WATER

The Water Women:
A Case Study of Tank Restoration

KARNATAKA

Keya Acharya

In 1980, an NGO called Gram Vikas (GV) began operations on a small scale in an interior village called Honnsetthalli in Mulbagal taluk of Kolar district in Karntaka. The focus of the NGO was child development through a nutritional programme, but the issue, being intertwined with the development of women in the village, led them into trying programmes to improve the lives of women in the region. Small self-help groups (SHGs) were organised into savings and credit programmes.

Within a decade of working in the field, GV realised that for any real change to come about in the quality of women's daily lives that were linked to an agrarian subsistence economy, land-productivity would have to be improved. And for that to happen, ecological regeneration of their arid and degraded lands was necessary. The evolution of GV's SHGs into what is now a 5460-member strong independent women's movement came about from realising that restoring their access to water which in turn led to intricately related improvements, would have to be their primary focus.

Introduction and History of Kolar District

Kolar District, in the Eastern Dry Agro climatic Zone of the Deccan peninsula without any perennial rivers, is historically drought-prone. Rainfall is insufficient and unpredictable, with variations ranging from 562.3mm in 1960 to 1,215mm in 1962. The average annual remains 750mm.

The area has hence historically depended on its ancient irrigation water-bodies or 'tanks' as they are known locally, for its water needs. Designed to catch and store the run-off from catchment slopes, they were constructed by kings and philanthropists centuries ago and were maintained by the local communities. Karnataka has 36,672 tanks and Kolar has 4,488. Mulbagal Taluk has about 620 tanks with about 400 in the GV project area.

During the colonial period, the British took over the authority of maintenance of these tanks from the local villages and placed them within their Administration's Irrigation Department. Though the British, maintained them chiefly with their own interests in mind, local people lost both interest and stake in the ownership of these tanks.

Since the post-independence era, the Administrative mindset has been on mega projects for irrigation and large-scale agriculture. The larger tanks of over 100-hectares in size became the property of the Department of Major Irrigation, those up to 50 hectares came under the jurisdiction of the Department for Minor Irrigation and the smaller ones passed on to the Rural Department which passed them on to Taluk and Zilla Panchayats according to their size. But overall government neglect was near-total, both due to a lack of will and foresight together with a lack of resources brought about by focusing only on mega-dams.

The result is massive siltation from soil washed away from catchment slopes – to the extent of 60 per cent in many cases. Most are in a state of utter disrepair, with dilapidated sluices and spillways and decrepit crest gates. While they previously supplied water for two crops earlier, the tanks now can support only one, if at all.

The consequent lack of percolation has had a disastrous effect on trees, plants, shrubs and grass in a large radius around these tanks but the effect has been most pernicious on soils. Scanty rain and deforestation has reduced green cover, loosening and eroding the soil, which is loamy, sandy, gravelly and lateritic in structure. Increased wind velocity caused by lack of trees as arresters has led to soil being blown off in large areas, exposing bedrock. Little wonder then, that the area is now drought-prone.

Moreover, as many as 1,900 tanks in the State have been encroached upon, mainly usurped by rich landlords (20 – 30 hectare landholdings) who have now dug bore wells to access groundwater due to scarcity of surface water, growing cash crops to feed the nearby capital city's of Bangalore's markets, 80 km away.

Without an adequate groundwater monitoring policy and a check on the number of bore wells that could be sunk, those who could afford them have sunk bore wells at random, resulting in an unprecedented fall in groundwater tables. A Department of Mines and Geology Report, 1970 states water tables then being 'found at depths from 2' to 45', which is down to 500' today.

In what appears to be a replay of lack of government co-ordination, the 1970 report even specifies the size of wells that may use pumping energy

according to their recharge capabilities and the number of wells that may be sunk in total. A groundwater policy however, is yet to take off.

Those most affected have been the poor and marginalized, with smallholder farmers who had neither water from their tanks nor the finances to sink bore wells being reduced to subsistence –levels.

Local markets began registering a scarcity of traditional staples as crop patterns changed from low water consuming traditional cereals like ragi, to water-intensive cash and horticultural crops grown for Bangalore's markets.

Furthermore, incredibly short-sighted rural policies have seen a spurt of dairy-related and silkworm mulberry farming in the last three decades, exacerbating the use of water in a region historically arid, and encouraging the indiscriminate exploitation of groundwater.

It is against this backdrop that Gram Vikas saw tank restoration as its core strategy for rural development in the region. In the years preceding 1994, it had done, along with its SHGs, partial de-silting work in 3 tanks and applied this nutrient to local fields, had strengthened bunds through nitrogen-fixing plants and had undertaken one 'jatha' on tank-restoration and ecological advocacy going through 400 villages in 3 taluks. Above all, it had earned the credibility of the community also through making all expenditure on tank de-silting public.

The Birth of a Movement

By 1994, both Gram Vikas and its SHGs of women had realised that for effective campaigning and networking on tank-restoration, the women needed to form an alliance.
Thus, in 1994 the Grameena Mahila Okkutta or Rural Women's Federation came about. It became a registered Society in 1997 and now has 5460 members from 270 SHGs in three taluks of Kolar District.

Though completely independent of GV it works in close alliance with it, having gained experience in tank-de-siltation matters from GV in the previous years. With GV's data on

- Extent of water spread area of the tank
- Extent of silting in the tank
- Extent of catchment area
- Extent of Command area of the tank
- Farmer-wise holding of land under the command area of the tank and the farmers' socio-economic profiles
- Cropping pattern
- Whether the tank surpluses

- Extent of inability of tank (Amount of shortage of water) to meet the crop needs
- Number of open wells in the command area
- Ground water levels

The Okkuta secured a 2.3 lakh loan to desilt a 39-acre waterspread area of Bevanatha tank in 1997. NABARD, having seen the results and impact of previous tank-restoration done by these women through GV, readily supplied the money.

The women also had previous experience through Gram Vikas meetings to decide on the mode and operations in de-silting. Briefly these involved coming to decisions through a series of joint meeting with farmers from the command and catchment area of the tanks, SHG members, Gram Panchayat members and Okkuta secretariat members.
Decisions were left to the farmers entirely, to come about through joint participation of the entire group.

The issues discussed and decision taken related to:

- Resources – share of the community, share of GV, source of funds
- Formation of committee to bear the overall responsibility of the project
- Deciding the mode of payment of the share of people in the cost

- Prioritising Works related to the tank system
- Mode of de-silting (this was manual in all GV-supported de-silting projects)
- Modes of transporting silt such as tractors and bullock carts
- Mode of periodicity of payments
- Prioritising lands for transporting silt
- Fixing work and wage rates for excavation of silt
- Arranging for work teams (Arranging for workers from other villages in case of shortage)
- Introducing a token system to keep track of tractor loads of silt transported, for payment
- Fixing responsibility for cost share recovery from farmers (Responsibility for collecting dues from farmers was given to persons designated as Neighbourhood Community Network (NCN) leaders who were persons of good standing in the community and who were prepared to undertake the responsibility of collecting dues from at least five families each in her or his neighbourhood. Another criteria for selecting the NCN leader was that her or his house was in the middle of the cluster of houses of farmers receiving silt. MOUs were signed with each NCN leaders detailing his responsibility and liability,

and reflecting the instalments due from each farmer for whom the NCN leader was responsible)

- Assess the capacity of each farmer to utilize funds and ability to repay (the committee did this after intensive discussions. The committees assessed the capacity of people to share costs that is the percentage of the cost. Xerox copies of the signed MoUs were given to all signatories and members. The discussions also covered identifying bore well farmers and cash crop cultivators and fix higher slabs of repayment instalments for them.

Though methods have varied according to the priorities of different tanks, a typical operational mode has been identifying farmers to whom loans for bullock-carts were given (approximately Rs. 12,000), repayable interest-free in two years. The interest amount had, till recently, been taken care of by Gram Vikas and donor support, but the entire amount is currently to be paid back by the Okkuta and the community.

The bullock-cart owners charge a prior fixed rate of an average Rs. 30 per cartload of silt and Rs. 25 for transportation of this cartload to the buyer's fields. Men and women both work in the digging and carting head-loads of silt to the waiting bullock-cart and are paid daily wage rates. Between 120 to 300 manual labourers have been used, according to tank-size, contributing to about 40% of costs by way of labour. An average 25,000 cubic metres of silt has contributed to fertilising up to 500 acres of land.

Tractors have been used by those farmers already owning them, renting them to the Okkuta in exchange for silt. Doddaguttahalli tank transported 9000 tractor-loads of silt!

Alongside the de-silting work, the Okkuta organised an advocacy campaign. 40 women were selected on the criteria of being able to be away from home for an extended period (older women, widows, women with adult daughters who took over house duties) Also crucial to their selection was their understanding of the issue and the ability to articulate it convincingly. Further, ability to sing, lack of stage fright and ability to keep cool under provocative questioning were also criteria.

The women were trained, armed with information on the state of tanks and their socio economic importance. They were taught songs, a few or them composed, sung and recorded on audiocassettes by many team members themselves. They were issued with uniform saris and banners, which they carried into visiting villages.

The team worked very hard, getting up at the crack of dawn, cooking their food for the journey, riding off in a hired tempo to the villages, singing songs and raising slogans, returning in the evening after visiting at least a dozen villages. Cooking dinner was a shared duty.

The Okkuta also sees advocacy through:

- Organizing theme conferences of rural women where tanks were focussed on
- Inviting dignitaries and policy-makers (including the Governor, Speaker, Union Minister for Rural Development, State Ministers, senior officials) to the conferences in order to draw their attention to the issue
- Motivating women groups to secure ZP and district administration funding for tank restoration projects
- Drawing the attention of the media, both print and electronic to the issue.

The strategy has worked very well. Their efforts have resulted in the forming of a ' Tank Development Committee' in each village they visited. The team also motivated every village to send a representation to the Secretary, Rural Development, Government of Karnataka, demanding de-silting of tanks, with the Okkuta keeping up a bimonthly barrage of representations to the Zilla Panchayat, Agriculture Department and Gram Panchayat in this regard. The commitment of these women is extraordinary.

The campaign team members also participated in a seminar at Dodballapur on 'Women & Water' where they spoke forcefully and with conviction about the importance of de-silting tanks. Such was their persuasive oratory that they got many 'orders' for help in forming SHGs to become part of the movement.

But the Bevanatha experience showed the Okkuta the steep burden on bullock-cart owners to pay back their loan amount in two years. The Okkutta's General Secretary, a woman of exemplary strength, 40-year-old Papamma, says, " How can the government expect us to raise the money to clean up all these tanks? It is not only us, but everybody else who benefits from water coming back into the tank ".

It is this pressure to pay back loans that forced the Okkuta to go to the government in a long-drawn protracted battle to get the administration to help them in their tank-restoration efforts. The struggle in Minjenahalli is representative.

The Case of Minjenahalli

Minjenahalli village in interior Mulbagal has a population of 440 in 85 families of which 59 are SCs, 7 are STs, 10 are from the Backward Classes and only 9 are from the 'upper castes'. Of the village's two tanks Mavinakere and Badavankere, the latter was left exclusively for the lower

castes traditionally – its name bears that out, translating into English as the 'poor man's tank'.

As in the case of all tanks, this one's desperate condition made Minejenalli's 4 SHGs, part of the Okkutta, write to the Zilla Panchyat's CEO for help in 1998. Two years of fruitless pleas followed, though in 1999 the Okkutta succeeded in securing a letter from the ZP sanctioning Rs. 2.5 lakhs for the de-silting work.

But the funds were not released on the plea that the budget had been exhausted for 1999, but would do so in 2000. The year came and went, and still no money was forthcoming. Worse, money that had actually been sanctioned by the ZP for de-silting Badavankere tank had been diverted to work elsewhere.

In 2001, the Okkuta approached the local MLA, who is also the Speaker in the Legislative Assembly. But even the MLA's intervention couldn't over ride ego-clashes between the ZP CEO and ZP President, with the CEO blocking the release of funds. The women then picketed the offices of the Zilla Panchayat on a day when a meeting between the region's MP with other officials were to take place, refusing entry to anyone unless their legally allotted funds were released.

The MP, Mr. KH Muniyappa then wrote a letter to the Deputy Commissioner of Kolar, asking him to release the funds from the MP Local Area Development Fund (given to each MP to be used at his discretion), if the ZP failed to do so. Media coverage of the issue however made the Zilla Panchayat of Kolar district release the funds.

Yet, the struggle continued, this time in the government's unwillingness to allow community participation in the work of de-silting. ZP Engineers ruled that mechanical excavators through the tenders and contracts process would be used. The entire village joined into the effort of 'gheraoing' the engineers and telling them firmly that they would do their own de-silting with ZP funds to pay for their labour. The engineers finally relented.

The Okkuta Today

The Federation today is a powerful networking body that has caught the attention of the district administration. About 1000 of its women have emerged as leaders at the community-level. It organises training and exposure trips for women, legal assistance in women's problems, conducts health awareness camps, manages one rural hospital at Yalagondanahalli, works with the government in its immunisation programmes, conducts night schools and supports education for girls and helps form children's federations.

On the issue of tanks, its influence is unarguably complete. With the need to repair tanks firmly in the public agenda, Karnataka's government began by issuing a series of statements beginning with the Chief Minister's 2000-01 Budget Speech in which he declared his government's intention to de-silt 25,000 tanks throughout the state in the coming five years, which figure has now been scaled down to 5000 tanks @1000 tanks per year in a Tank Restoration Project called the Jala Samvardhane Yojana.

The JLSY will restore, through State assistance these 5000 tanks in 5 districts and hand them O&M to 'User Organisations' in a phased manner. 80% of the money is being asked for from the World Bank in 2002 (which has offered 12,000 Crores for rural and urban development to Karnataka, and awaits the State taking initiatives to start JLSY); 11% will be the government's contribution and 9% is to be brought in from the User Communities.

Moreover, the Deputy Commissioner of Kolar visited the Grama Vikas' tank de-silting projects and offered government funds for completing some of the projects. GV, now confident of this extraordinary body of quiet strength, has asked that the money be routed to the Okkutta's funds. The newly appointed Project Director, a senior official from the Minor Irrigation Department, appointed for the JLSY visited Grama Vikas for discussions on the policy, approach and strategy to be adopted for de-silting. Base line surveys are currently underway.

However, this fight does not end with the government recognising a people's movement. There are already different views within the government over the criteria of the selection of tanks, a factor that has political interests playing its part, together with divergent views on post-project management structures.

In June 2000, in its bid to woo the WB's approval for funding, the state government promulgated an ordinance creating a four-tier structure of Water User Co-operatives. The ordinance lacked the benefit of informed debate and was a Xerox copy of a similar piece of legislation from Andhra Pradesh. The drafting and promulgation of the ordinance was clouded in needless secrecy. The booklets containing the rules and regulations were neither disseminated nor debated, and bundles of the booklets are gathering dust in the offices of District Registrars of Co-operatives Societies.

Three discussion drafts for the Department of Minor Irrigation (DMI)-sponsored workshop (that was scheduled for August 1 but was

postponed), two of them commissioned by the government, the other being the World Bank Mission statement speak in divergent voices.

The World Bank Mission note appears to be more development-oriented and more people-centred than the DMI-sponsored studies that are fundamentally flawed. The DMI-sponsored drafts define tanks in engineering terms, and view the projects as engineering works, although engineering or technology component in such projects is very basic. They view de-silting of tanks in a narrow bandwidth, as a production enhancement measure to raise revenue rather than the all-round development strategy that it actually is. In short, they suffer from tunnel vision.

Given India's preponderance over bureaucracy and politics, no people's movement can rest once it has reached the ears of the government. The Grameena Mahila Okkutta's struggle is now gathering itself to relentlessly follow up on the government.

Tank System Restoration Project: A Model Budget For A Tank[1] *(Courtesy: Gram Vikas)*

Sl	Activity Head	Unit Cost	Amount (Rs.)
1	De-silting (Excavating and transporting the silt to fields in the catchment area)	30,000 CMT of silt excavated and transported @ Rs 50 per CMT of silt	15,00,000
2	Soil conservation	@ Rs 500 per acre for 250 acres	1,25,000
3	Casing of the tank bund	2,900 mandays @ Rs 35 per manday	1,01,500
4	Check dams and gully plugs to arrest soil erosion leading to silting of tanks	4 units @ Rs 75,000 each	3,00,000
5	Agro-forestry	12,500 saplings for planting in catchment area, @ Rs 10 per sapling	1,25,000
6	Fodder Development (trees)	2,500 saplings @ Rs 10 per saplings	25,000
7	Repair of waste weir canal	2,900 mandays @ Rs 35 per manday	1,01,500
8	Repair of Distribution Canals in the Command Area	--	--
9	Fisheries (Purchase of Fingerlings, nylon nets, feeds,		75,000[2]

[1] For a tank with average acreage of 22 acres of waterspread, 30.15 acres of command area and 250 acres of catchment, based on Grama Vikas experience in de-silting 13 tanks partially, and also on the average size of a village tank in Mulbagal Taluk

	stone pillars, security)		
	TOTAL		**23,50,000**[3]

[2] Break-up has not been worked out since fishery was attempted in only one tank

[3] The figure does not include overhead / administration / implementational expenses which works out to 15 per cent over and above the projected figure

WATER

Bhandara the Lake District

MAHARASHTRA

Vijay Paranjpye

Background

Historically, India`s economy has been predominantly an agricultural one and agriculture has been vulnerable to spatial and temporal vagaries of monsoons. From time immemorial, the prime concern has been protection of crops from unpredictable monsoons through efficient management of available water resources. References to an efficient management of water resources and equity concerns regarding their distribution, and that agriculture did not depend solely on rainfall can be found in the epic Mahbharata, (2 AD) and in the works of Magasthenese, the Greek ambassador in the royal Gupta court (325 AD).The earliest canal systems in the country date back to the 2nd century (AD). Vijaynagar Empire gave a major impetus to irrigation development Between 500 and 1500 AD several reservoirs were created in hilly terrain by building small earthen bunds in order to provide water for irrigation to the water scarce regions in Southern India. Clearly water resource management has a long and a rich history in India.

In the early 19th century, with the advent of high head hydraulic structures in the in the country, large structures with larger storage capacity were built for irrigation as protection against the two great famines. By middle of the 20th century it was felt that larger surface water storage were inevitable for augmenting and stabilizing irrigation supplies as well as for hydropower generation. Large dams were a vital part of strategy adopted after independence to extend irrigation facilities in order to increase food production. As a consequence, today there are 4000 large dams in India.

Unfortunately the rich heritage of traditional surface irrigation systems were not supported financially under the Five Year Plans. Approaches to water resource management became centralized and sectoral and had practically no relevance to the local situation as they envisaged little or no local participation in water resource management. Centralized and fragmented water resource management severed people`s connection with traditional, community based, sustainable use of water leading to

demand outstripping supply, and widening the chasm between the water "haves" and "have-nots". Interventions became increasingly non - sustainable and iniquitous. Water resource management evolved over the entire post-independence period shows no awareness of rainwater harvesting methods or participatory water management.

This loss of faith in centuries of experience of water management became institutional. In fact when talking about water the constitution essentially speaks of only river waters alone and not of water as a part of the ecological system. Riparian or appropriation rights of private parties farmers etc. are not secured (unlike in the United States), since govt. rights are treated as paramount. Traditional systems that have served for generations and are still
functional still have little or no security. The sources of supply for these systems are often diverted to other uses if the irrigation departments so desires .For example, traditional water harvesting structures rebuilt in Rajasthan by Magsayasy award winner Rajendra Sinha`s Tarun Bharat Sangh have been consistently declared illegal and demolished. This clearly inhibits local participation and private investment in traditional water management.

Traditional water harvesting technology was based on an understanding of the constraints and impact of local ecology, geology, topographical formation and orographic patterns on livelihood security. Water was treated as a part of ecology and culture and there was a strong inter-generation equity concern in technology adopted. Traditional systems have benefited from collective human experience since time immemorial and in that lies their biggest strength. The backward and forward linkages existing in traditional systems ensured stable output and near full employment. Irrigation like in modern times formed an important forward linkage in the village economy and its sustainability lay in the fact that such linkages were not obliterated any stage.

An evaluation of traditional water systems will enable us to find answers to problems of inequity, inefficiency, negative returns and non-sustainability that current water management techniques have inflicted upon us.

This paper will focus on the collective efforts of a Kohali Community of Bhandara district of Maharashtra, to arrest the flow of water amongst small hillocks and mountain ranges, to use it on the plains in this region. It deals with the numerous tanks found in Bhandara district of Maharashtra and the technical ingenuity of the Kohali community who built them almost 400 years ago and still are the largest source of irrigation in the Bhandara district. Thanks to these tanks, Bhandara has

a crop pattern far superior to that of the rest of the State and have the lowest proportion of barren and uncultivable areas and fallow lands today.

Reconnaissance: Bhandara District

The entire district of Bhandara falls within the drainage of the Wainganga river and one of its principal tributaries, the Bagh. Topographically this basin is sub-divided into Madhya Wainganga river basin and Nimna Wainganga river basin The whole country is rolling and open, at an average elevation of 250 m to 300 m. The higher elevations are seen towards the north-west and east, with a broad central depression being occupied by isolated ranges of low hills that rise to low heights above the adjoining floor-level of the country.

Geographically, Bhandara district lies between 20° 39' and 21° 38' north latitude and 79° 27' and 80° 42' east longitude. Surrounded by Balaghat District of Madhya Pradesh in the north, Rajnandgaon District of Madhya Pradesh in the east, Chandrapur and Gadchiroli

Districts in the south and Nagpur District of Maharashtra in the west, it is one of the smallest districts in the State. With an to area of 9,280 Sq. Km,it ranks 17th among the 31 districts of Maharashtra State in terms of population and receives an average annual rain fall between 1100 mm to 1400 mm.

The soil of the district is highly varied, arising out of the tropical sub-humid weathering of crystalline metamorphic and igneous rocks Most of the cultivable soils of the district belong to the *morand* and *sihar* types, both of which are light and slightly acidic in nature. The *sihar* are considered to be the best rice soils of the district while the *morand* soils are devoted to rabi crops like wheat and linseed, and Kharif jowar.

In its geological setting the district offers a marked contrast to the rest of the State. The rocks underlying the district are quite dissimilar to those, which underlie in most pates of the Deccan region in Maharashtra, with considerable variety in its rock formations that mostly belong to the archaean and the 'Dharwar' formations. The entire impervious archeain gensic terrain is therefore very suitable for adopting the tank irrigation technology.

The topography of the entire area reveals an east to west orientation, steadily opening out into a broad valley southwards in the west-central parts of the district, separated from its tributary valley basin by intervening hill ranges that also act as water-partings between the lesser streams of the district with water draining-off easily natural terrain.

Importance of the Traditional Tank Irrigation System

The district of Bhandara is often called the "lake district" of Maharashtra, which is well justified by the fact that there are as many as:

238 large tanks with a size of 10 hectares and above;
3007 tanks with size between 10 to 4 hectares;
7534 tanks with size between 2 to 4 hectares;
13,289 tanks with size between 1 to 2 hectares;
19,313 tanks with size below 1 hectare.

On an average, a single tank irrigates 10 to 50 acres, though it varies very much from year to year. Tank irrigation is the oldest and the most important source of irrigation found throughout the district. Construction, operation and maintenance of these tanks was entirely in hands of the local farmers.

Due to the presence of these tanks, in every tehsil of Bhandara district, the proportion of irrigated area is considerably higher than the State averages. The impact of tanks is such that today Bhandara has the largest proportion of irrigated land in Maharashtra, of which 78% of net irrigated area in the district depends on 43,381 tanks in all. The district proportions of low value crops are very low and those of the "richer "crops like rice, tur, wheat etc. are much higher compared to the rest of the state averages. The net cropped area in the state is greater than the net sown area in the district, since a large number of lands are in the command of tank areas.

Thus the traditional tank irrigation system that was conceived and built in place about 400 years ago with the collective effort of the community clearly had a strong intergenerational equity since it plays an important role in sustaining the agricultural economy of the district even today. On the average there are 8 tanks for every inhabited village. Obviously intra -generation equity was also an important criteria around which tank irrigation technology was built and one can clearly infer that tanks are an example of sustainable development. These tanks that support a population of today of the Bhandara district and have survived a step motherly treatment in terms of state investments and general neglect are sustainable in a sense broader than that implied by a techno-economic approach. Even after the institutional mechanism supporting them has been weakened, the tanks still perform their principal functions.

Types of Tanks

The tanks are of two types: 1) Bandh (the larger tanks) & 2) Bodi (the smaller tanks)

Large tanks have mainly been constructed in the hills of the Gaikhuri range and the Navegaon and Palasgaon hills. The catchment areas of these tanks range from 1 to 40 Sq. Km. It is interesting to note that the actual bund of Navegaon bandh is only 330 feet in length, built between two hillocks and forms a large reservoir of 15 Sq Km.

Small tanks are much larger in number. These are generally constructed at the slopes, foothills or on the gentle slopes of the valley side, by putting an earthen embankment a few meters high at its lower end. Though some of these smaller tanks fail to supply water during the hot weather or years of low rainfall (a large no. of smaller tanks are perennial) they play an important and vital role within Bhandara District .Besides irrigation, these tanks are extensively used for fresh water fisheries.

The Local Traditional Acumen

Traditional systems have an advantage of being built-up on the accrued collective human experiences which are passed on from one generation to another.

Most of the tanks in Bhandara District are surviving for the past 250 to 300 years. They were solely operated, managed, and maintained by the community. It is commendable that such a comprehensive and well-integrated social mechanism at three different levels viz. The Gond Ruler, The Malguzars and The Kohalis functioned with such efficiency and has stood the test of time. The system came into existence only due to a collective effort of the rulers as well as the beneficiaries. The vital roles played by them is explained in the following paragraphs.

The Gonds

The entire Bhandara district falls within the boundaries of Deogad, Mandla and Chanda kingdom of the Gond's. The Chanda king was a powerful chief amongst the Gond kings. King Hirshah, a Gond king of the 16th century, in order to strengthen and spread his kingdom, released a "farman "which said,

> *"A person who clears a patch of forest for colonizing will become a Zamindar of that area and a person who shall construct a tank will be awarded the land irrigated by such tank as a reward".*

Thus was established the local *malguzari* system, through which the kingdom could generate constant revenue. It is believed that the Kohalis were brought to Bhandara from Varanasi by one of the Gond kings of Chanda to capitalize the communities knowledge in building tanks. Thus the Gond Kings played an important role in laying down the institutional framework required to evolve such a system.

The Kohalis

A small caste of cultivators, the Kohali are found in the Marathi speaking tracts of the Wainganga valley, comprising of Bhandara, Chanda, Gadchiroli and Balaghat districts of Maharashtra. It is the community by their endless efforts could overcome the helpless dependency of farmers on rains. The Kohali community with their ingenuity and hard work constructed numerous tanks so that they could harvest one assured crop rice or sugarcane, in a year. Sugarcane, a water intensive crop was a favorite crop as it was used to make *gur (*jagerry or raw sugar), which formed a really important nutritional supplement to the local diet.

