

Fighting the Commoditisation of Water and the Marginalisation of Bhil Indigenous People in Jhabua District of Madhya Pradesh in India - A Multi-Disciplinary Approach

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ABSTRACT

The Bhil Adivasi Indigenous People of Jhabua District of Madhya Pradesh have traditionally treated water as a life giving resource and so have husbanded and used it judiciously. Modern man has treated all natural resources including water as commodities and in the process of extracting them for profit has marginalised and immiserised the Bhils. This has manifested itself even more so over the last decade in the mismanagement of water resources in Jhabua district and the costs have been sought to be pushed on to the adivasis. The Bhils have organised themselves to fight this injustice. In the process these Bhil mass organisations have not only had to engage the modern establishment politically but also learn its arcane procedures of "rigorous" validation of truth involving statistical analysis. This paper details how these mass organisations have used an innovative mix of mass political action and economic analysis to try and introduce environmental sanity and socio-economic justice into water resource management in Jhabua.

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In the month of April 2006 hundreds of Bhil adivasi indigenous people under the banner of their mass organisation "Lok Jagriti Manch" sat in a dharna or sit-in in Bhopal the capital city of Madhya Pradesh state in India demanding that the unjust recovery of loans advanced to them by financial institutions for lift irrigation schemes that had failed due to no fault of their own be stopped. They said they had conclusive proof to support their claim that the lift irrigation schemes had been based on faulty water resource planning arising from treating water not as a source of life as the Bhils had done for ages but as a source of profit as modern man had begun to do after independence in India. Eventually after ten days the Government of Madhya Pradesh partially yielded to their demands staying the recovery of the loans and a detailed investigation into their claims was ordered. Indeed globally the commoditisation of water has led to the problem of serious water scarcity, which is becoming more acute with time (Cosgrove & Rijsberman, 2000). Under the circumstances the innovative ways in which the Bhil adivasis in Jhabua have fought this deleterious process are worthy of an in depth study.

1. Background

The district of Jhabua situated in the south-western corner of Madhya Pradesh is home to the Bhil adivasi or indigenous people with the various sub-tribes like Bhil, Bhilala, Patelia and Mankar together constituting 86.8 % of the total population (Census, 2001). The district forms an unique agro-climatic zone called the Jhabua Hills in the southern part where it is part of the Vindhya hill ranges and drains into the River Narmada. The northern part of the district forms the undulating hilly edge of the Malwa Plateau and the eponymous agro-climatic zone and drains into the River Mahi. The topsoils are mostly light and lateritic with some fertile patches of the medium black variety. The underlying rock structure is mostly archaean igneous with some hard rock, deccan trap basaltic and sedimentary formations in patches. The first two formations have low primary porosity and permeability and so the groundwater aquifers have poor water retention capacity. While the deccan trap and sedimentary formations are better aquifers they are few and far between (GOMP, 2002). Thus the terrain and the underlying geological structure together result in most of the average annual rainfall of 829 mm running off during the monsoons and consequently the net groundwater availability is only 519 million cubic meters per year (CGWB, 2006).

Traditionally the Bhils lived by practising shifting cultivation, hunting and gathering in the dense forests that used to cover the terrain. A combination of the reduction of the fertility of their farms and epidemics would cause them to move every few years to new locations. Living at subsistence levels and being heavily dependent on physical labour they had no alternative to being integrated into tightly knit communities by customs of labour pooling in most aspects of their material and cultural life. The egalitarianism of the Bhils, apart from the usual patriarchal aberration, was further ensured by customs that decreed that surpluses accumulated beyond a certain limit be spent on communal merrymaking and feasting. This also did away with the possibility of these surpluses being used to develop agricultural and artisanal production and engage in trade and further accumulation and so protected the environment from over exploitation (Rahul, 1997). This aversion to trade also meant that they eschewed the abstractions of literacy and numeracy and remained firmly down to earth and developed a rich oral animistic culture with nature at its centre. Thus there was no commercial value attached to natural resources and especially water. The terrain and the kind of agriculture they practised discouraged the development of irrigation. Nevertheless

using their own ingenuity the Bhils developed an unique irrigation system that involved the construction of temporary weirs on the hilly streams and then the diversion of water into channels with lesser gradients that over a distance of a few kilometres brought the water into their small farms by gravity (Rahul, 1996).

