Content

ROLE OF TARBANDH IN PROMOTING AGRICULTRE IN THE TRIBLE VILLEGES OF CHHATTISGARH

GAJENDRA CHANDRAKAR[1]*

Tarbandh is traditional water harvesting technique that has got momentum in the last two decades due to small water intervention initiatives undertaken by the government and non-government organization it can conveniently be put under the category of small check dams. Basically it is constructed to irrigate the paddy crop at the critical crop growth stages. Tar bands in Chhattisgarh have been constructed by the ex zamidars/malguzars to arrest or minimize the migration of the villages and construct permanent water structures to avoid drought risk. The Tar bands after abolishment malguzari were not given much priority by the state government. Only during drought Tar bands have been constructed under the relief fund. That is why there is no systematic engineering designed have been developed.

The Tarbandh has also ecological dimension in term of recharging ground water and increasing water level in the open wells.

In the district of Mahasamund there are roughly 40 to 50 tarbandhs. These have been constructed on revenue as well as forest lands. Government and non-government organization to help the tribles committee to irrigate their crops and to meet the other domestic requirements have recently constructed Tarbandhs. In this case study linkages between water availability and development of agriculture in the trible-dominated villages of Chhattisgarh were examined. This report is organized in the following format. Next section deals with the profile of the study area. In the section III the finding of the study are discussed. The last section of these reports deals with policy implication for sustainable use of Tar band technology for promoting the water based livelihood system of the tribles in the study area.

[1] President, Institute for Sustaniable Agriculture Development, Mahasamund 493445

Profile of the Study Area.

Mahasamund headquarter is located 55 km away in the east from Raipur, the capital of newly established state CG state and 44 km away in the south east of Mahasamund headquarter there is Sirpur the palace of archeological importance. Five villages namely Senkapat, Pasid, Amlor, Raikera & Borid located near Sirpur are backward village. These villages are dominated with tribal population and have poor infrastructural facilities.

