the subcontinent—the Indus, the Ganges, and the Brahmaputra. There is also a third important zone, the hills. It is the portion of the Himalaya between 300 and 3600 meters where people live. Although the hills contain only 30,000,000 people, yet forces are working there which may destroy the livelihood of these people as well as undermine economic and social progress in the plains below. The problem is the rapid, massive, and widespread land degradation of the inhabited Himalaya, manifested in rising soil erosion, landslides, and sedimentation.

In a large mountain system like the Himalaya there is always some degree of natural soil erosion. However, because of an expanding hill population, a subsistence agriculture based on cereal grains, and a loosening communal control over forests and grazing lands, hill people are overcutting, overgrazing, and expanding their cultivated agriculture on lands too steep to support it. In the Kumaun Himalaya, on the lands beneath Nanda Devi, for example, the hill population has increased by 45 percent since 1951. Nearly everyone is engaged in growing the three staple subsistence crops of rice, wheat, and millet. Three-quarters of the farms are less than 0.6 hectare in size (about one acre), and each is fragmented in 16 to 20 pieces up and down the terraced slopes. The hills are sparsely populated compared to the plains. There are only 75 people per square kilometer in the Kumaun Himalaya, while 375 people per square kilometer is the norm in the rest of the Indian state of Uttar Pradesh. But it is more meaningful to compare the numbers of people per *cultivated* hectare in the two regions. By this scale 18 people must live off each cultivated hectare in the hills compared to 2 to 6 people per cultivated hectare in the rest of the state. As a consequence of this pressure on the hill lands, the cultivated area in Kumaun has increased

from 15 percent in 1951 to 27 percent today. The alternative to expanding one's farmstead is emigration to the plains. A large but unknown number of people have been forced out of the hills since 1951 and have either cleared large areas of forested land in the immediately adjacent plains, or sought menial work in the cities and towns of northern India and Pakistan.

Life has not improved much over the past twenty-five years for those who have remained behind in the hill communities. The *per capita* income in Kumaun in 1973-74 was only Rs. 617 (about \$71) compared with an Indian national average of Rs. 850. Nutrition and the general level of health are poor, infant mortality is high, and doctors and health facilities few and far between. The high cost of building and maintaining roads means there are few of them. Severe problems of transportation and communication prevent many hill people from receiving government services or participating in economic growth. Further, as the number of people has expanded, so has the population of livestock. More people require more cultivated land, and thus cultivation has encroached on grazing and forest land. But more people and more animals require more forage and fuelwood, as well as more cereal grains.

Forests are the mainstay of the ecological system that backs up the hill agricultural economy. Hill people are very knowledgeable about their local trees and plants. Each has a name, a seasonal cycle, and good and bad features or uses in production, consumption, and religious practices. Forests provide fodder for animals, whose manure is a critical input to cultivated lands that have never seen an ounce of chemical fertilizer. They also provide fuel for cooking and heating, and lumber for construction and agricultural tools. Forests are also associated with reduced runoff, soil stability, even stream flow, and fresh water springs that run the year round.

Forests serve multiple and interacting functions which are important for the nutrition and health of hill people, and they realize it. Why then deforestation? Communities which were once able to regulate their members' use of the surrounding forests and grazing lands now find these social controls breaking down for at least two reasons. With wider political consciousness and legal and land reforms, local elites—the landlords and the higher castes—are less able to dictate others' behavior and farming practices. Secondly, population pressure contributes to an effect termed the "tragedy of the commons." With reduced fuelwood and forage available for all, the individual villagers must look to their own immediate needs and cannot take the longer run community benefits of productive forests into account.

The average productivity of rain-fed farmlands has fallen because the cultivated area has increased to the point where there is not enough animal manure to fertilize it. Soil loss from fields has also contributed

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*Photo by Charles Bailey*

Nepali children in front of a fruit tree on a heavily grazed and formerly fully forested slope just outside the Kathmandu valley.

