Improved Water Control as Strategy for Enhancing Tribal Livelihoods

Synthesising the lessons of a two year collaborative research programme by researchers and NGOs, this paper suggests that improved water control strategies, designed after taking contextual factors of resource conditions and socio-ecology into consideration, have a high potential for redressing the livelihood problems of India's most neglected people besides also leading to sustained and salutary impacts on wider human development indicators for this region. While other development interventions are also important and necessary, public investments in assuring improved irrigation water control can act to kick-start the tribal economy in the region.

SANJIV J PHANSALKAR, SHILP VERMA

I
Genesis of and Motivation for Research

The central Indian tribal homeland, located between 18 and 25 degrees north of the equator across the Indian sub-continent, operationally cover nearly 100 districts in eight states of the country stretching from Banswara (Rajasthan) in the west to Purulia (West Bengal) in the east (Figure 1). These districts together account for about 55 million tribal people (roughly 70 per cent of India's tribal population) spread over 68 million hectares of geographic area and having access to about 45 million hectares of cultivable land. The region is well-endowed in terms of rainfall and vegetative cover and yet, is home to one of the largest concentration of rural poor in the world. Central India Initiative (CInI), a collaborative research programme between the International Water Management Institute (IWMI); Sir Ratan Tata Trust (SRTT), Mumbai; Professional Assistance for Development Action (PRADAN), New Delhi and the NM Sadguru Water and Development Foundation (NMWSDF), Dahod, is aimed at identifying factors that lead to successes or failures of water-centric livelihood interventions among the tribal people in this region. The initiative recognised that improved 'water control' strategies would not only help strengthen tribal livelihoods, but also transform the tribal homelands into future granaries for the country.

Three aspects make the research subject of CInI important: (i) if it is possible to implement appropriate water control strategies for enhancing tribal livelihoods on a large scale, it would lead to significantly enhanced incomes and employment in the tribal areas, resulting in much reduced hunger, food insecurity and forced migration of the tribal people; (ii) these efforts would result in significant addition to national food production and contribute towards strengthening the food security of the nation in the long run; and (iii) these efforts would create incentives for the tribal people to work as a community in retarding and reversing the rapid degradation of the natural resources in their habitats. As a noted NGO leader points out, unless quick action is taken, several hundred square kilometres of tribal homelands will become depopulated, leaving a vast degraded land mass behind. This paper synthesises and summarises the results of 40 odd studies undertaken in CInI on the theme.[1]

II
Overview of Research

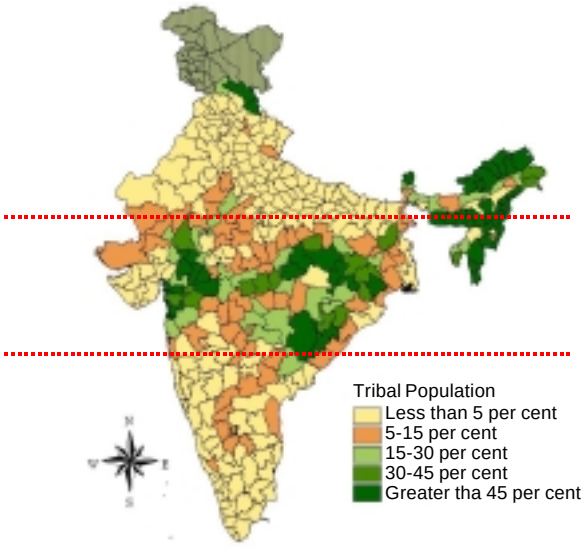
Tribal Context

Tribal districts identified under CInI have lagged behind other areas of the country on several indicators of development. For instance, Phansalkar (2003) has noted that these tribal districts form a majority of the 71 most underdeveloped districts of the country. Debroy and Bhandari (2003) have prepared a list of some 69 'backward and most-backward' districts of the country and as many as 30 districts identified for CInI find a place in their list, along with other districts of Uttaranchal, Uttar Pradesh, Bihar, West Bengal and the north-eastern states, many of which also have large tribal populations. Table 1 presents some important parameters reflecting on the level of development in these districts vis-à-vis national averages.

Data from a primary survey of more than 800 tribal and non-tribal farmers undertaken by CInI in seven tribal districts across seven states [Verma, Nair and Sharma 2004; Verma, Dasgupta and Singh 2004; Table 2] as well as data from 10 district studies undertaken as part of CInI reveals that: (i) tribal farmers derive much less income from their lands than their non-tribal brothers even in the tribal-dominated blocks of tribal districts; (ii) their net returns from agriculture are also much lower; (iii) they make much smaller investments (in absolute rupee terms) in agricultural assets as compared to the non-tribals while the proportion of their capital investments devoted to agriculture is much higher indicating their desire and willingness to increase the productivity of their agriculture; (iv) they have much weaker access to agricultural technology and inputs from the state or private sector machinery; and (v) the dependence of tribal people on income from seasonal migration, often under duress, is twice as high as that for non-tribal people from the same districts.