Tank Technology

Members of the Kohali caste constructed the tanks as they were the custodians of the technical and engineering traditional knowledge. They respected households who owned maximum number of tanks. Selection of a site for the construction of tanks was the most important aspect of tank building. This was based on 3 important criteria while selecting a site for tank building.

i. There should be sufficient number of streams in the catchment which could be diverted towards the tank.

ii. The base rock should have the capacity of holding water and it should not be porous.

iii. And, most critically, the bund should be of smallest possible length and height so as to hold back optimum amount of water.The quantity of water to be impounded was also determined on the basis of land available for irrigation.

It is said that Kolu Patel, who built the great tank of Navegaon-bandh selected the site by observing the level of dust and grass particles on trees and surrounding hills. As the area is bowl shaped water had little space to escape during rains. By making such small but important observations he built a bund of suitable height

Bunds were constructed invariably with black cotton soil *(Kanakar mati)* as this soil is considered to be hard, with remarkable water holding capacity. Only after selecting the most appropriate site, a small bund, a few feet in height was first constructed .The subsequent process of increasing the bund height would run into several stages, spread over a number of years. The water trapped in this small tank hardened the bund and provided strength to the structure, this process also aided in deciding the height to be raised in the consequent years. The eventual height of the bund was finalized after careful observation for years and at some places, where water pressure on the bund was high, the foundation was made by pitching stones using a mixture of soil, stones, lime and jaggary as a binder. The presence of dykes in the area was

obviously really crucial to the success of the tanks. Smaller tanks were constructed at the foot of the hills or general slope of the valley, by putting an earthen embankment, a few meters high at the lower end. The hills drain off the overflow from the tanks into the rivers, mainly the Wainganga and the Bagha. The valley floor of the Wainganga has practically no tanks because of the very gentle slopes of the and since there is little scope for bunding and storage in the alluvial soil. It is important to note that the need for tanks arose in the first place, and the tanks flourished, on account of there being absolutely no groundwater in the Bhandara district.

Water Drawing Technique

The mechanism of drawing water from the reservoir for irrigation is called *Tudum* or *Monga*. Different mechanisms were employed depending on the size of the tank. For a small tank or a *Bodi* a straight tunnel across the base of the bund was constructed using stones. A log was placed at the mouth of this tunnel and plastered with clay. This log was removed whenever water was required. For medium and large tanks a straight tunnel across the base of the bund was constructed using stones over which a stair *(monghad*) like structure was constructed, with a hole (*daccha)* in each step. The size of the tank used to determine the number of steps to be constructed. This hole was blocked with either a stone slab or a wooden log and carefully plastered with clay and water could be drawn out by removing the stone slab or the wooden log.

Another method employed was to use a hollow tree trunk across the base of the tank that was attached perpendicular to another hollow tree trunk with holes at regular distance. These holes were plugged using wooden logs and could be removed to draw water from the tank. But this method required frequent repairs as the tree trunk used to rot and very few *"tudum*" of this kind are to be found today .The stringent forest laws making tree felling difficult. Hence this technique has now been improvised by using brick channels.

Every care was taken while constructing a tank or a canal to prevent damage to the structures due to the force of flowing water. For this reason,*"Kutans* "were constructed adjoining big tanks to minimize the force of water released from tanks, the *"Kutan*" were the smaller structures constructed with a bund of 3 to 4 feet high which would arrest the stronger currents and prevent damage to the primary bund.

Water Collection and Diversion Channels

The maximum possible amount of water could be harvested with the help of water diversion nullahs constructed on the minor streams in the catchment, which channeled water from the smallest stream into the

tank. In cases where the inflow of water would exceed the capacity of the tank, one more tank was constructed down stream to trap the water flowing from the *Pharas* or *Pohar* i.e waste weirs to optimize the available water. All the waste -wiers traditionally had a gentle slope over which the excess water could flow.

The temple of *Bhuraji deo* is usually found on the tank bunds.This God is believed to protect the bund from natural calamities and enemies and evidently the temple of this god is found on bund of Shiregaon bandh. Similarly temple of *Bhivsen* is found in most of the villages and the people have a unusual ritual, wherein during droughts and delay in monsoon people apply cow dung to this god. It is believed that this would annoy the god and to get rid of the cow dung he would order the clouds to shower upon him. Temples of this God are found on the Navagaon bandh and Parsodisadak tank.

The Malguzars

A *'Malguzar'* was a person appointed by the King to collect revenue and look into the overall administration of an area. There was the " *16 Ana malguzari system* "In the entire Bhandara district. In certain cases many forest areas were allotted to the people for habitation and cultivation through the agency of an enterprising person known as `Patil' (*malguzar)* who arranged to colonize villages with families from various places.

The *malguzar* had to deposit a fixed amount to the king as decided by the King himself. During a normal season with high productivity, every body i.e the king, the cultivator and the *malguzar* would profit because of the surplus. But, in contrast, during bad season the *malguzar* had to bear the loss. On the face of it the system sounds discriminatory but functioned efficiently because the *malguzars* wanting to ensure that made profits, used to personally supervise the construction, building, maintenance and operational activities. This minimized the failure of crop, due to water shortage and could ensure generation of minimum revenue for the King.

System of Operation and Maintenance

Damages and the subsequent repairs to the tanks, canals and outlets were the responsibility of the villagers and the *malguzar,* who would personally supervise the operations. Similarly, distribution of water and conflict resolution was the collective responsibility of a venerable group of *malguzars* in the village. Such a committee measured the availability of water and chose the most appropriate way to distribute water and use it rationally, which was binding on all the cultivators. This committee used to appoint a person called "Pankar". The duty of the "Pankar" was to release water to the cultivators and to ensure that the decision taken

by the committee was implemented properly. Pankar's were preferably land less laborers having no interest in water for their own benefit. Every cultivator used to set aside a share in his crop and pay pankar's in kind. In case of default he had the right to demand his share from the farmer. On the other hand in case of any unjust favor accorded to any party by the "Pankar", the committee would debar him from his post and denied his rights and privileges as a 'Pankar'. Further any person found guilty of damaging the canal or tank was denied his share of water for that year or fined in cash or kind if he had already used his share of water, and if he failed to do so, he was denied his share of water next year.

Those cultivators who worked to construct the tank were provided water free of cost. The tanks were maintained and repaired by the beneficiary cultivators whose efforts were in turn co-ordinated by the Malguzars. Thus Services of all sections of the village society were solicited in maintenance of the tanks and canals. Roles and responsibilities of beneficiary farmers regarding repairs and maintenance were carefully defined. The entire approach to operation and maintenance and management was participatory and decentralized. This is particularly important in the post independence context in India where productivity in agriculture and value added by labor is lower than anywhere in the world. Lack of farmer participation in operation of the main system combined with poor O&M at both the main system level and farm level is an important cause of low productivity.

In fact, increased farmer participation is now looked at as a means to increase productivity in agriculture. Construction and maintenance of the system in consultation and with full participation with beneficiaries also ensured productivity. The silt (pakan) dug out the tank bed was utilized as fertilizer in the fields. Malguzar used to decide the time for the desilting exercise that would take place once in 3 or 4 years. But any cultivator was free to dig up silt as and when required with the permission of malguzar. Cultivators working on the tank were allotted free water and lands in the command areas of the tanks in return for the cost of their labor. There is no mention of free water or any kind of subsidies and a strict O&M system was in place. Obviously there seems to be a full- cost pricing of water.

Abolition of Proprietary Rights Act 1950

With the British rule in India, the East India Company needed to raise revenue during its civil reforms and introduced a system where tank management passed into the hands of the Company's revenue officials and army engineers all over the country. Consequently tank water, once a property of villagers now became the property of the government. Irrigation structures were designed, executed. operated and maintained

entirely by the Irrigation department .Thus participation of the community was neither solicited nor encouraged.

The abolition of Proprietary Rights Act was enacted in 1950 as a result of which the proprietary rights over the tanks was transferred to the irrigation department and the Zilla Parishads. These government departments were entrusted with the responsibility of repairs, and maintenance of the tanks. These wings of the government machinery were not equipped to address the maintenance and repairs of the large number of tanks existing in this region. As a result of which the local population had to suffer.

In the late 60's the government machinery took up the task of adopting modern techniques and replaced most of the traditional local tanks with new structures to enhance the water holding capacities and improve the water distribution system. However the new structures installed could not be maintained regularly. Moreover the local villagers lost the traditional bonds with these structures since their participation was not solicited. Prior to the Malguzari Abolition Act the Malguzars used to supervise the repairs and maintenance of the structures and the water distribution system. Later on, due to non-existence of such supervisor at the local level the involvement of the local people in the maintenance and repair works and water management came to an end.

Sustainibility - Why?

- A full incorporation of intra and inter generation equity concerns-
  -An average there were 8 tanks for every inhabited village
  -Built more than 300 years ago ,the tanks still sustain the agrarian economy of the district , even after the institutional mechanism supporting them no longer exists ,an burgeoning population and State neglect
  - Contribute to well above 88 % of food production
- Participatory management
  -beneficiary participation in construction, operation and maintenance ensuring productivity(in agriculture) and efficient demand management (of water) .The malguzari system ensured that crops did not fail at least on account of inadequate supply of water.
  -participation led to zero dependence on external agencies for O&M
- Since the tanks had strong religious context maintenance was ensured and water management gained a cultural significance .All sections of the village actively participated in its upkeep etc.

- Presence of full-cost pricing of water -i.e all costs of construction ,operation, repairs and maintenance were paid by the landowners using the water using the water.
- Ecologically safe and sustainable
  -tanks have near zero negative impact on the hydrological cycle- as there is very little change in the hydrological cycle on account of the presence of these tanks compared to a large water impounding structure which would have and consequently no negative externalities on the environment soil and the agrarian economy.
- Community rights over sources of supply as well as riparian rights were fully secured. There was no ambiguity over ownership of impounded water-it clearly belonged to the community. The role of the king was only that of a facilitator

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Lessons to Learn

The models and methods of harnessing water have for long formed an ideal medium that have bound ethnic groups into a political economy right from the times Aryans first settled in the Gangetic Basin. They have served to integrate social, economic, political, cultural, legal and ecological stakes to optimize the utilization of the community's resources.

The tank system of Bhandara has survived over the centuries and is an exemplary model of Sustainable Development, put in place, operated and maintained by the people. This has resulted in a water resource management that is relatively safe, with no negative externalities on the ecology and other social system, because it has been evolved within the cultural, social and environmental context of the local people.

The system also gives us an insight in to how an appropriate ,locally relevant water Management System governs two important aspects of development: firstly, it ensured the participation of the community in the efficient use of water resource; and secondly, implicated the community to conceptualization, implementation, operational maintenance of a locally relevant way of managing their natural resources.

The Tank Irrigation System came in to existence solely based on the local need: i.e. frequent failure of rice crop due to undependable rains. Embankments, medium sized tanks and small bodies were constructed practically everywhere. These tanks constitute an important and vital source of irrigation within Bhandara District. Besides irrigation, these tanks are also extensively used for fresh water fisheries, which is a source of livelihood for fishermen community residing in that area as well as a source of proteins to the population residing in this region.

Further the traditional systems were built using the traditional knowledge and techniques. The expertise required to built such tanks and distribution systems were available locally and could handle any kind of emergencies immediately to minimize the losses.

These tanks were formally maintained and repaired by the beneficiaries whose efforts were coordinated by the *malguzars*. Thus services of all sections of the society living in village were solicited initially in tank building and later on in repairs and maintenance of the tanks and canals. The people received land and free water supply in the command area in recognition of their efforts.

The goal of any developmental activity is to serve human kind; any effort directed towards development would not sustain itself without a comprehensive socio-environmentally just water management system. The tank system was sustainable, as the desired postulates were compatible with increase in demand. In return this system has invigorated the agrarian economy of Bhandara since it is based on equity and self-sufficiency, is locally relevant and within the carrying capacity of the region.

Present Situation

Before the Malguzari Abolition Act were under the control of these Malguzars. The Majority of the agricultural lands were then owned by Malguzars. But, now with the Land Ceiling Act, Malguzars have lost proprietary rights of tanks and on most of their agricultural fields.

Sugarcane used to be one of the important crops in Bhandara. But now barring a few pockets of Bhandara near Tumsar, elsewhere sugarcane is not harvested at all. There are many reasons for the same, the most important being scarcity of water during summer. After 1950s the government increased the length of the canals so that more people could avail of the water from a tank. This naturally decreased the amount of water available for each farmer. Thus sugarcane crop no longer remained a profitable proposition.

The alienation of the people in tank building and related activities resulted in the deterioration of the condition of these tanks throughout the district. In many places new structures are non-functional and people have resorted to the old traditional technique of water harvesting and distribution. At the end of 96-97 the budget for major and medium irrigation works was to the tune of Rs.3459.98 Crores. Resources to this tune were not available at any point, for the tanks. Despite this, in last

few years, people have realized the importance of the old structures and have started building traditional water harvesting structures.

In the past, with local management of water, it was possible to cultivate two crops a year, and even water intensive crops like sugarcane. But after the Irrigation department took over the management of the tanks after 1955, and even increased storage capacity, farmers faced water scarcity for even a single crop on account of mismanagement of water distribution. Fishing rights were taken away from the farmers as the *Zilla Parishad* and the *Paanchyat Samitis,* now the legal owners of the tanks auctioned away fishing rights. No new tanks have come up in recent times with community participation. Tanks that have come up in recent times are built by the irrigation department where there was no role for the local community, which had to pay a cess without any guarantee of assured water.

Winds of Change

The wisdom and efficacy of traditional water harvesting systems is apparent, in that there are several pockets in the country where traditional water harvesting systems exist. In some areas of Maharashtra, Rajasthan, and Madhya Pradesh, people still practice the age-old methods of water harvesting, whereas in some places people have successfully attempted revival of such age-old techniques.

In April 1998,a workshop on traditional water harvesting systems in Maharashtra was organised by the NGO, ECONET, Pune and IGRMS, Bhopal in Bhandara, where traditional water harvesters from all over the country held a dialogue, studying and examining water harvesting techniques from all over the country and problems faced by such systems, and their revival. The experiences of almost 80 odd participants (including Magsasay Award winner Rajendra Sinha) and the 10 participating villages in Bhandara were almost uniform. Most State Govt. took up the challenge of finding answer to water scarcity, but totally neglected such proven traditional and sustainable solutions, as the Bhandara tank system which demonstrate the practical utility of people managed decentralized water harvesting and distribution systems.

An urgent need to study the present practice of water management of modern, post *malgujar*i tanks was felt by all participants. A very important conclusion that came up as a
result of this workshop was that autonomy to the *Gram Sabha* at the village level to decide the affairs of water management including maintenance, repairs, distribution and construction of structures, catchment and distribution associated with water harvesting and distribution was critical to sustainable water resource management. This

is exactly what the 73rd amendment to the Constitution envisages. Taking forward this theme of sustainability through of participatory community management of tanks, replication has been attempted in various parts of the State. Several NGOs in Maharashtra now see community participation in water management, as an answer to droughts, and other water scarcity problems in particular and sustainable water resource management in general. For. e.g. in some parts of Yavatmal district of Maharashtra where ground water is severely depleted, traditional tanks have been used as percolation tanks to recharge ground water, entirely through community participation, by NGOs with zero contribution by the State to the effort

Replication: Is it Possible?

Replication of this technology in other areas of the district will necessitate combining this technology with modern watershed management techniques and practices, entailing increasing utilization of capacities already built, upon which social costs have already been incurred.

The Aashti Success Story

The village Aashti, in the Tumsar *tahsil* of Bhandara district is a unique example of community managed tank irrigation on lines of Bhandara tanks system, in the true spirit of the 73rd amendment.

The village has 76 traditional tanks spread over an area of 987 hectares .Out of a total cultivable land of 523.94 hectares, 413.94 hectares of land is irrigated by tanks. Out of 76 tanks, 56 tanks are under the *Zilla Parishad`s* jurisdiction. Only 20 are privately owned. There are three big tanks on the upper area of the village forming a chain of tanks. There are three such chains and all are connected to each other. Water drawn from any tank can go to any field in the village. Paddy and sugarcane are the traditional crops grown in t he village.

After independence, the Irrigation Department took over operation and maintenance of the tanks, as owners. They tried to introduce technological changes in the tanks. But this failed. People were no longer consulted in bringing about technological changes imposed departmentally. At the time of introducing new technological inputs on tanks and related structures the state had not given any attention towards the technology and knowledge of the people, which was area specific and appropriate for local management. This cut of people from the tanks. The tanks failed and no more were used, due to irregular O & M.

After their tryst of with the Irrigation department, the villagers took over management of the tanks through Water Users Associations. People, no more depend upon the Irrigation Department for O&M, but have taken it up themselves. User fees are collected and used for the purpose. This has ensured them an uninterrupted, assured supply of water. The traditional tank system has given back people their ownership over the tanks and enabled them to sustainably manage their irrigation participatorily.

Aashti of course, has its share of disparate political groups and there are peoples of different castes and religions, but the village is united on the issue of water and its management.

Participation and the73rd Amendment

A major problem facing Indian agriculture today is low productivity, and therefore, increasingly involving farmers in operation of the main systems would really go a long way towards improving productivity of agriculture and effective demand management. Water resource development is currently entirely in the hands of the government. In fact this is one of the biggest bottlenecks to water resource development. Private participation is obviously restricted only to wells, tube wells and private lands. The Central Water Commission regulates the choice of technology for water resource development in the country. Traditional water harvesting technologies are very important complements to major and medium water impounding technology. Water resource development should include not just surface water management, but a combination of rainwater, groundwater and soil moisture

To ensure successful replication it is necessary that a new institutional mechanism (in place of the *Malguzari* system in) that is within the spirit of the 73rd amendment to the Constitution be installed .In the Bhandara case participatory approach to both construction and O&M, within the *Malguzari* system ensured that the system survived for this long. Since people were involved in O&M themselves, their dependency on an external agency (like the dependence on the irrigation department in modern day) was negligible.

Replication is now occurring in quite a few parts of Maharashtra, especially in and around Bhandara district, in places like Yavatmal, one of the most severely drought hit districts in Maharashtra. Wherever replication has occurred, management of tanks is entrusted to a water users committee, ensuring all members have an equal right on water. Half of such committee members are women, which has ensured gender considerations are effectively ingrained . Such committees normally appoint a tank manager, (like the *pankar*) who ensures that canal water

courses are cleaned, desilted, sluices are operated, that water is distributed equally and in time to cultivators, that penalties are collected ,and that there is no wastage. He is generally a landless labourer and his appointment terminates each year. Area and cropping pattern is decided by the Water Users Association. Repair work on tanks is carried out by the WUA itself through the irrigation charges and penalties. The Gram Panchayat (through the grants in aid it receives from the State, under the 73rd amendment) should supplement this effort financially through the Gram Sabhas. 10 % of Gram Panchayat funds should be kept aside for this purpose. Rules and regulations laid down by the people for management of the tanks have received wide recognition, and are a part of the generics that Civil Society Organisations or the Government may try to evolve on the management of tanks. Participation has ensured efficient use of water. Once there is an assurance of receiving proper share of water with an acceptable degree of certainty, most beneficiaries are keen to join the WUA and also invest in renovation, repairs etc. While most of the *modus operandi* is within the framework of the 73rd amendment, it is stipulated that irrigation water should be given to such associations that are at village levels or watershed levels and not to individuals, on a run and recover basis. Participation has ensured some sort of security over supply sources and encouraged the farmer to actively invest in a technology he understands and ensured effective demand management. Supply -demand mismatch so common in case of centralized designs is eliminated resulting in a better performance. Privatization thus has begun at people's level. The State's role will have to be redefined from that of an absolute provider to that of a facilitator, guide, regulator and technical supporter with emphasis on public participation, openness and accountability.

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WATER

People's School Of Energy, Allekod

KERALA

Deepak Malghan

Introduction

The primary motivation for studying the different initiatives being led by People's School of Energy (PSE), Allekod, Kerala comes from fact that an effort has been made by the group and the local community there to situate energy issues in the context of larger social, political processes. An effort is also being made to understand the myriad linkages between energy resources and general ecology of the region. Further motivation comes from serious endeavors to learn from other similar initiatives in South Asia. This cross-fertilization of ideas and innovations independently provides one of the focal points for this study; especially given the fact that one of the key aims of the Seeds program is to facilitate cross-fertilizations between seemingly disparate endeavors in different parts of the country.

Almost all of the initiatives in this study are in very early stages to be able to conclusively present these initiatives as a model that is replicable in other parts of the country. However, if one situates these initiatives within the larger context of social political movements in the region including the movement for local level planning and governance, the study presented here is perhaps worthy of its inclusion as a detailed case study.

I will begin with the social, cultural and geographic history of the region as well as a brief history of People's School of Energy (PSE). Next, I will discuss the now famous initiative at Pathampara village that involved the building of the first completely community owned electric power plant in South India. Following a discussion on the Pathampara initiative, I will discuss initiatives by the group in water conservation and the launching of a movement to redistribute excess lands to Adivasis in the region. Finally, I show how these seemingly disparate efforts are part of the larger goal of the group to understand the important linkages between ecology, equity and sustainability.

For the most part, I intend to present this case study as a verbatim transcription of my notes from the field visit (Even the background history is from several interviews and 'tea shop conversations' during my visit to the area). A verbatim transcription preserves many of the important details that are often lost in an attempt to simplify field data to make it legible in a received scholarly tradition.

Brief History of the Hilly Regions Around Allekod

Geographically the region that we are concerned with here is situated in the hilly regions of Kannur district in northern Kerala. Allekod is the commercial hub and one of the largest villages (As in other parts of Kerala, the whole region is one big village - there are no fixed boundaries between different villages- village boundaries are in most cases an administrative creation in this part of the country) in this region. The Allekod hilly region is part of the hills that are an extension of the Western Ghats. Allekod is about fifty kilometers from the district headquarters at Kannur (Cannaonore) and about thirty kilometers from Thaliperumba, a commercial town on the West Coast Highway just north of Kannur.

Until the end of World War-II, this region was very sparsely populated and mostly inhabited by Advasis who had lived among these hills for several centuries. At the end of World War-II, this region was part of the greater Malabar region that was under direct British colonial rule. Southern Kerala (Travancore) was an independent kingdom, not under direct colonial administration. During that period, the Travancore region faced a severe economic depression, and the region witnessed several episodes of distress migration to the Malabar region in general and the Allekod hilly region in particular where 'surplus' land was available at throwaway prices. A constant stream of people soon followed this first wave of settlers in the Allekod hill region, migrating to the Allekod region from southern Kerala. This migration continued into the first ten years of independent India.

This migration, comparable to the white expansion in the American 'Wild West', led to dramatic changes in the ecology and culture of this region. Towards the end of 1950's, the settlers from south Kerala had managed to wipe out the original Adivasi inhabitants almost completely from several hills in the region. The clearing of entire hill slopes of native forest and replacement with plantation crops (Arecanut, Rubber and Coconut) by the settlers led to large-scale changes in the ecology of the region. This ecological change that destroyed the very basis of the original inhabitants' existence drove a lot of Adivasis either into extinction or at best into

marginal existence. In addition to settlers' clearing of native forest in the region, the successive state and central governments of independent India have encouraged and actively promoted (often under different ‘economic welfare programs’) conversion of forest lands into plantations held by state owned plantation corporations.

The drying up of streams and other water bodies as well as frequent incidents of large-scale soil erosion in the last few decades is directly linked to complete disappearance of native forests. With all the land available used as plantations, this region of Kerala (not unlike several other parts of the state) imports all of its food grain and vegetable requirements from outside of the region and often from places as distant as Bangalore. The linking of day-to-day subsistence to the cash economy has driven several people in the region (mainly Adivasis who now work as contract plantation workers) to extremes of desperation. The state bureaucracy has largely not recognized this ecological basis of the economic poverty of a particular section of the society. In the official circles, this part of Kerala is sometimes even labeled as ‘economically developed’ as reflected by the cash income of wealthy plantation owners.

This brief geographic and ecological history of the region was meant to a serve as a broad canvas to situate the specific efforts that have been taking place here in the past few years. These efforts hope to chart a future that is more socially just and ecologically sustainable than has been the history of this region in the last fifty years.

The Construction of 'People's Power Plant' in Pathampara Village

Even the relatively wealthy cash-rich villages in this region lack access to state provided infrastructure like roads and electricity. The difficult terrain in the region makes extension of conventional infrastructure to these villages difficult and in some cases impossible. In some other cases, 'technical considerations', often a euphemism for the biases of the centralized, city-elite controlled provision of basic infrastructure services are cited as reasons for not extending infrastructure services in the region. Thus, a village like Pathampara has been denied access to electricity for several decades under the pretext of 'technical considerations' - in this case the technical consideration being unacceptable voltage regulation as a result of extending the electricity grid.

In early 1997 two engineers from Allekod, Anil Kumar and Samuel Thomas founded the People's School of Energy with the objective of combining research and activism to achieve local control of energy

resources. Anil Kumar has been directly involved in the struggle against large dams in the Narmada valley for over ten years. A lot of the initial inspiration for this initiative came from his experiences with the long struggle of the people of the Narmada valley to retain local control over life sustaining natural resources.

Pathampara is a village of hundred and twenty families about ten kilometers from Allekod. It is nested among the higher reaches of the Allekod hill range at an average altitude of over 3500 feet. The population in the village is predominantly (nearly hundred percent) Roman Catholic Christian settlers from south Kerala. Almost everybody in the village either owns a plantation farm or works on one. The people in Pathampara are relatively well off as in other villages in the region. The demographic and economic profile of Pathampara is very typical for a village in this region. The homogenous nature of the community has certainly played an important role in helping catalyze interest of the people in establishing local control over energy and water resources.

In early 1997, the people of Pathampara decided to build a small village power plant with the help of Anil and Samuel of the People's School of Energy. Different options for providing electricity to the villages were considered and it was found that making use of one of the perennial streams to build a 'pico' hydro plant would be most cost effective. Anil and Samuel did the initial survey of the stream to determine the most appropriate piece of hardware for the selected site. It turned out that the most cost-effective technology (I will not go into the details of the actual technology hardware here) option was not readily available with them.

While Anil and Samuel were charged with the task of designing the power plant and getting different pieces of equipment in place, the local community started raising the capital required for the construction of the power plant. The estimated cost of the 4.5 kW (Kilo Watt) power plant, designed to supply electricity to about eighty homes as well as for street lighting was about two hundred and seventy five thousand rupees (Re 2.75 lakh). Each family that was to benefit from the project contributed between two thousand and four thousand rupees and the entire amount was collected within three months.

Meanwhile, the search for appropriate hardware for the project proved to be rather difficult. The multi million dollar UNDP-GEF (United Nation Development Program - Global Environment Facility) sponsored program to develop micro hydro competency in the country was of little help. The dedicated research center established at the University of Roorkee (The

Alternate Hydro Energy Center) was not able to provide technical assistance to Anil and Samuel. Frustrated, Anil and Samuel decided to visit Nepal where several micro hydro schemes on the lines of that envisaged at Pathampara have been built. They were hoping to learn directly from the experiences of communities and organizations in Nepal. After a month long trip to Nepal, Anil and Samuel came back with the know how to confidently manufacture the required hardware locally. During their stay in Nepal, they visited several workshops manufacturing micro hydro equipment as well as a number of communities that have successfully installed micro hydro systems.