Independence from British rule in 1947 brought in massive changes into this subsistence livelihood of the Bhils of western Madhya Pradesh. From 1949 onwards a process of land settlement was started with the aim of stopping shifting cultivation. With the formation of the state of Madhya Pradesh in 1956 from an assortment of former princely states and British administered areas in the central Indian region that were left unclaimed by the other more articulate linguistic sub-nationalities. The Indian Forest Act 1927 was then extended to the adivasi areas in Jhabua which had formerly been out of its purview being ruled by minor princely states. The act was strictly enforced totally stopping shifting cultivation. The forests began to be worked for fuel and timber for the development of industrial and urban centres in Western India. Timber contractors in collusion with corrupt Forest Department staff began indiscriminately decimating the forests. This put the adivasis in a difficult position. They could not shift to newer locations any more as the fertility of the soils decreased and simultaneously the massive deforestation meant that the supplementary income and nourishment from minor forest produce also went down.

The destruction of the Bhils' agricultural base and their loss of control over the crucial natural resources of land, water and forests in the western Madhya Pradesh region in fact, have a long history. Under pressure from the Mughals and the Rajputs from the sixteenth century onwards they had first to give up the more fertile lands of the Malwa plateau and Nimar plains bordering the lower Narmada river valley and recede into the forested hills to cultivate sub-optimal lands. This process gained in momentum with the increase in trade and settled agriculture as more and more forests on the plains were cleared and brought under the plough. The British accelerated this transformation by laying railway lines from the decade of the 1860s and thus opening up these areas further to trade and the penetration by sahumars or moneylender traders who also doubled as tax collectors into the remotest regions. The loss of access to forests and agricultural lands, the burden of heavy taxes and the exploitation of the sahumars had destituted the Bhils even prior to independence (Banerjee, 2003).

Following on the national policy in this regard the concentration of government finances after independence on the promotion of green revolution agriculture on the more fertile lands belonging to non-advansi farmers in the river valleys to the neglect of the much wider dryland areas of the Bhils in the upper watersheds has further skewed the resource access pattern of the region against them. The benefits of the green revolution were cornered by the sahumars, who traded in the inputs and the increased output and also made super profits from lending at usurious interest rates. The large farmers too benefited immensely by earning huge surpluses from low production costs due to state subsidised supply of inputs and the use of their extra-economic powers over the adivasis to keep wage levels depressed (Banerjee, op cit). The lack of state support for research and development of indigenous crops suitable to harsh topographies of the Bhil homelands has further weakened their economic base. Thus the Bhil adivasis have remained in the clutches of sahumars who dominate the rural markets of the region exploiting the former through un-remunerative prices for their produce, exorbitant prices for the agricultural inputs and usurious interest rates on loans advanced to them (Aurora, 1972). Consequently most of the Bhil adivasi peasants have to rely on migration either permanent or seasonal to make ends meet (Mosse et al, 2002). This in turn means that their labour which is the only asset that they have and which was previously being used on their farms is now being expended in building the assets of other people in other areas which are already better developed adding to the injustice to the Bhils.

The most glaring failure of planning has taken place in the sphere of the management of water resources. The proper way to go about managing the surface and sub-surface water flows in a river basin, especially in dry land areas is to start from the ridges of the topmost micro-watersheds that constitute the catchment of the river and then work down to the river itself (Shah, et al 1998). It is economically much cheaper, socially more just and environmentally much safer to do this than build big dams, which should only be constructed if necessary to service the needs that cannot be met through in situ water conservation and extraction. Instead two large dams have been planned and are under construction on the rivers Narmada and Mahi, which will serve the non-advansi people in control of the plains lands leaving the advasis literally high and dry. Moreover, motorised Lift Irrigation Schemes (LIS) have been implemented on a large scale, as if to make up for this injustice, with scant regard as to the sustained availability of water in streams and rivulets given the heavily deforested condition of the area. The sustained availability of adequate electric power to run the motors was also not considered. These schemes have boomeranged adding further misery to the precarious livelihoods of the Bhils. It is these schemes, which underline the commoditisation of water and the marginalisation of the Bhil advasis that are the subject of the present study.

2. Community Lift Irrigation Schemes

There was a review in the year 1975 of the general failure of development in advansi areas all over the country similar to that in the Bhil homeland after which the Central Government introduced a new Tribal Sub Plan under which special programmes were started in the three crucial sectors of agricultural development, education and health. The National Bank for Agriculture and Rural Development was constituted in 1982 to give a thrust to rural development and a new Integrated Rural Development Programme (IRDP) was started to give subsidised loans to families living below the poverty line to start some income generating activity. A new scheme was started in Jhabua district in 1989 to improve the agriculture of the advasis through enhanced irrigation facilities.

