

**Water Management in the Semi-Arid Margins of Gujarat:  
NGOs, User Groups and Water Rights**

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Paper prepared for the workshop entitled 'Legal Aspects of Water Sector Reforms'  
to be organised in Geneva from 20 to 21 April 2007 by the International  
Environmental Law Research Centre (IELRC) in the context of the  
Research partnership 2006-2009 on water law sponsored by the  
Swiss National Science Foundation (SNF)

## **Abstract**

Indian NGOs have taken an important part in the water sector, in promoting participatory approaches and establishing local water user groups. However, recent water policy orientations are viewed by NGOs as a clear regress regarding participatory processes. User groups have no legal status and water management is attributed to Panchayati Raj Institutions which have limited means and competencies. The paper based on the results of a collaborative research project involving a partner NGO analyzes the efficiency of water use in a water development program managed by local user groups. The latter have the responsibility of maintaining water harvesting structures and fulfill this function efficiently. From this point of view providing a legal status to user groups seems fully justified. However, user groups tend to concentrate water resources in the hands of a limited number of farmers to the detriment of the overall economic efficiency of water use. Beyond the recognition of user groups there is a clear need to clarify water rights and define irrigation standards.

## **Introduction**

This paper is based on the results of a collaborative research project between the Aga Khan Rural Support Programme, India (AKRSP), an Indian NGO engaged in rural development in Gujarat, the Graduate Institute of Development Studies, Geneva and the Swiss Institute of Technology, Lausanne<sup>1</sup>.

The influence of Indian NGOs in water management increased significantly during the 1990s. They promoted participatory approaches aimed, organized local water user groups and gained influence in the definition of state policies. However, recent water policy orientations, defined in the 10th plan (2002) and the Hariyali guidelines (2003), are a source of major concern for NGOs which led to the publication by a group of NGOs working in Gujarat of The Bopal Declaration (Shah, 2005, DSC, 2005). The latter stipulates non-negotiable principles such as participation and equity in water management.

The research project aimed at analyzing the efficiency of irrigation water use in a development program conducted by the partner NGO in the semi-arid margins of Gujarat. The State of Gujarat faces a high increase in water withdrawals and demand projections show a high risk of recurring shortages (Dinesh and Singh, 2001). As irrigation accounts for nearly 90 % of total withdrawals, the efficiency of water use for agricultural purposes is a central issue in the current Gujarat water policy reform.

Results of the research project question the relevance of water policy orientations in particular technical and economic measures foreseen to increase the efficiency of water use. They also highlight the need to clarify the legal framework in which NGOs operate. Indeed, the legal vacuum regarding the management of surface water favors the concentration of surface water resources in the hands of a limited number of farmers to the detriment of the efficiency of water use.

## **The water policy reform**

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<sup>1</sup> The research programme benefited from the financial support of the Geneva International Academic Network (GIAN).

Early British colonial records recall that Gujarat has suffered repeated droughts for a long time. The 1999-2000 drought led to a major water crisis. Relief works, water and fodder supplies and other state implemented emergency programs were unable to contain the impact of water shortages. Twenty five million people (half of Gujarat's population) were affected and severe conflicts opposing rural to urban dwellers broke out in suburbs of the cities of Rajkot and Jamnagar. In response to the crisis, the government commissioned a review of Gujarat's water future with the objective of providing guidelines for a water policy reform (IWMI-IRMA, 2001).

The rapid demographic and industrial growth result in a sharp increase in urban water demand, nonetheless, agriculture remains the main water consumer: Irrigation making up 89 % of total water withdrawals for the whole state. The total irrigated area has tripled since 1970, mainly as a result of private investments in groundwater mobilization. In 2001, 80 % of irrigated lands were indeed supplied by groundwater resources exploited from individual wells. The 1999-2000 drought highlighted the growing risk of groundwater over exploitation. The intensity of groundwater withdrawals varies according to locations. In areas in which groundwater resources are over exploited farmers have access to both superficial water tables and deep aquifers: These areas are located in north and central Gujarat and in three coastal districts. In the rest of the State territory, groundwater withdrawals remain below 65 % of the estimated recharge (Government of Gujarat, 1999). In the latter areas farmers exploit locally recharged superficial water tables.

Conversely, public investments were largely concentrated on surface water developments through major and medium scale irrigation projects in which water use efficiency is very low. In addition to losses inherent to the traditional irrigation techniques like furrow irrigation, the conveyance efficiency is less than 60 % as a result of poor maintenance.