Within two months after Anil and Samuel got back to Allekod, the 'People's Power Plant' at Pathampara was ready for commissioning. The beneficiary families provided all the labor for the construction of the power plant. The power plant was inaugurated on Christmas day of 1997. A local youth form the village was trained to look after the day to day operation and maintenance of the power plant and the plant has been running without any major problems in the nearly three years of its operation. When I visited the power plant in September of 2000, it was providing electricity for lighting and communication (Television in some households) to about eighty families in addition to lighting up the church and the main street in the village. The several families that I spoke to were generally very happy with the reliability of their local power source. On several conventional technical-economic parameters like cost per kW (kilowatt), the Pathampara power plant ranks among the best anywhere. It is among the most cost-effective micro hydro plants in this power range.

Beyond (and Behind) the Pathampara Power Plant

While the Pathampara power plant is a note worthy technical achievement, for the purposes of the 'Seeds of Hope', what is even more important is how this technical initiative fits into the broader cultural, political ecological and economic landscape. Pathampara power plant has inspired several other communities in India to look afresh into the mostly city biased nature of infrastructure development in this country.

At the time the power plant was constructed, national and state laws explicitly prohibited generation and distribution of electricity by non-state agencies. During the construction of the power plant, the state electricity board tried to prevent work on the basis that the construction was 'illegal'. The construction resumed only after a weeklong non-violent political action by the people of the village. The state was hard pressed to explain the 'illegalities' involved when this community had been denied access to basic infrastructure facilities after more than four decades of repeated

promises. While there were changes taking place in the entire country that would allow private generation and distribution of electricity, the new laws were geared more towards facilitating private production of electricity on a large scale and in an urban setting. For a community like Pathampara, 'legal' generation and distribution of electricity continued to present significant difficulties even under the new laws. The political action by people of Pathampara as well as painstaking research and advocacy by the People's School of Energy has had a direct and decisive influence on the new guidelines for rural infrastructure development within the framework of the decentralized planning process being experimented throughout the state of Kerala.

The Pathampara power plant has had influence beyond its immediate surrounding communities in terms of demonstrating cost-effective decentralized alternatives to large centralized infrastructure development programs. In the spring of 1998, the leader of the Narmada Bachao Andolan, Medha Patkar visited the Pathampara power plant. She was impressed enough with the possibilities demonstrated to make provision of decentralized electricity in the Narmada valley a central part of the *nava nirman* activities in the valley which are now a part of the larger *satyagraha* in the valley. During 2000 monsoon *stayagraha* in the Narmada valley, Anil and Madhu, his colleague from the People's School of Energy installed a small micro hydro plant at Domkhedi. Anil and Madhu are currently working on two more micro hydro plants in the Narmada valley.

The Pathampara initiative represents an assertion of the rights of the local people over water and energy resources in their immediate vicinity. Several communities in the Allekod region are beginning to challenge the long accepted paradigm of centralized provision of energy and other infrastructure services. With forty percent of the total plan expenditure of Kerala being handled at the local levels under the new decentralization program, there is a critical need in the state for examples of initiatives that represent a true departure from centralized model of the last forty years. The people of the Allekod region are at the forefront of the movement to further decentralize the planning process, especially as it relates to provision of infrastructure. Even with present decentralization of the planning process, almost seventy- percent of the final approvals are actually made at the district and the block level where the old centralized way thinking largely continues to dominate. For instance, the decision of one of local panchayats in Wyanad district to fund a fifty kilowatt micro hydro plant was rejected by the district planning committee on the grounds that written records for the flow in the stream to be utilized for

the project was not available. This is even when some of the same experts have no problems in approving large dams based on incomplete or even non-existent studies and data.

In the first year of decentralized planning process, a majority of the plan allocation was spent on projects that can be best described as artifacts of the centralized planning era -- trunk roads, grandiose irrigation schemes that exert further pressure on the already fragile ecology, etc. The significant gains made by the implementation of the decentralized planning process now withstanding, it is worthwhile noting how the five decades of centralized, bureaucratic top-down planning and 'development' process has systematically wiped out the ability of local communities to work out genuine alternatives. One of the most significant achievements of the People's School of Energy in general and the Pathampara project in particular has been in demonstrating a workable alternative to large centralized solutions. The Wynad case mentioned above finally got the approval of the district committee only after People's School of Energy was able to convincingly demonstrate to the experts that technical evaluation of decentralized systems have to be fundamentally different from that of large centralized systems.

One of the drawbacks of institutional approaches to 'alternatives' including 'Appropriate Technology' has been the lack of appreciation for the fact that linearly scaled down versions of centralized institutions and technologies will not function effectively at the decentralized level. A good comparison here would be the multi-million dollar UNDP-GEF sponsored Hilly Hydro Project (HHP) and the efforts of People's School of Energy. Several independent reports and by GEF's own admission, the HHP has failed to deliver on its most fundamental objective of developing a broad based micro hydro competency in India. People's School of Energy has in the last four years been able to develop a larger awareness about micro hydro possibilities in the Kerala part of Western Ghats than the UNDP program has managed through all its training and 'extension' programs. The barefoot visit of Anil and Samuel to Nepal will probably not qualify as 'south-south cooperation' but as we have seen, this direct exchange with local workshops and communities in Nepal played an important role at Pathampara. In contrast, by GEF's own admission, the several 'educational trips' to places like Switzerland, Germany and Australia was a severe drain on scarce resources. Most of the people who participated in these visits were members of the bureaucratic setup, having little or no stake in the communities that they were supposed to help.

Even when it comes to technology hardware, there is an important lesson to be learnt from the Pathampara initiative. Very often, the hardware used

in decentralized projects is a linear scale model of larger more conventional, centralized technologies. One of the key reasons for the cost effectiveness of the Pathampara initiative is the use of technology hardware that is not merely a scaled down version of conventional hardware but one that is fundamentally and structurally different. By structural differences, I refer to the relationship of the technology hardware to the myriad contextual factors like ecology, economics, topology and politics of the environment and people that the technology is supposed to benefit. One of the key reasons, the micro hydro projects of the People's School of Energy have been a lot more successful than those of different institutional initiatives is their sensitivity to contextual factors. The Pathampara power plant does not use a five-kilowatt scale model of conventional hardware. Most of the hardware used is designed and manufactured locally in Allekod. The mainstream academia and institutional programs are likely to reject the hardware used at Pathampara as being inefficient and this has indeed been the experience of the People's Energy School. A distinction needs to be made between efficient and optimal technologies. Mechanical or thermodynamic efficiency is not a sufficient condition for the technology being optimal. Thus, a used motor converted as an electricity generator (a piece of hardware used at Pathampara) might not be the most efficient piece of hardware but can certainly be an optimal technology solution depending on the context, as in the case of Pathampara.

The single most important policy lesson from the Pathampara experience is the critical imperative to recognize and further encourage genuinely bottom-up community led initiatives like the Peoples Power Plant. Non-institutional initiatives like the one at Pathampara demonstrate an understanding of the local context unlike most top-down institutional programs. Moving towards an India that is socially and ecologically just as well as economically viable will sooner rather than later call for a shift from a centralized bureaucracy led 'welfare programs' to decentralized, local community led initiatives like those of the People's School of Energy. The imperative to recognize and further encourage such initiatives becomes clearer when one recognizes the serious limitations of present day institutions to work on a decentralized basis with sensitivity to local contextual factors.

The work of the People's School of Energy also has important lessons for our academic institutions that for the most part are completely detached from the social fabric of the nation. The kind of participatory, barefoot grassroots research done by the group needs to be recognized and more importantly incorporated in the mainstream scholarship.

Other Initiatives by the People's School of Energy

People's School of Energy has been able to utilize the community goodwill generated through the Pathampara power plant initiative to embark on several other experiments. All these new initiatives have the potential to make the communities of the Allekod region more economically viable while at the same time making them socially and ecologically just. The reduction in the water availability during the off-monsoon season has sometimes resulted in reduced electricity being generated from the power plant. This has brought to focus the consequences of reckless destruction of native forests in the past fifty years. Further motivation to conserve and regenerate native forests comes from the sensitive dependence of the region's economy on commodity prices of main cash crops that periodically crash (often owing to excess supply). When the commodity prices are down, the very survival becomes a daunting task for several families in the region. People's School of Energy launched a program to start regenerating native forests in the hills of the surrounding catchment region that are the source of water to the stream powering the Pathampara power plant. Other villages in the region are beginning to recognize the benefits of regenerating native forests and have adopted several other hills. Presently about seven villages and communities in the Allekod region are actively involved in forest regeneration and other water conservation activities.

People's School of Energy is also at the forefront a new Adivasi movement in the region that aims to redistribute land to the original inhabitants of the region. Redistribution of any asset and land in particular is fraught with immense political hurdles. Probably only fighting a war is more challenging than asset redistribution. This fact is clearly borne out by the very slow progress made in the area of land redistribution in several parts of the country. Several state-owned plantation corporations are divesting their properties under the overall economic liberalization program underway in the state. The newly available land (5000 hectares) in the Allekod region alone is mostly being sold to individual rich farmers of the region, often at less than market prices. The new movement is staking the legitimate adivasi claim on this newly released land. With the land being state-owned, the government has already come under pressure to start listening to the adivasi voice. State ownership of land also comes with relatively less difficult politics of redistribution. Some of the settlers in the region are supporting the movement as well. This movement has already spread to the neighboring hill district and has the potential to move to other parts of Kerala as well. This movement is however in its very early stages to be able to predict the results.

WATER

Rain Water Harvesting

MIZORAM

Dunglena

Mizoram, one of the smallest states of India has an area of 21000 sq kms. The state is entirely mountainous covered with green vegetation. The mountain ranges in North-South directions and as such the rivers flow either in North or South directions. Towns and villages are mostly located on hilltops or on the upper reaches of the hills. Perennial streams and rivers being much below habitations, scarcity of water in dry season is very common.

Traditional Water Supply

Springs on the hills slopes and valleys used to be main sources of drinking water. During season most of the springs dried up or the yield got reduced considerably. People walk long distances to fetch a bucket of water in dry season. In the year 1900 the British who established an outpost at Aizawl constructed a ground reservoir of 12 lakh gallons capacity on a hilltop. A sloped roof of corrugated galvanized iron sheets on timber frames was constructed around the reservoir for rainwater catchment. This was the only water supply of Aizawl for government officials till the year 1973. From this time the Mizo people practiced rooftop rainwater harvesting to meet their domestic water demands. Spring water supplemented by rainwater harvesting is still the means of water supply in many villages and towns. Many people in Aizawl, the state capital, also depend on roof top rainwater collected on to meet their domestic demands.

Rain Water

Mizoram has an average rainfall of about 250 cms per annum. The rainy season of six months in a year is between May and October. The pattern of rainfall recorded in Aizawl is shown as follows:

Year	1988	1990	1991	1992	1993	1994	1995	1996
Rainfall (cm)	265.6	282.7	261.4	194.5	322.8	207	250.1	236.3

Rainwater in Mizoram is free from undesirable impurities. If properly stored it remains pure chemically. However, mosquito breeding and bacterial growth develop on long storage requiring disinfections.

Types of Rainwater Harvesting

Houses in Mizoram are constructed with slope roof. Even in Villages, thatch roofs are replaced by galvanized Corrugated Iron (GCI) Sheets. Semi circular rain gutter made with plain galvanized sheets tilted on the caves of roof collect rainfall and stored in reservoirs for use in the dry season. Circular GP sheets are very common. Masonry ground tanks and reinforced cement concrete tanks of varying sizes are also used. Scarcity of good sand and stone in Mizoram restricted use of concrete and ferro-cement tanks

International Drinking Water Decade Programme (1981-1990)

During this decade programme a massive programmes of providing drinking water to all problem villages was launched. As most of the towns and villages in Mizoram are on high hill slopes or hill tops gravity water sources and ground water sources are very scanty. Government of Mizoram Public Health Engineering Department proposed springs improvements and rooftop water harvesting to solve the drinking water supply problems of Mizoram. The Government of India, under the National Drinking Water Mission approved the schemes in the Accelerated Rural Water Supply Programme (ARWSP) and State Plan of Mizoram. From the year 1986 rainwater Harvesting and Spring Improvement Schemes were taken up each year. So far the Government of Mizoram provided about 15000 nos. of rainwater harvesting tanks to individual households in over 200 villages of Mizoram. The number of rainwater harvesting tanks constructed by private individuals in the different places of Mizoram may be around 50000 tanks.

Initially common public water reservoirs by harvesting rain from the roofs of town halls and churches were constructed. Distribution and control of water by villagers themselves was very difficult. Thereafter, individual house tanks were designed and found to be workable and were welcomed by the people as well.

Design Parameters

Rainwater Harvesting depends on two things

- Quality of Rainfall
- Area and nature of catchment

The catchment may be classified into three categories

i. Hard surfaces like roofs and rocks which gives a total run off-100%
ii. Semi hard surfaces like pavements compounds of houses with 50% run off

iii. Loose soil which gives 25% off

The following simple formula may be applied to arrive at the quantity of rainwater collection:
Quantity of water = Catchment Area x run–off factor x rainfall

For example:
(a) If the roof area is 10 cm and 5cm and rainfall is 250 cm per annum:

Quantity of rainfall = 10 x 5 x 250/100 x 1000 = 125,000 litres per annum

(b) For a family of 8 persons, this is 125000/8 x 365 = 45 litres per capita per day

Individual rainwater harvesting tanks provided by the Government of Mizoram under the Rural Water Supply Programmes are designed assuming a family of eight persons per day at a drinking water supply rate of 10 litres per capita per day and storage required for 120 days of continuous non railway days in a year

Size of tank = 8 x 10 x 120 = 9600 litres
Provide: 10,000 litres capacity GP Circular tank

Quality Control

Atmosphere of Mizoram particularly in rural areas is free from air pollution. Rainwater is free from chemical impurities. The first rainfall for an hour, after dry season, should not be collected to avoid dirt from roof entering the water tank. Boiling of water for direct consumption is the normal practice. Mosquito breeding after long storage is very common and some bacterial growth can be expected. An occasional dose of bleaching powder once in two months is recommended. Mizo people keep rainwater in the storage tanks for months and even few years and the rainwater collected remains good for long period of time.

Conclusion

The process of evaporation and precipitation is a continuous process going on all the time. As such, rainwater is renewable. Most of the rainfall is being wasted. If properly harvested, the rainfall received is sufficient to meet our demands. If everyone at every place practices rainwater harvesting the crisis of water can be solved. The crisis is not about having too little water to satisfy our needs but a crisis of bad management of water resources.

WATER

Hiware Bazaar: Community Stewardship of Water Resources

MAHARASHTRA

Nikhil Anand

Introduction

Hiware Bazaar is a village located in the drought prone district of Ahmednagar in Maharashtra State. The district receives little rainfall, approximately 250 mm per year. What makes maters worse is a perennially low water table in soils that scarcely retain moisture. These are scarcely able to retain any rainfall, and are very porous. In the summer months there is little water to drink, and none for agriculture. The village common lands are overgrazed as people try to supplement their agricultural incomes by investing in cattle, themselves suffering the drought. Most villages have an acute water problem by the end of the spring. Many in this district seasonally migrate to the cities as a means of sustaining their families. Hiware Bazaar was no different from other villages in the district. Though the acute water shortages were barely a generation old, the degraded natural ecology affected the social ecology of the village.

The people of Hiware Bazaar never quite recovered from the drought of 1972.In the memory of its residents was the first turning point for Hiware Bazaar. A year frequently recalled as the year where times of plenty gave way to a generation in which the lack of water was a source for migration, barren fields, unemployment and rampant alcoholism. During this time, most people's land was not fit for cultivation and they were heavily dependent on employment in the cities. Many migrated daily to Ahmednagar, looking for casual wage labour. Others moved to Mumbai. Yet things came to an all time low when, in 1982, there was a murder case in the village. Few in the village of a few thousand could imagine a murder in their small community. As village governments came and left, there was little that people thought would change. The law and order situation had deteriorated so much that the police did not venture into the village unless they were armed and numbered. Local bootleggers had a steady market in the unemployed youth that were frequently inebriated. Residents claim that the village was marked as a punishment village, where employees of the civil service were transferred if they had offended higher-ups or had disciplinary action taken against

them. As a punishment village, even the school teachers would not want to teach here. The primary school was in disrepair and few children graduated from even the fourth standard.

Beginnings

Things steadily deteriorated until the 1990s. During the Panchayat elections in 1989 some youth in the village approached a former resident of thevillage, Popatrao Pawar to stand for elections. Popatrao was an unnatural choice. He had left the village as a teenager to pursue his higher education, and was working with an airline company in Pune when he was approached. Many believed that his education and principles could help transform the village. In 1989, he was elected as the sarpanch of the village unopposed. Early experiments with governance, though well intentioned, were not always successful. One of the first steps he took was to plan imli trees in the middle of the village. But these were soon destroyed by the people who tried to take more from these trees than give to them. In the destruction of the trees, Pawar learned a valuable lesson that would lead Hiware Bazaar out of its difficulties. Henceforth he decided that any development actions need to be performed with the residents participating in their selection and execution. Moreover, for these long-term actions to sustain themselves, it would be necessary for these to have tangible results in the short term as well.

On Jan 26thof the next year, the village witnessed its first Gram Sabha in a generation. Over the next years, this revived tradition had every family sending one representative to participate in decision making for future activities of village development. Over the next few years, the cynicism surrounding the fate of the people of began to be transformed as all essential decisions were taken at Gram Sabha meetings. At these meetings, citizens made a priority list of their most urgent needs. Issues like employment, health and education figured high on the list. Subsequently all decisions that were taken were based on the methods and means suggested by the people. All of these centered on shramdan, or the voluntary contribution of labour. All projects executed in the village had local people at the forefront donating their labour for building schools, contour bunds or the many sanitation projects executed to make their living environments free of disease. Funding was a secondary issue. When these could be obtained from the government, they were, else they borrowed from financial institutions.

Water Ecologies

The first and most urgent steps taken were to restore the degraded ecology in and around the adjacent hillsides. Rolling hills on three sides surrounds Hiware Bazaar. This feature of its geography makes it a prime location for water harvesting projects. Yet, overgrazing and deforestation had created barren hillsides incapable of retaining water. Consequently,

the little rain that the village received would runoff soon after the monsoons, before it could recharge the local water table in any significant way.

Recognizing that a healthy ecology would serve to increase the ability of the ground to retain water, the community passed strong rules that governed the use of the community land. Unlimited grazing was banned on all community land. Henceforth, the Sabha decided that only a headload of fodder per family per day could be secured from these hills, and that the Panchayat for this privilege would charge user fees of Rs. 100 per family per year. These funds would later be used to fund different village welfare programs. No outsiders were allowed access privileges to these community grasslands. While the rules significantly altered the livelihood practices of the village, the results of these decisions were quickly evident and served to strengthen them still more.

With such community-imposed regulation, the grasslands of Hiware Bazaar today stand regenerated. Fodder production of these lands increased from 200 tones in 1994 to 1600 tonnes in 2000. Not only are these able to adequately feed all its cattle, but are also sufficiently abundant that some fodder is also sold to neighboring villages to meet their needs. Farmers have also made a transition towards stall-feeding their cattle to reduce overgrazing and increase milk yields.

Milk is now Hiware Bazaars largest export. Controlled and selective use of their pasture lands have increased milk yields from 300 litres per day in 1994 to 2000 litres per day in 2000. Using a total of 201 different cross bred cows and buffaloes, families are able to increase their monthly income to Rs. 30,000 per month on these increased milk yields alone, according to the Yashwant Krishi Gram Panlot, a community run NGO in the village. By demonstrating the community's ability to govern and enrich their pasture lands, the citizens of Hiware Bazaar have shown that it is possible to dramatically increase their productivity by controlling their consumption of common resources.

Because of their function to retain moisture and enrich the soil, the Gram Sabha also took the decision to enforce a ban on tree felling by both the community and the Forest Service. Every citizen inthe village takes responsibility of ensuring that no trees are harvested illegally. At the same time using voluntary village labour, the Panchayat began reforesting the hillsides with several endemic tree species. Over the last ten years, approximately10 lakh trees have been planted and cared for. To do this the village residents used the employment guarantee scheme sponsored by the state government. This enabled them to earn some money while completing a project that would ultimately serve the village residents.

Soon after the community imposed bans on grazing and tree felling, the village approached the forest service for initiating a water-harvesting project on forest lands in the nearby hills. On this land the village constructed several bunds, percolation tanks and nallas using locally available materials. For the first two years, the village residents noticed little difference. Just as enthusiasm in this effort was beginning to fade, however the aquifer was sufficiently recharged in the following year, to bring via a bunded nalla, some water through farms.

The success this small initiative was sufficient to inspire and recharge the community. Following the success of this initiative there was a flurry of activity in Hiware Bazaar. When private landowners saw the success of the greening of the Panchayat land, they too offered some of their land for reforestation, in the hope that it improves yields on the rest of their agricultural land. Soon, water harvesting plans were structured for their village common lands as well as some vacant government land in the village. The Panchayat researched and developed a database of the different government yojnas that they could use to improve their agricultural or water development programs.

Using this information, they sought the services of government experts to plan their watershed development. Officers and residents together surveyed the lands in and around Hiware Bazaar determining the sites for tanks and bunds. Building on this knowledge, they structured a water harvesting plan using a series of earthen bunds, cement nallas, boulders and percolation tanks. Some, but not all support was available from the DPAD scheme of the government. Funds received from these and other schemes served as an added incentive to development plans the village held as critical. As a result of such NGO, private and public efforts, 976 hectares of land in Hiware Bazaar have been greened for increased agricultural yields.

Yet, eager to not have the increased water availability to be wastefully utilized, the village has passed a series of rules that govern their utilization of these recharged water resources.

- Water intensive crops like sugarcane and banana have been prohibited in the village by popular decree.
- For other horticultural production drip irrigation is mandatory.
- Borewells have also been banned as these are damaging to the underground aquifers and cause exacerbated drought, granting some groups access to more water than others do.
- Though farmers still use some amount of pesticide, they are being encouraged to use gobar as fertilizer instead both because of its abundance in a village that feeds so many cattle and because of its impact on the ecology.

Traditional crops, such as jowar, bajra and wheat are now grown with onion, potato, fruits and vegetables. Now, with a revitalized agriculture in the region, sugar is the only food that Hiware Bazaar imports.

Social Investments

The people of Hiware Bazaar have spent their increased incomes on improving the quality of life in their village. The school, formerly only a primary school, now has facilities for students until the age of 14. When the school needed to be expanded, the villagers 'convinced' the neighboring liquor den to donate its land and some financial resources. In return, it was promised alternative land where they responded to strong pressures to sell milk instead of alcohol. In a village that began following the practice of *nashabandi* this was at once a social and financial decision for most of the dealers of alcohol.

Meanwhile, the village using voluntary labour again expanded the infrastructure of the school. The expanded and airy classrooms have children sitting quietly working even when teachers were not in the classroom. While only one in three girls used to go to school ten years ago, now every child, girl and boy, studies at least until the seventh standard. For families that cannot afford to send their children to school, the Panchayat spends for their uniforms and books. The tree planters prize has been instituted recognizes the efforts children make to plant more trees. The whitewashed school building, located in the center of the village is at once its pride and future.

Hiware Bazaar prides itself on its cleanliness and many refer to the recognitions it has been awarded by the state for this. Indeed the village is spotlessly clean, even on a normal day. Money from a government scheme was used to implement a major sanitation project in which over 1700 toilets have been constructed at the cost of Rs. 3500 each. Private toilets have been built for all families that paid for them. For those that could not afford these, communal facilities have been provided, with three families sharing one toilet. At the same time, an elaborate network of nallas maximizes the utility of all waste water. All runoff from community taps, and waste water used for cooking and washing are channeled into community gardens, where the village is growing common trees and vegetables and plants. Despite an improved living environment, the village hosts health camps twice a year. At these camps all are checked for common ailments and treated free of charge.

Adarsh Gaon

In 1993, three years after a serious village led community development process was underway, Hiware Bazaar was recognized by the Government of Maharashtra as an 'Adarsh Gaon' (ideal village). Under a government program that sought to identify the most promising locations of village development in each district, the Hiware Bazaar story was

highlighted to the government machinery and to the people at large. In many ways this was because it quickly learnt from the experiences of village development from itsmore famous neighbor of the last decade, Ralegao Siddhi.. By adopting the four tenets of Anna Hazare's work, Charabandhi (ban on grazing), Nashabandhi (ban on alcohol) Nassbandhi (family planning) and Katbandhi (ban on deforestation), it appealed to planners and politicians alike.

The results of this recognition, besides having monetary benefits for various developments were enormous. Access to government and bureaucratic machinery was greatly increased as a consequence of this. As a result, villageleaders now report few difficulties while trying to access the bureaucratic structure of the government. Most officials were extremely cooperative and eager to enhance the successes of their efforts.

Over the years, therefore, the village of Hiware Bazaar has reportedly used the infrastructure and benefit of many government and quasi government agencies for village development works. These are:

1. *Yashwant Krishi Panlot Sanstha*- NGO headed by the sarpanch, (recipient of Adarsh Gav Yojna) funded nalla bunding, aforestations, storage bandharas, and boulder/ earthen structures
2. *Forest Department*- Van-tale, aforestation
3. *Agriculture department*- Bunding
4. *Minor Irrigation dept*- Percolation tanks
5. *Rural Sanitation programme*- Construction of toilets
6. ?- Subsidies for Biogas, solar energy
7. *MH Govt.*– watershed training institute
8. *ICAR and Mahatma Phule Agricultural University*- increasing dry crop yields under Jawahar research scheme

Spaces for Growth

According to village activist Habib, labour is in very short supply in Hiware Bazaar. As a result, there has been a movement towards community farming over the last few years. During harvest and planting seasons, people work on single farms together. This social practice ensures that the village can simultaneously harvest large tracts of land.

Yet the shortage of labour and the relative abundance of land has not propelled the community into implementing significant land reform. The few large holding that exist have not been challenged sufficiently. Instead landowners rent out 2-3 acre plots to landless families which till and farm the land for the year. At the end of the season, they remit a rent to the property owner for this privilege. The sarpanch maintains that this is not such a seriousproblem because of the shortage of labour in the community. It is claimed that this shortage enables wage laborers

a unique bargaining power over the terms of exchange and rent of this land

Significantly, the Panchayat has also passed a rule prohibiting landowners from selling their land to those who are not from the village. Pawar claimed this to ensure that local cultivators enjoy the benefits of Hiware Bazaars significant development of its natural resources and to permit those without any land in the village more equal terms of the village. Indeed, it would be unfortunate if the developments in this village would end up displacing the people that these were for.

Women still do not get equal pay in this otherwise progressive village. Unfortunately, the perception that women do less work here still exists. As a result, the women get Rs. 50 per day for agricultural labour and men get twice that. Of course, this was justified saying that men do most of the heavy work anyway. This, along with the challenge of landlessness will doubtless need to be confronted by the village in the days to come.

In Conclusion

The single largest factor in the transformation of Hiware Bazaar has been the reassertion of democratic responsive governance principles at thevillage level. By consistently calling upon every member of the society to consult with and participate in the process of their development, the Panchayat has succeeded in creating a sense of ownership and pride in Hiware Bazaars remarkable achievements. Indications of Hiware Bazaars success do not lie in government recognition of its success, but, more significantly in the remigration the community has witnessed recently. Over sixty families have relocated to Hiware Bazaar from the cities. These former residents of the village are now looking with hope toward their revitalized communities.