The scheme was kicked off in the southern Alirajpur Tehsil of Jhabua district and high power motors and accessories like pipelines were made available to draw water from streams and rivers on a community basis. The expenses of taking water from streams and rivers to farms situated at a distance is relatively more than the economic capacity of an individual advansi and so he is not able to avail of irrigation. That is why the loans available to individual advasis under IRDP were pooled together and community lift irrigation schemes were started. It was also thought that this would lead to an increase in the cooperative endeavour among the advasis. The initial success of the scheme led to the district administration pushing the scheme on a large scale throughout the district. This is what led to the scheme being implemented in all the other tehsils. A decade after the implementation of the schemes it became clear that while there have been some successes most of them have been failures. The advansi members of the unsuccessful schemes now have a heavy debt burden on their shoulders and the Damocles sword of repayment of their huge debts or failing which forfeit of their minimal landholdings hangs over their heads.

3. Objective of Study

Given the vast socio-economic and cultural gulf between the advasis and the modern system it was inevitable that they would suffer rather than gain from modern development. Provisions had consequently been made in the Fifth Schedule of the Indian Constitution that the Governor of a state can with the advice of the Tribal Advisory Council consisting of advansi Members of the Legislative Assembly prevent the implementation of laws and development policies being followed in the rest of the country in the advansi majority areas notified under this schedule and prepare special laws and plans for these areas. But the irony

is that this hasn't been done and so like in other Fifth Schedule areas of the country in Jhabua too the Bhils are alienated from their traditional resource bases and lifestyle and are also bereft of the facilities and resources required for modern development.

In Madhya Pradesh it had become clear very early that the adivasis were not being able to benefit from the loans advanced to them under various schemes because their planning and implementation were faulty. So in 1979 The Madhya Pradesh Determination of Liability Rules were framed by the Scheduled Tribes and Scheduled Castes Welfare Department of the Government of Madhya Pradesh to be applicable in the Fifth Schedule adivasi areas and it was acknowledged that - " Till the adivasis do not become familiar with the formalities and complexities of the working of the economic system it is necessary to protect them from unknown and unwarranted liabilities and there is a need to institute a higher level system for resolution of disputes regarding such liabilities between the simple adivasis and powerful financial institutions". Under these rules a procedure was established such that if it could be established conclusively that the adivasis are not responsible for the failure of the schemes then they would be freed from the liability of repaying the loans as a measure of social justice.

Several mass organisations of the Bhil adivasis had been agitating against various issues regarding their deprivation and marginalisation in Jhabua district from the early 1980s including in the form of the long drawn battle against the construction of the Sardar Sarovar dam on the River Narmada (Rahul, 1997 op cit). The move by the administration to recover the dues on the failed LIS in gross violation of the laws and policies detailed above came as the last straw in a long line of illegalities and injustices committed against the adivasis. The adivasi mass organisations held a series of group meetings in villages throughout the district in 2003 to find out the real reasons for the failure of the LIS. These group meetings revealed that the main factors behind the failure of the schemes were -

1. The streams and even the Mahi River, which were the main water sources had dried up after a few years in the crucial winter season when irrigation is most required because of the large number of LIS that came up on them. So most of the schemes had not worked after the first year or two.
2. The power supply to the motor pumps was highly irregular and of so low a voltage that the high power pumps either would not run at all or would get burnt out.
3. Qualified engineers of the Government had not designed the schemes and instead the materials had been supplied on an ad hoc basis by the sahuikars who had come to the villages and got the villagers together to apply for the scheme. The sahuikars did all the paperwork and running around and handled all the money in cahoots with the loan advancing banks and the government officials. Thus the materials supplied were ill designed and of an inferior quality leading to the failure of the schemes.
4. The loans that were thrust on the beneficiaries were far greater than their annual incomes and so represented a tremendous financial burden right from the start.