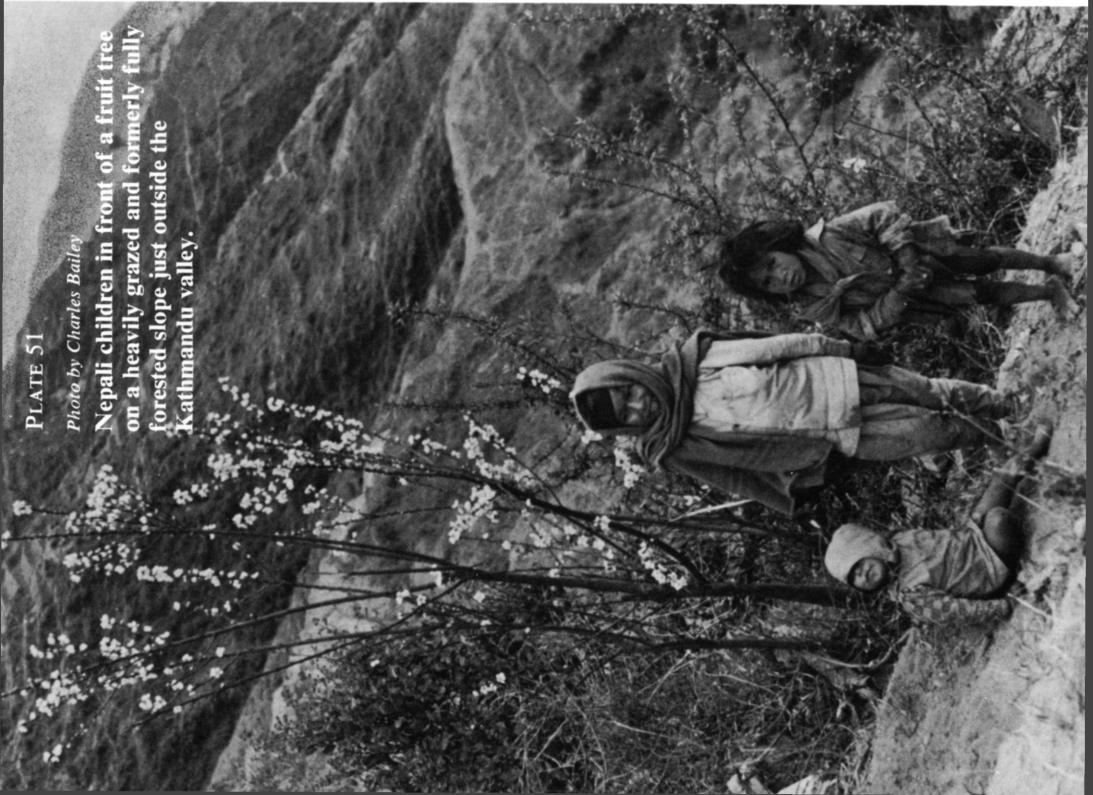


PLATE 52

*Photo by Charles Bailey*

The downstream consequences, Western Nepal. A tributary of the Kali Kandaki threatens to replace the remaining rice land with boulders.



to lower productivity. With the great fragmentation of individual holdings, no one farmer, even if he could afford it, can take effective soil-conservation measures. Treating a 1/10 hectare plot while land on every side continues to erode does just not make sense. Where there are markets, some wealthier farmers have been able to diversify into fruit trees or poultry production; others send a family member off to employment in the military or the cities. However, the majority face a downward spiral of rural poverty which is destroying the land and the livelihoods of the people that depend on it.

The downstream effects of land degradation are equally disastrous. In the lower hills, reservoirs constructed at great effort and cost are filling up with sediment seriously impairing their capacity to even out peak monsoon flows, control floods, and generate power. Further down in the plains, sediment chokes irrigation channels and raises stream beds. This causes rivers to change course and cover rich agricultural lands with sand and boulders. The environmental impact is two-pronged: impoverishment for the hills, and a handicapped agriculture in the heavily populated plains.

This is the story in Kumaun, but the same forces appear to be at work elsewhere in the Himalaya. On the other hand, it is dangerous to generalize too far since conditions vary widely. Average annual rainfall, a central factor in soil erosion, declines from east to west along the Himalayan chain, and is highly variable within any locality. Temperature ranges, on average, decline from east to west, and also with elevation. Population density is variable, and there are many separate ethnic groups which have made unique adaptations to their local environment. Political jurisdictions hinder resource management on a watershed basis, and historically have had different impacts on their sections of the Himalaya. For example, in India there are roads in the Himalaya, in Nepal, almost none. As for political perception of these environmental problems, it appears highest in Nepal and lowest in Pakistan, with India somewhere in between.

There are very few systematic quantitative data on land degradation in the Himalaya. On the other hand, there is considerable anecdotal evidence. Increasingly severe floods ravage the plains of eastern Uttar Pradesh, Bihar, and Bengal. Rivers jump their banks and destroy prime agricultural lands. More hill people are trying to settle permanently in the plains, and the remaining open land is rapidly filling up. Each year refugees come to the plains, their entire mountain village and farmland having been swept away in a landslide. Aerial photos in Nepal show that in some places the forest edge has been pushed upward 2000 feet in ten years. Hill farmers complain that their land is no longer as productive as it once was. Forest Department officials complain of hostile villagers who poach wood in the reserved forests. More tourists flood

the hill stations, and trekkers, the higher mountain villages, increasing the demand on the surrounding forest for fuel. On the basis of this kind of evidence there is a genuine and serious problem in many places in the Himalaya. What is to be done about it? Are only local and small-scale solutions possible? Will the Nepalese landscape resemble that of Afghanistan by the end of this century?

Obviously, solutions to the problems outlined here must start with the hill people themselves. Equally obviously, even a heightened awareness of the threat to their land will not be enough incentive for individuals or small groups of hill farmers to take effective action by themselves. The governments of the region have undertaken reforestation, erosion control measures, and agricultural development programs in some parts of the Himalaya. While there have been some successes, most efforts have been partial and scattered, and often have not gotten at the social and economic roots of the problem. Villagers have frustrated some reforestation programs which closed off land to which they traditionally had access, or which transferred its control to a distant official. Earth and cement works to channel streams or plug gullies, while valuable, frequently treat the symptom rather than the cause. Agricultural development programs usually just promote one or two crops, and assume the easy availability of chemical fertilizer and markets for the produce after they terminate. While these efforts have increased the knowledge government and aid agency officials have of local conditions, and what works and doesn't work, more needs to be done.

