HIMALAYA, the Journal of the Association for Nepal and Himalayan Studies

Volume 16
Number 1 *Himalayan Research Bulletin No. 1 & 2*

Article 6

1996

Changing Contexts, Steady Flows: Patterns of Institutional Change within the Communal Irrigation Systems (Kuhls) of Kangra Valley, Himachal Pradesh, India

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Introduction

Throughout the world large scale demographic, political and economic changes have transformed relations among rural land users and between them and the natural resources they use and manage. Pervasive changes include the expansion of markets and monetized exchange relations into hinterland areas, the increasing assertion of state claims to control and regulate natural resources which were, in many cases, previously under some sort of local jurisdiction, demographic shifts in population densities and growth rates, and emerging participatory political systems. The redistribution of power, access, control, and ability to exclude that these processes entail has produced myriad forms of conflict among rural land users and between them and various of state entities. The ensuing fault lines of conflict range in scale from gender-based intrahousehold negotiation and contestation (Schroeder 1993, Carney 1993) to competition for resource access and control between peasant groups differentiated by economic interests, kin alliances, class and ethnicity (Ensminger and Rutten 1991) to conflicts and alliances between peasant groups and state agencies (Moore 1993, Neumann 1992, Peluso 1992).

Local institutions that regulate the provision, distribution and utilization of common resources constitute a mid-level site on which the multiple tensions accompanying large scale political and economic change manifest themselves. One particularly common form of economic change is the expansion of monetized market exchange relations into areas where previously they did not exist or where they existed in muted forms only. Market expansion generally increases the economic differentiation within an area as some individuals take advantage of new economic opportunities while others do not. The lines of differentiation often follow preexisting axes of inequality such as gender, caste, class, ethnicity and/or wealth. Increasing market-based economic opportunities generate tensions within institutions which manage common resources because they differentially reduce the dependence on and hence value of the resource for those who have access to new economic opportunities. Polanyi (1944) and Jodha (1985) have shown that these tensions erode common property resource institutions by weakening individuals' dependence on the benefits the resource provides. Polanyi and Jodha suggest that as increasing reliance on outside income reduces dependence on local resource systems, then institutions for managing those systems will lose support.

While this formulation is true in a general sense, it does not capture the remarkable diversity of impacts of, and responses to, increasing nonfarm employment observable among the gravity flow irrigation systems (kuhls) in Kangra Valley, Himachal Pradesh. Two axes of differentiation help to identify variation in response among kuhl regimes.[1] The first is the degree of role specialization and organizational formalization of the kuhl regime and the second is the extent of state involvement in kuhl management. The degree of role specialization and formalization ranges from informal kuhl regimes with no specialized roles or formal rules, to highly specialized and formalized kuhl regimes with multiple watermasters, a formal kuhl committee with

1 By *kuhl regime* I mean the complex of physical structures which comprise a kuhl and the social relations and institutional arrangements necessary for its construction, repair and maintenance. In addition to pressures associated with political economic changes, kuhls are also subject to recurring environmental shocks, i.e. floods, earthquakes and drought, which threaten the ability of kuhl regimes to maintain their integrity. For an analysis of the interconnectedness of kuhls and of how inter-kuhl networks reduce the risks of environmental dependence see Baker, J.M. (1995) "Irrigation Networks in the Western Himalayas: Methodological and Conceptual Implications for Public Administration Theory."

elected officers, extensive written records and sophisticated methods for measuring water flow. Similarly, state involvement in kuhl management varies greatly, from minimal degrees of involvement in some kuhl regimes to the entire management of others.

In this paper, based on fieldwork among the 39 kuhls which divert water from the Neugal River just west of the town of Palampur in Kangra Valley, I argue that the variations among kuhls in their degree of formalization and the extent of state involvement can be explained by examining the specific configurations of social relations and ecological conditions which characterize each kuhl regime. I show how the particular combination of social relations and ecological conditions within a kuhl system shape the tensions arising from increasing nonfarm employment as well as the means people employ to resolve those tensions. Furthermore, I argue that the varied roles the state of Himachal Pradesh plays in the management of different kuhls results from negotiations between various state agents and the persons involved in kuhl management. This negotiation, and the outcomes in degree of state involvement in water management, are shaped by local social and ecological influences rather than by the blanket application of a homogenous "policy" across a socially and ecologically differentiated landscape.

