

Acknowledgements

First and Foremost, We would like to express my gratitude to the enterprising tribal community who gave us wholehearted co-operation with the study. Their warmth and ability to overcome the limitation of language and give us time despite the transplantation work was inspiring and their life a statement of community and social belonging.

We are also thankful to the cooperation of the staff and team of PRADAN who helped us conduct this study despite their busy schedule and work pressure of delayed monsoons. We are particularly thankful to Shri Pawan, Shri Sameer, Shri Anilji, Shri Suraj Sharma, Shri Sathya, Shri Alope Barnwal, Shri Nitin Sharma and of course the drivers Shri Pramod and Shri Shahbuddin who doubled as translators during the fieldwork as well.

We are also thankful to Mr. Manas Kr. Satpathy, Mr. Deep Joshi, Mr. Sanjiv Phansalkar, Dr. Tushaar Shah and Dr. Christopher Scott for their guidance and the discussions with them.

We would like to thank the IWMI-Tata Water Policy Research Program and the management committee of the Central India Initiative for giving us this opportunity for studying this wonderful intervention amongst the tribals.

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Table Of Contents

Introduction	2
Introduction to the Implementation Area	2
Introducing the Districts and the PRADAN villages	3
Figure 1 : District map of Jharkhand	4
The PRADAN LI Model	4
Figure 2: A typical LI (without pump house, yet to be built) of PRADAN	5
Table 1: Cost Estimate of a typical lift irrigation scheme, componentwise	5
Water Users' Association (WUA)	6
The Process	7
Objectives of the Study	7
Methodology of the Study	8
Constraints	8
Observations (Refer Annexure 3)	8
The demand	9
The Infrastructure	9
Information / Knowledge / Skill	9
Table 2: Cumulative Observation table	10
Analysis	12
Credit Linkage and capital for investment into Agriculture	12
Information Linkage, Input Link	13
Figure 3.: Rabi Crop Coverage for district Lohardagga	13
Marketing Linkage	13
Agricultural Skills	14
Group Dynamics and meetings	14
Economic status of the WUA members in general and as individuals.	14
Operator	15
Coupon System, Distance, Grazing Problem and Elephant menace	15
Lessons from the field experience this study picks up	15
Next Generation Issues for the study	16
Table 3: Performance of schemes in Lohardagga district	16
Figure 4: Farmer Coverage during Rabi	17
Possibilities of Replication	17
Synthesis and Conclusions	18
References	19
Annexure 1: Protocol for the Study	20
Annexure 2: Success Criteria for PRADAN LI scheme	23
Annexure 3: Data Sheet for the Schemes	24
Annexure 4: Individual Scheme Case studies (to be added)	27

Where is the Demand?

- A Case study of Lift Irrigation Intervention of PRADAN in Lohardagga and West Singhbhum Districts of Jharkhand

Introduction

The state of Jharkhand was carved out of Bihar on 15th November 2000 after a protracted demand for a separate as the home of tribals and forests. The State has a total area of 79,714 sq. Kms and the economy is based on agriculture and minerals with allied activities¹.

The Scheduled tribes² form 28% of the state Population. The area under forests in the state is 29% and the net sown area is 25%. The net irrigated area is only 8% of the total area. The state is characterized by abundant water resources but high underutilization as is shown by the net irrigated area, which is just 1.57 lakh hectares.

The tribals have faced reduction in income from forests due to various measures by the forest departments and the MoEF. Being Second and third generation farmers they suffer from low productivity and production from agriculture. Reduction in their income sources has led them to migrate for their livelihoods.

Introduction to the Implementation Area³

Jharkhand, the new state carved out of Bihar, is home for 6.6 million (9.77% of tribal population of India) tribal, the most deprived in the country. As per 1991 census, 28% of its population belong to Scheduled Tribes. Some information relevant to this study is detailed below -

- Nearly 8 lakh hectares of land that they own even though are protected against transfer, lack productivity. Curtailment in income from forest and scanty production from land have made a huge proportion of these people to resort to migration as a source of livelihood.
- Despite a high average annual rainfall of 1326 mm the net irrigated area is only 1.57¹ lakh ha. which is nearly 8% of the net sown area. Nearly 80% of the monsoon rains result in runoff and cause severe soil erosion. Total cultivable land in the state is 38 lakh ha. (48%), whereas the present net sown area is only 18.04 lakh ha. (23%). About 29% of the land is under forest area. Climatic conditions are largely sub-humid with one rainy season between June and September during which 82% of the annual rainfall occurs.
- Poor degraded soil and lack of irrigation facilities particularly hamper agricultural productivity in the undulating terrain of the state. Sixty percent of all land

¹ <http://www.pib.nic.in/feature/feyr2001/fjun2001/f180620011.html>

² <http://www.jharkhand.nic.in/about/profile.htm>

³ Satpathy, Manas Kr., *Irrigation for Livelihoods Improvement: Small Holder Tribal Irrigation IN Jharkhand*, IWMI-Tata Water Policy research Program- Annual Partners Meet 2002.

holdings are of less than one hectare and therefore are officially classified as marginal. The average yield of rice, the main staple crop, is only 0.8 metric tons per hectare, which is less than half the national average. Because there are few local employment opportunities, many farm laborers migrate on a seasonal basis to distant states such as Punjab, West Bengal and Assam.

- An average tribal family in Jharkhand still holds 2-3 acres of land. Nearly 30% of the families have more than 5 acres of land. Agriculture is predominantly rain-fed and mono-cropped. Paddy is the major crop accounting for about 60 to 70% of the cultivated land during the *khari* season, with productivity ranging from 1000 kg to 2500 kg/ha. The other crops are maize, finger millet, wheat, pulses and oil seeds. Food grains occupy about 95% of the cropped area.
- The main crops grown in the *Rabi* season are wheat, oilseeds (rapeseed, mustard, linseed and groundnut), pulses (pea and gram), and vegetables. Vegetable cultivation is picking up very fast due to the favourable climate. These are preferably grown on homestead land. Women participate in all agricultural operations excepting ploughing and sowing of rice seed (taboo), contributing between 70 to 80% of the total labour.
- Mostly being located in the upper reaches of the basins, tribal people of the state generally are not benefited by the state's large irrigation projects. Wells either private or distributed under poverty alleviation schemes of government are the chief sources of irrigation for them. Due to high undulations moisture holding capacity and productivity varies widely across lands in the region. So when the lands get divided among the brothers of a family each plot is shared. As a result everybody's holding is quite scattered. Since the farmers in the area hold lands at different places it is difficult to bring all the lands of a family under irrigation with wells.

Introducing the Districts and the PRADAN villages

Lohardagga is perhaps the smallest of the districts of the state of Jharkhand being about 60 Kms away from Ranchi, the state capital. West Singhbhum is the second largest. Lohardagga is mainly inhabited by the Oraon tribe in PRADAN LI areas and villages whereas West Singhbhum by the Ho and the Mundari tribes.

The agriculture in Lohardagga district schemes is of a higher quality than that in the West Singhbhum district. In Lohardagga people are better at agriculture and have more knowledge about it as compared to West Singhbhum.

At both places within the same village or hamlet you will find people dependent upon forests and Bidi-making as well. In both the districts people migrate out in times of need and go as truck helpers as far as upto Punjab. However little agricultural knowledge is brought back by these lads. Lohardagga is better linked than West Singhbhum with Rourkela, which is the major market for vegetables grown in Lohardagga district. Only the Manoharpur block in West Singhbhum district is well linked with Rourkela that also because of very little distance between the two places.