Hiware Bazaar is also a remarkable place where people have taken it upon themselves to control their own access to resources while simultaneously ensuring that others, both strangers and neighbors do the same. Realizing the finite regenerative abilities of their grasslands they boldly chose to reduce their demands on these. Aware that the water table had limited reserves, they banned water intensive activities as well as the means to draw on these. These decisions have resulted in a strong and active support for its village government. Indeed the sarpanch, Popatrao Pawar has been reelected to office twice since his election in 1989. He recounts with pride a recent meeting in Delhi where discussions were taking place on the 73 and 74 amendments to the constitution, “ten years ago we showed them that *Hamare gaon me hamara raj* can work for us. Now they are sitting and talking about it”,

What of the days gone by? Were all 'anti-social elements' externed from the erstwhile punishment village to make it what it is today? Habib responds smiling, "no, they are still here, considerably changed" he says, "they were only responding to the opportunities our economic condition provided. Once this changed, we changed them." According to Habib, most of them still live in the village, farming and selling milk instead.

Such a commitment to improve the condition of the people that constitute the village is indeed rare, especially given that this commitment forsakes the investments that Hiware Bazaar's neighbors want to make in the village now that it has taken on a new life. Yet it remains resolute in its insistence that the fruits of these developments should be enjoyed by those that had invested their time and labour over the last ten years.

Many questions remain to be answered at Hiware Bazaar. How will it sustain efforts of its development once the state loses interest in its novelty? When will the disadvantaged position of women and the lower castes be responded to ensure their equality in work and rights? Surely that day cannot be too far behind for this emerging seed in a strangely fertile landscape.

WATER

Small Hydro

HIMACHAL PRADESH

Prasant Negi

Humans have a long history of coveting the environment to inveigle support for the promise of 'unlimited growth'. Few interventions rival the scale of change as those resulting from the construction of a large dam. Consider this, from 1950 to the 1980s, more than 35,000 large dams built worldwide have stultified, altered and have caused rivers to cease reaching their natural destination- the sea. From icons of economic development and scientific progress to symbols of natural destruction, biodiversity loss and a source of human rights violations, large dams constitute one of the most important and controversial issues in sustainable development. Little has changed in the debate over large dams. Over the years, lobbying for and against large dams has become an end in itself and the debate seems to be unequivocally polarized at the moment.

Large dams have denuded the plethora of predilections that were enjoined with its turgid and exiguous rodomontade, the incessant infractions centrally evident on the basis of social, cultural and environmental concerns. With increasing privatization and globalization, the debate is likely to become an imbroglio. The demonstrable futility of developing a peremptory strategy on dams has become more than evident in the recent years considering the superfluous nature of the debate. The need for new (and some existing) developments in this regard and their critical analysis in light of available alternative options is all but a natural condition. This process can be better facilitated by evocating an adjure unison in the realization of the enormity of the task and also of the nature of responses concerned. More often than not, the debate has circumlocuted around a motley crew of prevarication's that seem to deign, arrogate and vitiate other available alternatives as confounded and impetuous.

A considerable challenge lies ahead if we are to commiserate with the languishing task that confronts humanity and to countervail it by an attempt to audaciously develop and apply solutions that are in the best interests of the people and the environment. The actuation can be expedited by the realization that a preemptory embroiling disaster besets humanity and averse to disgorge into a coruscation of a nonplused

aggrandizement of miseries. The need, therefore, for a consensus and to engender an alternative is consummate and irrerevocable.

The paper is not meant to reduplicate and refashion the list of social, economic, cultural and environmental reparations accentuated by large dams. It posits and predicates that such concerns have already been hypothesized besides being inscribed and that there is enough obvious manifestation verifying that large dams do cause considerable impairment to the environment.

What is the Debate About: Is the Paradigm Lost?

To expound how to develop water in ways that do not debilitate the constituents of the collateral resources we all depend on, we must go beyond platitudes. Our convalescence must surface not through vignettes, but through a complex, coherent and cohesive polemics, that clearly displays where we have been, how did we come to be where we are, why we are in conflict, and how can we, with a prudish empathy alleviate ourselves.

To deliberate rectitude on such epochal determinations, palpable development must be anthropocentric, while respecting the role of the State as interposing, and often delineating, their pursuits. For the sake of an endeavor to ameliorate the current conventions, social and environmental surroundings, maturing the incipient decision-making criteria, procedural and supervisory skeleton to entree transmutations for energy and water stratagem, to appraise the development efficacy of the small dams, enumerate ramifications for institutional policy and financial frugality so that benefits, costs and risks are equally shared at the global, federal and territorial levels etc, we will posit in this paper that small hydro power projects can provide viable, anthropocentric, enduring and tenable refuge to large dams. The nemesis (if the arguments against large dams are considered) to the ostentatious 'large dams' as an unfolding recourse is prevalent ubiquitously in the Himalayan State, in the North of India, Himachal Pradesh. In fact, large dams have appropriately and justifiably been systematized to the status of a pariah in the hill state. It is a small wonder that the State received a first prize for the development of0 small hydropower potential by the Government of India.

As a judgment to the contrivance of 'gargantuan' and 'dams are the temples of modern India' philosophy, small dams have mushroomed in the State of Himachal Pradesh, thereby assiduously contravening, not only the 'superfluous and damning' preponderant ideology of the dam industry, but further echoing the pedant sentiments of participatory, sustainable and anthropocentric development to the vanguard as an alternative prerogative. It is laudable that the Government of Himachal

Pradesh industriously synthesizes such latitudes in its welfare and distributive justice policies with deference to the conception, improvisation and composition of dams. Such viscosity not only generates, accumulates and sublimates knowledge and know-how on human aspects economic, political, cultural and social change but it also deals with the challenges of transformation and change within the already inflating candidacy of development electives.

Such amplitudes, not only make the governmental policies more multitude centric and environmentally responsive but they simultaneously lead an umbrage against the overriding 'big dam' philosophy, only to embolden themselves to further tread the path to deliver the coup d'etat to the 'big dam' prospects as being esoterically exploitative, archaic and antiquated.
It is propitious that in the coeval incongruous and anachronistic manifestations of 'large dam' ideology, a predisposition as highlighted by the 'small dam' sector in Himachal Pradesh, has evolved circuiting an axis of comprehension of complex institutional structures, their interaction with one another, the modern day deliberations on the 'large vs. small', resource conflict, abatement of such a conflict by a cogent and optimal utilization of the available resources etc.

The *sine qua non* for harnessing the waters of the copiously sinuous river's of Himachal Pradesh burgeoned due to its anomalous geographical chorography as a hill State and to 'create', 'utilize' and 'enhance' potential (economic and electric), not by 'taming nature' but by working in congruity with it.

Statistics clearly infer how such a panorama has didactically and systematically transformed the State. It has become self-sustained in the power sector and has also consolidated its economic options by further exporting the surplus electricity produced.

It is alternative development policies like the ones being followed in Himachal Pradesh that maintain the *status quo* and the symmetry of the debate between the 'big vs small' and at the same time invigorate and breath life into a school of thought exigent to the dominant ideology. It will be dispassionate and objective to annotate here that given the power and irrigation situation of the country, States like Himachal Pradesh, are in fact the protagonists in the erratic flutter of the 'options debate' by expositing at the forefront, the representations to be simulated for optimum utilization of the infrequent reserves and further reduction of triangular conflict between the 'powers that be', 'the people' and the 'resource', in itself. The efficacy of the 'small dams' in Himachal Pradesh contributes both theoretically and exoterically in further relegating and

disgracing the dominant 'large dam' ideology, as being moribund and decadent.

The propensity of the government of HP to make overtures in the elaboration of small hydro power is connotative of the mediating role of the State, besides symbolizing the interests of the people and the endorsement of the processes of globalization and change, not as lead from above by a few men but as led from below, by all.

It is not my understanding, nor my conviction, to call the pot pourri of current views a *de trop* of existential reality, the need for them is inherent and desirous for an inclusive insight into any situation in its totality, but the repudiation and recantation of other available options as being marginal, is unacceptable and disastrous. Simply put, the need for an accentuating and encompassing synthesis, which calls for a harmonious and concomitant coexistence of the available options and their application is not only acute, but also highly concupiscent.

The travail towards an effective amalgamation of the available options calls for an advocacy of *esprit de corps* rather than a denunciatory and culpable display between the gushing waters of the 'large and the small' debate, which not only fetters the desired effort but also renders the need for alternatives to oblivion. The probity of the attempt, more often than not, circumscribes the probity of the outcome.

Policy Interventions Guiding Small Hydropower Development

Renewable Energy Strategy For 10th Plan

Planning Commission initiated an exercise for preparation of Renewable Energy Strategy for the 10th Five Year Plan (2002-2007), with the terms of reference focusing on the assessment of sectoral energy demands, domestic resources, development of a policy on hydel and renewable sources of energy etc, encouraging private sector participation, recommending suitable regulatory mechanisms and examining the role of the government in the energy sector.

In the first meeting of the Steering Committee on Energy Sector (3rd January 2001), the major points of consideration were:
The 10th plan should give impetus to liberalization of the economy so as to encourage and facilitate the movement of the energy sector towards private sector. It called for incorporation of the power trading approach for transfer of power to various States and justification of subsidies for new and renewable sources of energy.

A Working Group was also instituted by the Planning Commission to develop the small hydropower sector. The program included:

- To take stock of international developments and approaches towards power generation from small hydro power projects.
- To project the likely contribution from small hydropower projects in the power sector in the near term (2007), medium term (2012) and long term (2020).
- To review the progress achieved in the small hydropower development so far, in particular during the 9th plan period; reasons for shortfalls, if any, in the achievements of financial and physical targets.
- To identify barriers and constraints, technical and non-technical, towards greater penetration of small hydropower projects in the power sector.
- To access the status of various technologies, globally and in India, identify the gaps in technology and suggest thrust areas and programs for R & D, technology development and acquisition.
- To carry out techno-economic evaluation of small hydro power development in relation to costs of conventional power generation, and to suggest measures for reducing costs to achieve greater techno-economic viability.
- To suggest ways and means of increased private sector participation in the production of equipment for small hydropower projects, and in the development and implementation of commercial projects.
- To propose steps for bringing about greater involvement of rural communities and non-governmental organizations, especially in the development of decentralized application of small hydropower projects.
- To devise appropriate mechanisms for close performance monitoring and improved operation and maintenance to bring about higher capacity utilization.
- To evolve programs for human resource development, including development of trained manpower at various levels.
- To recommend suitable institutional mechanisms for planning, implementation and coordination of programs at various levels, including clearance and approval of commercial projects.
- To suggest measures for the development of appropriate infrastructure for the implementation of small hydropower projects.
- To examine the status of various financial mechanisms for this sector, and, to evolve new approaches towards greater and easier availability of financing and simplified procedures for term loans, working capital and micro credit, means to channelize international assistance and investments.
- To recommend policies and guidelines to accelerate commercialization, and to attract greater private sector participation within the framework of power sector reform process in the States.
- To propose physical targets, and access the total requirement of funds, including budgetary support, private investments and external funding.

Additionally, at a major national seminar on small-scale hydropower development in the Himalayan Region held in New Delhi from January 20-21, 1995, New Delhi, the following important conclusions and recommendations were made:

- A decentralized approach towards small hydropower development is advocated as this could reduce costs and provide more benefits to rural and local communities in many remote areas, besides reducing deforestation, and protecting bio-diversity of the eco-fragile hilly regions.
- Small hydropower schemes may be declared socially relevant and useful, and extended preferential financial support through suitable government subsidies, incentives and loans.
- As a practice in several countries of the region, small hydro power projects, say up to 100 kW capacity, should be freed from all licensing, clearances, royalty payment requirements and regulations.
- In order to utilize the power from remote small hydropower projects, productive end uses, may be encouraged and supported.
- Local people may be given preference in employment for management and operation of small hydropower projects and trained adequately for this purpose. Necessary institutional linkages may be developed and strengthened in this regard.
- Adequate system for funding of small hydropower projects, down to district levels, if necessary, should be developed and judiciously implemented.
- Possibility for insuring small hydropower projects may be explored to protect the interests of the communities, entrepreneurs, financial institution's against all foreseen and unforeseen risks.

Small Hydro Development Programme in Himachal Pradesh

Himachal Pradesh became an entity denominated as a State by the Constitution of India, on 25th January 1971, and, since then it has embarked upon accelerated agricultural and industrial development. The State's economy is predominantly agro-pastoral with over three-fourths of its working population being engaged in this sector (See, Detailed Project Report on Pandoa Small Hydro Power Project, June 2000, Dodson Lindblom International Ltd.).

The State of Himachal Pradesh adopted a new industrial policy in 1971, which aimed at expeditious and antithetic growth of small and large industries dissipated all over the State. Antecedence was given to industries founded on agro-horticulture produce, herbal resources, wool, sericulture and electronics industries. Coupled inherently with the essence of industrial development, existing and planned, the policy of dispersal and increase in the living standards was the stimulated demand for electricity all over the State.

Himachal Pradesh has an astronomical hydel power potential to the tune of approximately 21,000 MW in the five river basins (Satluj, Beas, Ravi, Chenab and Yamuna) and out of this approximately 4000 MW potential had been harnessed so far. Out of this, a potential of approximately 750 MW is estimated to be in the small hydro sector, on the basis of remote sensing data. Small hydropower is accrued as being sterling, eco-friendly and a gentrifying source of energy, which can be exploited in decentralized and cost-effective deportment. The Government of Himachal Pradesh ascribes consequential purport to the exploitation of small hydro power potential and views it as a mechanism for accelerated economic growth and as a bridge to fill in the gap shaped by the proliferating demand for electricity in the Northern sector.

Himachal Pradesh is among the few States, which has streamlined and crystallized disparate procedures to minimize the bottlenecks, and, has thus, fostered participatory assemblage in harnessing hydro potential in the form of small dam sector. Foremost among the benchmarks is the policy of unmitigated non-conformity to the creation of large dams and their commutation with more socially, culturally, economically and environmentally benign, small dams. Secondly, the fact that there are no reported 'oustees' from the small dams constructed so far, stands as a testimony not only for the Government's resolve to its people, their welfare, the environment etc but also provides for a fitting condemnation to the large dam ideology as being unnecessarily excessive.

Thirdly, the encyclopedic amount of procedural inputs in the wake of pilot studies, environmental clearances, project feasibility studies, command area development studies etc. are incorporated and adhered to stringently heretofore the construction schedule of the projects. Fourthly, notwithstanding the palpability that there is no displacement of the people involved, a comprehensive Rehabilitation and Resettlement Policy, which is synchronous with those being preferred elsewhere in India, co-exists for expeditious enforcement as and when the need arises. Fifthly, the pertinacity of the Government to administer the State to self-reliance in the filed of power production and thus to an economic revival modulates in various catalysts for private sector participation like the Implementation Agreement and the Power Purchase Agreement for the small hydro projects (these measures are explained in the paragraph on incentives provided). Sixthly, the Government's determination to decentralize the process of small dam construction manifests itself in the development of the local areas, provision of employment to the local people and enhancement of their living standards etc. thereof.

The process of harnessing the hydro potential in the form of small hydropower sector began during 1995-96. Since then, the allotment of

project sites has been a continuous process and at present and at present, work on 88 projects is in its various stages of execution.
Himachal Pradesh Energy Development Agency (Himurja), a department under the administrative control of the Department of Science and Technology, Government of Himachal Pradesh, has been given the responsibility of developing small hydropower sector in the State with projects upto 3 mW. Himurja has instituted a plurality of initiatives for the development of this promising renewable source of energy. Simultaneously, Himachal Pradesh State Electricity Board (HPSEB) is also developing small hydro sector in the State with projects upto 25 mW.

Justification for Small Hydro Power Projects

The small hydro projects are planned, initiated and executed by Himurja after carrying out detailed feasibility studies, obtaining the desired and stipulated clearances and fulfilling the necessary pre-conditions as required by the various Department and Ministries of the Government of India. The Department claims to have the necessary infrastructure and technical expertise to carry out such studies. The developers (read the Government & private investors) of various projects working in co-operation with Himurja are also required to submit such studies. Besides, Himurja actively recruits the services of Alternate Hydro Energy Center (AHEC), University of Rourkee, to carry out survey and investigations and to prepare detailed feasibility reports for the projects. According to Himurja, as per conventional procedure the overall time required for preparation of such reports is 2 years.

Surveys on suitable and necessary scales are carried out on the following layouts:

- Topographical surveys
- Hydrological data
- Meteorological data
- Water quality survey
- Geological survey
- Land survey
- Geology, including physiography, regional geology, geology of the project area: diversion weir, diversion channel, desilting tank, water conducting channel, forebay tank, penstock alignment, power house and tail racer channel.
- Seismicity of the area: It must be remembered that Himachal Pradesh is situated in the seismic zone of the Himalayas, therefore, it is accentuated that the project be demarcated as per the codes (earthquake resistant design of the structure: IS- 1893-1984), prepared by the Indian Standards Institution (now Bureau of Indian Standards). Generally, most of the projects fall between the Zone IV &

V, and accordingly, the basic seismic coefficients for the sites are determined and recommended for execution

- Sub-surface conditions survey
- Hydrological survey, including, dependable flow, regional flow, rainfall runoff relationship, base flow curve, non-monsoon base vs preceding monsoon rainfall, surface runoff during non-monsoon period, assessment of monthly flows etc.
- Power potential, installed capacity and discharge survey
- Financial and economic studies, which include the estimates of cost and phasing, assumptions and generation cost
- Construction planning and program
- Environmental and ecological aspect: The small hydro projects envisage harnessing of energy in an extremely benign manner. Firstly, the projects being small do not involve submergence or violation of the sanctity of the forests and water impoundment because they are run off the river schemes. Secondly, the location of all the components of the project are so selected that it requires about 6 m wide strip of land for the penstock in about 440 m length and and about 80 m wide area for power house and forebay tank only. Studies conducted by Himurja suggest minimal ecological and environmental imbalance. Thirdly, the projects aim to reduce the dependence upon nature depleting fuel like forest wood, kerosene and diesel and also aims to replace diesel operated generating sets presently being used in the areas. Fourthly, the projects conceive maximum utilization of local labor, thereby reducing the inflow of the migratory labor and exerting less pressure on the ecology. This particular objective seems to be farfetched in its imagination as most of the project sites that I have visited are being executed by highly skilled labors mostly from Bihar and Uttar Pradesh. Though local recruitment is there, but it is limited in nature. Fifthly, the project authorities plan to increase the area under plantation by compulsory afforestation.

  Detailed environmental assessments, according to project authorities includes resettlement and rehabilitation (R & R) master plans (See Rehabilitation and Resettlement Policy of the Government of Himachal Pradesh, mentioned below), catchment area treatment (CAT), geo-environmental studies, environmental impact assessment studies and compensatory afforestation plans. These are initiated before the execution of the projects (See appendix for detailed environmental aspects).

  Though in comparison to large dam projects the perdition to the environment by small hydro projects is marginal it is still disheartening to note that while the advantages of the projects are oft quoted, what is never realized is the fact that damage to environment

is permanent. What is regrettable is the fact that, none of the project reports made available by the Government of Himachal Pradesh, mentions any loss to the environment by way of loss of standing forest cover, submergence etc. no matter how infinitesimal it might have been. Besides comprehensive pilot studies on the environmental aspects, though are initiated, but almost all seem to allude the designated losses to the environment. It is also widely accepted that though there is adequate provision in the assessment studies for the development of ancillary aspects (Command Area Development (CAD) and afforestation etc.), ignoring the same during construction of the projects has been the hallmark of hydel projects whether large or small. The ratification, being the inadequacy and unavailability of the research and extension units for the implementation of such programs. Ignoring ancillary aspects, giving lukewarm response to related programs creates indifference in economic and social implications leading to an unintegrated water-land management system. The impact on plants and animals is well beyond the area circumscribed by the project boundaries, tending to favor the most aggressive plant and animal species and replacing thereby, some useful native species. Land and water are seen as basic inputs for development and while the demand for these resources is continuously on the increase, what is seldom realized is that these resources are constant and the need to efficiently use them becomes imperative. The fact that there are subsequent losses to the cultivable land due to water logging etc cannot be negated. Such a predicament gradually accentuates itself by a further depletion of the resources. Officially, the Government's response to ecological concerns is that it is irrelevant in the context of countries like India trying to catch up with the long neglected path of development, and, that ecological concerns over long term consequences of nature harnessing enterprises for the environment, are answered effectively, in the case of our country, with reference to urgent and inescapable needs of the people. These developments seem to be symptomatic with the low importance attached to environmental concerns and the truth of the matter till date remains that many of the required studies are not even initiated, to think about being incorporated and executed.

The problem rests on the trade-off between ecology and environment and the reiteration of the fears of inadequate and incompetent action, are real, and should be addressed, if not ensured sufficiently, the effects of human distress will be so gigantic so as to negate future benefits from these projects. In such a rudimentary mindset towards environmental aspects, it is important to incorporate interdisciplinary and theoretical considerations into developmental policies and ensure their parallel execution with the construction of the projects.

- Land rights of the project affected persons: The Government of Himachal Pradesh, besides utilizing Government land for the purpose of construction of a small hydro power project, also acquires private land as and where required. Though the efforts are to minimize such acquisitions but inadvertently the necessity for the same cannot be ignored. Wherever the need for acquisition of private land arises, the Government realizes that by doing so, a number of families might be rendered homeless and in order to protect the interests of the 'project affected persons' or 'oustees', adequate arrangements are to be made by way of implementation of a draft policy on 'rehabilitation and resettlement'.

  The framing of a draft policy on 'rehabilitation and resettlement' is to be project specific and is required under Rule B-A of the Himachal Pradesh Nautor Land Rules, 1968. The draft policy on 'rehabilitation and resettlement', therefore, is drafted under the Land Acquisition Act, 1894 (Act 1 of 1894).

Draft Policy on Rehabilitation and Resettlement

The draft policy on 'rehabilitation and resettlement', as initiated by the Department of Revenue, Government of Himachal Pradesh is as is as follows:

Part I

1. The scheme may be called the Rehabilitation and Resettlement of the oustees of the projects.
2. It shall extend to whole area affected, or, likely to be affected, as a result of construction of the project.
3. In this scheme, unless there is anything repugnant in the subject of context:
   A. 'Oustee' means, a land owner who has been deprived of his house or land, or both on account of the acquisition proceedings/ private negotiations in connection with the construction of the project and entitled to compensation in lieu thereof, and includes his successors in interest.
   B. 'Family' means husband and wife, who are entered as owner and co-owner of land in the H.P. State Revenue records, their children, including step or adopted children, their parents and those brothers and sisters who are living jointly with them, as per the entries of the Panchayat Parivar Register, as on the date of notification, under Section 4 of the Land Acquisition Act of 1894. Provided that only the Panchayat Parivar Register entry, as it stood on the date of the notification, under Section 4 of the Land Acquisition Act of 1894, shall be taken into account for the purpose of 'Separate Family' for Rehabilitation benefits that is consideration for employment etc.

C. The word ' Regular Employment', means employment in regular basis in accordance with qualifications.
D. 'Holding', means the land holdings possessed by the family of an 'Oustee', immediately after acquisition of this property.

Part II

Sanction of rehabilitation grant, infrastructural grant or facilities and grants to the families rendered houseless.

1. Resettlement grant
   Each oustee family, which will be rendered houseless on account of the acquisition of the land/ house for the construction of the project, shall be entitled to:
   A. A compensation of Rs. 60,000, in the form of houseless grant, and
   B. Infrastructural facility in the oustee colony, which will include developed house sites measuring, 50' X 40' (one plot per family), electrification of the street lights, line for suitable drinking water, constructed approach road/ path and a Sulabh Sauchalaya.

   Families, which do not opt for the plot of land (including other infrastructure), will be entitled for Rs. 25,000, as infrastructure grant in the same line.
2. A minimum of 25 to 30 families should opt for the plots, 50' X 40', in lieu of acquisition of their house in the resettlement colony. Only then the infrastructural facilities as specified in Part two earlier will be provided by the project authorities in the resettlement colony. The following facilities will be considered as one time capital expenditure, the facilities when developed, will however, be a property of the State Government, which will in turn be responsible for allotment and maintenance.
   A. Primary School: All capital expenditure for the school building, furniture, blackboard etc would be provided by the executing agency. However, the responsibility of running the schools would be that of the State Government, In case, the State Government's efforts do not materialize, the schools can be operated with the help of welfare agencies of the State or any other suitable alternative to be decided by the State Government at its own expense.
   B. Dispensary: All capital expenditure for building, furniture, equipment etc, will be provided by the Project Authority. However, the running of the dispensary will be the responsibility of the State Government.
   C. One village pond, panchayat ghar, one drinking water well, for at least 25 to 30 families, renovation of existing well/ hand pump shall be provided in the resettlement colony.
3. Rehabilitation Grant
   Landless Grant

The families who are rendered landless on account of acquisition of their land shall be eligible for landless grant in the following manner:

A. Family, which has more than 5 Bighas of land and rendered landless: Rs. 50,000.
B. Family, which has less than 5 Bighas of land and rendered landless: Rs. 45,000.
C. Families, who are left with less than 1 Biswa after acquisition, will be treated as landless

4. Eligible family grant

Eligible families shall be those who do not become landless but their land holding is rendered to less than 5 Bighas on account of acquisition.

A. Families who are left with land more than one Biswa and upto 2.10.00 Bighas: One time grant of Rs. 40,000.
B. Families who are left with more than 2.10.00 Bighas but less than 5 Bighas: One time grant of Rs. 35,000.

The Deputy Commissioner concerned shall be the sanctioning authority for the Rehabilitation grant, which shall be provided by the project authorities and placed at the disposal of the concerned Deputy Commissioner, for disbursement to the eligible families. All these grants shall be in addition to the compensation paid under the Land Acquisition Act.

5. Explanation

For the purpose of Resettlement and Rehabilitation:

A. Houseless family means a family who is rendered houseless as a result of Acquisition of their house under the Land Acquisition Act.
B. Landless family/ Oustee means a family who is holding no land with 1 Biswa or less, than 1 Biswa after acquisition, whether as an owner or a tenant.
C. Eligible family means a family who, after acquisition, holds less than 5 Bighas of land as landowner or as a tenant.

Tenant as per the record of the Government of Himachal Pradesh and list given by the State Government at the time of the acquisition and Section 4 notification under Land Acquisition Act, 1894. The family who has been sanctioned the houseless grant for house construction shall have to construct a house at the place of their resettlement.

Part III

1. Employment

The project authority shall provide employment for personnel in the category of unskilled and skilled workmen as specified in para. 4.6 of the agreement. The eligibility criteria for regular employment, where offered will be as follows. The status will be determined on the date of notification of transfer.

2. (Subject to the above), one member of each affected family will be listed for consideration for employment, depending upon the number of jobs, as generated by the projects, in the following manner:
3. One member of each affected family, who is absolute owner of land or house or both, whether male or female, as per entries of Revenue

records, and entered as separate family in the Panchayat Parivar Register, as on the date of notification under Section 4 of the Land Acquisition Act, 1894. Unmarried daughters and sons, minor daughters and sons who are co-owners of land as per entries of Revenue records, shall be treated as the family members of the widowed mother or any of the married elder brothers, as recorded in the Panchayat Parivar Register.