The topography of Kangra Valley, a series of gently sloping alluvial fans spreading outwards from the base of the Dhaula Dhar mountains, creates opportunities for irrigated agriculture at a scale unusual in the Himalaya. Each alluvial fan in the valley is bisected longitudinally by a stream or river originating in the Dhaula Dhar. From their narrow headwater canyons to their disappearance into the erosive canyons of the Sivalik Hills ten to twelve kilometers to the south, they each supply water to as many as forty or fifty different gravity flow irrigation systems. These irrigation systems consist of a diversion structure, a main channel ranging in length from less than one kilometer to more than 40 kilometers, numerous secondary and tertiary channels and hundreds of named distribution points. The initial construction of the longest and most complex kuhls was occasionally sponsored by pre-colonial local rulers. However the majority of the kuhls in Kangra Valley were constructed without state patronage either by local elites or collectivities of farmers. By the beginning of British colonial rule in Kangra in 1850, responsibility for managing and repairing each kuhl rested with the cultivators of the land the kuhl irrigated (Coward 1990). Approximately 715 major kuhls and more than 2500 minor kuhls irrigate more than 30,000 hectares in the valley.

The areas irrigated by kuhls differ tremendously in agricultural productivity, the availability of irrigation water from post-monsoon annual streams, and the social relations among irrigators. Some kuhls irrigate only highly productive rice and wheat growing fields located near the perennial streams flowing from the Dhaula Dhar. Other kuhls, after traversing the fertile riverine terraces, transport water several kilometers and deliver it to the less fertile agricultural areas on the ridges and plateau tops above the perennial streams. In some areas local annual streams which flow after the onset of the monsoon reduce an irrigator's reliance on water transported from the more distant perennial rivers. The irrigators of kuhls may be relatively homogeneous or considerably different in caste and wealth distribution. Differences can be exacerbated when upper caste farmers cultivate the headend areas of a kuhl's command area and lower caste farmers cultivate tailend areas.

Local Determinants of the Effects of Environmental Change

The diverse social and ecological contexts of the kuhls of Kangra Valley provide a rich arena in which to examine the conflicts which arise when economic change alters shared dependence on a common resource. Agriculture in the area remains primarily oriented to subsistence grain production. However, a rapidly expanding nonfarm employment sector has provided unprecedented opportunities for (mostly male) off-farm employment. For example, in the Neugal River basin at the base of the Dhaula Dhar range, between 1961 and 1991 the numbers of males engaged in full-time nonfarm employment more than tripled, while those engaged in full-time agricultural work remained about the same.[2] Households which draw income from nonfarm employment now have less incentive to contribute the labor necessary for kuhl maintenance and repair, and to comply with rules regulating the control of, access to and use of irrigation water, than households without nonfarm employment income.

The disincentive to contribute labor and/or money for kuhl maintenance and repair is also influenced by the potential for conflict among a kuhl's irrigators and the use value of the water a kuhl delivers. The disincentive is greatest either when a kuhl irrigates primarily low value crops for which alternative post-monsoon water supplies are available, or when caste, class or locationally derived inequalities generate conflict among farmers. The disincentive to contribute towards the provision of irrigation water is least when the kuhl irrigates high value crops and when inequalities among irrigators are minimal. Furthermore, the same local factors which influence disincentives to participate in kuhl management also affect the degree of regime formalization, if any, and the extent of state

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2 This information comes from the Riwaj-i-Abpashi (Book of Irrigation Customs) compiled as part of the 1915 settlement of District Kangra. A major kuhl has a perennial water source and irrigates two or more villages. The Himachal Pradesh Statistical Outline (1990:58) notes that in 1988, of the 32,511 hectares of irrigated land in the district, 30,895 were irrigated by kuhls and lift irrigation systems and 1,616 hectares were irrigated by wells and tube wells.