Figure 1 : District map of Jharkhand

Source: <http://www.pib.nic.in/feature/feyr2001/fjun2001/f180620011.html>

The PRADAN LI Model

PRADAN (professional Assistance for Development Action) realized that there was considerable runoff in the small streams and rivulets to harness for irrigation with a smallholder focus. They put forward the community –owned micro Lift Irrigation schemes that are not only suited to the regional peculiarities but also within the rural poor peoples’ reach. These small-scale LI schemes entail low capital costs, use local materials wherever possible, and exploit available water resources that are often neglected in conventional irrigation planning and have the flexibility to adapt to the changing local conditions. Local People are involved at very stage of planning, implementation and management of the community-owned LI schemes.⁴

The PRADAN II model is part of the Irrigated agriculture theme, which includes a package of community organization, agricultural training, coop production assistance and facilities for timely credit and marketing. The formation of strong and cohesive groups of farmers who use the water for irrigation remains the cornerstone of the PRADAN model.

The model is suited to smallholders with close co-operation and is based on diesel as fuel for the engine to run the pumps. Tribals have landholdings mostly in the uplands and middle lands and here lifting water from the small streams and rivulets required small and simple technology.

⁴ Gupta, Tilak D. , *From Subsistence Agriculture to Irrigated Farming – experience of community managed lift irrigation in Bihar and Orissa Plateau.*

Figure 2: A typical LI (without pump house, yet to be built) of PRADAN (picture not attached to reduce file size)

The PRADAN model uses a simple centrifugal pump driven by a diesel engine to lift water to a height. Rigid PVC pipes of different diameters are used to deliver water to the command area. A number of outlets are suitably located in the command area. A number of outlets are suitable located in the command area to irrigate the fields. The delivery pipe remains buried underground.

Table 1: Cost Estimate of a typical lift irrigation scheme, componentwise⁵

Item		Approx. Cost (Rs.)
Intake Well	(10 ft. dia. & 10 ft. deep)	25,000
Pump House	(14 ft. x 10 ft. inside dimensions)	15,000
Pumpset	(A 5-8 HP diesel engine coupled with a pump)	21,000
Accessories	(Foot valve, suction pipe, nipples, GI bend, Non return valve and the like)	9,000
PVC Pipe	(Length 600m x 160mm dia.) & solvent cement	85,000
Riser Assemblies	(4 with PVC tee/bend and flange outlet)	5,000
Sub-Total		1,60,000
Unskilled labour work contributed by people (trench digging, pipe laying, trench filling, machine installation, construction of pumphouse and intake well)		20,000
Total		1,80,000

A pump house is built to protect the pump-set. An intake well, wherever necessary, is dug to ensure cleaner water as well as steady supply in summer months when the surface water becomes inadequate. Atypical user-group LI scheme usually lifts water to a height of 10 to 20metres to irrigate 30 to 50 acres of land belonging to an average of 20 to 40 farmers. Usually 5 or 8 HP diesel engines are used and the pipeline length varies between 300 to 1500 meters. Within these basic technical parameters, a number of variations are made to accommodate local requirements.

Believing the success of the LI scheme to be crucially dependent upon the formation of cohesive water users association, it was felt that the volume of water discharge should be such that only one farmer at a time can irrigate his/her parcel of land. Therefore the flow needed to be small enough for only one farmer to manage it and adequate enough, especially during *Rabi*, to move about the command area effectively.

The machine and its parts required to be simple as to be operated and managed by the tribals and to be cost effective with a balance between capital cost and operating cost as well. Given below in table is the cost estimate of a typical LI scheme, componentwise.

⁵ Gupta, Tilak D. , *From Subsistence Agriculture to Irrigated Farming – experience of community managed lift irrigation in Bihar and Orissa Plateau.*

Lift Irrigation System and its Components

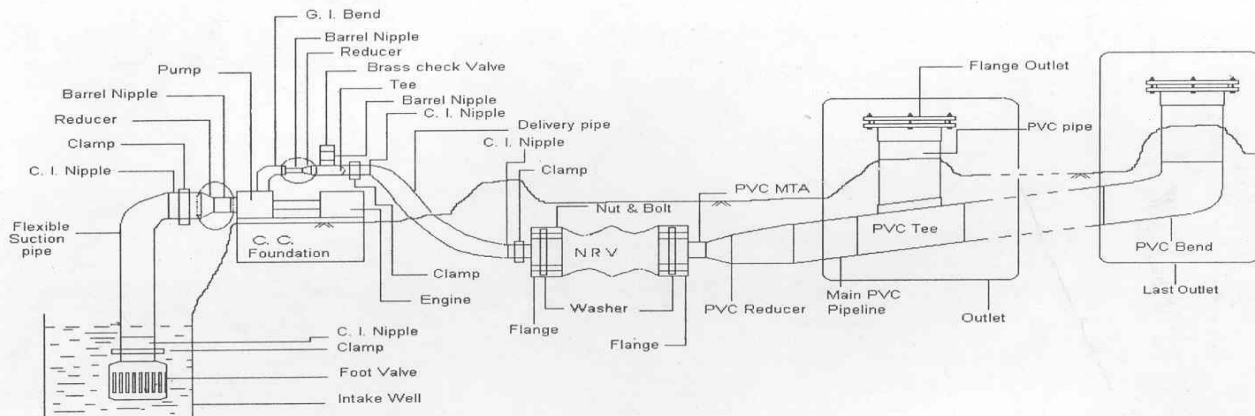


Figure 3: Schematic diagram of Lift Irrigation Scheme and its Components

Water Users' Association (WUA)

The WUAs are the foundation of the user-group managed LI system. PRADAN has tried to have groups with as much of homogeneity as possible as regards to the caste or tribe involved. This has been coupled with a conscious bias towards small and marginal farmers being included in the Water Users Associations. The WUA has to be functional before the scheme is implemented, as PRADAN does not transfer any money to its account. The grant or loan is transferred directly to the account of the WUA, thereby necessitating the formation of the group before the implementation of the scheme.

PRADAN plays the facilitators role helping the WUAs to become functional and guiding them through the implementation of this new technology (for them). PRADAN provides training to one operator and helps the WUA office bearers to pick up elementary accounting methods. Once the LI scheme comes into operation, PRADAN has little role in running it. The WUAs are left unto themselves to manage the schemes. Now PRADAN provides the strengthening inputs, agricultural training, crop production assistance and market linkages. A revolving fund was also inbuilt into the scheme.

The Users association has a president, a treasurer and an operator as office bearers. The functional rules are all decided by the WUAs themselves with no or very little input from PRADAN.

The Process

The PRADAN LI model is a process-based model with customization as a flexibility to suit the local conditions. This process consists of the following steps.

1. Selection of the Site:
 - a. Reconnaissance Survey
 - b. Site Selection for pump house.
2. Initial Visits
 - a. Exposure visit to the existing site
 - b. First few village level meetings aimed towards formation of WUA with a cohesive group.
 - c. Explanation of the whole process
3. Formation of the WUA
 - a. Map Study
 - b. Command Area Mapping
 - c. Beneficiary list preparation
4. Group Building
5. Technical Survey and proposal preparation
 - a. Technical Survey
 - b. Design and estimate preparation
 - c. Submission of proposal to DRDA /FA
6. Project Sanction and Procurement of materials
 - a. Sanction of Proposal
 - b. Operators training
 - c. Ordering and procuring materials
7. Construction of the LI infrastructure
 - a. Trench digging by full labour contribution
 - b. Channelisation of funds to WUA
 - c. Installation by WUA with help from PRADAN
8. Operation and stabilization
 - a. Accounts Training
 - b. Starting of irrigation
 - c. Testing and setting of norms
9. Agricultural Extension Work
 - a. Agricultural training and exposure
 - b. Crop planning and follow up.
 - c. Input linkages
 - d. Market linkages

Objectives of the Study

The study was taken up to reflect upon the issues out forth by the PRADAN experience – what are the factors facilitating farming and adoption with sustainability, what have been the added benefits required to generate continued interest and agriculture etc. keeping these issues at the back of the mind the study took the following objectives: -

- ? What stimulates demand for irrigation in tribal context?

