

## **INDIA - COMMUNITY WATERSHED MANAGEMENT SOCIETIES IN RURAL INDIA CASE #132**

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This case study highlights several IWRM lessons from recent research in the Shiwalki Hills, Haryana, India. Specifically, two villages are examined to determine how social, political, and environmental factors drive the institutions which manage these common pool resources.

### **ABSTRACT**

#### **Description**

In the late 1970s a successful joint forest management strategy was established in Sukhomajiri. By initiating a dialogue with villagers, key issues were identified which led to the construction of earthen dams for the provision of irrigation water. This in turn led to increased fodder production that reduced the grazing pressure on nearby forests and therefore improved the forest condition, reducing sedimentation of a nearby reservoir. With this success, the project was expanded throughout the region between 1990 and 1998. Unfortunately the successes of the original project were not replicated and the scaling-up efforts ended in rapid siltation with only 20% of the dams functioning by 2000.

The reasons for these failures are complex and were explored by a recent study of 28 community water user associations, or Hill Resource Management Societies (HRMS), in the Morni-Pinjore Forest Division of Haryana. Primarily concerned with resource management institutions, the research revealed that heterogeneity of community groups, as measured by household endowment indicators (i.e. average land irrigated, size of land owned, number of livestock and family size), was a key factor in the success or failure of HRMS and IWRM. Successful regions had clearly defined social roles, be it patron-client or caste-based, and often used a private contractor to allocate water resources and collect user-fees.

Therefore a heterogeneous mix of household endowments, combined with interested stakeholders, is a positive precondition. By examining the existing social institutions and physical conditions of an area, the possibility of IWRM success may be assessed. For example, participation and rule-compliance were affected by access to irrigation alternatives, e.g. tubewells; the distribution of land-holdings, i.e. at the head or tail of irrigation networks; and the share of household income from non-agricultural sources. Once community resource strategies are in place, managers must be aware of the potential impacts that larger national policies (e.g. import reforms altering commodity prices and in turn, village income profiles) and changing internal dynamics (e.g. increased workload for women without participation in management decisions) can have on long-term success.

#### **Lessons learned**

- Communities need to have an interest in the successful operation of dams and these interests are shaped by a variety of political, social and environmental factors
- These preconditions, such as historical experience and natural endowments, are key to the success of collective action
- Heterogeneous groups, with clearly defined social roles, experienced less management conflict than groups with homogeneous household endowments
- The effectiveness of community water resource management can be affected by internal (e.g. lack of participation from women, despite large stake in outcome, may harm long-term sustainability of policy) and external (e.g. national trade policies which alter the values of water-related commodities) forces

#### **Importance for IWRM**

This case demonstrates that a successful IWRM project needs to align political, social, and environmental factors. Furthermore effective community involvement can gain from traditional

social structures and yet must reach beyond customary roles, which may block certain groups such as women from participating.

### Main tools used

- B1.9 Civil society institutions and community based organisations
- C1.4 Developing water management indicators
- C4.2 Communication with stakeholders

### Keywords

Household endowments, irrigation management transfer, water rights, collective action, community watershed management societies, rural livelihoods, India

## MAIN TEXT

### 1 Background

This case study begins in the Shiwalik Hills of Haryana, India with watershed and joint forestry management strategies. The forests in this region, administered by the Morni-Pinjore Forest Division, are critical for mitigating soil erosion and this was realised during the early 1970s when grazing of cattle and fuelwood collection degraded the forests and resulted in increased siltation of the Sukhna reservoir in the capital Chandigarh. Studies revealed that most of the run-off was coming from the Sukhomajiri watershed and the Haryana Forest Division (HFD) was charged with finding a solution to the problem.

Their efforts, supported by the Ford Foundation, led to unique soil and water conservation activities in Sukhomajiri. Initially check dams were constructed to arrest the movement of silt but villagers soon destroyed the dams and continued to graze their cattle as before. A dialogue was then initiated with communities which revealed that inadequate irrigation led to fodder scarcity and thus grazing of the forests was necessary. Beginning in 1978, earthen dams were constructed to provide irrigation and this led to a chain reaction of positive outcomes (see Figure 1). The success was primarily due to the effectiveness of community participation in the watershed's management.