What could be the possible explanations for these differences? There are some hints in existing literature. There is a fairly articulate view that seeks to project tribal communities as being distinct in their cultural ethos and life pattern from the rest of

Figure 1: Districtwise Percentage Tribal Population



the Indian society. This view holds that tribal people are the un-spoilt children of nature who seek to live in harmony with nature but suffer due to ossified production conditions [see, for instance, Areeparampil 1996]. They do not have a sharply defined notion of private property and the resources around them are seen to be meant for the nurturance of every one. The forest provides for their simple needs and it is this resource abundance and communal partaking from 'Mother Nature' that traditionally kept them away from the need and concepts of resource-use intensification and settled farming. Even though now the ground reality around the tribal communities has changed or is fast changing with rapid depletion of forests and dispersion of tribal people, they attempt to guard the essence of their way of life and are reluctant to resist or lack the necessary attributes for acquisition and for intensification of resource use.

Boserup (1965), in a similar vein, tries to explain this gap using the concepts of resource conditions and population pressure. She suggests that resource-use intensification occurs under pressure of population. Tribal people have traditionally lived under conditions of relative resource abundance (low population density; high rainfall and high vegetative cover) and hence were never compelled to intensify the use of their resources such as land (through increased cropping intensity) and water (through irrigation). Likewise, Pfeffer (2003) talks about differences between immediate and delayed return systems to explain how the nature of resource-use would be different under the two systems. There are other arguments that explain the low productivity of tribal agriculture as a result of a systematic state neglect. Finally, there is a school which looks at tribal farmers as rational economic actors, not very different from other peasants (for example, see Pathy 1992 and Mukherjee 1982 among others). The proponents of this view argue that tribal agriculture continues to suffer because: (i) tribal people do not have the security of tenure (they often live in reserve forest areas); (ii) the chance of meeting own consumption demand through alternate options such as migration is high; (iii) there is neither any security of savings nor any convenient investment option available; and (iv) cash is always at a huge premium and cost of capital prohibitively high for them. This view thus implies that security of tenure, comparative economics of options (comparison in terms of leisure income tradeoff as well), and a facilitation of savings as well as investment will induce tribals to take to intensive agriculture like it does for every one else.

III
Implications from the Study of Interventions

Eighteen sets of interventions have been studied in CInI over two years. These interventions can broadly be divided into five groups: (i) supporting and building upon spontaneous community action based on traditional wisdom (as well as schemes that followed essentially the same logic); (ii) interventions that installed irrigation schemes or revived existing public irrigation schemes to enable tribal people in achieving greater water control; (iii) watershed development programmes being implemented in various parts of the central Indian tribal heartlands; (iv) impact of the inter-play of market forces on tribal farmers; and (v) comprehensive 'Water PLUS' interventions aimed at rehabilitating tribal people and sustaining their livelihoods on their respective resource bases. We briefly discuss inferences from each of these categories of studies.

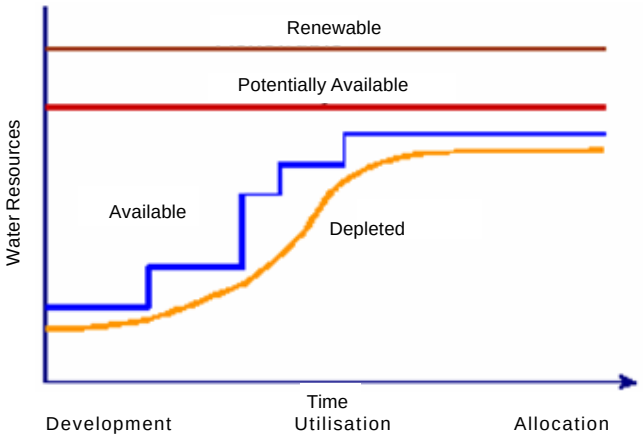
The 'community action based on traditional wisdom' interventions[2] are those that have emerged as a response of the communities to changes in their specific resource conditions, essentially to protect their paddy crop from water stress induced by erratic monsoon. 'Dabaris' (smaller versions of the famous Chandela and Malguzari tanks), for instance, were essentially created as storages of surplus precipitation. Several of them face the same fate as other tank systems elsewhere: ill-defined ownership and stake in the changing context; absence of well-defined governance norms to replace the erstwhile feudal norms; disrepair and disuse. The government of Chhattisgarh picked up the concept of dabaris and implemented a large programme for supporting and building new dabaris all over the state. These interventions seem to be oriented towards subsistence rather than growth and the case studies provide little evidence that these structures led to creation of marketable surplus or the onset of a market oriented agriculture that creates capital for reinvestment. Therefore, while

Table 1: District Level Comparison of Tribal Districts in Central India with All-India Averages