? How to ensure sustained interest and development of tribals towards irrigated agriculture?

Methodology of the Study

The idea was to do the study using stratified random sampling however the timing of the study during monsoons and the delayed rains forced us to use convenience as a criteria as we were short of time.

However we tried to have LI schemes, which were at least four years old in order to be bale to study the whole process after the installation and PRADAN withdrawal. We tried to cover the diversity in terms of technical variables and waterplus approach of the schemes.

The PRADAN schemes were classified as successful, medium successful, and not so successful based on the criteria of success as adapted by PRADAN that fulfilled the criteria needed for such a classification for the study purpose. (See Annexure no.2)

The tools used to carry out the study were focused group discussions, In-depth interviews, secondary data Analysis and long free floating discussions with users for developing a comprehensive background.

Constraints

The study faced the constraints of timing as it was hurriedly done over a short span, also the timing during monsoons coupled with delayed monsoons and transplantation of paddy at the time of the study were a severe limitation to availability of people for interaction and studying.

This time also happens to be the peak time for the organization and as such interacting with the implementers is also of a different kind. However both the villagers as well as the PRADAN employees were very helpful within their constraints.

The Policy of withdrawal of PRADAN form the schemes also left data gaps for the intermediate years that, if available, could have added to analysis in quality and quantity of outcomes. The data available fo past years was also not similar for botht he districts which left comparisons and generalizations between the two vey difficult.

Observations (Refer Annexure 3)

The Process of LI schemes have been initiated in many places on the demand from the community rather than the efforts of PRADAN alone. The communities before the advent of LI schemes were predominantly rainfed paddy cultivators who used traditional varieties without nursery and fertilizer or pesticide use. The communities in the two districts are different with the *Oraon* community being the one resident in lohardagga districts and the *Mundas* and the *Mundaris* and the *Hos* in the West Sighbhum districts. As far as the adoption of agricultural skills is considered, as of now, the *Oraon* community is ahead of the *Mundas*, the *Mundaris* and the *Hos*.

The tribal people easily associate agriculture with risk taking and this factor seems to play an important role in determining the spread and development of Rabi agriculture.

The demand

The tribal people show a lot of enthusiasm regarding irrigation saying agriculture is their greatest need. They are clear about irrigation enabling Rabi agriculture if not summer. But talking to them about their experience so far reveals a complex reality of the system.

The demand for irrigation is not a demand for irrigation alone. It incorporates demand for irrigated agriculture as a solution to problems of food security, migration, poverty, social well being as well (in some cases).

This is what complicates matters. The tribals have been practicing agriculture in a primitive form. Earlier they were dependent on forests and other sources of livelihoods but then the scenario changed. Sustenance by being dependent on forests became more difficult and they learnt new things and trades and eventually they took to agriculture, as land was available to them. They took growing rainfed paddy, maize, and those close to rivers would lift water with simple systems (effort intensive task).

Their agriculture as of now is severely hampered by low water availability, lack of information and skill, low capital adequacy, marginalization, dependence on natural factors, poor infrastructure & extension services, poor market and input linkages and characterized by mainly kharif only, low productivity, low-value, paddy-based cropping pattern in a subsistence agriculture system.

In such a scenario agriculture itself would seem unattractive to an individual and hence we have to tackle the problem of demand generation in such first and second-generation farmers.

The Infrastructure

Both the districts are characterized by poor infrastructure which hampers the input as well as market linkages for the producers. Very few villages are connected by road or / and some transport facility. Most of the villages taken up for the study were comparatively more easily accessible due to the time constraint but a good estimate of the poor infrastructure can easily be made.

Information / Knowledge / Skill

The extension services in this region are very poor and often the tribal farmers being relatively new to agriculture need a lot of support in their endeavour to take up agriculture as a sustainable option. The extension services are responsible for performing the function of ensuring the supply of this information, knowledge and skill of agriculture. However they have fared miserably in fulfilling this responsibility. PRADAN professionals in charge of such LI schemes have been the valuable information link to all these Schemes and the users. Unknowingly their every visit brought in some desired information for the users in the form of names of pesticides, problems to solutions, idea generation for tackling a problem.

Thus an information link needs to be looked at as a critical factor for success of any LI scheme. It must be realized that Information, knowledge and skill are closely related.

Except for two sites the information – success link is also pretty obvious.

Table 2: Cumulative Observation table

Functioning	Grade	Credit	Information	Input	Agricultural Skill	Group Dynamics	Group Meetings	Coupon Systems
Good	High	5	5	3	3	4	2	2
	Medium	0	0	2	2	0	2	0
	Low	0	0	0	0	1	1	3
Medium	High	2	1	2	2	2	1	2
	Medium	0	3	2	2	1	1	0
	Low	2	0	0	0	1	2	2
Poor	High	1	2	1	1	0	0	0
	Medium	0	1	2	1	1	0	0
	Low	4	2	2	3	4	5	5

Functioning	Grade	Market Linkages	Economic Status	Distance from Block HQ	Grazing Problem	Elephant menace	Type of land in Command area
Good	High	4	4	4	1	1	5
	Medium	1	1	1	1	0	0
	Low	0	0	0	3	4	0
Medium	High	2	1	2	0	0	4
	Medium	1	2	2	1	0	0
	Low	1	1	0	3	4	0
Poor	High	0	1	2	2	1	2
	Medium	3	1	2	1	0	1
	Low	2	3	1	2	4	2

Capital and credit is definitely a major criterion that goes into deciding whether the scheme will be a success or not. Agriculture means that the tribals have to invest capital into agriculture and ensure the livelihoods in the meantime as while. If, by bad luck (bad rains), or by misinformation (bad seeds, harmful pesticides or harmful quantities) or by lack of water the crops fail and the capital is lost. Losing the capital is very significant in the first two seasons. If the newly irrigating farmer loses money in the first season – he doubts both the prospect of Rabi agriculture as well as his own ability to collect capital to invest in agriculture the coming year. However if the crop fails in the second season then the farmer has a problem of capital but it seems he would not question the option of agriculture as an occupation.

Thus ensuring a source of cheap and convenient credit should definitely take the farmer towards sustained agriculture efforts and development.

Out of the 5 weak schemes studied only one had a good credit linkage all other schemes lacked in capital linkage and the farmers clearly stated credit to be their

major problem. Of the good schemes all the schemes had some good credit linkages to them.

Out of the places we visited we found that sites that have a homogenous caste composition are more likely to succeed as LI schemes rather than sites with a heterogeneous composition.

Out of four sites with mixed castes only one was performing good and there also the decision-making and interest in agriculture was restricted to only one caste. Out of the 10 sites with perfectly homogenous caste composition only two were functioning as weak schemes. Out of the four heterogeneous three were in the weak category.

Input linkages are important as they affect the farmers experience with agriculture. A bad inputs linkage might mean bad quality inputs which could lead to unproductive agriculture leading to loss of valuable capital or loss of farmers' interest in agriculture as an occupation.