It may be that there is no overall solution. Control of population and more planned resettlement in the plains are obvious components of a solution in most areas. The means of implementing them are less obvious. A reduction in the rate of population growth is as much a function of general economic advance and social change as it is of specific family planning and maternal and child care programs. Resettlement runs into problems of who gets settled where, and whether there is enough suitable land available. Efforts in these directions should continue, but in addition attention should be given to five other areas of possible leverage:

1. There is need for more specific and sophisticated understanding of the geography and the socio-economic and biophysical causes of land degradation in the Himalaya. This would enable governments to pinpoint the most severely affected areas for priority attention in land treatment and rural development programs, and the type of programs most needed.

2. People will continue to live in the hills for the foreseeable future, but many of them will be unable to benefit from already developed modern seed-fertilizer technologies, or to specialize in tea, fruit, or nut crops for sale outside the hills. Subsistence rain-fed cereal grains will

continue to be the primary source of food, and the lands devoted to this use must be improved in efficiency and productivity without need for costly imported inputs. So far there is little agricultural research to meet this need. Future research should define the exact specifications for a subsistence food-grain technology and provide the genetic material to make it possible.

3. The Himalaya have a shortage of food and fiber for human and animal muscles, and for cooking food. Additional and alternative sources of energy ought to be explored to reduce the pressure on the forests and to ease the lot of hill people. For example, community or individual planting of sturdy fuel and fodder trees would simultaneously provide extra energy and protect steep and unstable slopes. The unexploited hydroelectric potential of the Himalaya, an estimated 83,000 megawatts in Nepal, could be developed to supply the cooking and lighting needs of the larger hill communities and possibly to power regional transport systems.

4. Community means for regulating forest and water use should be supported, and where possible strengthened, with such things as new tree species and techniques to minimize channel distances along unstable slopes. Outside assistance which builds community cooperation without shoring up old feudalistic ties between families is difficult. In the past, smaller populations and such unequal relationships protected to some extent the surrounding forests and soils. The challenge to development programs is to encourage hill people in an emerging new social order to handle common resources for the common long-run benefit.

5. In the Himalaya, education should be related to local needs. There is at least a presumption that more of the right kind of local formal and informal education would help hill people to deal with their problems and so pressure their governments for more effective rural development programs. At the least, education can enable some to get well-paying jobs outside the hills and give additional support to their families remaining in hill villages.

This program is ambitious, and given the resources at hand and the political realities, probably not realizable in its entirety. Nevertheless, these are important points to consider in coming to grips with land degradation in the Himalaya. Mountaineers traveling the higher parts of the Himalaya for a month or two may not confront the ecological changes happening thousands of feet below, but the predicament of the hill people must challenge anyone concerned with the northern reaches of the subcontinent.

*The following note was sent us by Eric Roberts, leader of the British-American Nanda Devi Expedition of 1977. The account of that expedition is in the "Climbs and Expeditions" section. The following brings up a very different and also important point of view, the preservation of a unique local environment in its original state. The article deals with the economic development of the hill peoples so that the country can best be preserved to serve in the future the needs of those who live there. It must be understood that these two worthy objectives of conservation may at times be in direct conflict.*

Our expedition to Nanda Devi, through our member Lavkumar Khacher of the World Wildlife Fund India, carried out a conservation survey in respect to the flora and fauna of the Nanda Devi Sanctuary. The aim was to establish the effects and damage caused by the intrusion into this previously untouched region of a rapidly escalating number of trekking parties and expeditions. In a 30-page report to the Indian government and the Indian Mountaineering Foundation he made among others the following points. The Nanda Devi Sanctuary and the Rishi Gorge approach are unique and supremely worthy of preservation in their natural state. The main problems are in order of priority: 1. deforestation through supplying expeditions with firewood, man-initiated forest fires and grass fires; 2. introduction of domestic herds to previously inaccessible summer pastures on paths improved by expedition traffic, with consequent overgrazing of the area; 3. poaching of Himalayan Blue Sheep (*Bharal Pseudois nayaur*) and Musk Deer (*Moschus Moschiferus*), this rendered feasible by paths opened by expedition traffic; 4. further destruction will take place if the local plan to build a bridal path to the Sanctuary is permitted. If expeditions can thus enter the Sanctuary earlier in the season and wander at will, this could interfere with the breeding habits of Bharal and Goral. A reduction in their numbers will in turn affect the snow leopards. In regard to one issue which has been publicized, namely the litter dumped and strewn around many places between Lata and Base Camp (there are really some shocking messes developing), it is noted that—despite its unpleasant visual effect—it is ecologically insignificant compared to the main issues outlined above.

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