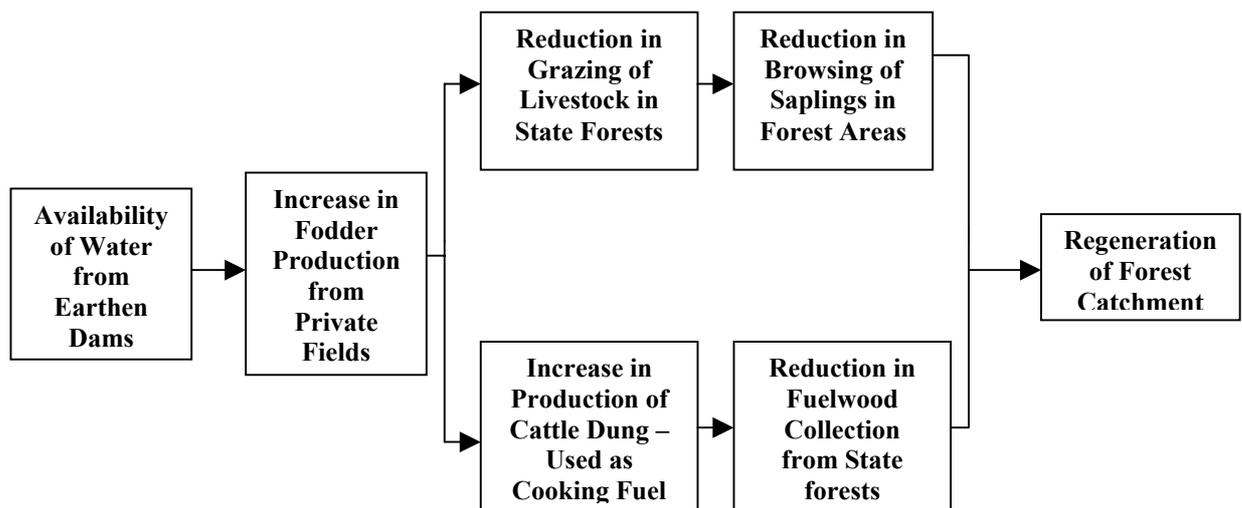


Figure 1 - The Sukhomajiri Watershed Model

This case focuses on the expansions of this model by the HFD, with the Ford Foundation and Tate Energy Research Institute, between 1990 and 1998; however, it reviews the community management of water resources, as opposed to primarily soil erosion and forestry. The findings of this case are derived from recent fieldwork research, by the Institute for Social Studies, and concentrates on two villages in the Morni-Pinjore Division of Haryana, Bharauli and Thadion. The study, which also incorporated a broad survey of 28 other villages in the area, examined

temporal and spatial scales to reveal the political, social, and environmental factors which affect local decision-making and watershed management institutions in the area.

## **2 Decisions and actions taken**

To scale-up the Sukhomajiri model, the Haryana Forest Division established a well-defined series of institutional rules to govern the management of water from earthen dams. Through a series of community consultations, six key features were established:

- Water user associations were reformed as Hill Resource Management Societies (HRMS) to manage and lease the rights for water, fibre, and fodder grasses.
- A system of tradable water permits was developed to enable landless households to gain a share of water from the dams.
- Profits from the sale of HRMS water and grasses were directed to community development projects.
- The HFD facilitated annual elections of the HRMS managing committee.
- Membership issues, such as how to share revenue between multiple villages and the placement of women on the managing committee, were addressed.
- Where joint management existed between the HFD and HRMS, profits were shared.

Water from the dam was shared equally among all families that paid an irrigation service fee. These funds were collected by the HRMS or individual farmers who lease the rights at annual water auctions. The successful bidder then has an annual contract to distribute water, collect fees, and maintain the dam. A portion of the proceeds are deposited with the HRMS for community development activities.

## **Problems**

Unfortunately, several problems disrupted attempts to scale-up the Sukhomajiri watershed model. First the HRMS' profits from the sale of fibre grass decreased between 1996 and 2000 due to changes in national import policies. Traditionally these grasses had been sold to nearby paper mills but liberalisation of raw material imports made it cheaper for paper mills to import softwood pulp. By reducing the market for these grasses the HRMS' profits, and in turn those of the HFD, were reduced: the HRMS were particularly hard hit as the HFD compensated for decreased revenues by increasing taxes on HRMS and thus reducing the funds available for community development and dam maintenance.

Additionally 31% of all dams in the Morni-Pinjore Forest Division silted up within five years of construction and 33% within ten years: 20% functioned for less than a year, leaving less than 20% of dams still operational in 2000. This state of affairs was due partially to a failure to establish water user groups before dam construction since these groups are responsible for catchment stabilisation before construction.

Poor management of the HRMS was the principle problem in the village of Thadion. Meetings were seldom held, accounts were in disarray, and water was being distributed in a chaotic manner. However, the research also detected environmental influences on management practices. The presence of groundwater and private tubewells provided an alternate source of irrigation for certain members of the community and therefore they had little interest in the successful operation of the earthen dams.

