Water Resource Augmentation & Management: An Exemplary Case Study of Public participation

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Abstract

Community based water resources management has gained worldwide acceptability and recognition over the years, local knowledge on traditional water resources management practices being the center-stone of this approach. Some initiatives in India have grappled successfully with this complex process, and different models of people driven development have emerged. In this study an attempt has been made to highlight one such attempt & perhaps the most notable of these, the Arwari Watershed of Alwar District, comprising of 72 villages. An extremely degraded village with large scale migration, ill health, low productivity, today is unrecognizable. Productivity has increased manifold. There is a sense of community and sharing among all the people, and complete self-sufficiency in foodgrains. Arwari parliament demonstrates what village people can do when they take control of their own development. It serves as a testimony to community interest taking precedence over self-interest.

Introduction:

C*ommunity Participation, Citizen Participation, People's Participation, Public Participation,* and P*opular Participation* are catchwords synonymously used in social sector development (UNDP, 1993). Community Participation is the process by which individuals, families, or communities assume responsibility for their own welfare and develop a capacity to contribute to their own and the community's development (Bhaduri & Rehman, 1982).

People's participation is viewed as a dynamic group process in which all members of a group contribute to the attainment of common objectives, share the benefits accruing from group activities, exchange information and experience of common interest, and follow the rules, regulations and other decisions made by the group. Need for people's participation is articulated in terms of efficiency and/or cost-effectiveness, equity in distribution of benefits, sustainability and empowerment of the people (Alastair, 1981). This process of people's participation basically entails Sustainable Natural Resource Management. FAO has defined it as the management and conservation of the natural resources base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable (FAO, 1997).

Disappointing performances of government owned and operated irrigation systems have compelled a number of countries to transfer rights and responsibilities for management of irrigation systems from government agencies to private or local persons or organizations. The Philippines (Wijayaratna and Vermillion 1994, Svendsen 1992), Indonesia (Soenarno 1995), China (Xu Zhifang 1995) and Sri Lanka (Ratnayake 1995) in Asia, Mexico (Gorriz et al 1995) and Colombia (Garcia-Betancourt 1994) in Latin America, and others such as New Zealand (Farley 1994) and Turkey (Devlet su Isleri et al 1996), have made major efforts in this direction. Transferring responsibilities has come to be seen as a way to reduce pressures on thinly stretched government finances while at the same time improving irrigated agricultural production and ensuring the long term sustainability of irrigation systems (Geijer et al 1996, Vermillion 1991). The intention is to encourage efforts by individuals to take responsibility for the management of resources in the belief that individuals have greater stake and better information for making efficient resource allocations (Brewer et al 1997). In India, the 73rd and 74th Amendments to the Indian Constitution brought in a Local

Government system as the third tier of governance with focus on economic development and social justice. Though consequent to the Amendment, Panchayats have been visualized as the 3rd tier of governance in the federal polity but lack of awareness, rules, bye-laws, political will, etc., have taken their toll on public participation for Sustainable Natural Resource Management (Mathew G, 2000).

Natural Resource mobilisation along watershed lines involving the local community so that they own and identify themselves with the efforts indicates the direction towards sustainable and equitable development. These have been the learnings from successful participatory watershed development projects since the micro-watershed is not only a naturally occurring spatial and ecological unit but also the sustenance base of the community living within it. With the aforementioned aim the present study has been undertaken to highlight the community efforts towards Water Resource Management, in the Arwari Watershed of Alwar District, Rajasthan.

Purpose of the study

The study was undertaken with the following objectives:

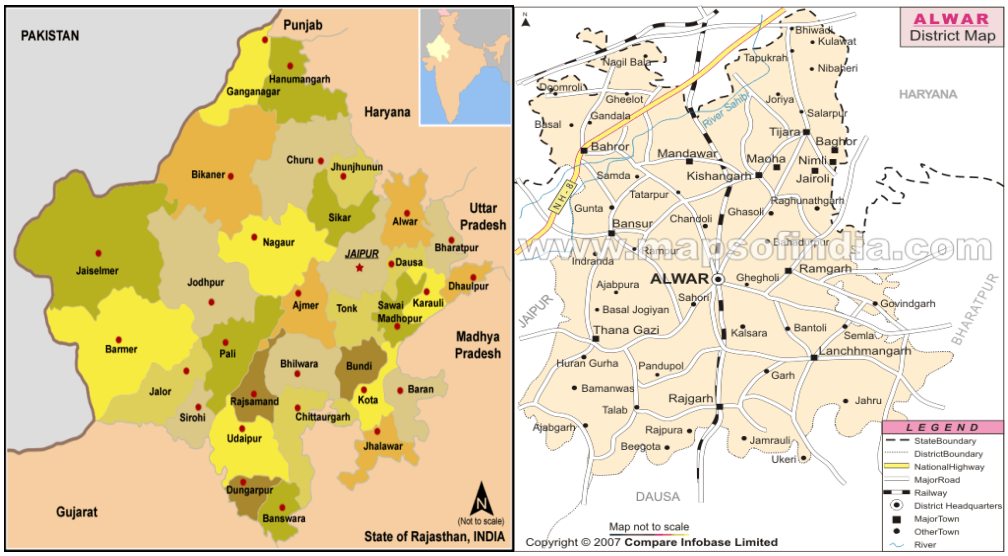
i) To study elements of successful watershed management e.g. level of people's participation, gender equity, conservation of natural resources, distribution of benefits, farmer based research, rural organization etc.