A massive agitation was launched after this in 2004 with mass rallies being held to try and force the administration to put a moratorium on the debts which were all invalid. However, the administration contested the claims of the mass organisations and refused to stay the recovery of the loans. The truth of the failure of the schemes due to the negligence and incompetence of the administration put forward by the adivasis in their simple style was not being accepted by the government. The government experts said that the truth had to be "proved" through the arcane methods that economists and statisticians adopt. Like in the case of the big dams on the Narmada River where too the protesters had to use the methods of

economists and engineers to expose the fallacy of the logic of the projects here too the adivasi mass organisations had to become more versatile and double up as economists and statisticians. This is why it became necessary to undertake a "rigorous" study involving systematic data collection through a detailed questionnaire survey and statistical analysis to verify the reasons for the failure of LIS that could conclusively prove whether the adivasis had been responsible for their failure or not. The limitations of time and resources meant that such a study could be carried out in one tehsil and that also only of a sample of schemes. The present study thus had as its objective an investigation into the causes of the success and failure of LIS in Petlawad Tehsil and the methods necessary for ensuring the sustainability of agriculture based on availability of renewable water sources in the area.

4. Methodology of Study

A total of 81 schemes were implemented in Petlawad Tehsil involving 1721 beneficiaries and a loan cum grant disbursement of Rs 347.63 crores (US\$ 77.25 million). Stratified random sampling was chosen as the most appropriate method of choosing the schemes given the diversity across various selection parameters that needed to be reflected in the study. A sample of nine schemes out of the total of 81 was chosen for deep study. For this the universe of 81 schemes was divided into three categories in accordance with their size - 28 schemes of beneficiaries numbering 12 or less, 28 schemes of beneficiaries numbering 13 to 20 and 25 schemes with beneficiaries numbering 21 or more. This division according to size was most important because previous experience has shown that the technical and social problems increase with the size in such schemes. Three schemes from each of these categories were chosen. In addition to this the sample was chosen such that the ratio of the successful to failed schemes in the universe was maintained in it, the social caste and income class distribution in the universe was also reflected in it. The different water sources that is tanks, streams, dug wells were also adequately represented in the sample. There are two successful schemes one of the Bhil adivasis and the other of the backward farmer caste of Patidars and seven unsuccessful ones, which are mostly of Bhil adivasis and some dalits and Banjaras in the sample. There were a total of 279 families who received loans but due to various reasons 18 of them did not respond to the questionnaire survey that was administered and so the analysis has been carried out with the responses of 261 households only. Table 1 gives the characteristics of the sample.

Table 1: Characteristics of the LIS chosen for study

Sl. No.	Name of Village	No. of Beneficiary families	Caste	Status of Scheme
1.	Bhabhrapada	8	Adivasi	Failed
2.	Samli	9	Adivasi	Failed
3.	Kardavad	12	Adivasi	Successful
4.	Kumbhakhedi	13	Adivasi	Failed
5.	Charankotda	11	Adivasi	Failed
		2	Backward Caste	
6.	Kundal Mor	15	Adivasi	Failed
7.	Garwada	21	Adivasi	Failed
8.	Piplipada	47	Adivasi	Failed
		46	Backward Caste	
		1	Upper Caste	
9.	Kodli	76	Backward Caste	Failed
	Total	261	-	-

The questionnaire was designed so as to garner information about the various parameters that could influence the performance of the LIS as indicated by the information gathered from the earlier group meetings and was pre-tested before being administered -

- Household characteristics like education, employment and family size.
- Landholding characteristics like size of landholding, irrigated land.
- Irrigation sources whether from streams, tanks or wells.
- Cropping pattern.
- Income characteristics.
- Debt characteristics like type, amount and sources of agricultural loans
- The LIS loan characteristics
- The role of the sahuikars, government servants and bank officials.

5. Preliminary Statistical Analysis

The statistical analysis was done with the help of SPSS ver. 11 statistical software. The schemes were divided into the three groups of unsuccessful schemes, the successful adivasi scheme in village Kardavad and the successful backward caste scheme in village Kodli so as to control for caste as a factor in the success or failure of the schemes while computing the basic statistics like means, frequencies and standard deviations of the many variables. There were 198 variables from the questionnaire and for the purposes of analysis another 31 variables were computed from them. The means for the variables mentioned above for the three groups are given in Table 2 below.