The primary problem in the neighbouring village of Bharauli was poor distribution of benefits, as the dam provided water for only 27% of residents. This village has limited alternative options for irrigation, and therefore without access to dam water, the crop options of households are restricted. Bharauli also exhibited the common theme of poor participation from women, despite their quota representation on the managing committees and daily role in agriculture.

## **3 Outcomes**

The primary goal of the research project was to determine the outcomes of scaling-up the Sukhomajiri watershed model and reveal key conditions for successful collective action. Again

these features were revealed by a broad survey of 28 villages, as well as detailed study of two villages, Bharauli and Thadion. This section describes some of the key results of the scaling-up process, as it pertains to community resources management.

## Heterogeneity and Collective Action

The heterogeneity of household endowments was a key factor and was measured by an innovative index including average irrigated land, size of land owned, number of livestock, and family size. In communities with a heterogeneous mix of endowments, contractor-based management of earthen dams was preferred and this resulted in more equitable and efficient water allocation. These private contractors were engaged primarily when less than 50% of a community had access to private irrigation alternatives, e.g. tubewells, and when more than 50% of water users relied on agriculture as a primary income source. The contractors only became involved when they felt certain that farmers would comply with water use, service fee, and dam repair regulations. Overall, collective action for dam management was seen in 80% of HRMS with heterogeneous endowment distributions and only a third of HRMS with homogeneous distributions.

Originally joint forest management was intended to do away with private contractors in Haryana; however the HRMS serve as intermediate organizations to share the benefits of forest management with the HFD. When considering fibre grass, the HRMS was expected to make an initial payment to the HFD to lease the right to harvest the grass. However discussions revealed that communities were rarely able to raise the lease amount and in many cases, an individual from within the village paid the lease. In some HRMS open auctions were held to award fibre grass harvesting rights and sometimes the same individual who paid the initial lease would again purchase the rights from the HRMS. This also occurred when considering water resources, with contractors undertaking a considerable risk since in the event of poor rainfall they stood to lose their deposit with the HRMS.

## Peasant Differentiation

The concept of peasant differentiation builds upon the issues of endowment heterogeneity above and it is necessary to explain community resources and social interactions. That is, while farmers groups may lack financial resources, there are other measures of wealth and endowment which are equally important. By differentiating peasants on the basis of their agricultural holdings, for example, it is possible to identify local leaders to organise farmers, resolve conflicts and generally manage water resources. In the case of Bharauli and Thadion villages, there is a marked difference in resource heterogeneity in each village, with heterogeneity in Bharauli increasing over time due to an increase in irrigated land area (see Table 1).

**Table 1 – Distribution of Household Endowments in Water User Groups, 1996 and 2000**

<i>Water User Group</i>	<i>Distribution of Household Endowments 1996</i>	<i>Distribution of Household Endowments 2000</i>
Bharauli	61.4	69.1
Thadion	46.6	33.6

By examining these villages, it was revealed that high endowment households achieved the highest per acre crop productivity and highest mean farm incomes (see Table 2). With greater access to irrigation these households relied less on livestock but took risks by devoting large acreages to radish cultivation, the price of which decreased between 1996 and 2001. Medium and low endowment households had a more diversified household income, relying on government jobs and low paying seasonal employment to supplement any agricultural income.

**Table 2 – Intensity of Agricultural Operations in Bharauli Micro-Watershed**

<i>Endowment Cluster</i>	<i>Cropping Intensity Rate (%)</i>	<i>Fertilizer Application (kilos per acre)</i>	<i>Households Hiring in Labour (%)</i>	<i>Area Irrigated by Earthen Dam (acres)</i>
High	196.0	216.6	100	3.0
Medium	175.4	211.1	66.6	2.1
Low	185.7	191.5	60.0	1.2

The key point here is that a diversity of endowments can help form social exchange relations. These relationships are very important, with high endowment households acting as sources of credit to poorer households during times of hardship. Low income households also relied on wealthier families for on-farm wage labour. While caste-based professional specialisation and social exclusions were also seen to have importance, it is clear that significant social power is derived from natural endowments and agricultural assets. These influences combine to form the local social and economic context for resource management.

### **Irrigation Service Provision and Rule Compliance**

As a demonstration of the connection between natural endowments and social power, consider the village of Bharauli. Here, an individual farmer, from the high endowment category, was consistently responsible for leasing water harvesting rights in the village. The farmer has the largest land area in the command area of the dam, all of his plots are at the end of the distribution lines, and alternative irrigation from private tubewells is unavailable. Therefore this individual has a significant interest in ensuring that head users do not exhaust the resource. By contrast in Thadion three of the wealthiest households have private irrigation from tubewells and correspondingly had little interest in the successful community water management. This is demonstrated in Table 3.