Out of the schemes studied, the better performing schemes had better input linkages and the medium performing ones had medium level of input linkage and the weak schemes had the poorest input linkage.

The marketing linkages are indeed important as they are what ensure the cash flow to the farmer after all the labour has been put in. the marketing linkages showed a pattern similar to the input and the information linkages.

This becomes an important factor here as the farmers we are talking of when we speak of tribals in the districts of Lohardagga and West Singhbhum are new to Rabi Agriculture and have known little agriculture apart from rainfed paddy cultivation and cultivation of some traditional varieties like *gora* and *marua* during *kharif*.

The irrigation schemes have been used for cultivation of lands, only uplands and medium uplands, for Rabi cultivation as the farmers here do not have the skills to dewater the lowland plots as they have standing water till November at times hampering Rabi cultivation.

Apart from lowland two of the schemes were unsuccessful in *Rabi* as the farmers had problems of waterlogging in their fields during the sowing time for *Rabi* as their lands were at the foot of hills.

Apart from this the exact knowledge of pesticides and fertilizers for different requirements of the crops are not known and then they have operational difficulties like how to mix them and how to apply. A better understanding comes when we realize that till about five years most of these farmers did not practice paddy cultivation in nurseries or by transplantation. They were still and in large parts still use the traditional varieties for broadcasting.

This is not an independent factor but closely related to the agricultural skills as explained under the same. The tribals often have a problem practicing agriculture in the lowlands during *Rabi* as they are still under water during the sowing time. In case they wait for the lands to get drier then the crop gets late and requires more irrigation and fetches lesser prices.

As stated earlier the formation of a vibrant group of water users is the cornerstone of the PRADAN LI model. Any failure to do so ought to result in a less successful LI intervention. Out of the five better performing schemes studied four had better performing and one average performing WUA groups with respect to group dynamics. Out of the five weak groups the group dynamics was poor in four and average in one. Out of four average performing groups two had good, one had average and one had poor group dynamics.

Group dynamics serves as a important indicator of problem solving, conflict resolution and hence balancing of conflicting interests within an intervention. This variable again makes more sense when seen together with the incidence of meetings of the group and their frequency. All the poorly performing schemes have not had meetings for along time. The better performing schemes have a better performance at holding meetings as well.

Out of the five good schemes studied four have a relatively higher economic status of the users during Rabi. The remaining one had an average economic status of users. Out of the five poorly performing schemes 3 have average economic status and two have relatively poor status. Out of the four average performing schemes one has high two average and one poor economic status. This presents an interesting scenario looked in detail in the analysis section.

Analysis

An analysis of the data generated as a result of the interaction in the fourteen schemes in two districts. (Refer table 2) the following variables are seen to be bearing upon the success of the scheme.

- ? Credit Linkage and Capital for investment into agriculture
- ? Information Linkage
- ? Input Linkage
- ? Marketing Linkage
- ? Agricultural Skills
- ? Type of land in Command Area
- ? Group Dynamics
- ? Group meetings
- ? Economic status of the WUA member sin general and as individuals.
- ? Operator

Credit Linkage and capital for investment into Agriculture

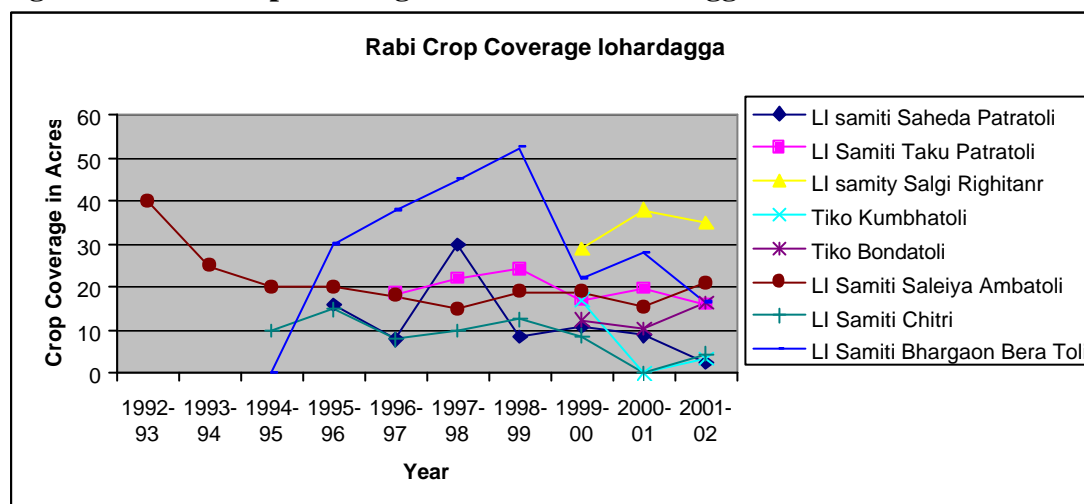
Credit by far makes the most important variable in determining the success of an LI scheme in terms of demand. It is a necessary but not sufficient variable as is brought out by the case of village Saheda Patratoli where though the women's SHG (2 in number) are running successfully the WUA has been unsuccessful. Also the scenario in villages *Salgi Righitanr* and *Chittri*, where the SHGs exist but there is no linkage with the WUA, shows that establishing a source of credit is not enough but it needs ot be properly linked with the WUA members to solve their problems of capital for investing into agriculture.

Also the well off farmers among the groups are taking land on share cropping from the others and practicing agriculture on them as they have the capital to invest while the others do not and therefore cannot till their lands. Thus what matters for the scheme success is the credit linkage available to farmers for supplying cash for investing into agriculture.

Information Linkage, Input Link

This is another major factor responsible for ensuring the success of the LI intervention. The information flows are important, as they are what can be termed as ideal agricultural extension services. The particular trend of high use of schemes in the first two-three seasons of installation and then falling usage is an indicator of the same as this roughly matches the timeframe of PRADAN withdrawal from the villages. It needs to be looked into and ascertained whether the PRADAN withdrawal and the falling agriculture match in time. (see figure 1)

Figure 3.: Rabi Crop Coverage for district Lohardagga



Right now in the absence of any other information flow media and the incidence of high PRADAN involvement schemes being a success that this generates a hypothesis. Associated with this will be the quality of human resources input into the community. Thus information-human resource input variable can help ensure better success of the schemes.

The input linkages are also part of information flows only as PRADAN professionals refer the farmers to a reliable input shop or center for input procurement. Thus the input linkage we refer to also boils down to an information link. But in many cases for the introduction of new varieties and crops the initial test procurement has been through PRADAN under one or other programme. Thus it is a part of the information-human resource input to the community

Marketing Linkage

This is a very important linkage as the farmers are carrying out agriculture as an occupation and therefore they are immediately associated with the returns from the agriculture. Thus marketing which often determines the prices obtained by the farmers for their products is an important link in getting incentives to the farmers for practicing agriculture. In the event of poor marketing link the farmers loses in ways –

one, he does not get the main share of the crop value – the majority being taken away by the middlemen, two, they are unable to create favorable demand-supply balance and lose the value of their produce, thirdly the farmers get poorer incentive or maybe disincentive for agriculture as an occupation.