Table 2: Means of Variables for the three different categories of LIS

Sl. No.	Variable	Gr I : Unsuccessful	Gr II : Successful Adivasi	Gr III : Successful Backward Caste
1.	Household Education Index	1.32	1.34	2.36
2.	Household Size	6.36	5.33	4.47
3.	Hhd. Landholding Size (Ha)	0.95	1.0	1.43
4.	Per cap. Landholding (Ha)	0.2	0.2	0.38
5.	Annual Hhd Income Index	2.92	4.5	5.89
6.	Annual Hhd Debt (Rs)	28886	24800	55857
7.	Annual Debt/Income Ratio	1.73	0.7	0.84
8.	%age of Agricultural loan used for seeds & fertilisers	77.2	50	88.5
9.	%age of Agri. loan taken from institutional source	26	50	82
10.	%age of Agri. loan taken under institutional schemes	15.8	50	16.7
11.	Land irrigated by LIS (Ha)	0	0.69	0.61
12.	LIS loan/ Annual Inc. Ratio	1.18	0.62	0.34

The comparison of the means for the different variables of the three groups were sufficient to determine the independent variables that had to be chosen for advanced statistical analysis and so the other basic statistics are not mentioned here for the sake of brevity. The household education index is obviously much better for Gr III but since Gr II has also been successful despite having a low education index therefore education cannot be

taken as a direct factor of success in the present case. However since it has been established from many other studies that the status of education does in general affect developmental performance (Dreze & Sen, 2002) it has been included as a predictor for regression modelling. There are differences in household landholding and per capita landholding between Gr III on the one hand and Gr II and Gr I on the other but once again since Gr II has succeeded despite having much lesser landholding than Gr III indicates that this is not a major factor of success. Moreover even the average household landholding for Gr III is that of the smallest farming class that of marginal farmers having less than two hectares of land.

To get the true picture of the economic status of the households a new variable was calculated as Annual Debt to Annual Income ratio. This variable shows clearly that while Gr III is badly indebted, Gr II is in fact the best positioned despite having a much lower income index than Gr III because its debt is comparatively much less. Thus this is definitely an important factor affecting the success of the LIS as higher debt to income ratio obviously prevents a household from managing its agriculture efficiently. Since in this case the debt due to LIS is more important for analysis so the LIS loan amount to Annual Income ratio has been taken as the independent variable. The share of agricultural loans taken from an institutional source is much better for Gr III and Gr II and reflects their greater access to such cheap and reliable sources of credit and so this too has been an important factor in the success of the schemes and has been included as an independent variable for further analysis. It is interesting to note that for all the groups the share of agricultural loans for the purchase of fertilisers and seeds is very high and this reflects the basic weakness of agriculture in India at present where even big farmers find it difficult to make enough of an income not only to be able to fund their seasonal requirements but also to fund capital investments in improving the productivity of their farms.

Another information set from the questionnaires that has not been mentioned in the table is regarding the people who played an important part in the planning and implementation of the LIS. The households in Gr I reported that the sahuikars who were also the traders were the main designers and implementers of the schemes whereas for Gr II it was the Sarpanch, the head of the village elected body, and the Bank officials and for Gr III it was the revenue department officials right up to the District Magistrate. Yet another crucial information set is regarding the source of irrigation. Whereas the source for Gr I was either the Mahi river or some stream the sources for Gr II and Gr III were big tanks built on perennial streams which provided water for the LIS throughout the winter and spring seasons and sometimes into summer. Thus it is clear that these last two variables too are important factors in the success or failure of the scheme. The area irrigated by LIS has been taken as the dependent variable and as a dummy variable indicating as to whether the scheme has succeeded or failed. The schemes that have failed obviously show zero irrigated area.

6. Advanced Statistical Analysis

All these variables differ from each other in the sense that in the questionnaire some of them have coded values as responses while others have absolute values as responses. That is why for proper comparison all these variables have been recomputed with appropriate coded responses. Those responses to the questions that are contributory to the success of the scheme have been given a value of 1 for this recoding. Similarly those responses, which are indicative of negative factors that have contributed to the failure of the scheme have been designated as 0. For the dependent variable the code for unirrigated land is 0 while the code for irrigated land is 1 signifying success of the scheme. The process of advanced analysis involved first testing whether there was any statistically significant correlation between the variables that is whether they vary in the same manner either in the same direction or

inversely. Subsequently simple regressions about a linear function were carried out to see to what extent the independent variables influence the dependent variable separately. Finally a multiple regression model was constructed around a linear function involving all the independent variables together to verify the extent to which the independent variables influence the dependent variable when they are taken together. This process establishes conclusively whether the independent variables do indeed explain the variation in the dependent variable and if so then what is the contribution of each independent variable to the variation in the dependent variable.