4. Only one member of the such affected, consisting of widow as co-owner with her only daughter or daughters as co-owners, or sons and daughters, if they are all recommended, only one member against all shall be eligible for consideration of employment in the project and if they are entered as a separate family in the Panchayat Parivar Register;
5. Only one member of the such affected, consisting of only one or more than one daughter or son or sons and daughters as co-owners, if they are all recommended, only one member against all shall be eligible for consideration of employment in the project and if they are entered as a separate family in the Panchayat Parivar Register;

4. In case of such affected families who are co-owners such as brother and sisters and share of acquired land of each of such co-owners is 1 Biswa or less, and, if they club their shares together with which, quantum of acquired land becomes more than 1 Biswa only, only one member against all shall be eligible for consideration of employment against all such co-owners after their consent.
   A. Provided that no member of a family whose total land acquired is 1 Biswa or less, married daughter or heirs of pre-deceased/ married daughter, who are recorded as co-owners in the Revenue records with their brothers, sisters or parents shall be eligible for consideration of employment in the project.
   B. No member of affected family shall be eligible for consideration of employment if the quantum of his acquired land is 1 Biswa or less.
   C. No persons shall be eligible for consideration of employment in the project that are not entered as members of the concerned affected family in the Panchayat Parivar Register.
   D. No family shall be entitled to give its right for consideration of employment to a member of some other family.
   E. No persons or his family member shall be eligible for consideration of employment if he becomes owner of land by way of sale, gift, exchange etc. after the date of notification of Section 4 of the Land Acquisition Act, 1894.
   F. Priority for consideration for providing employment from amongst eligible persons, not exceeding the number of unskilled and skilled workmen required to be recruited for the project, as decided by the project authority, shall be fixed by the concerned Deputy Commissioner in consultation with the project authorities.

   Procedure for Employment

5. Every head of the family will submit his application on the prescribed performa in the office of the Land Acquisition Officer/ Relief and Rehabilitation Officer (LAO/ RRO), along with a required affidavit, duly attested.
6. The particulars of each affected family shall be entered in the list to be maintained in the office of LAO/RRO on the basis of particulars filled in the application and Panchayat Parivar Register entry shall be entered in the list against all such families. LAO/ RRO will send the list to the Deputy Commissioner (D.C) and the names of the eligible persons shall be sponsored by the D.C. concerned in the shape of Mohal-wise lists to the project authorities for consideration of employment, depending upon the number of vacancies s determined.
7. Form of application along with specimen of affidavit shall be supplied to each head of the family by the LAO/ RRO, free of cost.

Secondary Employment

For practical reasons it may not be possible for the project authorities to provide direct employment to all eligible persons due to many constraints. But every affected family shall have to be helped in starting some gainful occupation/ getting vocational training. Therefore, for such eligible persons who may not be accommodated in direct employment, project authorities will help them in any one of he following manner:

1. The project authorities will construct shopping complexes in which a number of limited small shops/ stalls will be earmarked for allotment to eligible persons after appropriate consultation regarding capability and aptitude on a nominal rental as fixed by the project authorities.
2. Some members of the oustee family to go for vocational training courses like ITI etc. The project authority concerned will pay the training cost including tuition, residential charges, books and stationary and other requirement charges. However, no job commitment would be given to the trained persons.
3. For starting an income generation scheme/ self-employment etc. the project authority will provide a financial grant of Rs. 15,000, except in the case of shops allotted to the land oustees.
4. The project authorities will also consider to award petty contracts to the Co-operative of eligible families on preferential basis so that some of them may be engaged in such jobs also. Secondly, the project authorities will persuade their contractors to engage eligible persons from affected families on a preferential basis wherever possible during construction stage.
5. The oustee family shall be given preference in fishing rights in the project reservoir as a mode of livelihood.
6. These steps will ultimately lead to facilitation for adjustment of all the eligible persons in different employment/ income generating/ self-employment schemes etc. for appropriate rehabilitation.

A Village Development Advisory Committee will be constituted by the executing agency with the representatives of the State Government, executing agency, land oustees and village Panchayat for monitoring and implementing the above scheme.

It has to be put explicitly at the outset here that the Government of Himachal Pradesh claims that not even one family has been displaced by the small hydro projects constructed by it so far. What seems preposterous is the fact that since not even one family is displaced by these projects, still, a comprehensive 'R & R policy' is incorporated for each project. Therefore, the fact that families may be displaced cannot be negated and hence a critical examination of the 'R & R policy' becomes imperative. Though a comprehensive and detailed 'R & R' policy is existent in almost all projects including the ones in Himachal Pradesh, the debate continues unabated. The fundamental objections to the 'rehabilitation & resettlement policy' in Himachal Pradesh are synonymous with those of the concurrent debate as the 'R & R policy', is more or less uniform in its content and applications throughout India, it derives from an antiquated Land Acquisition Act of 1894 with an amendment introduced for land for land compensation in 1984. The debate primarily revolves around, whether the positive economic benefits of the projects outweigh the costs, the way in which positive and negative impacts are distributed among people, whether such a distribution is equitable. Lately, there has been a particular concern about the impacts on indigenous people, women and reservoir evacuees. Further the debate also incorporates within its ambit, the issues of equity concerning the normative issue of fairness or justice of the existing or planned distribution of impacts.

The assessment of social impacts is problematic. Firstly, social impacts can be both positive (new access to resources such as energy, irrigation water) and negative (resettlement etc.). Secondly, social impacts can be direct or a resultant of a cascade, where environmental impacts generate economic impacts, and these in turn cause social impacts. Thirdly, social impacts, environmental or economic impacts from, which they stem, can be interlocked in complex and profound ways. Positive and negative impacts can flow from the same environmental change. Fourthly, the positive and negative impacts of projects are not evenly spread and there can be disparities in impacts, particularly between less and wealthy groups of individuals, livelihoods being central to social impacts. Fifthly, gender, as a category has been a missing element in impact assessment of projects, this fact is elaborated by all the project reports initiated by the Government of Himachal Pradesh. It has to be understood that gender is one of the basic relational dynamics through which a community organizes itself. Projects affect men and women in different ways. An analysis of the social impacts of the dam that marginalizes

gender can often produce misleading conclusions, at variance with realities of both women and men, and the specific ways in which projects affect them.

There are a number of ways to refer to those impacted by hydropower projects. The debate on equity revolves around three main axes, which also reflect the divergence of views and perspectives. The first axis is based on a general balance sheet approach where the basic question is whether positive impacts of dams outweigh the negative impacts. Proponents of hydro projects tend to hold the view that if, all the social and economic implications of most projects are taken into consideration, with clear description of all benefits that accrue to regions and nation as a whole, the advantages of these projects outweigh the disadvantages. For opponents of such projects, if all the social and environmental costa were taken into account, particularly how land and livelihoods have been affected, the magnitude of disadvantages of such projects would appear clearly and would call such interventions into question.

The second axis concerns the extent to, which those who bear the costs reap the benefits, or have access to wealth generated by the project and vice versa. Those who receive more than they loose would be the gainers, and the others who loose more than they receive, are the losers. Opponents of hydro projects claim that displaced populations and riverine communities (losing their traditional source of livelihood and exposed to water borne disease) tend to be the net losers, as they are generally denied access to the benefits generated. The proponent's point to the trickle down effects of such projects and the fact that they ultimately benefit society at large, including locally affected groups.
The third axis, compares the way costs (taken separately) or benefits (considered in isolation) of the projects are distributed between selected groups, spatially (upstream or downstream, or among riparian States) or temporary (current and future generations) units or administrative entities. The most serious negative impacts of hydro projects has been documented as being the trauma of resettlement, or the socio-economic, cultural costs to the displaced, who are not resettled.

Though, displacement and rehabilitation are often viewed primarily as social consequences. They are first and foremost, political issues. Added to this is the fact that the Government of India does not even have an explicit National Policy on Rehabilitation and Resettlement. Contextually, the Draft Policy on Rehabilitation and Resettlement being pursued by the Government of Himachal Pradesh is guided by the Land Acquisition Act of 1894, which provides for cash compensation for the displaced and a amendment introduced in 1984, which allows for the State to provide for land as alternative compensation. But it has to be made explicit here that the provision of land as compensation is not legally binding on the

State, it merely facilitates it. Both these Acts have, totally ignored the rights of the landless, those customarily cultivating land and those who have locally recognized user rights to land, for compensation. Another shortcoming of these Acts is that the notification declared under them has to be published in the government gazette and two regional newspapers. To the illiterate population of India and those without access to newspapers in interior areas, the written word has no meaning.

There is some controversy as to what would constitute an adequate resettlement package. Cash compensation alone, is a highly problematic formula. Several studies have shown, for instance, that if the displaced persons are not used to handling large sums of cash, compensation money can run through their fingers 'like water in a sieve', this problem is apparent in a hill State like Himachal Pradesh where liquor consumption is high. Moreover, cash compensation is usually below the replacement value of land and if compensation level is adequate in principle, suitable land may be hard to find. Since, switching to other bases of livelihood is often quite difficult, cash compensation tends to end up being used as a temporary means of subsistence. The income criterion, however, does not take into account the role of environmental and common-property resources in the pre-displacement economy, nor does it give adequate recognition to other aspects of quality of life that are threatened by the displacement process, such as family ties and community participation. The best way of guaranteeing sustainable livelihood, then, is the direct provision of land as compensation- the land for land policy. A land for land policy reduces the dislocation involved, but land is a highly contested resource in Himachal Pradesh and the land available may be inferior, unproductive and available in limited quantities. Therefore, an alternative to land for land compensation is employment based compensation, but again the number of displaced persons being high causes the creation of inadequate employment opportunities for them. This is particularly the case when the displaced persons have low levels of education and human resources. Even when employment criterion is feasible on an adequate scale, the transition out of land-based economy can be quite problematic, if it disrupts important social and cultural roots of the displaced.

Resettlement Policy, as it exists in Himachal Pradesh, allows for a flexible use of different bases of compensation and concentrates on the objective, rather than the means to be used. The World Bank for instance holds the view that the basic objective of the resettlement policy should be to ensure that the income of the displaced persons does not decline.

One general flaw of the current approach to 'R & R policy' in Himachal Pradesh is that, the content of the resettlement packages is left entirely to the Government or the project authorities. An entirely different

approach would consist of leaving it to the displaced people to decide for themselves or allow for a participatory approach, in constituting an adequate resettlement. This is one of the ideas of voluntary resettlement.

Project Objectives

- Improve basic living conditions and education standards of the project areas.
- Improve agricultural productivity by getting assured reliable and stable power supply for irrigation needs.
- Establishment and sustenance of small scale and rural agro-based industries.
- Reduction in carbon emission due to burning of fuel wood and petroleum products to meet heating and cooking energy requirements by availability of reliable power.
- To enhance the economic and power condition of the State.

Ongoing Projects and Projects Already Completed

The United Nations Development Program under Global Environment Facility (UNDP-GEF) is a collaborative venture of the World Bank, UNDP and over 90 national governments. It is a Rs. 45 crores or U.S. $ 15 million technical assistance program formulated specifically to develop small hydropower projects in India. The main objectives of this program are optimum utilization of the small hydropower resources to help protect the environment by way of reduction in the emission of the green house gases, preservation of the ozone layer and conserve the bio-diversity.

All the projects under the UNDP-GEF Program are required to be located in remote, difficult and far-flung areas, which are either connected with a weak/unstable grid or not connected at all. The international consultant component under the project includes the Mini Hydro Power Group of Europe (MHPG), Mead & Hunt, USA and IT Power, UK. The national counterparts are Consultancy Engineering Services India Pvt. Ltd. (CES), New Delhi, Alternate Hydro Energy Center (AHEC), Rourkee, Tide Technocrats Pvt. Ltd. Bangalore and Tata Energy Research Institute (TERI).

The detailed project reports (DPRs) were reviewed by the consultants mentioned above and the MNES. The comments of the above were incorporated into the reports to set up truly world class and cost effective demonstration sites as per the criteria of UNDP-GEF.

The government of Himachal Pradesh is participating in the UNDP-GEF Hilly Hydro Program. Under the aegis of the program 20 small hydro projects are to be developed throughout India, out of which 8 projects are allotted to Himachal Pradesh.

The details of the 8 projects being executed by the government of Himachal Pradesh under the UNDP-GEF:

Sr. No.	Name of the project	Location
1	Lingti (400 kW)	Kaza Sub-division of Lahual & Spiti district.
2	Kothi (200 kW)	Near Manali in Kullu district.
3	Juthed (100 kW)	Near Tissa in Chamba district.
4	Solang (1000 kW)	Near Manali in Kullu district.
5	Raskat (800 kW)	Near Manikaran in Kullu district.
6	Titang (900 kW)	Near Pooh in Kinnaur district.
7	Purthi (100 kW)	Pangi Sub-division of Chamba district.
8	Sural (100 kW)	Pangi Sub-division of Chamba district.

Out of these 8 projects, 5 projects, that is, Lingti (400 mW), Kothi (200 mW), Purthi (100 kW), Sural (100 kW) and Juthed (100 mW) are being executed by Himurja, whereas 3 other projects namely Solang (1000 mW), Raskat (800 mW) and Titang (900 mW) are being executed by private investors.

Kothi Project

Kothi project became the first project under the UNDP-GEF Program to be commissioned in the country. The project is situated in Deo Kothi Panchayat, which lies in the remote area of Manali in Kullu district. This project is located at the left bank of the Beas Nallah at a distance of 50 kms from Kullu and 300 kms from Shimla. The project was implemented through 50% central assistance/grant in aid of Central Government/UNDP-GEF through MNES, Government of India. The estimated cost of the project was Rs. 272 lakhs and the cost of generation on 30 years average basis with subsidies and grants comes out to be Rs. 2.06 per unit (Kilowatt hour) of electricity with an installed capacity of 200 kW. The project generated 22,888 man-days of employment, out of which, 19,090 man-days (about 90%) of total employment generated were from Himachal Pradesh. The project was constructed in 540 working days i.e. 18 months, which is demonstrative of the short gestation period of the small hydropower potential.

The Minister for Technical Education and Power, Mr. Ravinder Singh Ravi while inaugurating the project maintained that:

"The Government of Himachal Pradesh shares the eco-friendly attributes and trends of advanced countries towards small hydro projects as compared to big dam projects, besides administering the need for awareness regarding the environmental conservation of the fragile Himalayan ecology and therefore adequate attention was given to the development of small hydro power sector in the State".

The Additional Chief Secretary & Chairman (EC), Himurja, Mr. Harsh Gupta while speaking at the same function informed that:
"The Government of Himachal Pradesh is developing a master plan to harness nearly 10,000 mW of power potential in the next 2 plan periods, as also about the initiatives being taken to improve the functioning of Himurja and HPSEB. In this connection he specifically referred to Rs. 25 crore, which the Government of India had sanctioned under the Accelerated Power Development Program".

Juthed Project

Juthed Project became the second project to be commissioned under the UNDP-GEF program. This project is constructed in Deo, Kothi Panchayat, which lies in the remote locality of Tissa Sub-division of Chamba district of Himachal Pradesh. The project is located on the left bank of the Satnal Nallah at a distance of 89 kms from Chamba and 524 kms from Shimla. The project was implemented through 50% central assistance/grant in aid of Central Government/UNDP-GEF through MNES, Government of India. The estimated cost of the project was Rs. 169 lakhs and the cost of generation on 30 years average basis with subsidies and grants comes out to be Rs. 2.30 per unit (Kilowatt hour) of electricity with a total installed capacity of 100 kW. About 50 villages and an odd population of 4000 will benefit from this project. The benefits will be shared by the villages of Banet, Dabbu, Bnaroga, Pugthala, Chulanio, Hutei, Dogas, Tarvai, Padhag, Chhakari, Galyar, Hadingal, Haswani, Bairagarh, Majoga, Beraka, Sautha, Majhoga, Chandoga, Chalunj, Kelhera, Ghilari and Bhatmna.

Lingti Project

Lingti project is in its final stages of construction and is almost due for commissioning in the near future. It has been constructed in the Lalung Panchayat, which lies in the remote locality of Kaza of Lahul & Spiti district in Himachal Pradesh. The project is located on the right bank of Lingti Nallah at a distance of 18 kms from Kaza and 408 kms from Shimla. The project was implemented through 50% central assistance/grant in aid of Central Government/UNDP-GEF through MNES, Government of India. The estimated cost of the project is Rs. 830.59 lakhs and the cost of generation on 30 years average basis with subsidies and grants comes out to be Rs. 2.21 per unit (Kilowatt hour) of electricity with a total installed capacity of 400 kW. About 16 villages in the vicinity of the project namely, Lingti, Sushna, Shichling, Dhankar, Mane, Poh, Rama, Lalung, Demul, Kibbri, Lidang, Lara, Shego, Sagnam, Mikkim and Kharo will benefit from this project.

Projects Now Being Offered For Private Sector Participation

Himachal Pradesh Government has now offered 261 project sites with potential ranging from 150 Kilowatt (kW) to 3 Megawatt (mW), with aggregate estimated potential of 383 mW for private sector participation. The district wise details of the identified project sites and their estimated potential is as under:

District Kinnaur

River Satluj is the principle river of the district. Its main tributaries are the Baspa, Bhaba, Tidong, Ropa, Spiti and Lingti. They are further fed by various streams and rivulets. These streams originate at various elevations varying from 2500 meters to 4500 meters. The river Satluj in this district descends from 3500 meters to 1000 meters. The catchments of these streams are snow fed with perennial flows. 30 sites with potential ranging from 150 kW to 3000 kW with a total aggregate capacity of 50.50 mW have been identified in this district.

District Shimla

Satluj, Giri and the Pabbar are the main river's of this district. Their main tributaries are Dogra, Khaneti, Gumma, Chakred, Nogli, Machhad and Behra with further numerous smaller streams. Pabbar river is the major tributary of the Tons river in the Yamuna basin. It originates from the Dhauladhar ranges at an elevation of 5100 meters above mean sea level. The main tributaries with perennial flows are located in Rohru and Chopal tehsils of Shimla district. The river Giri is another major tributary of Yamuna river, which originates from the peaks of Shimla district. 41 sites with potential ranging from 100 kW to 3000 kW with total aggregate capacity of 30.20 mW have been identified in this district.

District Sirmour

The main river of this district is Yamuna. Giri is the major tributary and Chandni, Badag, Badoo, Mannal and Timbi are the other streams/ rivulets of these two rivers. 5 sites with potential ranging from 750 kW TO 300 kW with total assessed capacity of 5.75 mW have been identified in this district.

District Chamba

The Ravi and Chenab are the main rivers of this district. The Chandra, Bhaga, Miyar Nallah, Harsar, Marshu, Sal, Holi, Setun, Hul, Chirchind, Manjhal, Budhil and Belij are the major tributaries. Its streams have been identified as having adequate potential for setting up small hydropower projects. 50 sites with potential ranging from 250 kW TO 3000 kW, with a total assessed capacity of 76 mW have been identified in this district.

District Kangra

The Ravi and the Beas are the main rivers of this district with tributaries namely Neogal, Maujhi, Manuni, Iqu Binwa Brahl, Shah and Thamsar. These tributaries originate from the Dhauladhar ranges and are snow fed having adequate perennial flow foe setting up small hydropower projects. 7 sites with a potential ranging from 150 kW to 3000 kW, with total assessed capacity of around 11.90 mW have been identified in this district.

District Kullu

The Beas and the Satluj are the principle rivers of this district. Beas originates from 'Beas Kund', a small spring near Rohtang Pass at an elevation of 4085 meters. The main tributaries of this river are Manalsukh, Allain, Duhngan, Sarvari, Parbati, Huria, Tirthan and Sainj. Thes tributaries are joined by narrow streams/ rivulets having perennial flows, which can be utilized for setting up small hydropower projects. 25 sites with a potential of 200 kW TO 3000 kW, with a total assessed capacity of 25.85 mW have been identified in this district.

District Lahul and Spiti

The main rivers of this district are Chenab and Satluj. Chandra, Bhaga, Lingti and Spiti are the major tributaries and Sissu, Shansha, Thirout and Billing are the other streams/ rivulets, which join the Chenab. 86 sites with potential ranging from 250 kW TO 3000 kW with total assessed capacity of 160.75 mW have been identified in this district.

District Mandi

The Beas is the main river of this district and its major tributaries include the Uhl, Arthi, Narli, Dul and Baggi. They all originate from the higher reaches with snow fed catchments and have perennial flows. 15 sites with potential ranging from 200 kW TO 3000 kW with total assessed capacity of 12.65 mW have been identified in this district.

Major Issues of Importance

The biggest inclination and partisanship towards small hydro power projects is their relatively low costs, short gestation periods and the question of productivity in the form of 'potential created and potential utilized' is belied by directing the proclivity towards the undercurrent of only power production, thereby holistically underplaying the need for the creation of an exhaustive distribution system. In fact, most of the ills of the big dams are the resultant of the omissions of the provisions in the original estimates of the devices a farmer will need before he actually irrigates his land- that is an extensive distribution system. An almost complete process of virtual scramble in the State of Himachal Pradesh accentuates the small dam sector, as it requires limited studies, funds

and time frame for its completion. It is further helped in its objective by not having to suffer from the inherent need of the big dam projects to keep the estimates at a deliberate low to achieve desired internal rates of return, thereby making the project more acceptable to the public. Thus, a vicious cycle of projects languishing for the paucity of funds and revision of estimates, which sets into motion with overruns becoming the order of the day, has been completely avoided.

Further, the small dam sector, especially in Himachal Pradesh does not suffer from the internal weaknesses that plague the large dams and which are difficult to overcome. Since it is constructed for a purpose of electricity generation and for the same run off the river type of project is envisioned, it is not wasteful of the very resource it professes to nurture, the water losses due to evaporation and seepage are minimum. The small hydropower sector is not vulnerable in comparison to the large dam sector, to premature siltation and therefore, the questions of loss of storage capacity due to denudation; soil erosion, water logging and salinization are relegated to the background.

Where Do We Go From Here?

Profound changes are taking place throughout the world; it is, but imperative that more and more governments start realizing the potentialities of SHP in totality. Though in Himachal Pradesh winds of change have begun to blow but the need for them to be prolific, progressive, ever evolving and continuous is as dire as the project of development itself. Considerable issues needing to be addressed are:

- The need for a policy of self-reliance: Decisions and policies should be so formulated and directed that essentials for rural development like community participation, management, ownership etc are encouraged. Though Lingti Small Hydro Power Project has been developed in totality by a private engineering concern, SAIKA, based in Shimla, the need for more such endeavors cannot be negated.
- There is a need to finalize and develop a policy for integrating SHP into the national grid, which implicitly calls for the construction of a national grid for SHP.
- Renewed interest for the development of SHP can be realized by understanding the need for adequate, affordable and environmentally sound energy in relation to inproportional energy consumption in rural areas leading to an increase of firewood fuel consumption, large scale deforestation, soil erosion, decrease in soil fertility and subsequent environmental damage. Furthermore, India is a developing country and if we want our economy to develop faster, there is a need to establish an efficient rural-energy economy. Such endeavors call not only for a consensus on SHP but

also for the institutionalization of policy influences in the development of the rural energy structure.

- SHP development should include flexibility treatment i.e. it should favor neither centralized nor decentralized exploitation but should be flexible and in conjunction with concrete local conditions. The idea should be to enhance local energy structure, flexibility to diversification, self-reliance and improved energy efficiency leading to the development of an alternative for rural energy supply which is apt for the improvement of rural environment and the promotion of rural economy.
- Due recognition needs to be given to the fact that SHP is widely regarded as a competitive energy source despite fluctuations in the prices of various fuels.
- SHP is a step towards the realization of the twin goals of sustainable development stimulated by environmental concerns. SHP is regarded as a sustainable rural energy source as it enables the coordination between hydropower development, sustainable economic development and environmental protection, it replaces firewood with electricity and thus contributing to the development of a clean rural energy structure by reducing deforestation and improving ecological environment, provides an antitheses to the popular notion that wood and bio-mass are free to be taken from nature: at the present rate of over-consumption of these resources FAO statistics showed that by 2000, the inadequacy reached up to 900 million metric cube of firewood and that at the rate of plantation in 2000, only one percent of need was available. Further, such profligate consumption lead earth to the way of desertization at the rate of 20 million hectares per year.
- Research shows that SHP vigorizes modernization of rural development. In order for the process to be better facilitated the 3-S Policy of Self-construction, Self-management and Self-consumption has to be institutionalized. In addition Self-consumption also implies that there should be a SHP market, i.e. SHP stations should have their own distribution/supply area known as the concession area instead of selling all the energy to the national grid for distribution. Further, for resultant sustainable, speedy and wholesome development of the rural economy, 'Four Doubles' in power output, industrial and agricultural output, farmer's net income and county revenue have to be realized.
- There is a need for commercialization of the SHP industry in order for SHP development to be cost-effective. A 'Six-local Policy' of encouraging participatory development, managing of local SHP resources, adopting local technology, materials and funds to solve the problem of local rural commercial energy supply is needed for comprehensive de-centralized development of SHP potential.

- Relevant United Nations organizations conclude that for SHP technology to be appropriate, it must be in line with the local, social and economic development. Only in this way, can it be fitted into the different conditions of the various countries and promote its transfer among developed countries. Moreover, it can be divided to enable categorized technical transfer on payment basis according to the development level of the specific country or region, hence to provide the same with technology that is not necessarily the most advanced but more appropriate to its concrete conditions.
- Commercialization of the investment and construction systems from public to private domain and the introduction of managing SHP in the market economy mode needs to be gradually introduced in the SHP industry. Instead of simple state-owned and collective nature enterprises, SHP should be developed as share-holding enterprises, share-holding corporations and private enterprises etc. Such measures will not only vigorize the development of SHP but will ensure participatory, decentralized, anthropocentric and sustainable development.
- A decentralized approach towards SHP needs to analyze strategy and policy-making, administrative infrastructure, implementation and management, operation and maintenance. All these aspects need to be decentralized at the initiative of the local governments to the local levels enabling the SHP project to fit into the local conditions and be better suited for the socio-economic development of the area.
- 'Electricity generates electricity' policy. All the profits should not be sent to the local revenue but to the enterprises in themselves for reproduction.
- At the core of SHP development is for SHP to have its own supply area, therefore, a protection policy should be incorporated in areas under SHP distribution to ensure that large grids do not take over the areas supplied by SHP.
- 'Who invests, who owns and benefits' policy needs to be incorporated to encourage multi-channel, multi-level and multi-patterned fund collection for SHP development.
- Rural electrification, modernization and social change: It has to be recognized that rural electrification is a prerequisite towards rural modernization. The utilization and popularization of electricity is vital to the advancement from agricultural mode of production to industrialization. A report by the Asian Development Bank (ADB) shows that rural electrification is an important symbol of modernization, a factory of abridging the gap between the urban and the rural. It enables the rural dwellers to see and utilize every possibility for reproductive activity and thus gain from it. Also, it can change the expectations and opinions of people and become motivators of change both social and economic.

- It has to be recognized that the traditional mode of rural electrification in Occidental countries is the extension of the large grids into the rural areas. But considering the shortage of power in large grids, the high transmission costs due to large areas and the inadequate input of the country to the large grids makes it possible for SHP to be developed.
- There is a need to develop and formulate primary rural electrification standards: The realization of these can stimulate economic growth and alleviate poverty stricken areas. The scientific value of these standards is the direct connection between rural electrification and economic growth. It reflects in simultaneous development of generation, supply and consumption of power.
- Dissemination of new technology and indigenous SHP manufacture: Technology needs to be self-sustained and indigenous for it to be appropriate both technically and economically.
- The policy of decentralization and diversification needs to be guided by matching measures with local conditions, combining various sources of energy, adopting multi-purpose use of energy resources in order to stress on and achieve practical results.
- Finally, it has to be realized that the process to development is ever evolving. Efforts need to concentrated and continuous for them to be successful and result-oriented.