ii) To summarize the experiences of the Arwari Parliament in watershed management, its constraints and lessons learned and make the same available for others to follow.

The Study Area

Location : The district is situated in the north-east of Rajasthan between $27^{o}4'$ and $28^{o}4'$ north Latitudes and $76^{o}7'$ and $77^{o}13'$ east Longitude. It is bounded on the north and north-east by Gurgaon district of Haryana, in the east by Bharatpur district, on the north-west by Mahendragarh district of Haryana, on the south-west by Jaipur and on the south by Sawai- Madhopur and Jaipur districts.

It has an average elevation of 271 metres (889 feet).



Climate:

The climate of Alwar is quite dry. The summer season is very hot, but a little less than the other cities of Rajasthan. The average temperature in the summers ranges between 41° C (maximum) to 28° C (minimum), approximately. Alwar weather experiences a cold winter. The winter temperature falls in the range of 23° C (maximum) to 8° C (minimum), approximately. It experiences a short monsoon. The average annual rainfall is approximately 57.77 cm, with the average humidity being 70%.

The study area falls in drought prone area of the country with high probability of drought once in three years.

The resultant acute water shortage due to lack of rains over extended periods of time in the study area has affected various human activities and lead to problems like widespread crop failure, unreplenished ground water resources, depletion in lakes/ reservoirs, shortage of drinking water and, reduced fodder availability etc.

Methodology

Rapid Rural Appraisal method was used for which the following steps were undertaken:

- Selection of a successful watershed management project from various on-going projects in the country and review of the mechanisms used for promoting, testing and demonstrating peoples participation.
- Information collection through group meetings with GO, NGO and PO of the watershed area.
- Visits and survey of the households.
- Analysing the data and writing the findings.

People's Participation in Water Resource Conservation

Pre-Intervention Scenario:

During early 80's Alwar had been opened to miners and loggers, who decimated its forests and damaged its watershed. Its streams and rivers dried up, then its farms. Dangerous floods accompanied the monsoon rains. Overwhelmed by these calamities, villagers abandoned their Johads & emigrated to urban areas for employment.

As men shifted to the cities for work, women spirited frail crops from dry grounds and walked several kilometers a day to find water.

The Intervention Stage:

The change began in 1987, when Tarun Bharat Sangh (TBS), an NGO, started helping villagers in Gopalpura village to construct and rejuvenate traditional earthen dams called johads. Johad is a traditional way of conserving water in the desert area by earthen check dams that catch and conserve the rainwater, leading to improved percolation and ground water recharge (Mishra, 1993; 1995). It is a simple traditional and inexpensive mechanism. A *johad* checks rain water in *nalas* (drainage channels) where it is impounded for 50-60 days, spill-ways are provided to allow excess water to overflow. After the water dries up, crops are grown in the *petta* lands and wells are recharged so that additional irrigation becomes possible.

Steps undertaken for People's participation in water resource conservation are as follows:

Awareness Campaign: An awareness campaign for Gram Swawlamban, was organised every year during the summer months for forty days in different villages. In this campaign discussion on Gram Swawlamban, soil conservation, improved seeds, collection of herbal medicine and shramdan were the

activities undertaken. All these activities were coordinated to mesh with the villager's traditional cycle of rituals.

Social Networking: Meanwhile, with others he waged a long and ultimately successful campaign to persuade India 's Supreme Court to close hundreds of mines and quarries that were destroying the ecology of Sariska National Park .

Integrating Community with water resource conservation: TBS discovered that only peoples' fullest cooperation can achieve these ends. The water harvesting structures called 'Johad' (water pond) were constructed with the consensus of villagers' Gram Sabha. Every member of the village contributed either in terms of labour or money towards this collective effort. A social fencing was formed by the villagers' agreement to not let browsing by cows for 3 years, goats for 5 years and camel for 7 years to revive the denuded slopes in their village. People discussed on contentious issues for hours together and solved them in an amicable way.