Agricultural Skills

The agricultural Skills we are talking about are the introduction of new agricultural practices, giving the right support to crops at the right time like fertilizers, pesticides, irrigation etc. there are few farmers who are ready to take risks by introducing the new practices. The others have to see it happening in one of the fields of their village to believe it and learn it and then they will apply it in their fields. Thus teaching new things brings in the issue of convincing them of a new option. This means we have to convince them to take a risk as per their perception though it might be a solution to their problem from our perspective. This includes the case of ensuring drainage or water harvesting in lowlands and high uplands.

However it need not be realized that in a scheme where the command area is significantly consisting of lowlands it would need introduction of some new agriculture skill to the farmers.

Group Dynamics and meetings

This is a very important variable for the success of the LI intervention. The whole model envisages the LI schemes as group schemes. Therefore the Group dynamics is important to ensure the success. Proper group dynamics ensures better understanding and more collaboration and commonality to enhance the societal good instead of trading off societal good for individual pay-off. It also helps to discipline the operation of the scheme to ensure lesser conflicts and a more regulated and controlled intervention.

The variable of group meetings definitely does load onto this factor as a part of it. It however gives a totally different dimension to group dynamics and promoting demand for irrigation. While it means a constant dialogue between the different members therefore larger clarity in the direction the intervention is to take and more concerted efforts going into its success. Regular group meetings ensure more participation in terms of input of people. However its major contribution is as a first step towards conflict resolution. When the meetings get irregular and a conflict arises then there are usually not many ways to open a discussion on the same in a social setting. It is here that regular group meetings ensure a platform for a dialogue between the conflicting parties to take place. This discussion in a social space also leads to lesser involvement of egos and rigid stands than one to one discussions in the personal space.

Economic status of the WUA members in general and as individuals.

The Economic status of the WUA members is an important factor in generation of demand. Taking of agriculture we are talking about the investments involved and the livelihood of any tribal as well. Thus it involves a high amount of risk for the tribal to shift from any other occupation to *Rabi* agriculture. Having a better economic status hedges the farmers against these risks, as the risk is significantly lower as the farmers is economically better off. If one person can take risks then he or she becomes the demonstration to others. We need some people with good economic status at

individual level to show the new practices to the tribal target audience. We also need some schemes with high economic status to be able to sustain the LI scheme as a demonstration for others to see and realize that such a group scheme can be successful.

Operator

The Operator is a very important link in the socio-technological model of the scheme. It is the operator who demystifies the whole technology of Lift Irrigation and operating the pump for the tribals. As such the operator plays the role of a invisible leader for the intervention.

In Chittri the operator trained by PRADAN left and then it took some time before another person could stand in as a makeshift operator. IN Saheda Patratoli, the trained operator migrated form the village and the new operator has a job and so is more interested in job which is a more stable source of income than in the Lift Irrigation scheme. In Tiko Kumbhatoli the demoralized operator represents the morale of the WUA members. IN sombra also the operator's interest lies elsewhere in his own fields rather than the poorly functioning LI scheme.

The only exception has been of Kansara where there is a committed operator who had offered to perform the duties of operator as a service to the society free of charge.

Coupon System, Distance, Grazing Problem and Elephant menace

All these also emerge as factors bearing upon the success of the scheme. However a closer look rules them out as independent or serious factors.

The coupon system is a simple procedure and was intended for advance collection of money for irrigating fields. Though it seems that coupon system could help promote the success of the scheme but a closer look makes us realize that at many places where the scheme is functioning well the coupon system does not exist at all or exists just in name. The coincidence of all poor performing schemes having the absence of the coupon systems is explained by the fact of none existence of group cohesiveness and poor group dynamics rate than the absence of the coupon system.

Lessons from the field experience this study picks up

The lessons picked up are many

- ? Vulnerability is a characteristic of the tribal population. A major underlying objective of any such work has to be reduction in vulnerability and therefore reduction of risk in their lives. In order to shift to a new system of agriculture (irrigated agriculture) the farmers need to be taught risk management in view of their vulnerability. Entrepreneurship development trainings can help the farmers manage their risks better.
- ? Credit linkage is to be ensured in order to ensure success of the LI scheme. Also various mechanism need to be made to get better credit coverage for everybody and not just the main farmers practicing agriculture without any information to the others.
- ? Providing necessary information tot eh user group while training them to get this information on their own. In case PRADAN wants to withdraw from a scheme

then a proper information flow should be in place for the different information requirements.

- ? Market linkages are necessary to make the agriculture look more attractive to the tribal and therefore act as a greater incentive against the risk of leaving an old occupation and entering a new one permanently.
- ? Agricultural and other extension activities are necessary to reduce the risks with increased knowledge and proper training.
- ? Only a demonstration in action can make the masses take to it. Initially some very progressive and risk bearing farmers need to take up the new type of agriculture. Then by demonstrating it to others and with support of other activities it needs to be translated to mass demand for the irrigation system.
- ? The proper functioning of the group is essential for the success of this model as it is vulnerable to reduction in group activity.
- ? Homogeneity is an ideal situation for establishing a LI group in the PRADAN model but we need effective inputs and a common understanding to ensure the scheme's success at other locations. The group dynamics becomes very important at these locations.
- ? The operator is a very important factor. Care should be taken in selection an operator who will not migrate out of the village or take to any other occupation and be devoted to the job as a pump operator.
- ? To ensure more demand we need to get more people to accept agriculture as a serious option as an occupation. This means ensuring more people are ready to take the risk of shifting an occupation and developing more enterprise in people to take up a new activity and make it a success of their own accord. Thus entrepreneurship development training is advised for the probable target audience.
- ? A cluster approach can help solve the problems of grazing of animals. However too many schemes in one cluster would mean strict competition for two resources – water itself and market. In the case of Tiko Kumbhatoli and Tiko Bondatoli it is a case of reduced water for Kumbhatoli due to harnessing upstream. Whereas at other location there were concerns about prices obtained due to high competition on same products. Thus a balance needs to be reached between clusterisation and the availability of water and market.

Next Generation Issues for the study

At most places the Command area utilization figure has been substantially better than the figure for number of intended users using the schemes. This means that few well to do farmers are taking up lands from the not so well to do tribals and practicing agriculture on it.

Table 3: Performance of schemes in Lohardagga district

Sl. No	Name of Users' Association	Block	Total No. of Families	Designed Comm. Area (Ac.)	Adjusted command area	Total		%ge	%ge	Area/Benf
						Ac.	Appx. Families	Comm area	Benf	
1	LI Samiti Saleiya Ambatoli	Kisko	30	30	30	16	30	52%	100%	0.5
2	LI Samiti Taku Patratoli	Kuru	28	30	30	20	12	66%	43%	1.6
3	LI samity Salgi Righitanr	Kuru	26	35	35	38	18	109%	69%	2.1

4	Tiko Kumbhatoli	Kuru	17	25	25	17	10	68%	59%	1.7
5	Tiko Bondatoli	Kuru	20	25	25	10	10	42%	50%	1.0
6	LI samiti Saheda Patratoli	Lohardaga	50	50	50	8.9	9	18%	18%	1.0
7	LI Samiti Bhargaon Bera Toli	Senha	58	60	60	28	16	47%	28%	1.7

Thus we see that the command area utilization might increase but the use is being made by only a limited number of users who now form a smaller core group within the main WUA and this core group functions as the WUA on all issues. As this core group already excludes the tribals who could not take risks earlier. The new core WUA cannot address the concerns of these excluded members.

It is in this light that we need to reexamine what do we call as a successful demand creation – demand for irrigated agriculture on all lands (command area utilization approach) or demand for irrigated agriculture by all tribal households (beneficiary approach)

Also we must look into the PRADAN model, as it requires high involvement of the professional to convince the community for venturing into agriculture. Also it needs a lot of input in terms of information and human resources from PRADAN to ensure demand is created for irrigated agriculture.