Parameter	Average for Central Indian Tribal Districts	All-India Average
How Tribal Districts are Better-off		
Population density*	200.23	324.00
Per cent of forest area*	32.75	19.39
Sex ratio*	970.00	927.00
Under 6 sex ratio*	954.00	933.00
Female work participation (per cent)*	26.92	23.28
How Tribal Districts are Worse-off		
Per cent of rural population**	85.35	74.29
Infant mortality rate*	81.78	72.77
Per cent of population below poverty line*	42.67	26.00
Extent of hunger (per cent households going hungry)*	5.63	2.96
Literacy*	60.09	65.38
Average CMIE's Index of development*	84.09	100.00
Irrigated area as per cent of cultivated area**	11.00	34.00
Fertiliser consumption (Kg/Ha)**	32.32	63.88
Average value of crop output (Rs per Ha)**	2697.55	8578.00
Per cent of net irrigated area to net sown area**	14.98	33.59
Per cent of net area irrigated by major irrigation systems**	3.66	9.89
Per cent of net area irrigated by minor irrigation**	16.83	42.28
Groundwater**	11.32	24.28
Surface lift irrigation**	5.51	18.00

Notes: * Average for districts in central India based on data from 70 most tribal districts.
** Average for districts in central India based on data from 30 most tribal districts.
Sources: Shah and Singh (2003); *Census of India* [GoI 1991]; Profiles of Districts – Centre for Monitoring the Indian Economy [CMIE 1993; CMIE 2000]; Debroy and Bhandari (2003).

Figure 2: Stages of Basin Development



Source: Molden, sakthivadivel and Samad 2001.

they fit well with the local socio-ecology and need to be encouraged, they involve troubling questions regarding their durability in the context of unchecked onslaught in the tribal heartlands. The studies of state as well as civil society led irrigation interventions[3] indicated that so long as the four steps, viz, proper scheme design, mobilisation of the beneficiary groups, sound operating procedures, and provision of auxiliary inputs, are properly incorporated, large-scale group lift irrigation schemes can be replicable models for tribal livelihood enhancement. It must be noted that all these schemes have demonstrated huge potential for enabling the tribal people to take much enhanced incomes from their land. Several of them – notably the Sadguru lift irrigation (LI) schemes, a majority of PRADAN LI schemes and AKRSP (India) supported participatory irrigation management (PIM) schemes have realised this potential to a commendable extent. However, there are various questions which must be answered before such interventions are planned for large-scale implementation: (i) are the tribal communities ready for irrigated agriculture?, (ii) should one attend to social institutions first?, (iii) are group schemes a must?, (iv) do they have to be managed by tribal people from the very start?

Tribal communities across these studies face differing resource stress and have had varying levels of exposure to settled-farming practices. It would appear that the western Indian tribal communities face acute resource pressure and have been fairly exposed to the patidar communities and their agriculture practices. Possibly due to this, they have a clear and articulate demand for irrigation. In the case of eastern Indian tribal communities, however, the resource pressure is milder and their exposure to settled agriculture has been limited. Further, stream-based LI schemes usually do not address the key issue of stabilising kharif crops and create an unwarranted competition between rabi cultivation and migration based livelihoods.

The studies on watershed development programmes[4] suggest a new livelihoods-centric and tribal-friendly approach to watershed interventions. The 'standard' watershed projects follow a fairly rigid procedure and the dominant ideology is that of the 'conservationists' who are interested more in soil and water conservation (SWC) measures for long-term survival of the communities in those resource settings. Puritanical watershed development programmes discourage any water harvesting for irrigation as the extraction of water more or less negates the whole effects of conservation. Community interests, on the other hand, often tend to be more immediate. We find that the earthwork involved in watershed development projects creates employment for two-three years for the poor. The lure of this wage employment close to their homes makes tribal communities excellent partners in the implementation of these projects. The activities such as Continuous Contour Trenching (CCT) and Water Absorption Trenching (WAT) undertaken on hill sides do improve the overall moisture regime and increase water levels in wells but the benefits accrue disproportionately in favour of the people living in the valley portion. However, when the 'standard' methods are modified to include activities of direct relevance to tribal people, the degree of benefits received by them can change drastically.[5]

The studies on the impact of market forces on tribal farmers[6] raise the fundamental issue of designing technologies that are suitable for small-holders and at the same time ensuring prolific market development for these technologies so as to reach a large number of poor at affordable prices. The study of sprinklers in Narsinghpur, for instance, shows how a beneficial technology when marketed by profit-seeking players reaches the tribal people after a huge delay and even then serves only the 'creamy layer' among them. While these methods do not create water resources, they lead to efficient use of available water. Therefore, the success of the 'private sector model of development' critically depends upon the ability to create and develop markets for the product or services among the poor. They require the state or donors to invest in market creation which alone will lead to large enough demand to make private sector participate even at low product prices. But the preference so far has been on upfront subsidies: capital subsidies in conventional water resource development or direct product subsidies as in the case of drips and sprinklers which often fail to reach the poor.