**Table 3 – Water Predictability Difference**

<i>HRMS</i>	<i>Water Predictability among Users at Head of Distribution Network</i>	<i>Water Predictability among Users at Tail of Distribution Network</i>	<i>Difference in Water Predictability Between Head-End and Tail-End Users</i>
Bharauli	1.8	1.3	0.5
Thadion	1.7	0.1	1.6

Furthermore residents in Bharauli have experience in managing a *kuhl* (traditional water course) and this has established social norms which apply to the management of earthen dams. For example, this allows flexible rule compliance mechanisms: e.g. a marginal peasant pays for the use of water from the dam by working as a labourer for the water contractor. Bharauli villagers were also meticulous with their records and business dealings, unlike in Thadion where residents were disorganised and water was being used chaotically. This is shown also in the amount of time (mean labour days) and money (mean monetary contribution) spent maintaining the dam and distribution networks: 3.7 days and Rs. 377 in Bharauli versus 2.3 days and Rs 156 in Thadion. In other words, sustained cooperation in dam management in Bharauli has led to a set of rules and a habit of complying with them.

### **Environmental Impacts**

The original Sukhomajiri watershed model focused on the direct link between irrigation management institutions and regeneration of forests in the catchment areas. However making these forestry connections in the study areas were difficult for three reasons: the HFD continued to invest in forestry plantations, earthen dams provide irrigation for only a small percentage of the watershed population, and there is no direct link between livestock use and rates of soil erosion. These factors complicate any generalizations and suggest that difference in slope may better explain variations in soil erosion rates. Overall though, satellite imagery showed that the area of land under perennial agriculture has increased. As well, expansion of the dam distribution network has reclaimed riverbed areas for cultivation purposes.

## Gender Issues

As mentioned above, women are provided with quota representation on HRMS managing committees. Unfortunately, it was discovered that they did not attend HRMS meetings and were not consulted when management decisions were made. This impacts the effectiveness of collection action, since women are significantly impacted by water management decisions. For example, access to irrigation has improved fodder grass production on agricultural fields and this has meant more work for women, as they make more trips transporting grass from fields to their homes. Fodder grass from agricultural fields must also be threshed by machine further increasing women's workloads. As well, decisions to increase cattle herd sizes mean women spend more time feeding and bathing the cattle.

## 4 *Lessons learned and replicability*

The historical context of this case is quite unique. A successful development project, which focused on agricultural and forest management practices, inspired a larger scale implementation of community resource management, primarily focused on water issues. Due to this shift in focus (forests to water) and long-time scale (1970s to late-1990s), it is difficult to transfer the lessons of this case verbatim to another location. Nonetheless there are a few key lessons can be learned for water and community resource management.

When establishing a management framework for common pool resources, the preconditions and endowments of the area are very important. In this case, communities with a diverse mix of household endowments were more likely to hire private contractors to manage their resources successfully. As well, this heterogeneity leads to social stratifications that can be beneficial: for example, wealthy citizens developing patron relations with less-fortunate members of the community and assume leadership roles.

However these leaders must have an interest in the effective and efficient management of water resources. The failure of collective action in Thadion (where wealthy households had private irrigation alternatives) demonstrates that without such an interest, these leaders will not assist other members of the community when they try to access the benefits of the common resource. Whether or not this cooperation will occur can be determined by the geographic distribution of assets (e.g. fields at the tail of an irrigation network) or other factors (e.g. dependence on agriculture income, family connections etc). This holds for private contractors as well, who have a viable role in community resource management and need assurances that they will be able to collect their fees and run a successful operation.

In addition to this local environmental and social context, the broader historical and political situation must be appraised. In this case, national trade policies altered the income patterns of the HFD which in turn affected the hill resource management societies. As well, Bharauli has historical experience with managing a common water resource which helped build trust and acceptance for the new framework. Finally effective participation from all groups (such as women) requires more than quota allocations. Stakeholders who are impacted by water management decisions need to be consulted in decision-making processes and failure to do so can result in conflict, be it now or in the future.

Therefore the main message from this case is that social, environmental, and political factors must all be aligned for successful management of common pool resources. A clear social stratification, complete with responsible leadership based upon historical precedent, is a positive precondition. There must also be community support and participation and this is determined by local economic and social contexts. Furthermore, implementing this type of new management framework can alter social arrangements with potentially significant implications for specific groups (e.g. women). Therefore continued support of these policies requires wide consultation.

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