Need based Resource Conservation: With a view to fulfill the needs of the villagers, Shri Rajendra Singh started rural development and employment generation by Water Conservation. The first step was to identify water and fodder as the key to revival of rural life in the ravaged lands of Alwar. To make both available round the year, micro-structures to trap water had to be built and the denuded hills allowed regenerating, unimpeded by animal browsing.

As a result of these efforts the seasonal rivers in the northeastern Rajasthan area, that had nearly dried up become perennial. After the regeneration of these rivers, the Govt. of Rajasthan gave contracts for fishing in certain stretches of Arvari River. To oppose this policy and to protect fish and other riverine life forms, a three-month long Satyagraha was organised for not allowing any fishing. This Satyagraha resulted in reversal of govt. policy.

Formation of Arwari River Parliament:

To sustain this unity and the river in future a decentralized power model has been structured among the 72 villages of Arvari River Watershed , i.e., the ARVARI PARLIAMENT.

The primary objective of Parliament was to safeguard integrated and water management efforts of the community of river catchments where decisions are made at the grassroots and not by centralized institutions. Thus, Arwari Parliament developed the policies and the rules to govern & integrate management of interlinked recourses like water, soil and the forest for the well-being of the villagers. The Arwari Parliament conveys its general meeting twice in a year to deliberate upon the best strategies of the recourse conservation.

The Parliament, with two representatives each from 72 villages, has framed 11 rules with regard to the use of the river waters, relating to all aspects of water management, from the extraction or selling of water from the river, to the revival of traditional methods of water conservation. A coordination committee comprising members selected by the Parliament handles the operations and ensures compliance with the rules.

Following are 11 rules of the Parliament:

1. Arvari basin shall not have sugarcane, paddy & chilli. People growing these to be penalised.
2. No one shall draw water from the river after Holi (Mar Apr) up to monsoon (July).
3. Borewells not be allowed in Arvari catchment.
4. Recommended crops - barley, maize, bajra in upper and vegetables in lower reaches.
5. No axe can be carried to Bhairodev people's sanctuary, catchment of the source of Arvari.
6. Fishing can be done only for food.
7. Large-scale trade of foodgrains and vegetables was banned. Local production and consumption to be emphasised.
8. Village people to help people from other areas for implementing water harvesting structures.
9. Cattle outside the region are not permitted for grazing.
10. Rotational grazing to be followed by farmers in their own pasturelands.
11. Industrial units prohibited in 405 sq km of Arvari basin.

The Arvari Parliament meets on a regular basis and has been successful in resolving conflicts and safeguarding the water

resources. Though this 'river parliament' has no legal status and its decisions are not legally binding, the moral force of the people makes its survival possible. The workers of Tarun Bharat Sangh have served as facilitators. The success of the Parliament has been a result of the efforts of every member of the local community, each having contributed to the safety and maintenance of local resources.

The post Intervention scenario:

Socio-economic impact of water conservation in the Arwari river catchment is as follows:

Revival of the Geo-environment:

a) Restoration of the Surface – Ground water Interaction mechanism: The rainwater harvesting through small structures consequently revived Arvari river, which had been reduced to seasonal river, benefiting some 70 villages. The area was subsequently declared a "white zone" by the state government. The impounding of just three per cent of the rainfall is bringing about the economic and ecological miracle of regeneration in the region (Agarwal and Narain, 2000).

b) ***Prevention of erosion****:* In cases where the primary objective of the RWH was soil conservation, a significant impact in crop productivity and a reduction in expenses in maintaining and levelling fields affected by gully formation has been observed.

c) ***Prevention of Natural Hazards:*** A major ecological outcome of *johad* concentrations is the reduced impact of both floods as well as droughts. In the areas of Alwar district, which has dense concentrations of TBS supported *johads* and other water harvesting structures, the effect of the 1996 flood was minimal or absent all together; elsewhere, floods devastated villages, destroyed *pucca* bunds and in general created great havoc (Ravi and Jain, 1997; Singh, 1995; Singh, nd). A dense system of *johad*s cuts the pace and fury of flood waters that race down the hills with great pace and force, and thus preempts what might otherwise become a flood.