Also the high stress on formalization of procedures like coupon systems etc needs to be relooked at as the tribals have adopted local variations of these or they have left them in most cases. We might be burdening the professionals by promoting them.

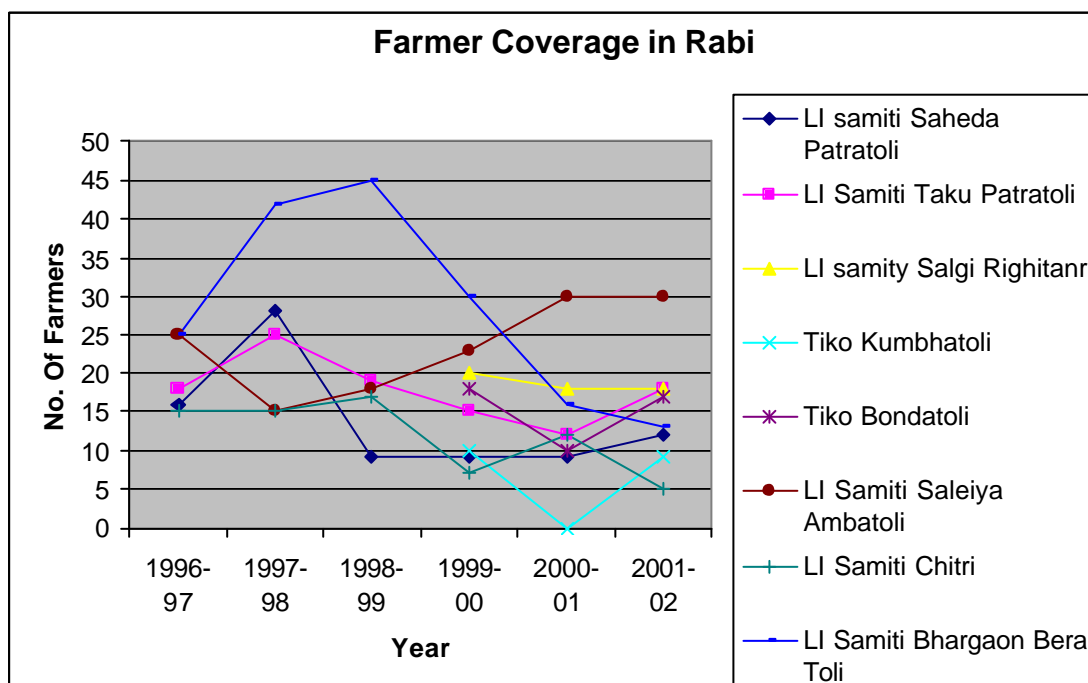


Figure 4: Farmer Coverage during Rabi

Possibilities of Replication

The possibilities replication of PRADN model are at places where

- ? Similar small streams are available for harnessing for lift.
- ? Homogenous community exists (or very superior group dynamics is possible)
- ? Some risk taking farmers who are able to bear some amount of financial shock need to be included as the demonstrators for the farmers.
- ? Regular group meetings are a must to ensure that a platform for conflict resolution exists.
- ? The command area is about 40-50 acres and number of members of the WUA is limited to 20-40.

Synthesis and Conclusions

The factors identified should not be treated as individual factors as they are not independent. They all have close links and are all associated with the livelihood options of the tribals. The whole scenario needs to be looked at as a system rather than a unidimensional issue of irrigation. The generation of demand of irrigation amongst tribals needs the development of attractive demonstration cases, adequate capital linkage for investment, proper information at the right time, ensuring high quality inputs, attractive prices for produce, a cohesive group for managing the scheme.

This boils to nothing short of integrated agriculture development. Actually it is more concerned with information and capacity apart from technology. Thus for successful demand generation we have to offer technology, information and capacity woven together in the thread of risk taking ability for the tribal. Probably some form of entrepreneurship development training would help the tribals to manage their risks better than now.

The tribal people are not averse to technology if it helps them. But since it is a new phenomenon for them and they are reeling under improper information flows, therefore they need to be fed with high amount of information on every aspect of the phenomenon. Since they are learning the use of new technology and new processes as well, their capacities need to be enhanced to make proper use of the new technology available to them.

As we provide the support to the tribals for taking to irrigated agriculture, we must realize that an important part of the process is the effective management of risk in life and livelihoods. Thus our intervention must look at the risk aspect and therefore the implementation process should address the fears of the community in adopting a new technology.

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Annexure 1: Protocol for the Study

Objective of the study:

- ? What stimulates demand for irrigation in tribal context?
- ? How to ensure sustained interest and development of tribals towards irrigated agriculture?

- Adopters and Non-adopters
 - What makes a person an adopter or a non-adopter (*demand management*)
 - Individual profile vis-à-vis community profile
 - Process of prosperity
 - Interaction on adopters and non-adopters
 -
- Different Schemes with different interventions
 - Irrigation alone
 - Irrigation + credit
 - Irrigation + Markets
 - Irrigation + roads
 - Irrigation + marketing channels
 - Irrigation + infrastructure
 - Irrigation + training
 - Irrigation + Capital support
 - Irrigation + pump mechanics
 - Irrigation + water allocation norms / rules / laws / ethics
- Institutional issues
 - In built mechanisms to promote and ensure success
 - Associated institutions required
 - Management structure
 - Skills and awareness and training
 - Suitable technology
 - Suitable to culture
 - Promoting function for irrigation
 - Sustainability
- Hardcore Engineering Issues
 - Size of schemes
 - Financial requirements for the technology
 - Suitability of technology to geohydrology of region
 - Group size required to manage scheme
- Techno –Institutional fit
 - Social milieu
 - Stage of economic development – affordability of technology
 - Availability of infrastructure
 - Factors related to management of technology
 - Familiarity with / awareness about the technology
- Role of Visioning, training and Demonstration
 - Training and demonstration
 - Exposure visits
 - In-situ demonstration

- Awareness
- Familiarity with technology
- Mental Blocks
- Different training levels
- Targeting related
 - Resource poor
 - Resource Rich
 - Men
 - Women
 - Real users
 - Perceived users
 - Real beneficiaries
- Targeted beneficiaries
 - Stage of Economic development
 - Availability of infrastructure
 - Factors related to management
 - Social Milieu
- Organisational Issues
 - Stumbling blocks
 - Conflicts and their resolution
 - Achieving efficiency
 - Achieving viability and profitability
 - Management norms and bodies
 - Governance of scheme
 - Allocation
- Impact of the LI
 - Impact of scheme on economy of region
 - Sustainability issues
 - Indicators like return per hectare
 - Consumption economy
 - Credit etc.
 - Impact on livelihood
 - Food security
 - Migration
 - Life quality
 - Influencing factors
 - Disposable incomes
 - Welfare expenditures
 - Impact on associated factors
 - Labour
 - Capital
 - Knowledge
 - Technology
 - Innovation
 - Supporting economics
- Opportunity costs and Benefits
 - Opportunity cost of investment
 - Benefits lost and / or gained
- Sustainability
 - Financially sustainable operations

- Financially sustainable investments
- Threshold of income effect of scheme to ensure sustainability
- Economic sustainability
- Expectations from an irrigation scheme
 - Peoples expectations
 - Delivered actuals
 - Where do the twains meet?

Annexure 2: Success Criteria for PRADAN LI scheme

Success criteria for an irrigation schemes:

The success criteria of an irrigation schemes can be broadly classified into the following sub-heads.