Finally, the studies on 'Water PLUS' interventions[7] look at attempts to rehabilitate tribal people through comprehensive land and water management interventions. The Bharatiya Agro Industry Foundation (BAIF) approach is to create 'micro-environments' in small plots of land using whatever sources of water that can be tapped. At core of the whole programme lies the concept of a 'wadi' or a small horticulture garden. Mango and cashew are planted in small plots by farmers and they are encouraged to take inter-crops of marketable vegetables and other cash crops so that they derive some income even during the long gestation period of the wadi. Besides the wadi programme, BAIF has also initiated several other programmes including those aimed at increasing agricultural productivity, drinking water provision and women empowerment. Another unique feature of BAIF's efforts is that they had built grass roots institutions which gradually take over the operations and management of their programmes and with time, their own role changes from being the implementing agency to that of one providing technical backstopping. BAIF has managed to lift over 18,000 tribal families out of the poverty trap through this approach and it has taken them over a decade to evolve the total package of practices.

The PRADAN case study [Chakraborty 2004] documents efforts taken to persuade farmers from the Santhal tribe to adopt modern farming technologies and practices with a view to stabilising the kharif paddy crop. The intervention involves simple steps: better land preparation; carefully choosing high quality seeds and treating them before use; better nursery management; and better nutrient management. It demonstrates that tribal people are concerned with the extra expenses and risks associated with more input-intensive agriculture in the context of uncertain water control. Wherever water control is achieved, technology adoption is much faster and the results are very satisfactory. Tribal farmers with

no water control and poor upland plots have difficulties in taking to and benefiting from such techniques.

Cross-Cutting Issues

In this section, we review the work done on four cross-cutting themes and aspects of water control as livelihoods enhancement strategies. The first pertains to availability of water on a sustained basis to implement water control based livelihoods strategies. This is relevant since tribal people live in upper reaches of river basins and at least theoretically, their use of water reduces its availability to communities living in middle and lower reaches of the same basin. The initiative undertook work on simulating the level of water-use development in a basin to assess the extent to which further development can take place without giving rise to situations of sharp conflict between upstream and downstream users [Verma, Ghosh and Seshadri 2004]. This basin simulation model grapples with the complex question of working out inter-sub basin flows in the context of uncertain rainfall. Using data for a small basin in Dahod district of Gujarat and the conceptual framework developed by IWMI [Figure 2; Molden, Sakthivadivel and Samad 2001], it shows how the level of basin development can be estimated and how the time to reach full utilisation can be computed under various assumptions and scenarios. Higher and more secure rainfall, low population pressure and low levels of basin developments perhaps permit much higher harvesting and use of water in the eastern basins. It suggests that undertaking such basin simulation may be useful in deciding the overall strategy for water control in a basin. Further, it indicates the need to explicitly factor-in the stage of development of a basin into the design of interventions, especially for the water-stressed and often over-appropriated western parts of the central Indian tribal homelands.

The second pertains to socio-technical aspects of water control strategies and the fit of types of technology with diverse conditions where a matrix of technologies in use across the central Indian tribal homelands has been studied [Satpathy and Naik 2004]. This study groups the intervention modes into 'hands off' and 'hands-on' approaches. In the former, an intervener, usually an agency of the state creates or supports water control hardware and leaves it in the hands of the people without further engagement. This, for instance, happens when a medium or minor irrigation scheme is created, a large group lift irrigation scheme is installed or a combination of well and a pump is provided on subsidy to the people. The 'hands-on' type interventions are usually implemented by civil society organisations who engage with the communities for a much longer time and work with them in overcoming the constraints imposed by specific inadequacies in agricultural skills, exposure, information, inputs, technology and market links.

The study groups tribal communities into three classes based on their livelihood patterns. The communities which have long experience and engagement in agriculture as well as a clearly articulated desire to intensify it with irrigation are termed agricultural tribes. Santhals of Bengal and oraons, mundas and ho of Jharkhand, gonds in central India or bhils in western India perhaps illustrate this type. The communities which practise subsistence agriculture with high dependence on forests for supplementing their food requirement are termed as subsistence tribes. The kolams and the kols, baiga kondhs, etc, illustrate this category. Tribes which have depended for a long time on artisan work or now have shifted to wage work are called wage earning tribes. The study offers inferences as to which type of techniques and technologies are likely to work under what conditions.

The third pertains to gender impacts of increased water-use and agriculture intensification. The study [Marathe 2004] notes that even though the tribal societies have traditionally given a better status to women than their non-tribal counterparts, this does not imply the absence of male dominance among them. The study reveals that the absolute as well as relative work burden on women increases with adoption of intensive agriculture. While food intake of women also rises, they do not always get a proportionate share in the increased disposable income. The study also finds that the negative impact of such interventions seem to get reduced when these are coupled with other interventions such as women self-help groups.

Finally, the fourth study is devoted to discussion of emerging models that could conceivably reduce the burden on public systems. The burden of creating demand for water control strategies in social contexts of subsistence and non-agricultural tribes often falls on the intervener and this introduces delay in adoption of intensive agricultural practices. This study suggests experimentation with a model for 'service providers' [Mardikar 2004] who would undertake the associated tasks of demand creation and supporting water use as a means of livelihood. It suggests that a service provider equipped with multi-utility equipment such as power tiller could generate his own livelihood by offering services such as tilling, irrigation and transport, thereby also benefiting a large number of tribal users in energy-scarce eastern India. It disabuses the notion that each tribal family must own a pump for benefiting from water control and shows how the capital investment can be made viable for an individual entrepreneur while producing desirable social consequences. The study suggests a possibility of linking this model with the ABC (Agri-Business Clinic) model promoted by NABARD. However, this would require a few adjustments in the existing guidelines set out by NABARD for the ABC model. For instance, the existing NABARD guidelines require that the ABC entrepreneur must have a minimum level of formal education. If this stipulation is removed, the tribal people in the region can benefit enormously.