Conclusion

The anthropocentric, eco-friendly and sustainable policies as exhibited by the small hydro power sector in Himachal Pradesh generate, accumulate and transfer knowledge and know-how on human aspects of economic, political, cultural and social change, dealing with the challenges of transformation and change within the already expanding horizon of availability of development options and the emergence of contemporary environmental crisis as a global phenomenon.

One of the distinguishing features of such an orientation is its interdisciplinary, comparative and pluralistic approach to the analysis of local issues in development and environment. Given such an inclination, the policies seem to be the resultant residue of a process of multi-disciplinary analysis perceiving the problems to be multi-faceted and responding to their analysis and solutions by incorporating inputs from a broad array of disciplines and perspectives, thereby enhancing the analytical capabilities of the responses. Moreover, the propensity of some ‘geographical areas’ and ‘powers that be’, to be ever supportive of large dam projects and conversely, coveting of small dam projects by the Government of Himachal Pradesh is suggestive of the embodiment of comparative analysis of societal problems, highlighting similarities and

commonalties as well as geographically, culturally, historically determined differences.

The process of development seems to be a fusion of criticality and application based policy. It is within such a framework that global processes of modernization, globalization and dependency manifest themselves at the regional and local levels.
The process of development in Himachal Pradesh facilitates processes by which societies could develop in sustainable and just ways and it also heightens awareness that acting in any historically or culturally specific context, be it spatially defined or within a network, requires insight into, as well as public control over, global processes of negotiation about, and the exchange of goods, services, capital, people and technologies.
The State of Himachal Pradesh and its advocacy of small power projects charters, merges and affiliates the understanding that an incentive endowed in theoretical and methodological capacities is better equipped to conduct policy analysis and that applied theories are situated within a deeper understanding of their methodological and theoretical settings besides providing an opportunity to compare conceptual approaches on one hand and their practices on the other within the broad universe of policy-application.

The process of development also provides an introduction to the substantial problems, concepts, theories and strategies in the reflection on and the practice of development.
There seems to an incarnation of 1) poverty, social exclusion and marginalization and 2) environmental degradation and resource conflict paradigms into people centric policy so as to minimize to the pinnacle the costs involved. The structural adjustment of the projects by decentralization (see appendix 1.1) and mitigating the role of the State as a facilitator and mediator further enables to locate the practice of development in the State within the wider political and economic processes.
Peculiar to the State is the lack of opposition to the ever increasing small hydro power projects, incidentally 25 project sites have been identified in Kullu, 86 in Lahaul and Spiti, 15 in Mandi, 50 in Chamba, 7 in Kangra, 5 in Sirmaur, 41 in Shimla and 30 in Kinnaur districts of Himachal Pradesh which is suggestive of the fact that the larger processes of economic and environmental degradation, the public action undertaken by the Government, analysis of development policies in the context of institutions, actors and political structures have undergone an intersectoral treatment, both in general and specific contexts to enhance analytical responses to socio-political, economic and cultural dimensions.

The Department of Finance, Government of Himachal Pradesh seems to be familiar with the economics of development, to be able to apply relevant areas of economic analysis to illuminate and to be familiar with and be appreciative of the institutional factors, ownership and the role of socio-political forces within the context of development. The Department of Finance primarily focuses on two broad areas, which are at the core of the development process before assenting to oversee the finances of the new power projects. First consideration is the determinant of economic growth, with emphasis on the conditions of sustainable human development. This, the Department feels is necessary to understand the foundations of welfare and distributive justice orientation of the State in a democracy, income distribution and human development, environmental economics and the relationship between long run growth, on one hand and human development and natural resource management, on the other. The other consideration is macroeconomic management and structural adjustment policies, given the number of projects being in various stages of execution and further being offered for private investment. Since the role of domestic and public finance in adjustment process cannot be overlooked and since the finance involved is exorbitant, this sector is provided due diligence by the Department. The underlying objective seems to be the amalgamation of macroeconomic issues with microeconomic processes.

It is difficult to provide, identify, describe and analyze key economic, socio-political, environmental (irrespective of the fact that Himachal Pradesh is situated in the Himalayas, which is a seismic zone) and spatial processes that are shaping the opportunities for collective action at local and regional levels, primarily because of the absence of conflict between the State and the people. Environmental concerns seem to occupy a backbench in the State where other social and economic concerns of the people take the forefront. This is further accentuated by the fact that there is a total lack of unity so far as voicing the concerns of the people are concerned and that no grass root organizations espouse their cause. Further, most of the new hydropower projects are small and are uniquely reducing the environmental and displacement aspects of the projects.

The analysis of normative implications of development as social change directed towards increased quality of life, social and physical security, and self-determinism, with the emphasis on inclusion and empowerment of the weaker sections of the society, is evident with the inclusion of local employment schemes being incorporated into the development projects.

\The emphasis on small hydropower projects provides knowledge for an alternative development strategy, evolving an alternative political economy that is relevant to plural ecological and cultural systems. It

seems to be rooted and based on the belief that alternative development calls for constant innovation and manifests itself in political, economic, cultural, and ecological dimensions. The challenge is to evolve synergies among social forces -- governmental and the non-governmental -- and ecological concerns. The urgent need is to understand and creatively respond to the role that politics plays in development and how power structures and political institutions influence development outcomes.

The State of Himachal Pradesh effectively demonstrates that though plurality is inherent in a holistic view of knowledge, it is often confused with universalism. If knowledge is to be integrated with life, and if life is pursued in diverse cultural and historical contexts, then surely systems of knowledge - both in theory and praxis - must vary too and provide alternatives for action. Efforts to move beyond narrow expertise and instrumentalist action must contend with the universalistic creed inherent in the dominant worldview underlying today's developmental processes. What this calls for is the need for interdisciplinarity that encompasses plural worldviews, as well as dialogues on the process of development, rejecting in the process, the linear view of the development paradigm.

The debate as highlighted by the process of development of small hydro power potential in Himachal Pradesh, has emphasized the need to view the existing debate in an 'integrated science of humans', and in a historical perspective. It has become clear, that to a considerable extent, the system of knowledge based on specialised disciplines, as well as universal claims of modern science and technology, is in conflict with knowledge that draws on more fundamental concerns of human spirit, seeking a new identity that transcends not just disciplinary boundaries, but also ideological and civilizational divisions. The debate, has also highlighted the existing fragmentation of paradigms between disciplines, a growing conflict between paradigms of thought, a grim battle between ideological systems, each with totalistic claims and struggling for world dominance and each presenting a growing challenge to popular perspectives.

WATER

SUKHA MUKTI ABHIYAN:
A Model for Water Management

JHARKHAND

Ramananda Wangkheirakpam & Swati Sresth

Introduction

This is the story of the water conservation efforts in the district of Palmau in Jharkhand. The story began with much fanfare and celebrations among the villagers and civil society organizations involved, and even some government officials, but it had a unhappy ending. Despite the unforeseen stalling to the palamau experiment, the efforts and the model that was used is indeed a 'seed' that can be planted in many villages of India. However, a word of caution has to be appended. Palamau was a success in many ways yet it 'failed' to proceed further because the ruling caste, politicians and the corrupted government officials failed to empathise and support the marginalized people of the region. One might wonder how it collapse, why was support from the government withdrawn? such questions are part of the lessons learnt from Palamau, and one might consider including the political map of any region before any project gets underway.

Palamau District of the newly created state of Jharkhand lies sandwiched between Chotanagpur Plateau and the Indo-Gangetic plain. Its physiology is characterised by an undulating terrain with altitudes ranging from 100m to 1000m. the average height of the district is 427 metres. The name Palamau is derived from 'Pa' or pahad (mountain), 'la' or lac and 'mau' for mahua (bassia Latifolia) and gives us an idea of the topography and economy of the region. Spread over an area of 7879 sq.km it had a population of 2,45 Million people (1991 Census) with 25.6 and 18.9 percent of the population comprising of Schedule Caste and Schedule tribe respectively. very low literacy rate for this section of the population.

The district comprises 7,293 watersheds of 20 to 40 sq. km each draining into various hill streams. Koel, Auranga and Amanat are the main rivers. The district gets 1300mm. rainfall. The rainfall ranges from an average of 1088 mm. In the North to 1820 mm. In the hilly south. About 95 per cent of the annual rainfall is received during the monsoon

months of July and August. The surface run off from the monsoon is important for paddy and Rabi crops. The average rainfall is good (128 cm), but the coefficient of variability is high. Severe droughts occurred in 1819, 1869, 1897, 1900, 1919, 1967 and 1992 due to failure of late monsoon and "*hathia*' rains. The distribution of rainfall is not uniform over the monsoon and this establishes the need for artificial irrigation in the region.

The forests of this region are the dry deciduous type. *Sal* (shorea robusta) is the dominant species and is found in depressions, along the streams and on the slopes of the hills. Other species comprise *asane* (Terminalia alatta), *arjun* (Terminalia arjuna), *aunra* (Embilica officinalis), *khair* (Acacia catechu) and *kusum* (Schleichera Oleosa). *Palash* (butea monosperma), *mahua* (madhuca Indica) and *Ber* (Zizyphus mauritiana) are commonly found in agricultural areas. *Palash* and *Ber* trees are used for lac cultivation.

Socio-Economic Profile

The district has a population of 2 million people (1991- Survey of India) with a density of 150 persons per sq. km. There are 3611 villages of which 316 are uninhabited. The maority of the population comprises the *Chero, Oraon, Khairwar, Bhogta, Paheria, Munda* and *Korwa* tribal communties. (SC/ST status). The dominat among these are the *Chero.* There are also some migrant communties in the region. These include the *Bhumiars, Ahirs, Keoris* and *Bhuiyans.* Economy is largely subsistence agriculture and collection of minor forest products. According to the 1981 census, eighty five percent of the population were engaged in agriculture of which 48.4 percent were cultivators and36.7 percent agricultural labourers. There is 21 percent literacy in the region.

Land based conflicts have led to the emergence and dominance of Marxist leninist organizations like MCC and CPI(ML) groups in Palamau and a counter reaction by the landed population. The government also pours in tens of crores of rupees annually into rural development programmes, but much of these went to the higly corrupted contractors, government officials and local politicians.

Irrigation Schemes by the State

Study by PSI showed that there was steady decline in the net irrigated area after 1960 which is largely due to the neglect of 'Ahars' the traditional form of irrigation system. PSI found that 'ahars' irrigated 81,000 acres out of the total irrigated area of 90,000 acres in 1926 (as found in District Gazetteer). This steadily declined and by 1989 the figure came down to 14,730 Ha.

Latter with droughts becoming a common feature the Government started with irrigation system in the region. Some of the major and

medium irrigation projects in the district have failed due to poor design, high siltation and poor management. In addition, large scale projects such as these shifts the control of water resources from the community to the state. The government has no re-settlement plans for those who are threatened by displacement by such projects. The Malay reservoir, which was completed in 1986 at a cost of Rs. 11 Crore was supposed to irrigate 20,000 acres but during 1992-93 drought it failed to benefit even 200 acres. Similarly, the construction at the Aruranga site started in 1988 and Rs. 14 Crore was spent in the pre-construction work. The Kanahar project estimated at a cost of Rs. 353.42 Crore in 1988 threatened to submerge 2927 hectares of forest area. It ran into trouble due to public resentment and financial constraints.

The Amanat project started in 1990 to irrigate only 10,000 hectares was estimated to cost Rs. 53.50 Crore. The failure of these schemes caused great dissatisfaction among the people. It was during this time that the *Auranga Bandh Visthapit Sangarsh Samiti* was established to enable the farmers to get adequate compensation for lands acquired by the government. Says Bhola Prasad, chief functionary of *Auranga Bandh Virodhi Sangarsh Samiti* (ABVSS) ' The project threatened to displace more than 3000 families of 21 villages, totally submerging parts of the Betla National Park. However, it has been south Bihar's misfortune that under the guise of development projects - be it dams, mining or industrialisation - the adivasis have been pushed to the brink of total disaster. The famine of 1967 in Jharkhand spawned a host of state-sponsored development projects...The aim was to usher in ' green revolution'. It achieved exactly the opposite by uprooting the Adivasi farmers from their land. In 1961, in Chotanagpur and Santhal Parganas there were 34,49,000 farmers but by 1981, the number was down to 27,60,000. That means 11,89,000 Adivasi peasants have been forcibly evicted.'

Community Initiative: Description And Analysis

Origins and Process of the Initiative

On 15 August 1988, the ABVSS organised a 'peoples' convention for those who were threatened to be displaced by the proposed Auranga project at Chetma Mela Tabdh. Noted environmentalist Sundarlal Bahugana was present at this meeting. Bahugana's speech has a deep impact on the activists of the ABVSS who decided to rechristen the organisation Auranga *Bandh Virodhi Sangarsh Samiti* to highlight its opposition (virodh) to the construction of the Auranga dam. At the same time they also adopted a 16 point charter of demand and the slogan '*Marenge par zamin nahin denge*' (we will die but we will not give our land). Their movement included staging sit-ins, public meetings and *jail bharo andolan* (voluntary arrests).

In July, 1989, A.K. 'Dunu' Roy associated with the People's Science Institute (PSI), Dehradun met the ABVSS activists and agreed to technically guide ABVSS in gathering silt load data of the Auranga river. The data questioned the formulations of the Aurnaga project report designed by the Irrigation department. It pointed out that like some other projects in the area, the Auranga project would soon become defunct as its belts would have silted up. The river carries enormous silt from its denuded catchments during the monsoons. Apart from questions about the life and efficiently of dams, the ABVSS came to know of other dimensions of the project. They realised that enormous sums would be lost in submergence area and consequent loss of productive capital (such as land and trees). For example, a tree was valued at Re.1; the capitalised value of annual production of a Mahua tree and discounted for depreciation as calculated in the PSI survey worked out to Rs. 4000 per tree. And even this estimate excludes the value of timber and social benefits like income-generation.

During the ABVSS and PSI exercises, the need for investigating viable alternatives to the large dams surfaced. Traditional water harvesting in this region revolved around the *Ahar* technology. A survey was carried out in the command area of the proposed Auranga dam to assess the feasibility of the *Ahar* as an alternative system. This convinced the activitsts that revival of this technology was the most efficient alternative to a large dam on Aruranga. *Ahar* is an above surface gravity irrigation tank. It is essentially a hill technology but us extended to gently sloping plains with the help of run-off diversion channels, locally called '*pyens*'. An A*har* involves building an earth-fill check dams across the natural drainage course joining the uplands for harvesting the run-off water. The harvested water is stored in the A*har* bed to be used whenever there is a break in the monsoon during the crop season. The command, A*har* bed and part of the catchment are cultivated. The proportion of catchment area cultivate decreases as one moves toward higher slopes. The nearer as *Ahar* is to the hills the greater is the uncultivated part of the catchment. *Ahars* are aligned across the undulations so as to serve the dual purpose of an embankment and an access road on the top. *Ahar* were the prime source of irrigation for more than a century but were later neglected.

Elements of Community Involvement in the Initiative

The drought in 1992-93 compelled the officials to initiate water-harvesting schemes. A programme was launched to build 400 check dams under the *Jawahar Rozgar Yojana* and the '*Jal Dhara*' schemes. However due to poor planning, failure to involve people, corrupt polititians and contractors from the *pani panchayat* the project seemed deemed to failure.

Feeling the need to intervene the PSI launched a massive information campaign about the functioning of pa*ni panchayats* with a focus on fair wages for labourers. The campaign however did not have much impact. It was at this stage that local voluntary organisations decided to form the *Pani Chetna Manch* or PCM (Water Awareness Forum) to carry out the information campaign. The key organisations involved were the ABVSS, Jan Chetna Kendra, Sarwangin Vikas, Nari Mukti Vahini, Alternatives for India Development (ADI) and Indian Peoples' Theatre Association (IPTA).

In 1993-93 the district administration and the PSI prepared a comprehensive programme for participatory watershed development, predominantly in *adivasis* and *dalit* villages. Called the *Sukha Mukti Abhiyan* (SMA) the programme spread across 125 villages and was conceived as a long-term strategy for drought proofing Palamau. This programme involved forming 178 village level *pani panchayats* who were the actual project managers. The PCM helped in providing them technological inputs and facilitated co-ordination while the district administration remained the sanctioning authority.

Sukha Mukti Abhiyan as a Model of Development

The model of Sukha Mukti Abhiyan comprises of three institutions joined together for a common goal of drought proofing Palamau. This partnership model comprise of the District Administration which provided financial and governmental sanction for the activities. The next important partner is the Village Level Institutions (the only one from outside the region is Peoples Science Institute) which formed the Pani Chetna Manch, and lastly but the most important of all and the ultimate beneficiary are the local population of Palamau with their Pani Panchayat representing them. This differs from the usual government contract system where the local population, the real beneficiaries, are not included in deciding matters concerning them. This model on the other hand has tried to inform and strengthen the village community and more importantly empowerment to take decisions for themselves.

As already mentioned before, the efforts of the government to drought proof Palamau did not succeed because of bad planning, corruption at various levels and of course the caste factor. Salil Das from PSI explained that some watershed works were found in the area where higher caste live, but not in areas where tribals and schedule caste live. The intervention in 1992-93 did not worked well because of unclear strategy for people to participate. In 1993-94 the district administration and PSI collaborated to implement a more comprehensive programme to deal with the problem. PSI with some more local organizations proposed that the villagers themselves will be the project managers and will decide upon the works carried out in their area. The SMA began in October 1993 with a plan for constructing water harvesting structures. The administration

agreed to comply and act as just sanctioning authority. Not only this they agreed to transfer all funds to the village authority, in this case the pani panchayat. The *gramkosh* bank account was opened with the help of membership fees paid by the villagers. The measurement of the *shramdaan* money was transferred into the *gramkosh* account. There is also the joint account of the BDO and the pani panchayat. One would say that such a collaborative action of the government, the civil society organization and the local population is novel as well as a model that might work well in other situation of governance as well. But, lessons latter on in Palamau leads to the fact that there are issues of caste as well as the contractor and political lobby that need to be considered in detail so that projects are not hampered mid-way.

The basic aim of SMA was to drought proof Palamau and enhance the self-reliance of the people. The following were considered to be the guiding operational principles.

1. Establishment of village based peoples' organizations, Pani-Panchayat (PP), to plan and execute the projects and maintain the assets created.
2. The beneficiaries establish their stake in the project through Shramdhan
3. Build on traditional knowledge and local skills.
4. Introduction of equity in the sharing of the resources generated.
5. Enhancement of self-reliance by contributions from Shramdhan and equity agreements to a Gramkosh (Village Development Fund).

Lessons

Drought-proofing model

SMA was meant to be a pilot demonstration and approach to drought proofing. The water harvesting water structures were meant to recharge underground reservoirs which then can be used if in case there is a drought, and to provide surface water for irrigation in normal rainfall years to increase food production and security. Water harvesting structures were constructed in 125 villages with at least one water body in each selected villages.

One of the strategies adopted by PCM is demystifying technology. PSI carries out a technology de-mystifying campaign by teaching the villagers round level measurement, training in doing earthwork measurements on check dams and construction of dams. It is
reported that many dozens of barefoot engineers and project managers exist in the villages till now and that they are positively helping the villagers, not only in construction and management of water management, but as an alternative to dominance of the mystified science of water management.

Empowering Women

Another gains of SMA is the increased participation of women in the village affairs. Twenty-four Mahila Vikas Sangh (MVS) or women organizations were active in the region since 1994. Through nurseries and plantations programmes they have built Mahila Vikas Kosh (Women's Development Fund) though Shramdan. these MVS now run savings and credit groups, some of tehm venturing into food processing. Women were the worst victims of the near total collapse of natural resource base during the 1992-1993 drought. However, initiatives like the above have boldened and have begun to create space for women of Palamau.

What Happened Later

The success in Palamau was a severe blow to the contractor lobby. And they from 1996-97 began to conspire to sabotage the programme. After the successful completion of the first phase of the programme, and when the second stage was about to unfold i.e. specific projects related to micro-watershed development and a geographical diffusion of the programme were to be attempted, the vested interest mobilized local political leaders and junior officials to put pressure on the district administration. This resulted in stopping of further funding of any new development work in the region. Not only this, works initiated by Pani Panchayat had to be suspended. Pani Panchayat did tried to put counter-pressure but did not succeeded. Speculation among PSI activist explained that they did not foresee and plan for political opposition and hence could not sustained. Within a span of 2-3 years SMA did managed to complete 80 percent of the structures started. And all future action had to stopped after the scene changed. Presently PSI now works on a much smaller scale in 20 villages expecting to expand when co-operation with the government officials can be established.

WATER

Forest Conservation And Water Harvesting at Bhaonta-Kolyala Villages

RAJASTHAN

Swati Sresth & Tisha Srivastava

Introduction

Tarun Bharat Sangh (TBS) is a non-governmental organisation involved in rural development and environmental conservation in the Alwar district for the last fifteen years. Their activities include water and forest conservation, rural education and health and anti mining operations in the district. In particular TBS has been active in promoting a community based movement toward floral, faunal and water conservation in the region for the last 15 years. Conservation of natural resources in the region has evolved as a process of growing self awareness, self sufficiency and understanding of the natural world for resident communities and TBS. Perhaps the best way of understanding their work would be to look at the villages of Bhaonta-Kolyala where the combined efforts of the village community and TBS has worked wonders for the people and ecology of the region. This effort is not only indicative of the potential of local institutions in protecting natural resources but also provides an example of the role NGOs can play in strengthening communities and conservation initiatives.

Bhaonta-Kolyala are twin villages situated in the upper catchment of the river Arvari, in Alwar district of Rajasthan, western India. The area is a part of the Aravalli range that extends from Rajasthan to Delhi. The region is dry, receiving less than 600 mm. rainfall annually. Over the last few decades, till recently, severe drought conditions have characterised many of the villages in this district.

There are 70 villages in the Arvari catchment and some 200 water-harvesting structures have been built in it by villagers and a local NGO, Tarun Bharat Sangh (TBS). These structures have replenished ground water and increased the water table, enabling the Arvari to flow perenially again. Bhaonta-Kolyala have had a prominent role in this initiative, in particular in combining water harvesting with forest conservation and other rural reconstruction work.

The main livelihood strategy in this semi-arid region is a combination of intensive rainfed cultivation and animal husbandry. Water conservation in this area has traditionally involved trapping water during the short rainy months by constructing a series of small dams and tanks (*johad*). *Johads* require regular

maintenance. It is also important that the slopes of the hills remain forested to avoid soil erosion from the hills silting the ponds. In the years following Independence, over-dependence on the Indian state for irrigation caused the villagers to ignore the maintenance of the *johads*. At the same time excessive tree felling in the hilly areas not only stripped the area of forest cover but also increased soil erosion and silting of *johads*.

The villages of Bhaonta-Kolyala have a combined population of a little under 600, and are spread over about 1200 hectares. There are three communities in the villages and the region, the Gujjar, the Balai and the Rajput. The Gujjars are numerically dominant.

The villages are set in the flatlands at the foot of the Aravali hills, which are (or at one point were) covered by dry deciduous or scrub forests. These forests are mostly on land belonging to the State Forest Department.

Towards Community-Based Conservation

The impetus for conservation in Bhaonta-Kolyala built up following an awareness march with the slogan "build *johads*, save forests", organised by TBS in the late 1980s. During this campaign, the links between forests, soil and water were highlighted by TBS workers. A series of discussions within the villagers and with the organisation resulted in a decision by people of both the villages to collectively protect forests and construct *johads*.

According to the villagers, while there had earlier been a sense of collective solidarity in the village, there had been little collective organisation or action in the village. In order to carry out the agenda of forest and water conservation, a co-ordinating body, the *gram sabha* (village assembly) was formed. It is an informal body that addresses the common needs and aspirations of the village community. It has an open membership with a 22-member decision-making body that represents all the hamlets in the two villages. The *gram sabha* has the right to make changes in regulations and enforce penalties. The body however is not recognised by the state and has no formal legal authority.

In the last decade, 17 water harvesting structures have been built here, with technical help and 75% of the cost from TBS. 25% of the cost was the villages' responsibility, in the form of labour, materials, or money.

The decision to protect forests, which was co-terminous with the water harvesting work, involved admitting past mistakes and a commitment toward regulated forest use. Rules were formed by the *gram sabha* keeping in mind the needs of the village community and sustainable use of the forest. Since overgrazing and tree-felling for fuel and timber were perceived to be the prime reasons for forest degradation, shepherds were asked not to cut any trees while their goats were grazing. The community has also tried to lower the number of goats in the village. Extraction of dry and fallen wood is allowed for fuel.

After 10 years of successful forest protection, on TBS's suggestion that the forest be held as an example of successful effort at conservation by local communities, it was declared a Bhairon Dev Lok Van Abhayaranya (Bhairon Dev Peoples' Sanctuary) in October 1998. According to TBS workers, the declaration of the sanctuary represents an ideological alternative to the state-centred wildlife conservation policy followed by the Forest Department.

Another interesting innovation is the creation of a *gram kosh* (village fund), built up with the contribution, by each household, of 5 kilos of grains. Some of the collection would be retained as a grain reserve for village needs, and the rest could be sold to build up a monetary fund for common community concerns. The fund was established in 1993-94.

Impact Of Initiative

Habitat and wildlife: Forest regeneration has taken place over several hundred hectares of forest, and with that, a slow revival of some wild animal populations. Herbivores are reported to have increased, and villagers report the occasional presence of 2 leopards. Indeed, these leopards have been lifting goats, but as yet there does not seem to be any ill feeling among the villagers towards them. Indeed, elders welcome it, claiming that the disappearance of tigers and other predators from the forest was the reason behind depletion of forests. They maintain that the presence of predators will inhibit people from going into the forest unless absolutely necessary.

Resource availability and livelihood opportunities: According to the villagers the most visible change is the presence of water as indicated by the recharged wells and greenery in the village. The villagers say that after 1990 there has been a rise in agricultural productivity and two crops can be easily taken in a year. This is believed to be a result of both the water harvesting and the regenerating forests. The livestock has also become more productive due to the increased availability and security of fodder. Out migration has also decreased with an increase in agricultural and pastoral production.

Lessons, Constraints And Opportunities

Several major lessons emerge from the experience of Bhaonta-Kolyala:

Highlighting the visible linkages between forest, water and agriculture, was a major means of motivating the villagers towards conservation. Indeed, what comes out very clearly is that the perception of 'nature' here is not that of a 'wilderness', but rather of a continuum of human influenced ecosystems where non-human natural elements co-exist with, and relate intimately to, human ones. Forest protection is therefore a part of the larger livelihood strategy in the village, but also has, at least for some of the villagers, an ethical and moral component.

Involvement of local communities from the beginning of the conservation initiative helped instil a sense of pride and ownership in the initiative. It also resurrected the sense of collective and individual responsibility toward natural resources, and was a process of empowerment. The people of Bhaonta-Kolyala now feel confident to assert their rights to, and *de facto* control over, natural resources, even though there is no governmental recognition of this.