intervention in kuhl management. Ten of the thirty-nine kuhls within the Neugal basin deliver water to high value crops and have irrigators who are not divided by class or caste differences. These kuhls are informally organized with no watermaster and are managed independently of any state involvement. At the other end of the extreme are kuhls which deliver water to low value crops and whose irrigators are divided by class or caste inequalities. For these kuhl regimes the stresses predicted by Polanyi and Jodha were so great that they collapsed and the kuhls literally stopped functioning in the late 1960's and early 1970's. The panchayats included within the command area of each of these defunct kuhls negotiated with the Himachal Pradesh Irrigation and Public Health Department (IPH) for the department to assume responsibility for the management of these kuhls under the Himachal Pradesh Minor Canals Act. As a result, nine of the thirty-nine kuhls within the Neugal basin are presently managed by the IPH Department. The willingness of the IPH Department to assume management responsibility for defunct kuhls, and of other state agencies and departments to subsidize the repair of other kuhls, has helped preserve the overall viability of the kuhl networks within the Neugal basin. The various reasons for the willingness of these state agencies to subsidize irrigation management are grounded in the ideology of the developmentalist socialist welfare state. Instrumentalist motivations within the IPH Department include increasing the department's power relative to other departments, and justifying an expanding budget. A less direct motivation which drives the giving of subsidies for kuhl repair by the civil administration and, on occasion, grants brokered by a local Member of the Legislative Assembly (MLA), is the expectation of political support in return for financial subsidies. The remaining twenty of the thirty-nine kuhls irrigate mostly high value crops whose cultivators are characterized by various inequalities. Increasing nonfarm employment has weakened the social basis for cooperation within these kuhl regimes, thereby allowing differences rooted in caste, land ownership and position within the kuhl's command area, to manifest as conflicts within various arenas of kuhl management. In response to conflict, the members of these kuhl regimes have formalized their manner of self-organization by creating elected kuhl committees, formalizing previously informal rules governing the distribution of responsibility for kuhl repair and maintenance, instigating and enforcing fines and other sanctions for those who violate rules, and in one case substituting monetary for labor contributions for kuhl maintenance and repair.

I turn now to a brief review of the effects of increasing nonfarm employment on these kuhls. By using brief vignettes I will show how particular intersections of social and environmental characteristics influence the tensions resulting from increased nonfarm employment, such as declining participation in kuhl maintenance work parties, shifts in the burden of responsibility for kuhl maintenance from headend to tailend farmers, and the declining authority of the watermaster.

Declining Participation

Without exception, kohlis, the local pahari term for watermaster, cited mobilizing farmers for kuhl maintenance as their most difficult problem.[3] In 1991, due to low farmer turn-out on the appointed work days, Shri Laxman Das, the kohli for Kathul Kuhl, could neither complete the annual cleaning of the kuhl nor reconstruct the diversion structure. That year no irrigation was possible prior to the monsoon. Similarly, in 1988 because so few farmers turned out to clean and repair Raniya Kuhl, the kohli, Shri Kishori Lal, dismissed the work party and instead hired migrant laborers from Rajasthan to do the work.[4] Attendance registers for Pathan Kuhl also show that the number of farmers participating in kuhl maintenance has declined in recent years.[5]

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[3] Of the thirty non-government managed kuhls in the Neugal basin, twenty have kohlis. The kohli is responsible for mobilizing the communal work parties necessary for maintaining and repairing the kuhl, for performing the religious ceremonies associated with kuhl management, for supervising the transport and distribution of water in the kuhl, and for resolving conflicts between farmers regarding water use. Twelve kohlis have begun to keep attendance registers in which they note who was present and who was absent when work parties are organized. While all attendance registers record who contributes labor and who does not, the dynamics of declining participation and hence the function of the attendance register vary from kuhl to kuhl. Participation in the annual communal work parties to clean the kuhl and reconstruct the diversion structure may decline for political or economic reasons among big or small landowners. In some kuhls participation may have been low previously, while in others low participation may be a recent phenomenon. As the reasons for declining participation vary, so does the purpose, meaning and effectiveness of the attendance register.

[4] Shri Kishori Lal reported that only ten years ago eighty to one hundred men would show up for the four days required to clean and repair Raniya Kuhl. In 1993 only 21 individuals, mostly young boys or elderly men, came.