The Spearman's Rank Correlation Coefficients have been calculated between the variables and is given in Table 3 and Table 4 below. The variables specific to the scheme have been correlated together to determine their inter-relationship while the variable of education has been separately correlated with the LIS status to determine its relationship.

Table 3 : Correlation Coefficients between important variables of the Lift Irr. Scheme

		L.I. Scheme Status	Scheme of Agri. Loan	L. I. Loan Prin./ Total Inc.	L.I. Loan Facilitator	Irrigation Source
L. I. Scheme Status	rho	1.000	0.693**	0.589**	0.501**	0.856**
	Sig.	0.000	0.000	0.000	0.000	0.000
	N	261	222	260	260	261
Agri. Loan source	rho	0.693**	1.000	0.606**	0.460**	0.723**
	Sig.	0.000	0.000	0.000	0.000	0.000
	N	222	222	221	221	222
L. I. Loan Prin/ Total Inc.	rho	.589**	0.606**	1.000	0.492**	0.606**
	Sig.	0.000	0.000	.	0.000	0.000
	N	260	221	260	259	260
L. I. Loan Facilitator	rho	0.501**	0.460**	0.492**	1.000	0.499**
	Sig.	0.000	0.000	0.000	0.000	0.000
	N	260	221	259	260	260
Irrigation Source	rho	0.856**	0.723**	0.606**	0.499**	1.000
	Sig.	.000	0.000	0.000	0.000	0.000
	N	261	222	260	260	261

** Correlation is significant at the .01 level (2-tailed).

Table 4 : Correlation Coefficients between educational status and Lift Irr. Status

		L.I. Scheme Status	Hhold Educational Status
L. I. Scheme Status	rho	1.000	0.598**
	Sig.	0.000	0.000
	N	261	261
Hhold Educational Status	rho	0.598**	1.000
	Sig.	0.000	0.000
	N	261	261

** Correlation is significant at the .01 level (2-tailed).

All the correlation coefficients are statistically significant and above 0.5 in value. The best correlation coefficient is between the dependent variable and the irrigation source with its value 0.856. Which means that if the source of irrigation is a tank or well then the possibility of success of the scheme is much more and not if it is a stream or river. The next in line are the source of the loan with a coefficient of 0.693, which means that greater access

to institutional financing for agricultural loans in general ensures success of the scheme. The person who has played an important role in the implementation of the scheme with a coefficient of 0.649 is also a major factor implying that if the person is a government servant or bank official rather than a sahuکار then the chances of success are higher. The LIS debt/income ratio with a coefficient of 0.589 too is an important factor and it means that the lower the ratio of the debt burden to the annual income, higher are the chances of success. Moreover the independent variables are also well correlated among themselves, which implies that all these factors affect each other and so their combined effect on the independent variable should be studied to get a fuller understanding of the dynamics of the scheme. The independent correlation coefficient between educational status and scheme status also is important at 0.598. This confirms the general observation in rural development schemes throughout the world that educational status of the beneficiaries is indeed a major factor in their success.

The equation used for simple linear regression is $y = b_0 + b_1x$ where y is the dependent variable and x is the independent variable. Where b_0 is a constant and b_1 is a coefficient indicating the extent to which x influences y . Table 5 gives the regression results

Table 5: Coeff. of one is to one simple regression between dependent and independent variables

Independent Variable	N	Adj. R ²	S.E. of Est.	Constant b ₀	Unstandardised Coeff.		Std. Coeff.	t	Sig.
					b ₁	Std. Err.			
Irrigation Source	260	0.731	0.246	0.04118	0.849	0.032	0.856	26.620	0.000
Agri. Loan Source	221	0.478	0.346	0.08824	0.679	0.048	0.693	14.261	0.000
Hhd. Educational Status	260	0.356	0.380	0.103	0.576	0.048	0.598	12.020	0.000
L.I. Loan to Income Ratio	259	0.345	0.384	0.01786	0.563	0.048	0.589	11.719	0.000
L.I. Loan Facilitator	259	0.248	0.411	0.03093	0.491	0.053	0.501	9.307	0.000

Dependent Variable : Area Irrigated by lift irrigation used as dummy for L.I. Scheme status.