III
Discussion

Since the data on human development indicators has consistently pointed out a yawning gap between tribal homelands and national averages, attempts to redress the deficient public services naturally assumed priority. This perhaps explains the excessive concern of the tribal sub-plan with themes such as 'ashram shalas', curative health care and public distribution system. Yet, to accept the above as adequate explanation for the neglect of agriculture and water resources development in tribal areas perhaps would be naïve. Water resources development in the country has for long followed the 'civil engineering' model of building dam and canal systems. Initial national concerns with food security needed creation of irrigation potential at the quickest possible pace. Since valleys offered the more easy work areas for this, the catchment-dam-canals model was widely used. This model is obviously not suitable for the tribal people. They usually live in uplands and upper reaches while gravity must make water flow to the valleys.

Even the model of groundwater development, which today is leading the agriculture development in several states of the country, seems to have bypassed the tribal people [Shah and Singh 2003]. While the strong farmer lobbies in various states have been able to force the respective governments to adopt an extremely populist stance regarding electricity charges to suit the people who could not be reached through the canals,[8] tribal farmers have

not been able to extract similar concessions. In fact, a bulk of the eastern Indian tribal heartland have no power supply worth the name and in some places, it may take decades before electricity reaches these regions. The results are quite clear for all to see. Water abundant states such as Orissa and Jharkhand, which have the potential of becoming the largest exporters of 'virtual water'[9] (provided the food and water resource development policies were designed in tune with water availability) to the rest of the country are also the most food insecure states and end up importing virtual water in the form of foodgrains from water-scarce regions of the nation. Almost all the cases of starvation deaths are reported from tribal areas: Kalahandi and Melghat in Orissa are the most frequently reported places for these tragedies.

The efforts on the part of the government have yielded some results. The Million Wells Scheme (MWS) of the ministry of rural development (MoRD) was an initiative targeted towards marginal and small farmers of SC/ST households. Concurrent evaluation of the MWS [Panchmukhi and Nayantara 2001] reveals that an additional area of 7,33,181 hectares has been covered by irrigation as a consequence of the scheme. The study concludes that by and large the MWS has benefited small farmers in the country; however, the poorest may not have benefited as a result of the existing selection method, i e, 'first come first served' and high levels of political interference in this procedure. In another study [Janaiah et al 2000] carried out among tribal families in Chhattisgarh, it was found that the income from the rice crop in irrigated fields was almost 52 per cent higher than the income from non-irrigated fields. Total household income from all economic activities was 40 per cent higher in irrigated households. An interesting finding of the study was that with an increase in agricultural productivity and wage rates, people withdraw from non-farm activities such as fuel collection, grazing, etc, and engage fully in farming. There is also evidence that despite charges of malpractices and implementation problems, the World Bank-NABARD special intervention to promote intensive development of small-holder irrigation is ushering in a green revolution in Assam. Several other studies [Rayate 1989; Ramaiah et al 1991; Sharma 1998; Minj 1999] show similar results of water control interventions.

Even during the course of CInI studies, we found that wherever an intervention has helped to place improved water control in the hands of tribal farmers, many other changes have quickly followed culminating in improved income, employment, nutrition, household food security and reduced 'distress migration'. The presence of other favourable factors such as market linkages, institutions for credit and input supply, extension and other technical support have helped magnify the beneficial impact. Hence, while improved water control alone may not address all the problems which the tribal people in central India face, it does have the potential to become the trigger which can place the tribal economies into an upward-ratchet of food security, reduced distress migration and better living conditions.

IV
Conclusions and Suggested Strategies

Regions and Approaches

Our research suggests a good fit between a set of contextual factors within an identifiable set of external constraints, and an identifiable portfolio of options for promotion of water control strategies. These contextual factors vary across the central Indian tribal homelands. The key factors pertain to agro-climatic conditions, location of a tribal hamlet in the local topography, level of infrastructure development and the social attributes of the tribal communities. We therefore use a combination of these to classify the central Indian tribal belt into four distinct socio-ecologies and suggest region-specific water control strategies for enhancement of tribal livelihoods (Figure 3; Table 3). There are bound to be some overlaps in this broad classification. For example, Dangs in south Gujarat, which falls in zone C, might better represent characteristics of zone A while regions around Ranchi, which fall in Zone A, but where exposure to settled farming is much greater, may represent zone B. Hence, the zoning can better be seen with respect to the attributes rather than just the geographical locales.

