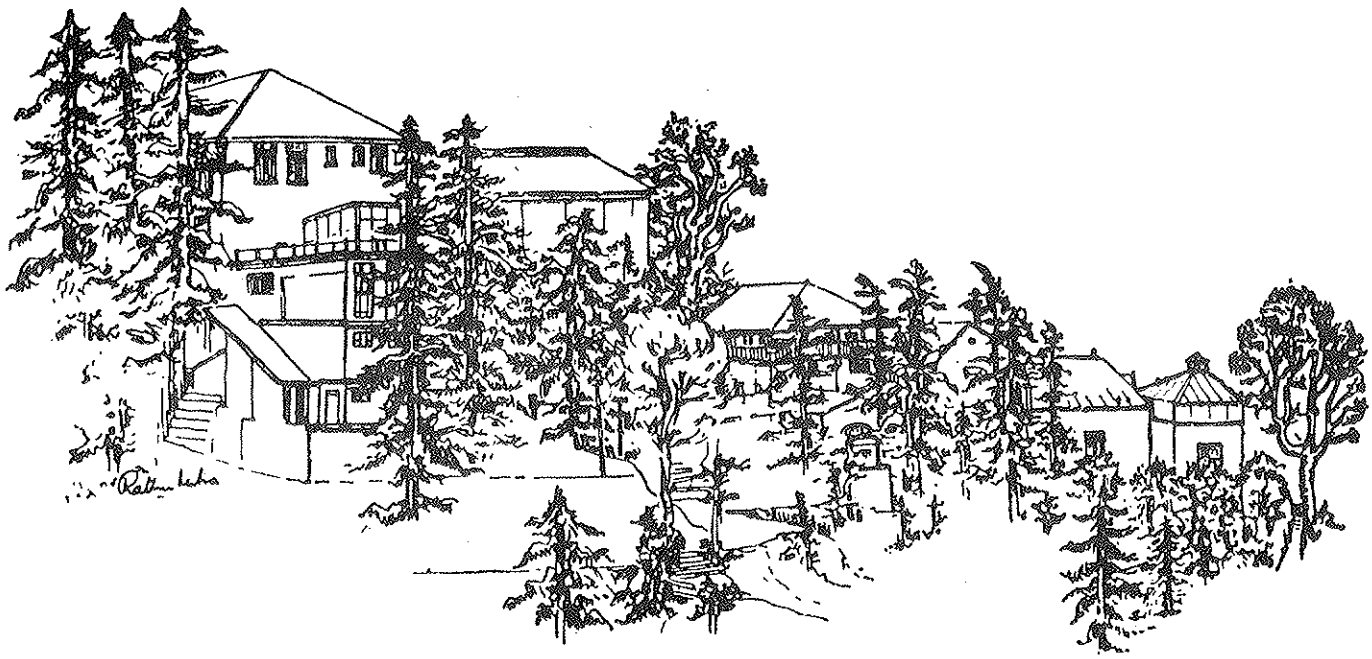
Quadrangle

Woodstock School Alumni Magazine



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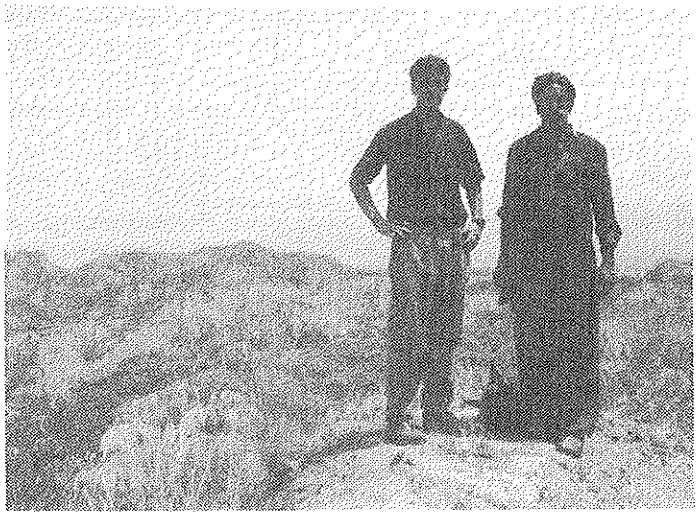
Reflections

Ecological Change and Community-State Collaboration

by Christopher Scott '81

Gazing out over the Dun Valley from the Eyebrow, past the dust and haze of Dehra Dun, one's view settles on the Shivalik Hills. Seemingly adrift on the vast expanse of the Ganga-Yamuna plain and dwarfed by the Himalyan ridges of our vantage, the Shivaliks' apparent insignificance belies their ecological role in buffering the Dun's climate. (Ever tried *leechies* from Roorkee? No contest with Dehra Dun *ke mashur!*) Throughout their expanse from Kashmir to Nepal, the Shivaliks form a boundary between the Himalayan and Gangetic Plains eco-systems. The stability of the Shivaliks' own ecology could be thrown out of balance by several inter-related processes, including the conversion of forest to agriculture and grazing land, intense rainfall, and the soil erosion which results. One must keep in mind that in geomorphically active regions such as the Shivalik-Himalaya, some soil erosion is inevitable. In fact, the Shivaliks are composed entirely of alluvium which was washed down from the Himalaya roughly five million years ago, deposited on the plains, and is being uplifted again. However, a comparison of historical and current records indicates that soil erosion in the Shivaliks has intensified, with direct effects on the productivity of agriculture and forests.