Agriculture:

Fully covered command area
Improved Agricultural practices
More uses of biomass/manure, agricultural implements
At least two crops with assured irrigation
Significant command area is under crop, cultivated for intention of selling

Group Dynamics:

Strong democratic and well functioning group
Started addressing other issues, specially harnessing other land and water Resources
Improved agricultural and technical skills of group members
Group is planning for the whole village
Active participation of women in decision-making process

Infrastructure:

Well-maintained infrastructures
(Group bears the maintenance cost)
Well-maintained distribution channels
Economic use of irrigation water

Linkages:

Linkage with the market for input and output
Group is accessing resources and utilities from the mainstream
Credit linkages with banks/ other financial institutions to ensure timely availability of credit
With agriculture department

People:

Food security
Improved living standard (better life style)
Migration of the group members reduced
Installation of irrigation in villages through existing group members
Children are going to school

Annexure 3: Data Sheet for the Schemes

Name of Scheme	Distirct	Community	Command Area	NO. OF WUA memebers	Functioning
Taku Patratoli	Lohardaga	Oraon	30	28	Good
Tiko Bondatoli	Lohardaga	Oraon	25	20	Medium
Salieya Ambatoli	Lohardaga	Oraon	30	26	Good
Salgi Righitanr	Lohardaga	Oraon	35	26	medium
Saheda Patratoli	Lohardaga	Oraon, Kumbhar	50	50	Weak
Chitri	Lohardaga	Oraon, rajput, sahu	54	30	Weak
Bhargoan Beratoli	Lohardaga	Oraon, mahto	60	58	Medium
Tiko Kumbhatoli	Lohardaga	Oraon	25	17	Weak
Sombra	West Singhbhum	Ho			Weak
Kamarbera	West Singhbhum	Munda, Mundari, Mahto	40	57	Good
Banjhikusum	West Singhbhum	Ho	40	20	Good
Kansara	West Singhbhum	Ho	40	42	Weak
Matkambera	West Singhbhum	Ho	47	82	Medium
Kundubera	West Singhbhum	Ho	45	89	Good

Name of Scheme	Credit	Information Linkage
Taku Patratoli	PRADAN SHG	good
Tiko Bondatoli	PRADAN SHG	medium
Salieya Ambatoli	2 Womens SHG 1 Mens SHG	good through PRADAN only
Salgi Righitanr	Womesn SHG not much linkage with LI	medium
Saheda Patratoli	2 womens SHG	good
Chitri	weak Anaganwadi SHG, no linkage	good
Bhargoan Beratoli	PRADAN SHG mar'2001	medium
Tiko Kumbhatoli	Womens SHG not a very vibrant group	poor
Sombra	NO Linkage	poor
Kamarbera	Weak Womens SHG (Non-PRADAN), Private Bank Account of 7-8 farmers	good
Banjhikusum	Private Savings account and KCC, one sub group has strong credit linkages	good
Kansara	Credit is a Problem	medium
Matkambera	Poor Credit	good
Kundubera	10-12 farmers KCC, individual bank account	good

Name of Scheme	Input Linkage	Operator	Agricultural Skill	Machine Problems
Taku Patratoli	good	no name	medium	no problems
Tiko Bondatoli	medium	no name	medium	no problems
Salieya Ambatoli	medium through PRADAN only	Upeshwar Oraon	good	no, new amchine
Salgi Righitanr	medium to poor	no name	medium	no
Saheda Patratoli	good	Dipak Minj	medium	good condition
Chitri	medium	Rabinder Bhagat	good	yes
Bhargoan Beratoli	good	Sanichar Oraon	good	no
Tiko Kumbhatoli	poor	Bishnu Oraon	weak	no
Sombra	poor	Tungtu Sombrai	weak	no
Kamarbera	good	Dholi Munda	weak - good	no
Banjhikusum	medium	Birbil Diggi	medium	no
Kansara	medium	Lakhan Champiya	weak	uninstalled due to floods
Matkambara	good	Ramlal Bodra	medium to high	no
Kundubera	good	Mangal Singh Purti	high	no

Name of Scheme	Group Dynamics		Coupon system	Market Linkage	Economic Status
Taku Patratoli	New office bearers lack leadreship and committee has been lamost non fucntinal	irregular since 1999	yes	good	medium
Tiko Bondatoli	good	regular	yes	medium	medium to poor
Salieya Ambatoli	good	regular	yes	medium	meiudm to better
Salgi Righitanr	poor	irriegular	no	not very good	meiudm to better
Saheda Patratoli	very poor	defunct	no	medium	medium to better
Chitri	poor	no	no	medium	medium
Bhargoan Beratoli	good	need based	no	medium	medium
Tiko Kumbhatoli	medium	irregular	no	medium	poor
Sombra	poor	irregular	no	poor	poor
Kamarbera	poor - good	need based	no (exisits only for name)	good	good-bad
Banjhikusum	good	need based	almost non-functional	medium to good	good-bad
Kansara	poor	Almost Non Functional	no (exisits only for name)	poor	poor
Matkambara	okay	not since 2000	exists	good	medium
Kundubera	good	regular and need based	almost non-functional	good	good-poor

Name of Scheme	Distance from Block HQ	Grazing Problem	Elephant Menace	Command Area Land Type
Taku Patratoli	1.5 kms	no	no	upland owning people have taken to agriculture
Tiko Bondatoli	5 kms	no	no	mostly upland and medium upland
Salieya Ambatoli	9 kms	yes little	no	upland and medium upland
Salgi Righitanr	10 kms	yes little	no	upland and medium upland
Saheda Patratoli	6 kms	no	no	lowland - good paddy food security
Chitri	4 kms	no	no	mixed
Bhargoan Beratoli	7 kms	no	no	upland and medium upland
Tiko Kumbhatoli	3kms	no / little	no	upland and medium upland with poor soil quality
Sombra	12 kms	yes predominant in summers	yes	lowland at foot og hills so water logging problem
Kamarbera	7 kms	yes	yes high incidence	upland and medium upland
Banjhikusum	7 kms	no	no	uplanf and medium upland
Kansara	10 kms	yes	no	foot of hills but suited to agriculture
Matkambera	5 kms	no / little	no	suited to agriculture
Kundubera	5 kms	during summers	no	suited to agriculture

Annexure 4: Individual Scheme Case studies (to be added)

District	Block	Panchayat	Village	Hamlet	No.of Users	CA acres	External Contribution	Funding Source	When Initiated	Usable Since	Pipe line leng(m)	dia(mm)	Out lets
West Singhbhum	BANDGAON	NAKTI	KANSARA	KANSARA	42	40	178769.00	GTZ	Mar'96	Nov'96	450.00	160	3
West Singhbhum	BANDGAON	KARAIKELLA	MATKAMBERA	MATKAMBERA	84	47	176000.00	DRDA	Oct'95	Feb'96	406.00	160	3
West Singhbhum	CHAIBASA	SINGHPOKHANAR	Kundubera	KUNDUBERA	89	45	128000.00	DRDA	Oct'96	Apr'97	600.00	160	5
West Singhbhum	CHAKARDHARPUR	ASHANTALIA	BANSHIKUSUM	BANSHIKUSUM	20	40	128000.00	DRDA	Dec'96	July'97	558.00	160	5
West Singhbhum	MONOHARPUR	NANDPUR	Kamarbera	MUNDATOLI	57	40	128000.00	DRDA	Feb'97	Nov'97	512.00	160	4
Lohardagga	Kuru	Tati	Taku	Patratoli	28	30	162246.00	GTZ	may'96	oct'96	318.00	160	3
Lohardagga	Kisko	Tisiya	Salaiya	Ambatoli	26	30	642516.00	MESO	mar'92	aug'92	258.00	160	2
Lohardagga	Kuru	Salgi	Salgi	Rijhitanr	26	35	141200.00	BPDP	nov'97	may'98	198.00	180	2
Lohardagga	Senha	Arru	Bhargaon	beratoli	58	60	119900.00	BPDP	dec'94	june'95	336.00	160	2
Lohardagga	Lohardagga	Hirmi	Saheda	patratoli	50	50	123000.00	EAS	may'95	oct'95	336.00	180	3
Lohardagga	Senha	Chitri	Chitri	Chitri	30	54	156700.00	EAS	mar'94	oct'94	450.00	180	3
Lohardagga	Kuru		Tiko	Kumbhatoli	17	25	88,100	Jaldhara	April'98	Feb'99	342	140	5
Lohardagga	Kuru		Tiko	Bondatoli	20	25	103800	Jaldhara	Mar'99	Aug'99	495	140	5