The higher the value of the statistic Adjusted R² the better is the explanatory power of the regression model and the higher the values of the coefficient b₁ and the statistic t the more is the influence of that particular independent variable on the dependent variable. The standardised coefficient beta is calculated to make it possible to compare the influence of the various independent variables which may have been measured in different units however in the present case since all the variables have been recoded to the values of 0 and 1 there is not much of a difference between the b₁ and beta values. Thus it is clear from the results of the simple regression that the source of irrigation is most important followed by the scheme under which the agricultural loan has been received, educational status, LIS loan/income ratio, and the person facilitating the implementation of the scheme.

To find out the combined effect of these variables a Multiple Linear Regression model was constructed using the equation $y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5$, where y is the dependent variable and x_1, x_2, x_3, x_4, x_5 are the independent variables, b_0 is a constant and b_1, b_2, b_3, b_4, b_5 are the respective coefficients. The results of the regression are given in the tables below. Table 6 gives the value of Adjusted R² for the model. Table 7 gives the results of the Analysis of Variance procedure carried out to determine the statistical significance of the value of Adjusted R². Table 8 gives the values of the coefficients of the independent variables and their statistical significance. Since the variable agricultural loan scheme has only 221 cases the others not having responded the regression could only be done with these cases and some outlying residuals had to be excluded from the analysis leaving 215 cases for the final regression.

Table 6: Model Summary of Multiple Regression

R	R Square	Adj. R Square	Std. Error of the Estimate
0.958	0.917	0.915	0.141

Predictors: (Constant), Irrigation Source, Scheme of Agricultural Loan, Household Educational Status, Lift Irrigation Loan Principal to Total Income Ratio, Lift Irrigation Loan Informant.

Dependent Variable: Area Irrigated by lift irrigation used as dummy for L.I. Scheme status.

Table 7: ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	45.087	5	9.017	453.170	0.000
Residual	4.079	205	0.020		
Total	49.166	210			

Table 8: Coefficients of Multiple Linear Regression

Variable	Unstandardized Coeff.		Std. Coeff.	t	Sig.
	B	Std. Error	Beta		
(Constant)	-0.147	0.029		-5.099	0.000
Irrigation Source	0.713	0.034	0.700	20.950	0.000
Scheme of Agricultural Loan	0.126	0.030	0.126	4.200	0.000
Hhold Educational Status	0.106	0.020	0.147	5.291	0.000
L.I. Loan to Income Ratio	0.067	0.027	0.065	2.323	0.021
L. I. Loan Facilitator	0.029	0.024	0.027	1.097	0.274

Dependent Variable: Area Irrigated by lift irrigation used as dummy for scheme status.

The Adjusted R^2 value is 0.915 and the analysis of variance procedure establishes that it is statistically significant. Thus this model explains 91.5% of the relationship between the independent and the dependent variables and quite satisfactorily proves that the positive factors of the independent variables have contributed to the success of the schemes while the negative factors have contributed to their failure as had been assumed at the outset. The irrigation source is by far the most important determinant of the success or failure of the scheme as the choice of a perennial source like a tank has led to success while the choice of the Mahi River or a seasonal stream has led to failure. So much so that while the value of its coefficient has only slightly reduced due to the combined effect of the other variables the value of the coefficients of the other variables have been reduced drastically from their simple regression values.

7. The Unfinished Battle

This household survey and subsequent statistical analysis of the data garnered by it confirmed the inferences made from the group meetings that had been held earlier regarding the reasons for the failure of the LIS and conclusively proved that the Bhil adivasis were not in anyway to blame. Instead the picture that emerges is of a major failure of planning and governance on the part of the Madhya Pradesh Government. The most serious mistake is in treating water as a commodity for commercial exploitation rather than as a scarce resource to be properly husbanded given the hydro-geological characteristics of the area. Thus instead of investing in watershed development and afforestation to improve the recharging of water into aquifers and thus first ensuring that there is enough water available for irrigation and other uses LIS were sanctioned indiscriminately without any thought being spared as to whether the Mahi River and the streams would have enough water flowing in them to satisfy this

heightened demand. Similarly little planning was done with regard to meeting the enhanced demand for electricity. The undulating terrain, high gradient and long distance to the fields from the streams where the intake wells were meant that the pumps had to be of higher power requiring steady electric supply at a fixed voltage for their operation. The supply of electricity failed to keep pace with demand as more and more LIS were commissioned. Later the Government made the supply of electricity to pumps of up to 5hp free resulting in the installation of many small pumps hiking up electricity demand further leading to poor quality of power, which could not run the high power pumps of the LIS whose users nevertheless had to pay huge electric bills. Finally a large dam was also began to be constructed on the Mahi River from 1995 onwards once again without any consideration of the fact that the water availability in the basin had come down drastically and siltation rates were bound to be high.