The implementation strategy in a locale in any zone must naturally depend on the specific constellation of socio-economic and physical attributes prevalent in the locale. We believe that the above logic of attribute-based zoning offers useful guidelines in conceptualising the locale fully. The implementation strategy will be based on a logical choice of specific activities chosen from the portfolio of options for the concerned zone. It will also be fruitful to explore how the labour component of the activities can be paid for through a 'Food for Work' mechanism. We also believe that irrespective of the zone, the basic principle will remain the same: initiating the tribal people in using water, helping them internalise simple water control techniques and skills for growing crops while giving full help in auxiliary inputs and then going in for capital intensive 'hands-off' type components. As an illustration, we elaborate the strategies for one of the zones (zone A) here.

Water Control Strategies for Zone A

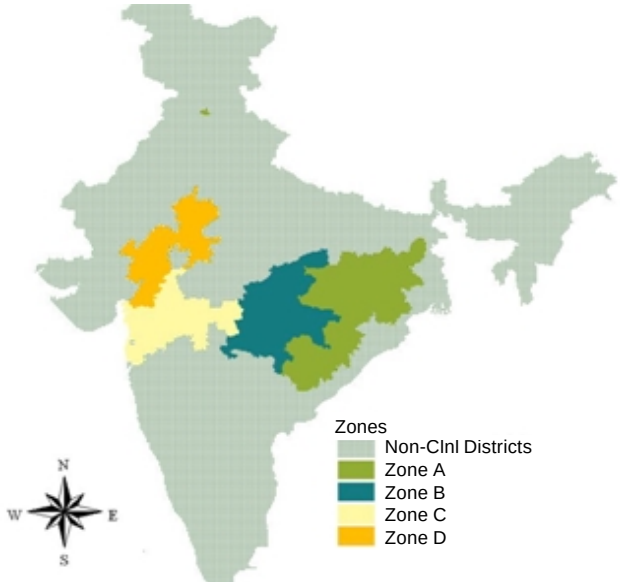
The most critical issue facing this region is food insecurity arising out of unstable kharif crop. Paddy mono-crop dominates this region and because of a lack of water control and the fact that the tribal people in the region have not traditionally been exposed to settled farming, the paddy yields are quite low. Paddy instability arises from two factors and both these relate to the

Table 2: Tribal People, Water and Livelihoods: Evidence from Tribal Districts across Seven States

Parameter	T-TB	T-NTB	NT-TB	NT-NTB
Centrality of agriculture				
Per cent of share of agriculture in total income	66.24	71.20	80.18	82.43
Per cent of share of migration in total income	15.57	17.43	5.00	5.57
Per cent of share of forests in total income	6.14	2.29	2.11	0.43
Per cent of share of other sources in total income	12.05	9.09	12.43	11.39
Facets about agriculture				
Average size of landholding (acres)	5.48	3.63	7.91	8.58
Average area cropped twice (acres)	1.03	0.34	1.87	1.99
Net returns from agriculture (Rs/acre)	4656.98	4493.51	6662.93	25031.61
Facets about water control				
Average irrigated area (acres)	1.56	0.79	3.07	3.50
Per cent of rain-fed area	71.80	77.79	53.56	57.59
Per cent of canal irrigated area (incl lift)	2.43	2.84	1.26	6.35
Per cent of groundwater irrigated area	17.43	16.90	42.93	30.76
Per cent of lift irrigation from river/streams	4.90	2.26	0.97	1.09
Per cent of irrigated by other sources	3.44	0.21	1.28	4.21
Facets about capital investments				
Capital investment per capita (Rs per annum)	9599.32	4878.74	33281.98	33333.33
Per cent of capital investment going to agriculture	89.64	89.36	64.79	81.23

Notes: T-TB: Tribal farmers in tribal dominated blocks,
T-NTB: Tribal farmers in non-tribal blocks from the same districts,
NT-TB: Non-tribal farmers in tribal dominated blocks,
NT-NTB: Non tribal farmers in non-tribal blocks from the same districts.
Sources: Primary Survey 2003.

Figure 3: Four Distinct Socio-Ecologies in the Central Indian Tribal Homelands



absence of water control. The first is the uncertainty in transplanting paddy from nurseries in the event of insufficient rains during end July to mid-August. This got exemplified in wide scale failure of the paddy crop in Chhattisgarh in 2001-02 leading to an almost complete drought situation there. The second uncertainty arises from failure of September ('hathia') rains. This is experienced quite often in Jharkhand and Orissa and the resultant low paddy yields lead to high food insecurity and forced migration.

Free grazing of animals in the post-kharif season is a common facet in these regions and this is an overwhelming externality that discourages an individual tribal farmer from attempting second crop even where access to water is not an issue. Virtually no water control measures that help farmers tide over the two periods of moisture stress have evolved or been implemented by public agencies. At present, the dominant irrigation intervention in the region is installation of small, group-based diesel lift irrigation (LI) schemes on streams and rivers. These schemes are largely used for irrigating the second crops as the pumps are almost useless during the kharif season due to the high rate of stream flow (leading to flooding of streams) and the huge amounts of silt being carried by these streams. The high cost of diesel based pumping schemes reduces the viability and acceptance of these schemes. We, therefore, feel that the primary objective of any livelihood intervention in this region should be to stabilise the kharif yields and incomes. This will, as a first step, improve the food security of the millions of tribals in the region. Moreover, it will reduce the tribals' dependence on migration and will encourage them to focus on agriculture based livelihoods.