Vats	Usable Since	No.of Users	C.A. acres	RELIABILITY OF WATER SOURCE				First Season	No.	LAST REPORTED SEASON USED FOR CROPPING				
				Name	Type	Summer	Rabi			Rabi	users	acres	Summer	users
GOOD	Nov'96	42	40	KATUA NALA	Tank	Limited	Sufficient	Rabi 96-97	2	97-98	23	20	98	0
GOOD	Feb'96	84	47	BAMNIRIVER	River	Sufficient	Sufficient	Rabi 95-96	6	97-98	30	25	98	15
GOOD	Apr'97	89	45	GUMUA RIVE	River	Sufficient	Sufficient	Kharif 97	3	97-98	20	15	98	7
GOOD	July'97	20	40	BAMNI RIVER	River	Sufficient	Sufficient	Summer 97	3	97-98	30	35	98	22
GOOD	Nov'97	57	40	KOINA RIVER	River	Sufficient	Sufficient	Rabi 97-98	2	97-98	6	5	98	7
	Oct'96	28	30	Taku Tank (2	Tank	Limited	Limited	Rabi 96-97	2	97-98	25	22	98	7
	Aug'92	26	30	Kauram Daha	River	Sufficient	Sufficient	Kharif 92	12	97-98	15	5	98	10
	May'98	26	35	Salgi River	River	Limited	Sufficient	DNA	0		0	0		0
	June'95	58	60	Benki river	River	Nil	Limited	Rabi 95-96	4	97-98	42	45	98	5
	Oct'95	50	50	Sukri river	River	Limited	Sufficient	Rabi 95-96	3	97-98	28	30	DNA	0
	Oct'94	30	54	South Koel Ri	River	Sufficient	Sufficient	Rabi 94-95	7	97-98	15	10	98	20
					Stream	Limited	Sufficient	Summer'99						
					Stream	Nil	Sufficient	Rabi 99-00						

acres	Users classification			Total	COMMITTEE			BANK ACCOUNT		GROUP FUND STATUS			Total Fund at present
	SC	ST	OT		Exist	Sex comp.	Exist	Branch	Received Rs Grant	Loan	revo- lved	Loan refunded	
0	0	42	0	42	Yes	Male	Yes	SKGB ETWARI BAZAR CKP	2500.00	NA	NA	NA	5000
7	0	84	0	84	Yes	Male	Yes	SKGB BR-ETWARI BAZAR	3500.00	NA	NA	NA	1400
3	0	89	0	89	Yes	Male	Yes	CANARA BANK, CHAIBASA	0.00	NA	NA	NA	1000
15	0	52	0	20	Yes	Male	Yes	SKGB, KERA CHAKARDHARPUR	0.00	NA	NA	NA	750
4	0	50	7	57	Yes	Male	Yes	CANARA BANK MONOHARPUR	0.00	NA	NA	NA	500
3	0	28	0	28	Yes	Male	Committee	SBI, Kuru	18000.00	0	0	0	0
3	0	26	0	26	Yes	Male	Joint	BOI, Kuru	7000.00	8777.23	2	7123	5000
0	0	26	0	26	Yes	Male	Committee	RKGB, Kuru	0.00	0	0	0	0
2	0	58	0	58	Yes	Male	Committee	BOI, Senha	12000.00	0	2	0	14000
0	0	45	5	50	Yes	Male	Joint	BOI, Lohardagga	0.00	0	0	0	0
10	1	20	9	30	Yes	Male	Joint	BOI, Senha	13500.00	0	0	0	0
	0	17	0	17	Yes	Male	Committee	Collectorate	6000.00				
	0	20	0	20	Yes	Female	Committee	Collectorate	5000.00				

Secretary	Treasurer	Oparator	PRADAN staff	Irrigation Price/hr	Operator charge/hr	Present Oparator	Duration Trained	Refresher Course	Majour deffect found till date
LAKHAN CHAMPPIA	RAMRAI	-DO-	ANIL	5.00	2.00	-DO-	30 days		NOT MAJOR DEFECT
GAR SINGH SAMAR	SHYAMLAL SAMAL	MR RAMLAL BODRA	ANIL	5.00	2.00	MR GAR SINGH	30 days		NOT MAJOR DEFECT
SINDHU SINGH PURTI	BIHARI LAL	MANGAL SINGH PURTI	Anjani Kumar Singh	10.00	2.00	MANGAL SINGH PURTI	30 days		NOT MAJOR DEFECT
BIRBIL DIGGI	SAKARI CHAM	MR.BIRBIL DIGGI	ANIL	8.00	2.00	MR.BIRBIL DIGGI	30 days		NOTHING
NA	NA	NA	ANIL	8.00	2.00	DILIP MAHATO	30 days		NO
	Sani Oraon			8.00	3.00	NA	30	yes	
	Dasrath Munda	Upeshwar Oraon		8.00	4.00	Upeshwar Bhagat	90	yes	no
				8.00	3.00		30		
	Bishnu Bhagat	Sanichar Oraon		10.00	3.50	Chamu Oraon	0	no	no
		Deepak Minj		10.00	3.00	Deepak Oraon			
	Birsa Patan	Rabinder Bhagat		6.00	2.00	Upender Singh	0	no	
		Bishnu Oraon		8.00	3.00	Bishnu Oraon			

Who repair the pump	Collect Money for Repairs	2nd Operator 3rd Operator	Duration Trained	Grade	Remark	No.of Users	CA acres	External Contribution	Funding Source	When Initiated	Usable Since
Operator		NA	DNA	C	Need more support	42	40	178769.00	GTZ	Mar'96	Nov'96
Operator		NA	DNA	NA	Need Agriculture training	84	47	176000.00	DRDA	Oct'95	Feb'96
Operator		GURUCHARAN	60 DAYS	B	Demonstration Site	89	45	128000.00	DRDA	Oct'96	Apr'97
Operator		NA	DNA	NA	Good summer veg.	20	40	128000.00	DRDA	Dec'96	July'97
Operator		NO	DNA	NA	DNA	57	40	128000.00	DRDA	Feb'97	Nov'97
External	yes										
Operator	yes	no			Intake Structure existing prevoiously						
Not needed											
2nd Operator	yes	tractor driver, S	60								
External	yes				Op changed thrice , the trained operator does not work						
External	yes	Pancham Oraoi	60		Depender Singh, previous leader has taken away roup fund and intake well advance						
				B							
				B							