The assertion of *de facto* control is not restricted to Bhaonta-Kolyala. In January 1999, a 3 day meeting was held to facilitate the formation of a 'parliament' that could help regulate resource use in the entire Arvari catchment. Villagers from across the catchment share the experience of empowerment, and it seems that a new collective identity is being formed in the process of discussions. This could help to overcome, to a certain extent, the occasional disempowerment that villagers of Bhaonta-Kolyala feel when dealing with neighbouring villagers, since legal authority is not vested in them.

Though the village still looks to TBS as a major support structure, over the years it has also evolved its own strong leadership. This comprises of individuals like Kanhaiya Gujjar, who are articulate and educated, work with TBS, and can negotiate with relevant authorities like the Forest Department; and elders like Dhanna Gujjar, who continue to play the important role of enthusing the village community to rally for a common cause.

The initiative continues to face a number of challenges. Chief amongst these is inter-village conflict; there has been an increase in the incidents of tree felling by the neighbouring villages. Since the *gram sabha* of Bhaonta-Kolyala has no legal authority over the forests, they can not enforce forest protection regulations on the other villages in the area. While TBS continues to play an important role, villagers feel that the Forest Department should also be more actively helpful. There are also some problems of intra-village inequities, with complaints from the 'lower' Balai community that their interests have been compromised due to conservation measures. They have been wanting some land in order to form another hamlet but the decision of the *gram sabha* has been to use the unclaimed land for water harvesting. This discontent, as yet very muted, could have a bearing on the CWM effort in the future, and needs to be squarely addressed.

Legal Implications Of Bhaonta-Kolyala

Upadhyay (1999) has carried out a study of the legal implications of community-based conservation, with Bhaonta-Kolyala as a specific example. He notes that forest and wildlife related laws in the State of Rajasthan have very few statutory provisions that facilitate community participation. The central constitutional amendment on *panchayats* could provide direct involvement of local participation in management and preservation of natural resources, but the ***Rajasthan Panchayat Act*** which followed, does not appear to give much power to village institutions regarding local natural resources.

Several other possibilities exist. Central and state circulars on joint forest management need to be incorporated into law. One way of doing this would be to use Section 28 of the Indian Forest Act, which allows for the declaration of Village Forests. It would also be interesting to study how changes in tenurial patterns vis-à-vis the state, have implications for community based conservation.

WATER

Pani Panchayat: Poverty Alleviation Through Equity in Water Management

MAHARASHTRA

Ganesh Pangare & Vasudha Pangare

Introduction

Mr. Vilasrao Salunkhe of Gram Gourav Pratishthan in Purandhar taluka, Pune district, Maharashtra state, has been campaigning for the equitable distribution of water over the past three decades, beginning from 1972. He formulated the concept of the Pani Panchayat or the Water Council, which is a philosophy of equity that encompasses all aspects of water harvesting and equitable water resources distribution. The term Pani Panchayat was first coined to describe the five-member committee set up to oversee the first lift irrigation project set up in the catchment area of a water harvesting structure in 1980. The term has now become synonymous with the concept of equity and is used to refer to the movement undertaken by the farmers of Purandhar taluka for the establishment of water management systems for the equitable distribution of water.

On the basis of the Pani Panchayat principles, community lift irrigation schemes in Purandhar taluka and neighbouring talukas have brought under cultivation about 3000 acres of land, covering a population of 10,000 people from 1500 families. The total capital investment has been Rs. 70 lakhs, for which people have contributed their share of Rs. 15 lakhs. Some projects have received subsidies amounting to a total of Rs. 15 lakhs, and the remaining amount has been given by the Gram Gourav Pratishthan (GGP) in the form of interest-free loans. In other cases, the GGP has helped farmers to obtain loans from nationalized banks.

Background and Concept

Western Maharashtra, a traditionally drought prone area, suffered one of the worst droughts in 1972. About forty lakhs of people were hired by the government under various employment generation schemes that gave them meagre wages on a daily basis. Most of the work consisted of breaking stones for purposes of road construction work. The sight of hundreds of farmers working under the hot blazing sun mechanically hammering large rocks into small stones presented a picture of despair and suffering. This was the scenario that Mr. Vilasrao Salunkhe, a

technocrat and businessman, first observed when he toured the region in his capacity as the Director of the Western Maharashtra Development Corporation. The sheer futility of the work these farmers were engaged in motivated Vilasrao to question the validity and effectiveness of these governmental efforts in mitigating drought. He began to talk to the farmers and soon realized that the creation of productive assets that provided an assured water supply was one of the permanent weapons to combat drought in the long run.

Mr. Vilasrao Salunkhe decided to use his personal resources and expertise to help the farmers to create productive assets for long-term relief from drought. He began his work in Purandhar taluka of Pune district in Western Maharashtra with the construction of percolation tanks and soil and water conservation measures in the micro catchments with the help of engineering students from the Poona College of Engineering and the local farmers who received food for work under the CASA scheme.

All the efforts and finances of the government in the meantime, aside from the employment generation schemes, were concentrated on the construction of medium and minor irrigation dams in the region. All the money was being spent so as to take the water by canals to the downstream areas. But no thought was given to the people who had lost their land, and had been ousted due to the construction of the dams.

Vilasrao began making enquiries to find out if any provisions had been made for the benefit of the people in the catchment areas of these water-harvesting projects. Did they have any right to the water that was only a few feet away from them? During these investigations he came to know of a government resolution that stated that 10 percent of the water from the medium or minor irrigation dam could be lifted by the people living in the catchment area. This gave him the idea of lifting the water to the fields in the upper reaches of the catchment, basically to those very people who had been ousted by the waters of the dam.

Setting up the Lift Irrigation Schemes

Making financial provisions

Lifting water from the dam to fields in the upper catchment was easier said then done. The major income for a large number of families in the region came from doing wage labour. If the water had to be lifted, it would not be possible for an individual farmer to do so. Organising the farmers was thus the first major step to be undertaken if the project was to be made successful and economically viable. Once the group was brought together the next important aspect was to raise the finances for the lift irrigation scheme.

A government subsidy was available for the farmers under the "Minor Irrigation Extension Programme: 2-4 hectares". Vilasrao felt that the farmers too should contribute towards the lift irrigation scheme. Investment by the farmers in the scheme would make the farmers feel that they owned the project. Vilasrao therefore devised a cost sharing system whereby 50 % of the cost of the scheme would be taken from the government in the form of subsidy, 30% would be an interest free loan from the Gram Gourav Pratishthan, to be repaid in five years and 20% would be contributed by farmers in cash or partially through voluntary labour.

A decision was taken to make use of the government subsidy for partial finance for the schemes. However, the farmers soon discovered that it was not easy to avail of this subsidy. Red tape and the frequent policy changes made by politicians in power made it almost impossible for farmers to obtain the benefits of this subsidy.

In the year 1981, therefore the Gram Gourav Pratishthan had to revise the cost-sharing ratio of five-three-two. By then the 50 per cent government subsidy was no longer available. Therefore, the contribution of the beneficiaries was increased to 30 per cent, out of which 20 per cent was to be contributed in cash, and 10 per cent through *shramdan*, or voluntary labour. The remaining 70 per cent was given by GGP as an interest-free loan to be paid back in 3 years.

Operationalising the lift irrigation schemes

Obtaining electricity connections proved to be the biggest hurdle in the implementation of the Pani Panchayat schemes. Although Maharashtra has achieved 100 per cent electrification of its villages, electricity is not available for agricultural use in many areas. The waiting list of applicants is very long, and as there is shortage of electricity, electrical connections are given according to the fancies of the politicians. The electricity department has no money to put up electricity lines, and do so only if at least 15 per cent of the cost can be recovered through revenues. The situation is almost the same now, as it was when the Gram Gourav Pratishthan first began its work. In fact, farmers are now required to pay a deposit when they apply for new connections.

In the command area of dams, wells are dug alongside the canals and are provided with electricity to draw water. Where beneficiaries are scattered and not located close to each other, the government refuses to make electricity available claiming that it is too expensive to install power lines for these locations. Since many of the Pani Panchayat schemes are designed to lift water from minor and medium irrigation dams, the struggle for electricity began with the very first group of irrigation schemes planned by them in 1981.

Over a period of 5 years, the farmers and trustees of Gram Gourav Pratishthan undertook various forms of protest to press their demand. They threatened to boycott elections, undertook a fast which lasted for eight days, besieged the offices of the electricity board, and culminated in the arrest of 200 farmers including women and children, who were even imprisoned at the Yerawada jail in Pune. The government went so far as to impose Section 144 in the area.

Finally, after 5 years, the Pani Panchayat schemes received electricity when Shri Ramakrishna, who was the Deputy Governor of the Reserve Bank of India, and later became the Chairman of NABARD, decided to help them. He had already removed the '15 per cent revenue return' clause. He realised that he could not single out the Pani Panchayat farmers for sanctioning the electricity connections; therefore, he released Rs. 80 lakh for providing electricity to the entire Purandhar taluka through the Rural Electrification Corporation.

The Naigaon Experiment in Integrated Watershed Management

The concept of watershed development and management is well known today, but what is not known is that the Naigaon experiment was one of the earliest examples of integrated micro watershed management. The importance of Vilasrao's experiment in Naigaon was eventually recognized by the government while planning the Comprehensive Watershed Development Programme (COWDEP).

Naigaon is a village of 1537 hectares, situated in Purandhar taluka, with a population of 1600 with 300 households. The micro watershed taken for development had a catchment area of 80 hectares. In order to understand for himself what it was like to develop land in a drought prone area, and to experiment with water conservation, Vilasrao leased 16 acres of grazing land in the village, which was in the catchment area of the micro watershed. He wanted to find out whether harvesting water for irrigation alone would resolve problems of employment and food security. He made the land cultivable by conserving the soil, and harvesting the rainwater through different measures. A percolation tank was constructed to collect the runoff, fields were leveled on the slopes and pipelines were laid to lift water to the upper slopes of the catchment. Different cropping patterns were tried out in order to find out the optimum yields. He was able to prove that half an acre of irrigated land was enough to support an individual's food requirements for a year.

During the course of his experiments in Naigaon, Vilasrao realized that the benefits of the project meant for the entire village were going to a few well-off farmers who had dug wells below the percolation tank and used the water for growing sugarcane. And in a sense these few farmers were free riders who reaped the benefit of public investment almost free of cost.

The Issue of Equity

What worried Vilasrao was that if the water from the lift irrigation/watershed project was going to benefit only a handful of people, and access to the newly created resources (water) was to be denied to the rest, there was no meaning to the project. In the majority of the interventions regarding access to water, the benefits are reaped by those who are in an advantageous position due to power equation, position of land holding, etc. In any community effort what must be ensured is that benefit sharing cuts across all borders and the gains from community actions are shared as equitably as possible.

Therefore, the issue of equitable distribution of water became the hallmark of the Pani Panchayat movement. If group endeavors at the village level have to work, then every member has to perceive that by joining the activity he will benefit more than what he would have gained if he performed the activity on his own, and that all beneficiaries will gain equally from the project.

The idea also was that the overall agricultural production in the village would also increase through the strategy of allocating water to a large number of small farmers. Small farms intensively cultivated could achieve higher levels of productivity than large farms less intensively cultivated.

With these issues in mind the following principles were laid down for the implementation of the Pani Panchayat lift irrigation schemes in the catchment areas of water harvesting structures:

1. Irrigation schemes would be undertaken for groups of farmers, rather than for individual farmers. Water would be allocated on the basis of the number of members in the family rather than in proportion to the land holdings. A family unit of five persons would be given water rights for the irrigation of one hectare of land.
2. Cropping patterns would be restricted to seasonal crops with low water requirements. Crops that require perennial irrigation and large amounts of water would not be cultivated. Specifically crops like sugarcane would not be grown.
3. Water rights would not be attached to land rights. If a farmer sells his land the water rights would revert back to the group.

4. All members of the community including the landless would have rights to the water
5. The beneficiaries of the lift irrigation schemes would be required to bear twenty percent of the total cost of setting up the scheme. It would also be their responsibility to plan, administer, implement and manage the scheme, and to distribute the water to the members in an equitable manner.

Mechanism for Implementation

The Pani Panchayat lift irrigation schemes are not formally registered as cooperatives, societies or trusts. They are informal groups managed by the members themselves. One of the main reasons for this is that since the people had on their own come together for an activity, which benefited them they did not wish to be answerable to anyone outside the village. GGP believes that the best results can be achieved if every member of the scheme feels that he has a role to play in making the project successful. Formal cooperatives necessarily mean that responsibilities are dedicated to specific committee members, who are also in a position to control decisions. The Registrar, too, often interferes in the functioning of the cooperative. Another negative factor about cooperatives is the necessity of electing committee members. The process of elections has the potential to destroy group spirit, and creates an opportunity for local politicians to capture the cooperative for political gains.

The advantage of an informal group is that it makes every member responsible and eliminates the chances of any one from free riding on the efforts of the others. It becomes the responsibility of each member to keep the project going as he has a stake in it. Every member's contribution becomes necessary and important.

The leader of the group and the five members committees are chosen unanimously, without elections. The main reason why conflict is kept to a minimum is inbuilt in the principles of the Pani Panchayat itself. Since water is allocated on the basis of half an acre per head, it removes the chance of any individual member feeling that he is an unequal partner in the group endeavor. In any community process if a single individual perceives that he has put in the same effort as his neighbor but the share he has received is less than that of his neighbor, there are bound to be problems. Such problems naturally jeopardise the whole community enterprises.

The leader is accountable to the group and facilitates the formation of the group and coordinates communication between the group members and the GGP for setting up of the scheme. GGP offers guidance and technical

inputs but the entire administration of the project is the responsibility of the group.

Lack of understanding of technical aspects by the villagers can affect the smooth functioning of irrigation schemes. Villagers usually lack the technical skills necessary for setting up and maintaining irrigation schemes. Dependence on external guidance for maintenance is likely to affect the functioning of the irrigation systems. In recognition of this, the GGP not only provides the necessary technical inputs for setting up the scheme, but also trains villagers to maintain the systems. In addition, the Gram Gourav Pratishthan representatives are always available for technical guidance whenever required.

Significance of the Pani Panchayat Lift Irrigation Schemes

The destabilisation of dry land agriculture is further aggravated by the inappropriate distribution of water to cash crops like sugarcane. In Maharashtra, surface water is supplied to sugarcane in the summer, in the drought-prone areas like Ahmednagar, and in most of the irrigated tracts of the state. Most of the Pani Panchayat schemes are located in drought-prone areas where water is a scarce resource. Therefore, judicious utilization of the water made available through the lift irrigation project becomes an important criterion for ensuring optimum gains to individual members.

In order to prevent abuse of the scarce water resource in the Pani Panchayat schemes, a decision has been taken not to grow water-intensive crops like sugarcane. Since the water is distributed on a 'per person' basis and the amount is limited, it becomes imperative for the farmer to plan for judicious utilisation. Growing food crops thus becomes the most efficient way to utilise the rationed water. On an average, the Pani Panchayat schemes provide 7,000 to 8,000 cu metres of water to irrigate one hectare of land. This quantity is sufficient to grow food grains, and limited amounts of oilseeds and vegetables. In this way, the farmer is able to cultivate some cash crops, along with food grains.

Where intensive canal irrigation is concerned, water is taken with the help of gravity through the canal system. This leaves out uplands and the areas where canals cannot be laid. It is in these situations that the Pani Panchayat Lift Irrigation Schemes provide the answer. By lifting the water, it becomes possible to take the water to upland areas, and also increases the efficiency in utilisation of water. More extensive irrigation thus becomes possible. However, it is important to understand that lift irrigation schemes implemented without the equity principle and judicious utilisation of water, would again result in inequalities. Without the implementation of these principles, the results from canal irrigation and lift irrigation would be the same.

One of the major criticisms against large dams is the resultant displacement of people from their own lands. In the case of small or minor dams, too, there is displacement. In many cases, the entire village is not relocated. What happens is that the village settles just above the submergence line in the catchment of the dam itself. The irony of the situation is that they live at the edge of the water, but cannot use it for irrigation as their lands are at a higher elevation. For these villagers, Pani Panchayat provides the answer by lifting the water for irrigation so that the oustees can be rehabilitated in their own surroundings.

Over the last few years, migration for employment from rural to urban areas has increased at an alarming rate. The only way to prevent migration is to provide employment at the village level, and this can best be done by making water available for irrigation. In the Pani Panchayat villages, farmers have returned from the cities to practice agriculture, after lift irrigation schemes made water available for irrigation, resulting in substantial increase in income levels.

The recognised direct impact of irrigation is increased agricultural production. What irrigation essentially does is make water available to the community. The primary aim may be to provide assured irrigation for crop production, but the availability of water also fulfils domestic needs. The requirement of drinking water is hardly 2 per cent of the water required for irrigation. What needs to be done is to plan for storage and access to a certain volume of the irrigation water, for drinking and domestic use. The Pani Panchayat Lift Irrigation schemes have made water available for drinking purposes and domestic use. In Madhapur village, Yeotmal district, for example, the village is situated atop a small hillock. The only source of water is at the foot of the hill. Under the lift irrigation scheme, a water tank was built near the settlement, due to which the women no longer have to walk up and down the hill to fetch water.

Case Study of Jal Malhar Lift Irrigation Scheme, Dhalewadi

Dhalewadi is a rehabilitated village, ousted by the construction of the Malhar Sagar (Nazare) dam on the Karha river in 1972. Only the village was submerged due to the dam, but the agricultural land of the village was spared. The villagers, therefore, received meagre compensation with which they were unable to rebuild their homes. So they built huts on their individual fields and stayed there.

The villagers of Dhalewadi are few among thousands of people displaced in the name of 'development' across the country. One of the criticisms against large dams has been the large-scale displacement that takes place as a result. But even in the case of small dams like the Malhar dam, there is displacement, and the plight of those displaced is similar to those displaced by larger projects, the only difference being in the scale.

Before the implementation of the Pani Panchayat scheme, many of the villagers had migrated in search of work to Bombay. The other village people would do some rain fed farming and work in the neighbouring villages as farm labour. The leadership for the scheme came from Jagannath Sable, who is now the group leader. In 1975, Sable had gone to Naigaon to see Vilasrao's experiment. According to Sable, 'We had heard so much about the Pani Panchayat that we decided to go and see what is happening there.'
Sable felt that the Pani Panchayat scheme could be implemented in their village and the water could be lifted from the Malhar dam. The villagers after all had a moral right to the dam water as it was they who had sacrificed their lands for the dam, but the benefit was going to someone else downstream.

But Sable realised that it was not going to be to implement the scheme in the village as a majority of the persons were alcoholics. He thought that the first step should be to remove alcoholism from the village. The women were the first to come forward to help stop the liquor habit of their husbands. Jagannath Sable says 'People will not stop drinking by force, so we thought that moral pressure might work'. He organised a religious get together where he felicitated the drunkards in the temple and asked them to give up drinking. The felicitation and the more pressures worked and the villagers gave up drinking.

In 1980, the villagers approached GGP for assistance in starting the lift irrigation scheme in their village, and stated that they were ready to follow the principles of the Pani Panchayat. The scheme got a subsidy of 50 per cent from the government and 30 per cent as an interest-free loan from GGP. But it was very difficult for the villagers to raise their own 20 per cent contribution. They sold their livestock and raised the money somehow. The surveys were done, the pipelines laid, but they did not get the electricity connection. After waiting for two years, the villagers decided to go in for a diesel pump to lift the water. But as it turned out to be a very costly proposition, they abandoned the diesel pumps.

Two more years passed and still there was no electricity connection. Many other schemes also had not taken off because of the non-availability of electricity. It was then that Vilasrao decided to start the electricity agitation. 60 people from Dhalewadi were locked in the Yerawada jail of Pune for seven days along with other villagers from various villages of the Pani Panchayat. This incident brought the villagers of Dhalewadi even closer because the people in the village helped the families of those who were locked up in jail fighting in their common cause. The villagers went continuously for 16 consecutive Mondays to the MSEB office in Poona. Finally, one honest and dedicated officer at the local level helped them to get the electricity.

It was in 1985 that they finally got the electricity connection, five years after they began planning their scheme. From then onwards there was no looking back for the villagers. Today, because of the Pani Panchayat scheme, the villagers of Dhalewadi, without taking anything from the government, have rebuilt their village. And instead of landing in the slums of Bombay as most development refugees do, even those who had migrated have since returned to the village to take up farming. From being a village of poverty and desolation, it has become a symbol of prosperity, where all the land has been brought under protective irrigation, and the norms of social justice and equity have been maintained.

Dhalewadi has a population of 917 people and around 150 households. There are a total of 66 members in the lift irrigation scheme, and a total of 119 acres of land gets assured water. The total cost of the scheme was Rs. 2,48,425. The members contributed Rs. 47, 570, the government gave a subsidy of Rs. 84,110, and GGP gave an interest-free loan of Rs. 1,16,745, which the villagers have repaid. The water is lifted from the Malhar dam with the help of two twelve and a half HP motors, and the pipeline runs for 7,000 feet.

After seeing the success of the scheme, other people in the village formed their own lift scheme without any subsidy from the government. There are around ten lift schemes in the village. Since there is no problem of water in the dam, the villagers are assures of two crops a year. The *kharif* crops are *bajra*, onion, vegetables and flowers. The *rabi* crops are onion, wheat, gram, green, fodder, *jowar*, flowers, etc. No sugarcane is grown under any of the lift irrigation schemes. Every family on an average has one hectare of land under protective irrigation, keeping in line with the principles of Pani Panchayat. In 1995, the village sold more than 2,000 tones, i.e., 200 truckloads of onion!

Under the leadership of Sable, there is an informal five-member committee which meets every month, along with the other members, to discuss matters related to lift irrigation scheme. The group has appointed two *patkaris* who are paid a monthly salary of Rs. 1,000 per month. The *patkaris* maintain the whole system, collect dues from members and are responsible for the running of the scheme. For food grain crops, the villagers have to pay a tariff of Rs. 30/acre/year to the irrigation department, Rs. 80/acre/year for cash crops. As mentioned earlier, the villagers get at least two crops a year, and if in a particular year there is enough water in the dam, they harvest even a third summer crop. The recurring cost per year comes to around Rs. 500 per acre. This includes the electricity cost, the salaries for the *patkaris*, and other expenses like replacement of pipes, maintenance of the motors, etc.

Farmer-Pastoralist Relationship in Dhalewadi Village

Pastorlists are a vanishing breed the world over. What is not known and understood by most is that these herders of sheep and cattle have a major role to play in rehabilitation and sustainable management of fragile ecosystems. Apart from producing milk, meat, leather and wool, and providing animals for traction, and manure for agriculture, livestock rearing also earns foreign exchange from exports.

Pastoralism is highly complex activity, hinging on a fine balance between the human population, animal population and natural resources. Though it maintains a reputation as the most complex and formidable of all agricultural and natural resource development tasks, pastoralists tend to be among the least educated and least empowered of rural populations.

Today, traditional pastoral institutions are being increasingly threatened with mass displacement because of intense competition from agriculture, population growth, herd dispossession and drought. Irrigation and improved techniques of dry land farming have virtually overwhelmed the former domain of the pastoralist. The anomaly of 'pastoralists without legal access to grazing land' has become a common reality. Once at the helm of a stable production system, the pastoralists are now constantly searching for new resources from which to make a living, adjusting to new migratory routes, etc.

What one finds in Dhalewadi is a unique example of how the pastoralists and the farmers have adjusted to each other and are, in fact, complementary to each other. In many agricultural ecosystems, manure is used to provide nutrients and organic matter needed for soil fertility on croplands. Even when chemical fertilizers are available, organic matter such as that provided by manure is the key to sustainable cropping. Farmers, and pastoralists often develop relationships centred around each other's needs. The pastoralists provide the manure for farmers and in turn get fodder for their animals. What one finds in Dhalewadi is an excellent example of such mutualism.

The '*dhangars*' are the traditional pastoral group of Maharashtra. They live as nomads for six months of the year; migrating with their livestock in search of fodder. In Dhalewadi, because of the availability of irrigation, there is a surplus of fodder. This has attracted the pastoralists to Dhalewadi. There are around 20 *dhangar* families who now live here all through the year, and the total livestock kept by them numbers around 2,000 sheep and goats.

The reason the farmers of Dhalewadi have accepted and encouraged the *dhangars* to stay in their village is because they value the manure. Also, the farmers have realised that the addition of chemical fertiliser has

started affecting the quality of their land, and is impoverishing the soil. Organic fertilisers are the best option, so the farmers are cutting down the use of chemical fertilisers. Thus, the farmers of Dhalewadi get their requirement of organic manure from the *dhangars* who in turn get fodder and some cash from the farmers.

This 'nutrient and energy trade' between the farmers and *dhangars* not only underlies agricultural sustainability, but may actually be increasing in importance because of the loss of common grazing lands and the increasing demands for fertilisers.

Impact of Jai Malhar Lift Irrigation Scheme

In the past, no families wanted to give their daughter in marriage to any man from Dhalewadi village, as it was known to be a poor and desolate village. Today, the farmers on an average make a net profit of Rs. 12,000 to Rs. 13,000 per acre per year. They have built permanent houses for themselves, they have also contributed towards a school and a temple in the village, and there are more than 50 motorcycles and two tractors.

More importantly, there has been a slow but sure reverse migration of people from the cities back to the village. This is in contrast to most other villages where one sees hordes of young men leaving for the cities. In fact, more than 100 people from the neighboring villages get employment round the year in Dhalewadi. For that last 15 years, the people have tried to keep the police out of their village. Any dispute or conflict is resolved within the village itself. The elections to the panchayat have been held by consensus and are not contested. According to Sable, 'Election is a disease, it breaks up the village'. For this very reason, the Pani Panchayat meetings are held under a tree away from the village so as to keep out village politics.

Today, Dhalewadi village may be in an ideal situation. But this has happened because of the availability of water. The prosperity here prevails amongst all the farmers, because the principle of equity was maintained, and sugarcane and other water intensive crops were not grown.

Conclusion

Absolute water shortages such as in drought-prone areas, demand certain norms for the proper utilization of the water that is made available for irrigation, whether it is done at public cost, or with financial investments by the community. In addition, coordinated efforts need to be made by the government as well as the rural community for the effective development and use of surface as well as ground water resources.

At a time when people were still talking of bridging inequalities through land distribution, Vilasrao first spoke of inequalities related to water distribution. Allocation of a basic minimum quantum of water to each family is the first step towards bridging inequalities among the rural poor, especially those who live in resource-poor areas. Acceptance of allocation is better if it is done through a participatory process.
Sustainable use of natural resources is possible when the control and management of common resources become the responsibility of the community that depends upon these resources. This responsibility brings with it social awareness, economic upliftment, and an improved quality of life.

The importance of the Pani Panchayat philosophy is that it has actually worked in the field. It had proved that equity is possible even in resource-poor, drought-prone areas and that it is possible to raise people above the poverty line with assured water for at least one cropping season per year.

Vilasrao Salunkhe says that Gram Gourav Pratishthan will continue its task of spreading the message of equity, but it is the responsibility of the government to make the necessary policy changes that will make the concept of equity widespread. There are limits to what an NGO can achieve at the national level.

The Pani Panchayat philosophy should form an integral part of government policies and schemes in the planning and implementation of irrigation and watershed development programmes.