Forests (trees as well as groundcover vegetation) are critical in arresting the erosion of topsoil so vital to the subsistence of local communities. Perhaps the *rishis* were alluding to this fact in their telling of the birth of Ganga, who descended to earth through the locks of Shiv, for whom the Shivaliks are named. Surely the force of Ganga cascading down unimpeded would have split the earth asunder. Metaphorically, Shiv's kesh is the forest, and Ganga the rain. Without forest cover, then, soil erosion is accelerated from natural levels. Upstream watersheds, where these forces are at work, generate the sediment which eventually shows up in downstream irrigation works. (The transport of sediment by rivers over long distances may take decades, even centuries).



Chris and Chhota Singh atop a hill in the Shivaliks

From the end of May through August 1990, I was involved with a program to rehabilitate the degraded Shivaliks eco-system around Pinjore, between Chandigarh and Simla. An initial project in the watershed of Chandigarh's Sukhna Lake was started in 1978 to reduce sedimentation in the lake. The village of Sukhomajri was pinpointed as the source of huge amounts of sediment, and conservation techniques were implemented. Subsequently, villagers restricted grazing in the watershed, in a process now known as 'social fencing,' an innovative alternative to barbed wire and forest guards. The forest department is currently collaborating with some 45 local village communities in a similar joint forest management approach.

I worked on a Ford Foundation grant with the Haryana Forest Department's Hill Resource Mangement Societies Progamme (HRMS) to devise a set of extension materials for rehabiliation. Extensive local knowledge on the part of my village informants formed the basis of my work. There is a well developed terminology in the local dialect (a mixture of Pahadi, Hindi and Punjabi) for land classification. For example, *choti, shamba, thapar, dhang, lassa* and *dakkar* all refer to different landforms with varying potential to support vegetation. *Jhiri, khud, nali, nala,* and *choa* all refer to water-courses with increasing potential to cause erosion.

for Rehabilitation: The Case of the Shivalik Hills

The principal means of arresting erosion is reforestation. Grasses and low shrubs actually serve this purpose better than trees; however, a mixed forest canopy is the ideal shield. Structural techniques are also quite effective, for example small 'gully plugs' of stone to obstruct flowing water, shallow trenches well-levelled along the contour to catch runoff, revetments (*pushtas*) to inhibit landslides and small dams to 'harvest water' from larger *nalas*. However, vegetative techniques have three primary advantages: they grow and propagate themselves, they provide for local subsistence needs (fuelwood and fodder for animals), and they cost less to implement. On the other hand, severe landslides can only be remedied by stone structures. An integrated approach to watershed conservation combines vegetative regeneration with

Most households cut and carry fodder for their livestock

structural techniques. Protection is a major problem; thus while the 'experts' are busy devising new technologies and integrating innovative project components, forests may continue to degrade. A more sound approach to resource conservation and development is based on the productive returns to conservation.

In the HRMS program, long-term conservation is negotiated by the forest department and communities, who have registered their own societies. Membership in the societies is simply by virtue of residence in the community. A separate forum allows women to consolidate their opinions prior to all-society meetings. Irrigation is the productive asset which draws villagers to the bargaining table.

The ability to withdraw the irrigation component gives the forest department considerable leverage. For their part, communities offer 'social fencing' in the bargain. In fact, negotiating an agreement can be rather like bargaining in any bazaar, accompanied by vocal, often dramatic exchange of offers and counter-offers.

With irrigation, farmers substantially increase crop yields. Water is distributed to every household, regardless of the size of its landholding (even to those without land), and is subsequently traded among society members. The societies receive first priority over leases for fodder and fiber grasses, while private contractors are excluded altogether. Grass leases are paid for through share contribution by households. Each sickle *(dati)* used by the household costs a fixed amount per season. Households may purchase rights to use as many datis as they wish.

Operational problems have severe implications for social equity. Water sharing has broken down in some cases. Prosperous households who can afford high milk-yielding buffaloes have benefitted more than households who only keep goats. Labor input has increased considerably, particularly for women, who bear the responsibility for livestock. Corruption in the sale and distribution of forest produce on the part of officials and some society members also threatens the equitable distribution of benefits. While these and other equity issues are being addressed and, in some cases, overcome by the societies, it is clear that conservation is extremely effective. The biomass productivity of forests has increased tremendously (up to 40 times), while erosion has decreased (to 10% of previous rates). The societies are clearly pleased with their progress.

- *Christopher Scott is completing his M.S. thesis (agricultural engineering with a minor in rural sociology) on Himalayan resource issues and the sustainability of joint management. He worked with the HRMS program in the summer of 1990. From 1987-89, he worked on watershed and irrigation projects with Seva Mandir, a non-governmental organization in Udaipur, Rajasthan.*