Recommendations from the review are in line with the water management principles defined by international organizations and fall into four categories:

- Technical optimization of harvesting, conveyance and exploitation of water (e.g. through the promotion of modern irrigation techniques such as drip irrigation).
- Institutional reforms aimed at increasing coordination between the different public services managing water uses and decentralized management, that could lean on local institutions and NGOs.

- Economic instruments to regulate water exploitation, including the pricing of water to establish a water market, increased electricity rates and the implementation of exchangeable water rights to regulate the distribution between agriculture and industry.
- Legal measures (undefined) to correct market imperfections in domestic water supply.

### **The study area: water scarcity and vulnerability**

The study area, located in the Surendranagar district of the Saurashtra peninsula, belongs to the semi-arid region of Gujarat. The annual average rainfall is of 450 mm, concentrated in the monsoon season from June to September. Rainfall is characterized by a high year to year variability and droughts occur, on average, one year out of three.

Locally, the spatial heterogeneity in water availability creates contrasting situations. A few villages in the Surendranagar district have continuous and intensive irrigated plots, which can be watered after the monsoon season. A part from surface water and superficial groundwater, farmers in these areas have access to deep aquifers exploited from bore wells. The rest of the territory is characterized by limited water resources and farmers having access to water for irrigation remain a minority. The latter make use of surface water and/or groundwater from superficial water tables. Irrigation in these areas is of low intensity and sporadic in the dry season. AKRSP focuses its action on these villages, where improving water availability is a major issue in order to secure agriculture yields and increase household incomes.

The study area includes five adjacent villages located in the Bhogavo-Limbdi river basin, a non-perennial stream. Water availability and quality varies greatly from one village to another. Indeed, due to the geology of the area, superficial water tables show a variable level of salinity. Titoda and Mangalkui benefit from the Bhogavo-Limbdi river recharge and are not considered as a priority by the partner NGO. Private wells are the main source of water. By contrast, Dhamrasala and Mota Sakhpar, where the salinity of groundwater is high, rely on surface water collected in the reservoirs of the dams built by AKRSP. A few farmers own a well, these can only be used for irrigation in the monsoon season when groundwater salinity is reduced by rainfall. The last village, Nana Sakhpar, has an intermediary situation; AKRSP has

built small capacity water harvesting structures in addition to the private wells which benefit from the Bhogavo-Limbdi river recharge.

Spread over 3100 hectares, among which a little more than half is cultivable, the study area is inhabited by 4176 persons. The majority of the population belongs to the *Koli* farmer cast and to the *Bharwad* and *Rabary* semi-nomad pastoralist casts.

Agriculture and, in second rank, livestock, are the main sources of income, even among the landless population, for which agriculture represents the main source of employment. The importance of agriculture has increased in recent years because of the settlement of pastoralists and the redistribution of public lands to members of untouchable casts. Regarding both food and fodder needs, a large majority of families depend on monsoon crop production. With an average farm size of three hectares, most families are highly vulnerable to droughts. At the end of the monsoon season many villagers migrate temporarily to cities or other agricultural areas in search of work.

#### **Surface water distribution and water use efficiency**

The main objectives of AKRSP regarding water development are to maximize the catchments of surface water flows and to reduce inequities in the access to water. The objective of maximizing the volume of harvested water favors the construction of structures providing a large storage capacity but these concentrate the water in a single location. In the study villages, among 24 dams built by AKRSP, 5 provide 85 % of the collected water. This spatial concentration limits the number of beneficiaries, only 26 % of households in Dhamrasala and Mota Sakhpar benefit from these 5 dams and less than 12 % of Dhamrasala families irrigate from the largest structure, which accounts for 50 % of the surface water harvested in the study area. This illustrates the difficulties in pursuing technical objectives (maximizing harvested surface water) and social objectives (reducing access inequities).

Technically, locations suitable for constructing dams are limited by the topography and the risk of flooding neighboring plots. However, technical constraints only provide a partial explanation regarding the limited number of beneficiaries. In Dhamrasala, half of the area that can potentially be irrigated from the reservoir of the largest dam is currently irrigated. This situation is explained by the low investment capacities of many farmers whom cannot join water user groups. The creation of user groups to assure the maintenance of hydraulic infrastructures is a precondition to AKRSP's

intervention. Members of the user groups have to provide around 10 % of the total cost of construction. Depending on the size of the dam and the number of users, the individual financial contribution ranges from 3000 to 6000 Rs, this remains much lower than the cost of a well. However, in addition to this contribution, to make use of the water farmers have to purchase equipments (a motor pump and pipes) the cost of which exceeds the capacities of many families. As a result, members of user groups gain access to relatively large volume of water. After the completion of a dam, the management relies entirely on the users group. The admittance of new members is subjected to the approval of the group members and groups tend to act as closed clubs restricting the access to water to the founders of the group.