WATER

Mukti Sangharsh – A Movement for Water Distribution

MAHARASHTRA

Seema Kulkarni

Historical Review of the Movement (1972-1990)

The Mukti Sangharsh Movement (Struggle for Liberation) was formally established in October 1983. Some of the activists of the movement were associated with the anti-drought movement in 1972-73, when Maharashtra faced a severe drought. It was after fierce struggles around this time that the government was forced to introduce the Employment Guarantee Scheme (EGS) in the state.

Bharat Patankar one of the key figures of the movement was working with the textile workers unions in Mumbai around the 1980's. A large number of the textile workers were from the drought prone part of Western Maharashtra. After the textile workers strike of 1982-83 most of the textile workers went back to their homes in the villages. Here some of the activists of the newly formed organisation were organising these workers. The base was established in Khanapur tehsil of Eastern Sangli district of Maharashtra.

Most of the issues taken up were common to most struggles that were active then. The concerns revolved around proper implementation of EGS, minimum wages, crèches for children etc. In fact most of the left parties then had started making a demand for permanency of schemes like the EGS and introduction of Provident fund in EGS.

The Mukti Sungharsh movement thought differently. Accepting the permanency of EGS kind of schemes is like accepting drought as a part of life. From then on the course of the movement changed and the idea of people's alternatives for drought eradication came up.

The first step in this was *padyatras* along the three main rivers in the tehsil of Khanapur in Sangli district. Here a detailed documentation, participatory in the real sense and much before the jargon came into existence, of the state of water structures, water use, number of tanks, reasons for change of the course of the river etc was done.

From then on the main slogan of the organisation was 'we will not break stones, we will not construct roads, and we will not rest until we have eradicated drought'. The seeds of 'EGS for building productive assets' were sown then.

This naturally meant a search for alternatives that were related not only to water per se but also agricultural practices of the area. Interactions with pro-people scientists like KR Datye (SOPPECOM), Shri SA Dabholkar (Prayog Parivar) grew and from then on different experiments and studies were conducted to make a statement on the drought situation of the area and alternatives to it.

In 1984-85 the Mukti Sangharsh Movement (MSM) for the first time put forward the perspective of integrated watershed development programme for Khanapur tehsil in Sangli district of Maharashtra. The local people surveyed each and every village in the tehsil. It was around this time that a demand for equitable distribution of the exogenous water from the Takari, Mhaisal lift irrigation schemes of the Krishna basin too was made.

The main demands were

- protective irrigation for the kharif and rabi crops
- maximum households and villages should have access to water based on the principle of equitable water distribution.
- Cropping practices that make use of optimum water should be made mandatory within the project area.
- A technical service for measuring water while distribution should be put in place

(Asud, 27th Oct. 1985 pp30)

Based on the findings in the area, the MSM held a Dushkal Nirmulan Parishad (drought eradication conference) in 1985 which was attended in large numbers.

The Struggle for the Baliraja Dam or the people's dam is in a sense a historic one. It started with people from the village demanding a right to village resources, in this case it was sand from the river bed that was being extracted by the private contractors for their own gains.

This later turned into a struggle for construction of a people's dam, a dam built and owned by the people. The people chose the site of the dam and decided the norms for water distribution too.

A Radical Step at a Critical Stage-Position on Water Use

The movement did not stop at the demand for right to water. In fact this is where they radically differ from most other organisations working on water. For equitable water distribution to translate into reality, it was necessary to experiment and define

- Optimum and rational use of water
- Sustainable cropping practices and patterns for rational water use
- Minimum quantum of water required to meet livelihood needs

Different experiments on optimum water use through alternative farming practices were conducted. It was through these experiments that the movement was able to first establish the minimum quatum of water requirement (around 3000^{m3} for this area) to meet the basic livelihood needs and raise a demand for right water around this.

The three-acre model then came forward as one of the options for the area. This 3 acre model was essentially a comprehensive model, which had a combination of agro-forestry, horticulture and kharif and rabi crop plan. The idea behind this was to address the range of household needs from both the short term and the long-term perspective. The crops were to meet the immediate food needs of the household. The forestry plot was to meet the sustainability needs of the land and to maintain and enhance the primary productivity, and provide for biomass for meeting the fodder, fuel needs and surplus biomass for meeting the 'beyond subsistence' needs (cash requirements for needs of health, education etc.).

Overview of the Historical Understanding of MSM on Water

The organisation's active role in the regional water scenario gave it a thorough understanding of the water situation. This led it to articulate its own position on water. The radical and informed position of the organisation comes from a much broader and historical understanding of the resource use, ownership and its relations with different sections of the people.

The movement has made efforts to look at the water issue in the historical perspective. They have studied the changes in the water distribution and use pattern from the ancient Indus and Dravidian culture to the present. Here we shall take a quick overview of MSM's analysis of the water scenario in the pre and post 1990's era.

Water Scenario Before the Reform Era (pre 1990)

The famous example of the 'Phad' system in Maharashtra, in a way sets the example for equity in water distribution. This is an age-old practice, which is still found in the Nasik and Dhule districts of Maharashtra. In this system all

the farmers own land in the command area or the 'phad'. Similarly the tank irrigation system in Tamil Nadu too allowed for equitable water distribution system. These systems also had some understanding regarding cropping patterns and cropping practices.

However these systems are slowly disintegrating with new projects coming in and defining new water distribution norms that favour the resourceful and private rather than public interest. In a way this process started in the British Raj. Changing social relations also led to changing property regimes. The British policy essentially centralised the whole water system. The present government is mainly carrying forward this policy. This has led to islands of green revolution but a sea of drought prone areas.

Water Scenario in the Liberalization Era (post 1990)

The post 1990 water scenario appears rather dismal. Three major changes that took place have affected the poor directly.

Water Distribution System

One of the major changes that took place is with reference to the canal system. Until 1990 the State government took upon itself the responsibility of water distribution through the canal system. But after the 1990's in the liberalization era the state government has conveniently evaded from this responsibility.

The government is in hurry to impound more and more water to meet the deadline set by the Bachawat Award for the Krishna waters. Although the Award explicitly states that the deadline of May 2000 is for utilisation of water and not merely for impounding of water, the government has not paid any heed to that. Water is now impounded in dams, no distribution system is in place, water is therefore released in the river and those with resources lift and use it as a free resource or sell it as a commodity. This then is the promised utilisation of the water. Those who are away from the source and who cannot afford to lift the water, lose access to water which is a crucial means for production.

This system has not only led to further privatisation of water but has also meant a great loss in terms of the electricity point of view. In such a system the command area gets defined by the number who have the 'power' to lift the water.

Formation of the Maharashtra Krishna Valley Development Coporation

Formation of the Maharashtra Krishna Valley Development Corporation (MKVDC) in 1997 is another example of privatisation implemented in the reform era.

The MKVDC hoped to complete its works through raising almost 50% of the total amount by selling its bonds to people. They had announced a very high interest rate to the investors. This will however be entirely at the cost of the poor farmers who unfortunately will not even benefit from the Krishna Valley development plan. Instead of floating a private body like this it would have been possible to federate the existing WUA in the state to decide on the water use and distribution in the Krishna river basin.

Priority of Water Use

After 1995 the government has taken a decision to give priority to industrial water use over agricultural use. This decision does sound rather misplaced in a country where agriculture is still the main occupation of a large section of the population. Apart from this water sports and other activities to attract tourists have also been given a priority.

These policies appear to be directed to building a few more islands of green revolution where the poor from the drought prone areas can have employment or rather the rich from these islands can have cheap labour. Whereas 75% of the population of the state will reel under drought the rest will have access to undue luxuries.

In the light of this understanding on the water issue and the policies until now the movement has been able to articulate its position, through the various struggles and dialogues, on water. This indeed is a radical position and touches most aspects of the resource poor.

The Salient Features of MSM's Position on Water

The issue of water distribution and use is essentially one of the inter-relationship between water-land-cropping pattern and the toiling people. This interrelationship has to be based on the foundation of equity, justice and parity between humans. The main features of the MSM position on water is as follows:

1. Optimum use of water for sustainable and long-term production essentially means increasing the productivity of land and water. Enhancement of this primary productivity will lay the foundation for a biomass based production system. It is important to recognise that this perspective is different from the purely technical perspective on water saving like drip irrigation.
2. Integration of different water sources is an important principle in water policy agenda. Although the primacy of water from the local watersheds has to be recognised there is also a need to look at external sources of water. It is the integration of external and local water that may finally allow access to a large population to meet their livelihood needs. This is particularly true for low rainfall areas.

3. Separation of land rights and water rights is another important principle in the agenda for water policy. This then includes the landless who are otherwise out of the purview of the water policy. Here it is recognised that water is the means of production.
4. Need for formation of water users groups that include the landless. This WUG will take the responsibility of distribution of water in an equitable manner.
5. It is not enough for WUG's to be restricted to water distribution at the village level. Unless there is some larger body, which has representation from all the WUG's, that monitors the overall use of water, it might be difficult to control the misuse of water. This monitoring should include crop planning, crop-water requirement, cropping pattern etc.
6. Right to water round the year. In Maharashtra there has been a long-standing debate on water for 8 months of the year and water for around the year. This debate has managed to deflect the main demand for right to minimum water for all.
7. The state government has been investing in building more and more dams without the necessary investments in constructing the distribution system. As a result of this water is released into the rivers which is then lifted by those who have the resources to lift and are situated closer to the rivers. This privatisation of a public resource is uncalled for and will leave the question of 75% of the people residing in the drought prone areas of the state, unresolved. There is need for a demand redistribution of water from the existing dams-a water reform programme on the lines of land reform.
8. It should be made mandatory that the spread of water should be over a larger area rather than the present policy of giving large quantities of water over smaller areas.
9. There is need to reduce the submergence area while constructing new dams without compromising on the command area.
10. Rehabilitation first and then construction of the dam as a precondition to new constructions of dams.

The Current Phase of Struggles (post 1990)

Based on the above understanding the organisation took up the issue in a vast part of Western Maharashtra region. Some of the significant struggles are outlined here.

Chinchni rally

26th December 1990 saw a major rally at village Chinchni in Khanapur Tehsil of Sangli district. This was specially organised to mark the beginning of a struggle for equitable distribution of water of the Krishna-Koyna Lift Irrigation scheme the Takari project. Here a resolution was also made regarding the distribution of water from the large dams, alternative cropping practices for meeting livelihood needs. This was one of the first alternatives for the Maharashtra State level water policy.

Several rallies and dialogue meetings were organised for the implementation of the alternative. Of the ones that need special mention is the open dialogue held with the government officials, people of the area, independent water experts etc in Kolhapur's Shivaji University. The outcome of this was that the government officials were not able to challenge the alternative posed by the movement. They had to accept a pilot project on the Takari scheme where water users associations would be formed and norms for water distribution be evolved. Accordingly 3 societies have now been formed, however the scheme itself has yet to be completed.

The Atpadi Struggle

The movement has now extended to the Sangli, Satara and Solapur districts of Maharashtra. This has now extended beyond the MSM and is called the 'Shetmajur, Kashtakari-shetkari Sanghatana' (Agricultural Labourers and Toiling Peasants Organisation) led by the legendary 75 year old freedom fighter Nagnath Anna Nayakwadi and Mukti Sangharsh Movement's Dr. Bharat Patankar and others like Nana Shetye of the Lal Nishan Party (L).

This movement has spread to 13 Talukas in the three districts. As a result of intense, sustained pressure in this area the government was forced to accept in principle equitable distribution of water on all the new dams.

For the Atpadi struggle the major demand was that water from the Tembu irrigation project be distributed equitably in the region and that the government agree upon a pilot project for equitable distribution. The norms used for Atpadi were in the range of 2500-3500 ^{m3} for every household.

As a result of the struggles, the Maharashtra Krishna Valley Development Corporation (MKVDC) had to agree to allow for a `pilot project' in Atpadi taluka of Sangli district. It has also has agreed to work out a plan to restructure the Tembu lift irrigation scheme which is to provide water to Atpadi and other adjoining talukas. The movement forced the MKVDC to have regular joint meetings and now the MKVDC has submitted the alternative proposal to the Government for approval. This is a very significant victory for the movement.The struggles would however have to go on till the scheme is actually allowed to be implemented.

Struggles of the Project Affected

As per the Bachawat Award, the Maharashtra Government was to impound maximum water by 31st May 2000. Since the Maharashtra Government had lagged behind in full utilization of its share of water, it desperately tried to

expedite dam construction in the Krishna Valley to fully utilize its share, before 31st May 2000. As a result of this general hurry most of these projects got passed without appropriate rehabilitation of the dam-affected villages.

The 'Maharashtra Rajya Dharan Grasta Va Prakalpa Grasta Shetkari Parishad' (MRDPSP) (Maharashtra State Dam & Project Affected Farmers' Organization) in South Maharashtra took up this issue in a big way. It organised the project-affected people at various dam sites like Chitri, Wang-Marathwadi, and Urmodi in particular. Again due to sustained struggles the government was forced to take cognisance of the issues. People stopped dam construction where their demands for rehabilitation were not met with. Oral assurances from the government were not accepted.

Some of the major demands of this joint front of the project affected and project beneficiaries for rehabilitation of the project affected were

- Monthly irrigation stipend and
- Provision of 13 civic amenities in the rehabilitated areas

The monthly irrigation stipend (Pani Bhatta) was an innovative demand, which reinterprets the compensation for land clause in the rehabilitation policy. The demand here is to pay a monthly irrigation stipend to the project affected until they get irrigated land. This amount was settled at Rs. 600/month. Although this was accepted on paper, to get this they had to organise agitations and as a result many of the project affected from dam sites in Satara, Sangli and Kolhapur districts got the Pani Bhatta for the initial 3 to 4 months. However, there is a backlog, as the government has not paid the Bhatta for the last several months.

The struggle reached its peak when on October 27th 1999, there was a three-day-long *dharana* simultaneously in 13 talukas in three districts, in support of various demands of both the project affected as well as the beneficiaries. Since then, pressure has been continuously and successfully put on the bureaucracy to implement the various assurances. For example, as per the act passed in 1987 ('Maharashtra Rehabilitation of the Project Affected'), the rehabilitated villages should be provided with 13 civic amenities which include school with playground, piped water supply, constructed drainages, cemetery etc. Usually, only some of these amenities are provided for but due to the presence of a vigilant and firebrand organisation, the government is forced to provide all the 13 amenities.

Each village has become a vigilance squad and dam work is not allowed to start unless the alternative land is transferred in the name of the project affected and the work is not allowed to be completed unless all the project affected get actual possession of the alternative land.

Alternative to the Uchangi Dam

Uchangi is a small village in the Aajara Taluk of Kolhapur district. The Maharashtra Government decided to build a dam there (on Tar-ohal, a small river in that area) that would submerge partly or wholly 6 villages to impound 660 million cubic feet (mcft) of water. The villagers had pointed out way back in 1986 that the area being a high rainfall area could have several smaller dams instead of having one larger dam. This would reduce the submergence without really compromising on the beneficiary area.

The government ignored this proposition of the people until it was forced to take cognisance of it in 1997, when thousands of people took out a rally opposing the construction of dams.

This rally culminated in a meeting with the district level officials who finally had to accept the people's demand that alternatives can be presented by the people.

Experts in the field, Mr. K.R. Datye and his associates in Society for Promoting Participative Eco-system Management (SOPPECOM), agreed to help out in preparing this alternative, if the relevant data were made available.

Under the guidance of these experts, an alternative plan for the area was prepared on the basis of a participatory resource mapping. However this data was not sufficient to prepare a detailed plan for the area. Hence topographical information was sought from the government. The district officials refused this information and also backtracked on their earlier promise of accepting the people's alternative. They decided to go ahead with the construction in 1998.

The people were up in arms against the government. A massive struggle was launched and on the point of right to information they forced the administration to agree to their demands. Over a 1000 police were deployed to disperse the crowds. But the might of the gun proved to be futile and the administration had to agree to provide all the 'secret' information.

Based on this, the organisation along with the SOPPECOM team prepared an alternative plan. This plan proposed 3 smaller dams on the Tar-Ohal river. These three dams together could impound 624 mcft of water, which had the potential to irrigate almost double the area in the government plan. In this plan there would be equity in distribution of water where each household would have access to 3000^{m3} of water. There would be no displacement and very little good quality land would be submerged.

A meeting was held with the MKVDC based on the alternative plan. They agreed to one of the sites in the alternative plan and also to reduce the height of the Uchangi dam by 2 meters. The other two sites were rejected on the grounds of not fitting the cost criterion of the government. Although the organisation and the experts tried to convince the government that cost reduction was possible the government expressed its inability to stretch itself any further.

Although people would have been far happier if the entire plan was accepted, these victories nevertheless were singular.

Due to this decision good quality land near the riverbed would be submerged, however the government agreed to lift water from the dam to irrigate the rest of the land at its own cost.

The Satara Struggle

From 24th December 2001 a new phase of the struggle started in Satara. This was one major step in this sequence, where the people are basically demanding that the Government hold true to it's commitment to the dam affected people in Satara district.

Some of the demands of this indefinite sit in were as follows

- Distribution of land to all of the dam affected families in Satara district
- Distribution of arrears of water stipend and various other legal dues of the dam affected people
- Providing the complete set of civic amenities to all the rehabilitated families
- The new demand of '***First provide water to the command areas of existing dams; only then will we allow construction of new dams'.*** This pertains to providing water in this Rabi season to people in Patan and Karad talukas, by completing the necessary work on Urmodi, Tembu, Uttarmand and Wang dams. In the meanwhile, water from Koyna and Kanher dams should immediately be made available to these talukas. If some funds remain available after completing work on all these existing dams, then alone should new dam construction be allowed.
- Adequate finances should immediately be made available for the effective functioning of the Kanher lift irrigation scheme.
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The Dharangrast Parishad had declared an indefinite 'sit-in' *(Thiyya andolan)* at Satara involving thousands of toiling men and women till their just demands are met.

After a 14-day long 'sit in', the Chief Minister of Maharashtra agreed to meet the leaders of the movement and then finally agreed to most of their demands. Two of its important demands of settling arrears of the water stipend and process of land surveys for identifying compensatory land were to begin on a war footing as a result of this meeting. This has been a major victory for the organisation.

Dialogue With Left Parties And Progressive Groups

The organisation's political front, the Shramik Mukti Dal, had made an effort in the early 90's to form a broader front by inviting most of the left groups active in Maharashtra around the proposed alternative on the water issue. The meeting was well attended.And although almost none openly challenged the position, none took it up publicly either.

This first attempt to form a broader front therefore did not take off. Most of the left parties do not treat water as a means of production. In fact many of the leaders from these parties have supported some of the struggles or themselves led struggles for water rights. However as a party they have not been able to outline their positions on the water issue to influence policy at the state level.

So has been the case with non-political organisations and NGO's networking on water. Most of their struggles have largely revolved around a source. Many have taken a stand that local water harvesting can meet all the water requirements and therefore there is little need for exogenous water. A perspective on integrated management of water and equitable distribution of water has not been articulated so far..

Despite very little support from various political parties and other progressive forums the organisation has gone ahead with its demand for equitable water distribution.

As a result of the tremendous response from the people the Nationalist Congress Party was forced to include this demand in its election-manifesto for the Maharashtra Vidhan Sabha election in September 1999. When it came to power the party lost no time in forgetting its election manifesto. The people however brought the party to book due to which it ultimately declared equitable water distribution policy for the new dams being constructed. Though this policy excludes the old dams, it is undoubtedly, a step forward, and constitutes a victory for the movement. Equitable water distribution on per capita basis has been included as the first point in the 51 point common minimum programme suggested by the N. D. Patil Committee appointed by the present Democratic Front government. The challenge now is to put pressure to implement this policy and to include the old dams in equitable water distribution!

Interface with SOPPECOM

The movement has recognised the significant role that pro-people technology and science can play in strengthening people's alternatives. This is one more difference between this organisation and the so-called 'participatory' band wagon that takes an extreme position on the negative role of science and technology. It is this balance between people's knowledge and the role of science and technology that has helped the organisation to build sustainable alternatives. Although no one can undermine people's understanding of their resources, there is need to accept that the breakthroughs in science can play a very positive role for strengthening and sytematising people's alternatives. This perspective of the organisation has given it the space to interact with the People's Science Movement and organisations like SOPPECOM.

SOPPECOM has been working in the field of land and water management for a decade now. Its main thrust area has been water, energy and livelihoods. It has diligently worked on alternative technologies in low-cost water storage structures, pipelines, construction technologies etc. Importantly, it has worked with resource poor groups including landless women's groups largely in drought prone areas on the issue of water use, institutions for water etc. It has done pioneering work on forming Water User's Associations on surface irrigation systems.

SOPPECOM experts have played a significant role in developing alternatives for the movement for water distribution, selection of sites, crop planning and related experiments and studies.

In fact SOPPECOM's water position on water has certainly emerged out of the learnings from its interactions with various people's groups particularly that of the South Maharashtra movement.

Final Comments

The radically different and informed position on water comes out of a much broader understanding that the movement has had on a wide spectrum of issues ranging from caste, class and women's oppression, understanding farming practices, participating in contestational politics and so on.

The struggle for equitable rights over water, has been one of the major liberating forces for the different oppressed groups. Although the movement is quite aware that all exploitation will not end with granting of water rights, it nonetheless sees tremendous potential in surging the struggle ahead through this demand.

It has articulated its position on how caste, class and gender exploitation has been further aggravated by systematically keeping these groups away from rights to resources, water being a crucial one.

Before we conclude let us take a quick overview of the innovative aspects of the movement and different organisational strategies that have sustained and enriched the movement for over two decades

A. Innovative Demands

Equitable water distribution: the movement considers water as an important means of production and has consistently struggled for equitable distribution of water, including to the landless. Some of the experiments related to water requirements for livelihood security have helped to strengthen the demand for equitable water distribution and also evolve equitable water distribution norms on a household basis. For example the movements demands that around 2500 to 3000 ^{m3} of water has to be provided to each household from an assured source as a basic service to meet livelihood needs

Monthly water stipend (*Pani Bhatta*): Another innovative demand has been in the case of dam affected persons. Under the latest rehabilitation package of the government, the project affected are supposed to get alternative land in the command areas of the projects meaning that the government is supposed to provide irrigation to them. So, two years back, the movement demanded that the government should pay the difference in production between irrigated and unirrigated agriculture to the project affected till they get irrigation water. After prolonged and intense struggles, finally the government agreed to pay Rs. 600 per household per month to the oustees as *Pani Bhatta*.

'First rehabilitation, then dam construction' : Under this broad principle, the movement because of consistent struggles could force the government to agree to certain well-defined procedures. For example the Collectors of Satara, Sangli and Kolhapur convene regular joint meetings (once in a month) to review the rehabilitation work. It is mandatory for the officers of all the concerned departments to attend these meetings. This has helped in sorting out matters and also has helped in significantly reducing the unnecessary rounds that the project-affected have to make to different offices and also in the process saving both money and time. The movement has also forced the government to prepare a time schedule for each activity or step both for dam construction and simultaneous rehabilitation. This time schedule is discussed in the joint meeting and if the government does not adhere to the time table in terms of the rehabilitation programme then the organisation physically stops the construction of the dam especially gorge filling, thus not allowing to store water. In the case of Urmodi Dam in Satara district, a couple of years ago even Bal Thakarey had to go back without laying the foundation stone, though the programme was announced well in advance, because of the opposition from the organisation. They allowed the laying of the foundation stone only after they got written orders for a time

bound rehabilitation programme including the 13 civic amenities and also water guarantee for the alternative land. In fact this has come to be known as the 'Urmodi pattern'.

'First water distribution from old dams, then construction of new dams': The organisation has consistently raised the demand that before any new dams are constructed in the region, the water available from existing dams and sources should be released and distributed equitably.

B. Creative Organisational Strategies:

A highly innovative and effective strategy adopted by the movement has been *to unite dam-affected people and the beneficiaries of the dam* under a common banner. This united struggle of the dam affected and drought affected has added strength to the movement in the region and they jointly participate in the struggles -- the dam affected demand equitable distribution of water and the drought affected demand proper rehabilitation of the dam affected. This is a unique situation of joining together the interests of two groups, which are traditionally considered to be at loggerheads with each other, a situation the state exploits to its advantage.

Another important strategy has been *to demand comprehensive information and propose concrete alternatives* to Govt. dam projects. This as we have seen earlier has happened in the case of the Uchangi dam in Ajara taluka of Kolhapur distt.

Consistent and rigorous follow-up for complete implementation of demands has led to long-drawn struggles yet has contributed to the many and real ground-level successes of this movement.

A parallel movement to articulate their position *on alternate culture* (vidrohi chalval) has also been the rallying point for all the non brahmin groups and women from these groups to come together. These are also the groups who have been deprived of access to resources particularly land and water. This broader understanding of caste, class gender issues makes the alternatives proposed by the movement more sustainable. The organisation has consistently addressed the caste class and gender issues through its political forum, the Shramik Mukti Dal.

Decentralised groups in each of the areas which have their own identities but come together on a common forum for demands around water. Each local area therefore has its own sanghatana with its distinct identity.

The Challenge Ahead

The gains made by this movement so far have been possible because of tremendous sacrifices and efforts made by the thousands of rural men and women who have participated in, and carried forward these struggles and also the creativity and innovations shown by the leadership of the movement. However, despite innovative gains with policy implications, the toiling people have to repeatedly come onto the streets to ensure implementation of each step of rehabilitation and water distribution, promised but not easily realised by the Government. At the cost of their daily livelihood, it is the people and not the officials who have to ensure that the Govt. actually does what it promises. The question is how can this agenda extend beyond the region and when will the government act honestly to implement its own policy decisions.

Public Awareness

There is need to increase awareness at two levels, one is among the larger middle class urban people who are unaware of the issues of the toiling peasants. The other is at the level of the political parties and progressive groups to accept water as a means of production and build a programme for equitable distribution of water on the lines of redistributin of land.

Such a campaign could be possible through organizing science festivals, exhibitions, public lectures, open debates, writings in various journals and the press and so on.

Need for a Broader Front

As we have seen earlier there had been an effort made in the past when different left groups and representatives of political parties and other progressive groups were invited to debate and discuss on the proposed agenda around water. Although none challenged the agenda none of them openly and publicly supported it either.

There is need for a renewed effort particularly in the wake of the current crisis, for progressive groups and parties to come together and from a broader forum around this agenda. Different organisations working and networking on the water and biomass issues need to form a broader forum to formulate a pro-people water and rehabilitation policy at the state level. This is a major challenge ahead and it will be difficult for any single organisation to wage this battle by itself.

Monitoring and Grievance Redressal Body

Thousands of people have always had to come to the streets to pressurise the government to implement its own policy decisions. This has effectively meant wherever there is a strong and militant movement, only there will the

government act. This has to change and certain systems need to be put in place.

A State level Grievance Redressal and Monitoring body needs to be formed, which has regional centres to look into the implementation matters. This body should have representatives from the different organisations working on the land and water issues, government officials and independent experts. The role of such a body and other details need to be worked out jointly.

(This case study is largely based on the literature of the MSM and also owes a special mention to discussions with and writings of Bharat Patankar of MSM, Anant Phadke of CEHAT and Lok Vigyan Sanghatana, KJ Joy, Suhas Paranjape, Shri Sane, Shri Lele and Shri Patil of SOPPECOM)

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