Improvement in the Agricultural Scenario: It has significantly improved as is revealed in the following cases:

a) Increase in water for irrigation*:* Where RWH has increased Groundwater and previously un-irrigated or inadequately irrigated fields have been put under irrigation, the impact has been the most dramatic in hundreds of villages (GOR, 1999). Wells, which a few years ago were completely or almost dry, now abound in

water that can be pumped for as long as farmers need. Several small rivers and numerous natural drainage ways that had been dry for decades have suddenly sprung to life and many flow perennially (Patel, 1997; Singh, 1996).

b) Increase in net irrigated Area*:* A study conducted in 2000-01 by an eminent economist; Bharat Jhunjunwala, observed that in the project villages of TBS, the area irrigated by a well increased by 7.4 bigha in project villages in comparison to 0.3 bigha in control villages and therefore, the impact of RWH was dramatic as the average increase in irrigated area in a project village was 426 bigha against mere 2 bigha in the control villages.

c) Increase in productivity and income*:* The most important input in increasing agriculture productivity is availability of secure water for irrigation. *In the case of wheat, the average productivity has increased from 720kg per acre to 1,500 kg per acre.* One major benefit of the RWH has been that cultivation has shifted from one Kharif crop of bajra or maize to second Rabi crop of wheat or mustard. Since the Rabi crop is the main cash crop in this region, this has translated into significant economic gains.

In many villages, farmers have diversified into crops such as onion, vegetables and flowers due to assured water availability. This has led to an increase in agricultural income. In some villages, reports of wastelands being converted into agriculture lands are also reported.

Impact of forest protection*:*

In villages where protection of Common Property Resources (CPR) and catchment has been done in addition to RWH structures, the improvement in quantity and quality of fodder has changed livestock composition.

a) Increasing drinking water availability for animals*:* The increased availability of drinking water for animals (both in grazing lands and in villages) in peak summers could be rated as star achievement. Drinking water security has resulted in significant changes in cattle population and composition.

b) Increase in fodder through strengthening of agriculture yields*:* In villages where a significant recharge in wells has taken place leading to better irrigation, a positive impact has been observed on fodder availability from agriculture lands in the form of agriculture residue from Bajra, maize and wheat as well as green fodder.

Societal Benefits:

a) Improvements in social dynamics : Local social capacity has been built with support from TBS. The creation of a local village assembly has strengthened cooperation, conflict resolution and management skills.

b) Health Benefits : More water availability has direct positive effects on health and sanitation.

c) Access to land : All households own land and common areas used for water harvesting do not involve the suspension of use rights. Yet the "lower" Balai community claim their livelihoods have been negatively affected since they had expected to be given the common land for their personal use.

Economic Benefits

a) Increase in milk yields of cattle: Due to increase in Drinking water availability from RWH and increase in fodder availability by protection of CPRs and catchment, it is reported to be a marked improvement in cattle health. This improvement is reflected in increased milk yields of cow and buffaloes.

b) Incomes from animal husbandry: With increased water and fodder availability, there has been a consequent increase in incomes from the animal husbandry sector. In many villages, the real annual income from animal husbandry per family rose by an impressive three times.

c) Impact on land Valuation : The area which had become a basket case has become green once again and is poised on the road to rural prosperity. Land values in many TBS areas have shot up from US $ 2000-2400 per ha to US $9000-10000 per ha.

d) Economic Implications: TBS's works are cheap compared to government structures. TBS has contributed around 70 million rupees (US$1.4 million) in outside funding to the cost of the water harvesting structures. This works out to a cost of 500 rupees per hectare irrigated and 100 rupees (US$2!) per person supplied with drinking water. An admittedly back-of-the-envelope comparison of these costs with those of the notorious Sardar Sarovar dam project (SSP) in Gujarat state gives startling results.

Taking a conservative estimate of the total cost of SSP of 300 billion rupees ($6bn) gives a per-person cost of 10,000 rupees for drinking water supplied --100 times more than in Alwar. The cost of supplying one hectare with irrigation water from SSP works out to be 170,000 rupees --340 times more than in Alwar (Patrick McCully, 2003).

Theoretically, if the budget for SSP was available to TBS-type water harvesters, they could provide drinking water to three billion people (half the world's population) while irrigating 600 million hectares (more than twice the world's irrigated area).

Conclusion

The present study demonstrates the turnaround in the Arwari Watershed region due to revival of traditional water harvesting structures backed up by region specific institutional mechanisms.

The study reveals that promotion of traditional water harvesting structures through appropriate institutional mechanisms and financial arrangements is the best intervention or adaptive mechanism for water resource augmentation as well as farm economy based livelihood.

This requires reworking the paradigm of water management, so that it is designed to harvest, augment and use local water resources so that it leads to inclusive growth at all levels.

In the above context, traditional community based water management systems, pave way for identification of appropriate adaptation and mitigation strategies to address the implication of climate change on economy and ecology.

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