We would like to suggest four distinct stages for water-based livelihood promotion initiatives in this region: (i) the first stage should focus on stabilising the kharif crops and incomes. This can be done through the creation of a plethora of decentralised water harvesting structures close to farms. These should be prolific and perhaps a structure may be created for every two hectares, preferably in a cascade; (ii) Once the kharif crop stabilises and the tribal farmers feel much more secure about their food availability, schemes that promote second crop cultivation will also find greater acceptance and could be promoted. However, an essential precondition for this will be large-scale promotion of 'adgharas' or 'kanji houses'[10] in blocks of contiguous villages to overcome the problems of free-grazing; (iii) As a next step, use of the water stored in these small water harvesting structures and available streams for second crops should be the focus of interventions. Lifting devices such as low-cost and high-efficiency Chinese pumps,[11] Willard type kerosene pumps, treadle pumps and shared facilities such as those talked about by Mardikar (2004) under the agri-service provider model outlined earlier may be encouraged. At places where wells exist, low cost micro-irrigation systems can be introduced to support women-managed vegetable cultivation in homesteads. Uplands may be to be taken up for soil water conservation measures and growing improved grasses, timber, host plants for silkworms/lac and fruit trees; (iv) Finally, agencies can focus on implementation of stream based large check dam-cum-lift irrigation and other irrigation systems. The Gram Bhagirathi Yojana, based on large structures on streams and bigger lifts, as is being proposed by the government of Jharkhand, will meet the case. The earlier phases will bring the possibility of agriculture being a superior option to migration to the forefront in the minds of the tribal farmers. Secondly, group dynamics are also likely to work better once the benefits are palpable and reachable. Successful implementation of these strategies would result in substantially higher farm incomes (and purchasing power) for the tribal farmers. This will also provide

Table 3: Four Distinct Socio-Ecologies in the Central Indian Tribal Homelands

	Zone A	Zone B	Zone C	Zone D
Parameters				
Agro-Climatic Classification	Zone VII	Eastern parts of Zone VIII and IX	Western parts of Zone VIII and IX; and tribal south Gujarat	Tribal parts of Zone XIII and XIV
Contexual features				
Rainfall	High	Moderate-high	Low-moderate	Low and highly variable
Vegetative cover	High	High	Poor	Denuded
Population pressure	Low	Moderate	Moderate-high	High
Agriculture skills	Subsistence	Moderate	High	High
Isolation/exposure	High isolation	Less isolation	Good exposure	Near-assimilation
External constraints				
Road network	Poor	Better	Good	Good
Electricity supply	Near absent	Better	Well developed	Well developed
Diesel supply	Sparse	Sparse	Easy access	Easy access
Market development	Poor	Emerging	Well developed	Well developed
Portfolio of options	Decentralised water harvesting structures; diversion channels; diversion bunds; groundwater development; stream based LI schemes; revival of BPDP structures; large check dams; Agri-service providers	'Bori Bandhs'; 'Nala Bunds'; Recharge structures; SWC measures; Dug-well based small schemes; Check dams	Groundwater recharge structures; Large check dams; KP Weirs; 'Bori Bandhs'; SWC measures; BAIF style 'Wadis'; revival of medium and minor irrigation canals through PIM; Promoting water saving micro irrigation technologies	Sadguru model; Promoting water saving micro irrigation technologies; On-farm water harvesting; Groundwater recharge; Irrigation management transfer

an impetus to the non-farm economy and increased labour availability to the landless and sub-marginal farmers.

Obviously, there will be pockets within zone A where the local conditions would allow direct implementation of phase II or III or IV directly due to greater proximity to markets, infrastructure developments and experience of and exposure to settled farming.

Ways Ahead

The tribal heartland of central India must be seen as the next granary for the country. If the low-productivity agriculture in this region is to be systematically transformed into a vibrant, sustainable and intensive agriculture, it will produce sufficient food and fruits to contribute significantly towards food security of the country as a whole. This issue becomes even more important for national food security if we look at the negative rates of growth in yields in states like Punjab and Haryana [Gulati 2002; Chand 1999; Singh and Kalra 2002], which have been the handmaiden of agricultural growth in independent India. Carefully implemented and sustainable 'water control' interventions in tribal homelands will contribute food and fibre to a nation that enjoys only a temporary holiday from the rigours of national food insecurity [Bhalla, Hazell and Kerr 1999]. Such a process will also transform lives of millions of tribal people and increase their own consumption, food security and perhaps induce a stable life pattern for them. The impact on contributing towards more sustainable and yet complete utilisation of land and water resources will be an additional benefit.