The limited number of farmers benefiting from water favors the production of irrigated cotton which is the main cash crop in the study area. In 2002, in the three villages where AKRSP built surface water harvesting structures, 65 % of the water used for irrigation was dedicated to cotton. Economic studies conducted by the ONG show that the average net margin of cotton per volume of water is lower than the net margin of irrigated monsoon crops such as sorghum, millet, sesame or groundnut. Support irrigation during the rainy season is particularly important to mitigate the negative impact of dry spells during the monsoon and stabilize yields.

The low economic efficiency of irrigation is not related to cotton per se but to irrigation practices and to the fact that a small number of farmers have access to relatively large amounts of water. Cotton is sown in the monsoon season and its production period spreads from November to January. In the study villages, cotton yields range from 600 to 3700 Kg per hectare depending on the length of the post monsoon irrigation period. The number of watering varies from 1 to 15 which explains the large range in yields. However, increases in yields are less than proportional to the increase in irrigation water. The net margin of cotton per m<sup>3</sup> of irrigation water declines from 29 to 6 Rs/m<sup>3</sup> when the number of watering increases from 2 to 15 (AKRSP, 2000).

Farmers having access to large amounts of surface water extend as long as possible the irrigation period of cotton to increase production. But at the village level, an extension of irrigated area, limiting the water available per plot, would increase the overall economic return of irrigation to the benefit of a larger number of families.

### **The need for a clarification of water rights**

In search of a better compromise between technical and social objectives, AKRSP has recently revised its water development strategy. Priority is now given to smaller capacity structures allowing the construction of more dams. The total harvesting capacity is lower than for larger dams but water benefits to a larger number of farmers. Nonetheless, its capacity to improve the distribution of water is limited by current water rights. In Gujarat, surface water exploitation is still regulated by the 1879 “Bombay Irrigation Act” conferring to the State a sovereignty right upon surface water allowing government agencies to develop and manage irrigation schemes. NGOs benefit from a transfer of attribution regarding the construction of hydraulic structures but have no rights, within the current legal framework, when it comes to the distribution of water and the control of access. Their role of in water development project is thus restricted to the organization of users group, the provision of financial support and the supervision of civil engineering works.

At the village level, water management is officially assigned to the state decentralized bodies, the Panchayati Raj Institutions (PRIs), reinforced in 1992, by the 73<sup>rd</sup> constitutional amendment. Recent federal initiatives, such as the 10th plan or the Haryali guidelines dedicated to Watershed programs, strengthen PRIs’ attributions. PRIs are identified as Project Implementation Agencies (PIAs). However, recent studies of the Indian decentralization process highlighted the lack of competence and the limited financial means of PRIs. Part of the concern expressed by NGOs in the “Bobal Declaration” relates to the fact that user groups, on which they base their interventions, have no legal status and PRIs do not provide an efficient alternative with regard to the management of hydraulic structures.

Within the current legal framework, the coexistence of user groups and PRIs is a source of confusion. However, PRIs rarely have a position to negotiate or oppose the constitution of user groups under the conditions defined by NGOs. The claim by NGOs for the recognition of user groups is justified considering the key role they play in water development programs. Nonetheless, user groups draw their legitimacy from their financial contribution. If they have generally proven to be efficient managers of dams, as shown previously, this can be at the expense of the efficiency of water use.

There is a clear need to clarify the legal stats of user groups. Their recognition is certainly important for NGOs in order to secure the management of the dams. However, addressing the issue of the efficiency of water use requires more than recognizing current user groups. There is an urgent necessity to specify water rights

in order to prevent the de facto privatisation of water to the benefit of the wealthiest farmers and to define local irrigation management standards to improve the efficiency of water use.

## **Conclusion**

The Bopal Declaration, expresses the concern of NGOs with regard to recent policy initiatives considered as a clear regress in terms of participatory processes. NGOs militate for a legal recognition of user groups on which they base their interventions in water development programs. The analysis of the efficiency of water use reveals that under the current vacuum regarding water rights, user groups tend to concentrate water resources in the hands of a limited number of farmers to the detriment of the economic efficiency of water use. Furthermore, under current circumstances, farmers having access to relatively large amounts of surface water have little incentives to adopt water saving techniques promoted by government services.

The economic efficiency of water use appears to be closely linked to the distribution of water among farmers. Beyond the legal recognition of user groups, improving the efficiency of water use in our study area requires a clarification of water rights and the definition of irrigation standards in order to prevent the monopolization of water resources by user groups.

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