[5] Between 1978 and 1991 the maximum number of participating farmers on a given day declined from between 90 and 100 to between 30 and 40. And the total number of persondays contributed per year also declined during this period. The kohli for Pathan Kuhl, Shri Dhyan Singh confirmed this trend by stating that

The reasons for the decline in participation in Raniya, Pathan and Kathul Kuhls vary. Declining dependence on kuhl water with a low end use value accounts for reduced participation in Kathul Kuhl. The "pull" of nonfarm employment opportunities accounts for declining participation in Pathan Kuhl even though it delivers water with a high end use value. Although Raniya Kuhl also delivers water to high value crops, its irrigators are divided by caste and land based inequality and conflict. Low caste small landholders leaving Raniya Kuhl to escape these inequalities account for declining participation rates in this kuhl. Declining participation, while a common phenomenon, has different causes and effects.

Distribution of Responsibility for System Maintenance

The burden of kuhl maintenance has always fallen more heavily on downstream irrigators. Customary rules for allocating responsibility for kuhl maintenance and repair between head- and tailenders simultaneously acknowledge this tendency and attempt to mitigate it. The declining dependence on agriculture and the consequent weakening of interdependence among households has reduced the leverage that downstream users have on headenders for system maintenance. This is especially true when caste differences intersect with locationally derived inequalities.

Buhli Kuhl exemplifies this point. The seventeen hamlets Buhli Kuhl irrigates are Rajput-dominated at the head of the kuhl, and are primarily lower caste at the tail end. Due to the caste bias of participation in nonfarm employment, upstream Rajputs became proportionately less dependent on kuhl water than the downstream, lower caste, households. Upstream Rajput contributions to kuhl maintenance and repair declined, leading downstream lower caste hamlets to withdraw from the kuhl. Residents of these hamlets now must sow paddy using the less productive dry-seed broadcast method instead of the more productive but water-intensive sprouted-seed broadcast method, and they must depend on timely rains for irrigation.

Declining Kohli Authority

The inability of the kohli of Buhli Kuhl to enforce rules governing the distribution of the burden of kuhl maintenance and repair among farmers reflects the general erosion of the kohli's authority. The basis of the kohli's authority and the legitimacy for rules governing kuhl management was common dependence on kuhl water. The fragmentation of this dependence, although moderated by ideologically compelling norms of reciprocity and hierarchical relations, nevertheless weakens the legitimacy of rules and the ability of village based authorities to enforce them.

Previously the position of kohli carried respect and prestige. When the demand for kuhl water peaked for paddy sowing and water supply was at its annual minimum, the kohli walked his kuhl overseeing water distribution and resolving water conflicts on the spot. His long turban and cane were adequate reminders of his authority and helped ensure that his word held. Now the hereditary right to be kohli, in some cases, is a liability rather than a privilege. Many current kohlis state that they would prefer their sons to get nonfarm jobs and not assume the responsibilities associated with the relatively thankless, difficult and poorly remunerated job of kohli.

Kuhl Regime Responses to Environmental Change

Kuhl regimes have responded to stresses by instituting changes at the operating and institutional levels (Ciriacy-Wantrup 1969). Responses at the operating level include changes in the remuneration for the kohli, the mobilization of resources for kuhl maintenance and repair, and the formality of kuhl management activities. Responses at the institutional level include the formation of kuhl committees, with their varied structures, functions, and degrees of effectiveness. The combination of responses among different kuhl regimes reflects each regime's particular set of social and ecological characteristics rather than a common response to shared tensions and conflicts. For example, although kuhl committees are structurally similar, some were formed to address increasing internal conflict while others were primarily formed to negotiate with the state.