The ill effects of this ill planned commoditisation of water were compounded by the socio-economic marginalisation of the Bhils. The limited access of the Bhils to cheap institutional loans, the lack of access to good education and in the specific case of the LIS to good and honest planning and implementation of the schemes which were mostly left to the whims and fancies of the sahuikars meant a severe governance failure arising from the general trend of immiserisation of the Bhils since independence. The cynical way in which they were burdened with huge loans without a proper evaluation of their payback potential is itself a criminal mismanagement of scarce financial resources. As Nathu Gangaram of Piplipada village which has one of the biggest LIS which has never worked because the pipelines were ill designed and burst under the pressure of the water on the first day the scheme was started says - " I had a dug well on my farm and used to irrigate my fields with the help of a diesel pump. The sahuikar came and said that I had to be a part of the scheme as otherwise it would not be passed due to a lack of enough members. I was told I would get a cheap supply of adequate water and would be freed from the cost of buying diesel. They took my thumb imprint and money was taken out of the bank. The pipeline never reached my field and anyway the scheme never ran because the pipes burst on the first day. Now the bank officials come and say they will take my bullocks away."

Ironically the Government itself has implemented a comprehensive watershed development programme in Petlawad with funding from the Danish International Development Agency (DANIDA), which has brought about significant improvement in water availability and consequent livelihood security for the Bhils in the project villages at a cost of just Rs 5000 (US \$ 110) per hectare (CWDPMP, 2005). This is in stark contrast to the Rs 300000 (US \$ 6600) per hectare cost of irrigation by the Mahi River dam. Moreover the water from the Mahi dam would reach only the fields in the valleys which are owned by relatively well off non-adviasis farmers whereas the watershed programme has made irrigation possible in the upper watersheds where the adviasis reside. Nevertheless the Government has discontinued this scheme as DANIDA has withdrawn funding after completion of the project while it persists with the building of the dam on the Mahi from its own resources and to do so insists on recovering the dues from the adviasis for the LIS, which have failed due to its own faulty planning and implementation. This is a distorted political economy that has arisen from the commoditisation of water and the marginalisation of the Bhils.

The adviasis mass organisations were not going to take this lying down. So armed with the encouraging results of the study they once again began pressing for a cancellation of the loan dues on the adviasis. This agitation dovetailed into the longstanding one for the implementation of the Panchayat Extension to Scheduled Areas Act 1996 (PESA) which had earlier been passed as a result of a concerted campaign conducted by the National Front for Tribal Self-Rule. This law was passed in accordance with the provision of Article 243M (4) (2) of Part IX of the Constitution that envisages that "Parliament may by law extend the

Provisions of this part to the Scheduled Areas..... subject to such exceptions and modifications as may be specified in such a law". Thus this was the first time that a central law had been amended to accord with the special situation of the indigenous people in the Scheduled Areas keeping in mind the failure of the Governors to implement the enabling provisions of the Fifth Schedule. The Madhya Pradesh Panchayat Raj Act was amended in 1997 in accordance with PESA and rules framed for its implementation in 1998. The gram sabha or village council was made the paramount decision making body and so a special local government system to accord with adivasi lifestyle and culture became a legal possibility. Mobilisation had proceeded since then all over the western Madhya Pradesh region to exert pressure on the administration towards implementing these provisions. The fight for justice for the Bhils of Jhabua burdened with the LIS loans became a part of this larger struggle.

This culminated in the sit in organised in Bhopal in April 2006 as the local administration refused to do anything to provide relief to the debtors saying that a decision had to be taken by the State Government. Even though the recovery of loans has been stopped a final decision on cancelling them altogether and so freeing the debtors and allowing them to take other loans has not yet been taken. The main reason being that a cancellation of loans in Jhabua would result in adivasis from all over the state demanding similar cancellations of loans given for equally badly planned and implemented schemes severely denting the resources of the fund strapped State Government. The rule being that in case of cancellation the State Government has to reimburse the financial institutions for the loss. Thus the adivasis of Jhabua still face an uphill task in bringing environmental sanity and socio-economic justice back into development planning and implementation.

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