Mere research does not, in itself, make a strategy. The lessons from the research need to be wisely and prudently woven with the art of the possible in the extant administrative and implementation mechanisms with the state. We recognise that the state machinery has greater competence and hence a bias towards 'blue-prints' and a 'hands-off' approach to programmes and schemes while the water control strategies thrown up by the research require a 'hands-on' approach and a fluid choice of techniques contingent upon the unique constellation of resource and social features of a tribal locale. The current order of governance does not leave much hope for adequate implementation of such an approach even if the state were to shed its preference for blueprint methods of spending large sums of money. We also recognise that the portfolio of options cuts across jurisdiction of several agencies of the state: water resources development, environment and forests, rural development and tribal welfare. Yet, we fear that the task might be too huge to be accomplished within the means normally at the command of civil society organisations working with external project funds. We thus hope that implementation mechanisms that can make a serious attempt at implementing decentralised water control strategies will emerge. This can happen only if there is wide scale recognition of the existence of the problem and a wide social mobilisation required to correct the situation. What is perhaps called for is a large scale collaborative effort between the state agencies and the civil society organisations in first understanding the complexity of the problem and in working together to evolve solutions using the portfolio of options suggested. EPW

Address for correspondence:
sanjv_ngp@sancharnet.in

Notes

1 As the initiative grew and expanded, several prominent NGOs joined in as collaborators. These include: BAIF Research and Development Foundation, Pune; Sewa Mandir, Udaipur; Foundation for Ecological Security (FES), Anand; and the Aga Khan Rural Support Program (AKRSP), India. The initiative also involved several NGOs and educational institutes and students as 'partners-in-research'. These include: Tata Steel Rural Development Society (TSRDS); Krishi Gram Vikas Kendra (KGVK); Harsha Trust; Institute for Sustainable Agriculture Development (ISAD); Rural Environment Conservation and Research Society (RECRS); Xavier Institute of Development Action and Studies (XIDAS); Indira Gandhi Agriculture University, Raipur; NKC Centre for Development Studies, Bhubaneshwar; Rural Management students from the Institute of Rural Management, Anand (IRMA); and MPhil students from Indian Institute of Technology (IIT), Powai. A detailed synthesis paper [Phansalkar and Verma 2004] was circulated as a pre-publication discussion paper for the IWMI-Tata Annual Partners' Meet in February 2004. A copy of the discussion paper can be requested by writing to iwmi-tata@cgiar.org.

2 The studies in this category included case studies of dabaris or minor irrigation water storage tanks in Chhattisgarh [Marothia 2004]; Tar Bandhs or diversion bunds created by the local communities in Mahasmand, Chhattisgarh [Chandrakar 2004]; and indigenously designed diversion channels as mechanisms for water control in Orissa [Mahapatra 2004].

3 The state-led interventions included case studies of GWRDC installed lift irrigation (LI) schemes for tribal farmers in Surat [Verma and Satpathy 2003] and government initiated LI schemes in Jhabua [Jagawat and Choudhury 2003]. The civil society interventions included case studies of Sadguru's work in Dahod and Banswara [Saini and Pandey 2003]; PRADAN's LI Schemes in Jharkhand [Mahapatra and Bhamoriya 2003]; AKRSP (I) supported PIM in south Gujarat [Mukherji, Verma and Rath 2002, 2003]; ASEEFA's LI schemes in Wardha and Yavatmal [Mardikar 2003]; LI schemes installed by the TSRDS in Jharkhand [Singh 2004]; and Seva Mandir's LI scheme in Shyampura, Udaipur [Vishwanathan 2004].

4 These include case studies on Vidarbha watersheds programme [Mansoor 2004] and the Rajiv Gandhi Watershed Mission in Dhar [Londhe 2004].

5 Also see Shah et al (1998) for an interesting reading on a new concept called 'Total Watershed Planning'.

6 These include case studies of International Development Enterprises (IDE), India promoted treadle pumps in Orissa [Panigrahi 2004] and the spontaneous spread and popularity of sprinklers in Narsinghpur [Rahul 2004].

7 These include two case studies of the 'Wadi' programme of BAIF in Thane [Deshpande 2004] and in Valsad and Dangs [Bhamoriya 2004] districts; and the intervention for kharif paddy stabilisation undertaken by PRADAN in Purulia [Chakraborty 2004].

8 The case of the Bhartiya Kisan Sangh (BKS) running a big campaign against the chief minister Narendra Modi is a recent example of this. Their lobby has been so strong that the flat electricity tariffs in Gujarat have not been revised for almost 15 years. In some other states like Punjab and Tamil Nadu, electricity is supplied free of charge to the farmers for agriculture!

9 Virtual water is the water needed to produce a commodity or a service. For details, see Allan (2003).

10 These are enclosures used to keep animals to prevent them from free grazing.

11 'Chinese Pumps', as they are popularly called, are low-cost, low-HP and high-efficiency pumps that have penetrated into markets in and around Ranchi (as well as in Bangladesh, Bihar and West Bengal) and are quite popular among the farmers. These pumps have a smaller life period and need to be replaced more frequently compared to the conventional pumps. If promoted properly, these have the potential of acting as 'stepping stones' for small and marginal tribal farmers in the region. This can be done by designing suitable subsidy and incentive schemes for the distributors and retailers.

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