Kuhl Committees

In 1993, there were fourteen kuhl committees within the Neugal basin. Local officers of the Punjab State Government organized two of the earliest kuhl committees in the early 1950's as part of a more general effort to form Agricultural Cooperative Societies. These two initial "cooperative irrigation societies" constituted the blueprint for subsequent kuhl committees, though the irrigators themselves rather than government officers created the later committees. Kuhl committees were formed for three reasons. The most common reason was to strengthen the declining authority of the kohli to enforce rules and mobilize labor. A second reason was to facilitate the negotiations with the various agents of the state necessary to acquire monetary support for kuhl system repair and maintenance. The last reason is to defend the kuhl regime members' water claims against an external threat. For example, the shareholders of Bhradi Kuhl organized a committee to challenge in court the IPH Department's proposed construction of an upstream kuhl which would threaten their water supply: they were successful. Evolving RulesKuhl committees provide a forum for the creation and modification of rules. The effectiveness of rules varies according to the nature and

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declining farmer participation for kuhl maintenance and repair was his biggest headache.

degree of conflict within the kuhl regime. Three examples of changes in the operating rules of kuhls are the creation of fine systems, the substitution of money in lieu of labor for kuhl maintenance and repair, and increases in the remuneration rates for kohlis. Every kuhl regime that maintains attendance records has developed a system for fining households which do not contribute labor for kuhl maintenance. For example the committee for Pangwan Kuhl, whose irrigators are mostly all Rajput farmers with relatively similar landholdings, levies and collects a fine, and gives a receipt, for every six or seven days of absence. On the other hand, for Raniya Kuhl, which is divided by caste conflict and wealth inequalities and a committee controlled by a few large landowning families, the kohli, Shri Kishori Lal, neither maintains accurate attendance records nor even attempts to collect fines. The fine system in Samruhl Kuhl led to women from female-headed households participating in communal work parties. This violated the prescription against female participation in any communal aspect of kuhl management. In response, the kuhl committee and irrigators of the kuhl substituted a monetary fee based on the area a household cultivates in lieu of labor contributions. The specific configuration of social relations among the irrigators of a kuhl has shaped the meaning and effectiveness of structurally similar changes. Some examples: the committee for Raniya Kuhl was a means (albeit not terribly successful) for local elites to maintain their threatened hierarchical authority; for Samruhl Kuhl the structurally identical committee was the vehicle for shifting from labor to monetary contributions for kuhl maintenance and repair; and the fine system of the Pangwan Kuhl committee effectively mitigated against the pull of nonfarm employment.

Conclusion

The title of this paper, "Changing Contexts, Steady Flows," suggests that although the unprecedented expansion of nonfarm employment opportunities has transformed the context of irrigation in Kangra, water continues to flow through the kuhl channels as it has done for the last several hundred years. This paper has conveyed an idea of the transformations in the organization of irrigation management, and in the mix of local/state authority for irrigation management, which has been necessary in order to achieve this constancy of flow. And it has shown how local level factors shape the effects of environmental change, the trajectory of response to those effects, and the extent of state involvement in kuhl management.

At the basin level increasing nonfarm employment opportunities initiated a sequence of responses that produced new patterns of authority and organization for water management. These differential patterns of change within individual kuhls created a web of multi-jurisdictional, interconnected kuhl networks that would appear highly resilient at the basin level, because each kuhl finds its own equilibrium mix of state and local authority and management structure for a particular type and rate of contextual change and its own configuration of social and ecological characteristics. The existing basin level pattern of authority and organization for water management suggests that while specific organizational forms, operations, and scales of regime management did not persist unchanged, the overall pattern of kuhl networks within the basin transformed in order to endure.

Acknowledgments

This paper would not have been possible without the support, cooperation and encouragement I received during my stay in Kangra. I would particularly like to express my gratitude to Shri Krishan Kumar Sharma and to the kohlis (watermasters) I worked with most closely, Shri Kishori Lal, Shri Laxman Das, Shri Ranvir Singh, Shri Kehar Singh, and Shri Jagat Ram Ohri. Rajesh Thakur and Jugal Kishore provided excellent assistance and friendship in the field and Professors Anil Gupta and T.V. Moorti provided institutional affiliation and intellectual support during the research. Jeff Romm and Kim Berry commented extensively on earlier versions of this paper. Financial support for the research this paper is based on was provided by Fulbright-Hays DDRA and American Institute of Indian Studies fellowships.

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Paper presented at the 24th Annual Conference on South Asia, University of Wisconsin, Madison October 1995.