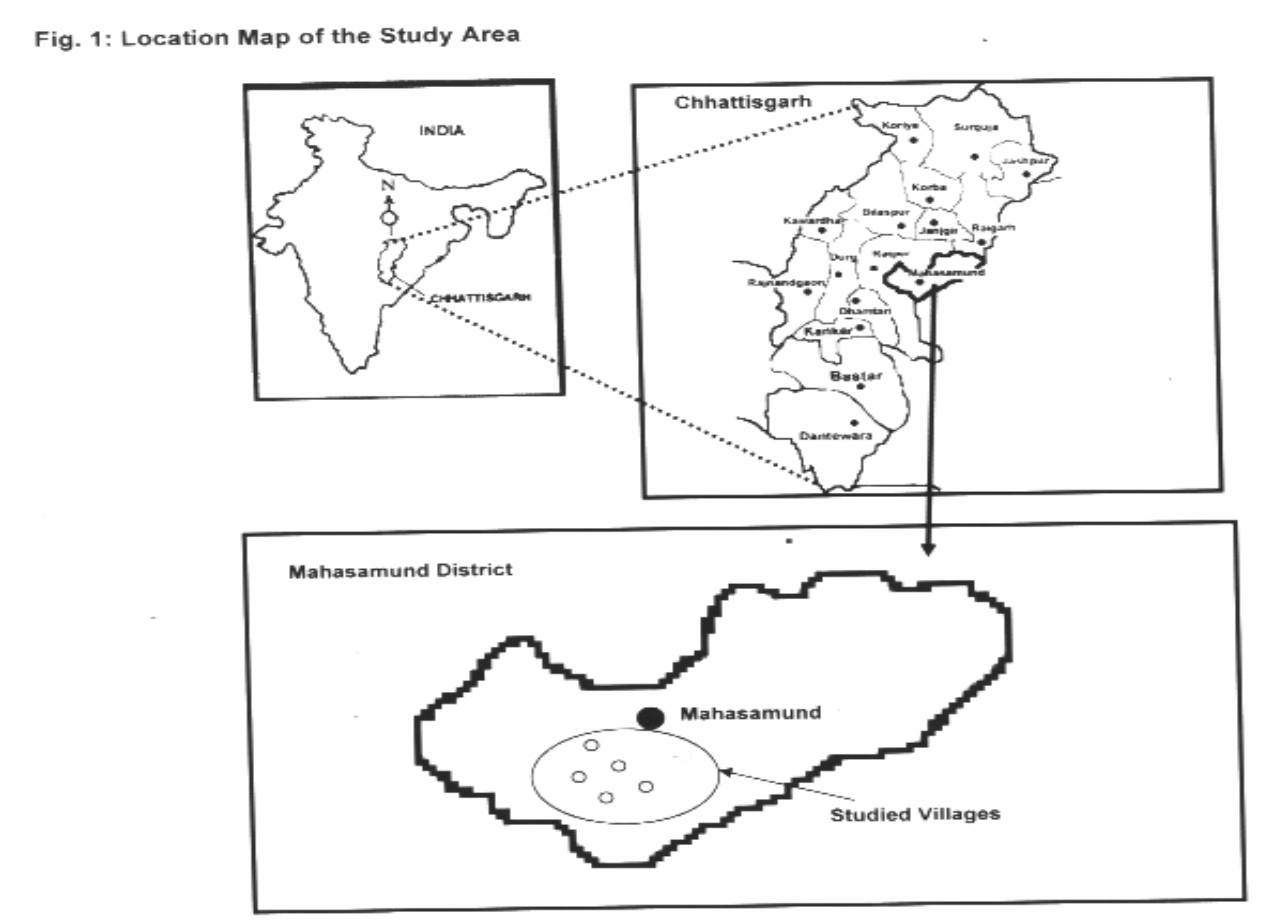


Figure - 1

The most of the forest region of Mahasamund block belong to Sirpur area. It has about 50% forest area and its main live hood is farming. Sirpur is located on latitude 21 ^{o} – 18' –10'' 21^{o}-19'-20'' 82 ^{o} –0-9'-10", 82 ^{o} –10'-30'' longitude. Its minimum height from the mean sea level is 975m and maximum height is 1000 meter. The land is 2 - 5 % unevenly sloped.

The monocropped rain fed farming system is prevalent in the area and paddy is the most important crop occupied more than 90% area in the Kharif season In addition to traditional farming the tribal population heavily depend on non timber forest products and vegetable cultivation on the bank of Mahanadi River. A brief description of the selected village is given below. The data reportated in this section have been collected from the villagers, sarpanch, members of the village panchayat and beneficiaries of the Tar bands. Most of the information has been cross checked with the participants associated with Tar bands from the fist phase of the construction.

Senkapat village

The area selected for the study covers Chheraka Nala Tarbhand area part of Senkapat village, Mahasamund district of the Chhattisgarh state. It is located about North East of Mahasamund city. The study area cover Senkapat village. The total extant of the study area about 192 hect. The study area is well connected road, electricity

The villagers told that this village name was 'Senkapat' because a 'Kapat' was found here in old days. This kapat is still present here. 'Sen' means stone and 'Kapat' means gate. i.e. 'gate of stones'. This village is located right on the bank of Mahanadi. It used to be flooded with water of river Mahanadi when the flood came that caused problem for the people coming and going because of this transportation problem to people decided to shift this village in another location and this a forest village also. So they cleaned the jungle and settled 1½ km away form the old village in the year 1975.

28 - 30 years passed since this Senkapat Village has been shifted. The main jobs of the people are farming and labour work. Total population is 375 and their are 75 families. The main problem of this village is lake of water. The crop doses not grow here for the lake of water and inadequate source of irrigation. Most of the people are Hindus. They very happily participate in religious activities and trust in their Gods and Godness.

In Senkapat village Tarbandh was constructed 50 yrs by the villagers. In the place previously established. In the beginning their was a small pool water in place of Tarband and most of the water used to flow out in vain so the villagers build small dams and canal to bring this water in to Chheraka Pond to irrigate their fields. They stored water in Chheraka Pond and irrigated their fields. After 55 years of struggling like this deepening and fencing was the done under the RGWSM in the year 2000. Now a great quantity of water is stored in it & even if it rains less the water flow from tarband to Chheraka pond. This contents water for about two months and help to grow crops in about 100 hect lands.

Raikera village

The area selected for the study covers Murti Nala Tarbhand area part of Raikera village, Mahasamund district of the Chhattisgarh state. It is located about North East of Mahasamund city. The study area cover Raikera village. The total extent of the study area about 212 hect. The study area is well connected road, electricity.

This village is located 6 km away from Sirpur; most of the people of this area belong to Gond tribe. The main problem of the village is providing irrigation for agriculture. There are 65 families living here. During discussion, the old ladies told us that during summer 'water problem' increases. They have to bring water from a far off canal. There are only three tube wells in this village. Which help to grow only Rabi crops. Raikera village has been established since 100 years. The total population of village is 332. The main problem of this small village is water. Its difficult to get enough crops without resources of irrigation.

The history of Tarbandh in Raikera**.** After famine of 1948 the villagers started to construct the Tar bandh . And in 1950 this location belonged to the forest area. When the forester came to know about it they took away all the tools (for digging etc) of the villagers. But the villagers did not care about them and restarted their construction. When the worker from forest department went there to requisite their tools again they told them to take their children also with the toys because they could not see their children dying due to famine. Then on their urging the forest department helped the villagers to receive a loan Rs 22000 through bank and since them they worked for 60 paise as labour charges. And the loan for Tar bandh was paid for the following 10 years.

Amlor village

The area selected for the study covers Chhaparchola Tarbandh area part of Amlore village, Mahasamund district of the Chhattisgarh state. It is located about North East of Mahasamund city. The study area cover Amlore village. The total extant of the study area about 440 hect. The study area is well connected road, electricity

This village is located 8k.m away from Sirpur 48 km from the district head quarter. Total population of this village is 574. The Tar bandh of this village is the largest in area. The water is filled in 25-35 acres and its in the form of a canal about 2 km long. This village has 90 families irrigates almost whole village.

Borid village

The area selected for the study covers Dhaskudh Tarbhand area part of Borid village, Mahasamund district of the Chhattisgarh state. It is located about North East of Mahasamund city. The study area cover Borid village. The total extant of the study area about 248 Hect. The study area is well connected road, electricity

Pasid village

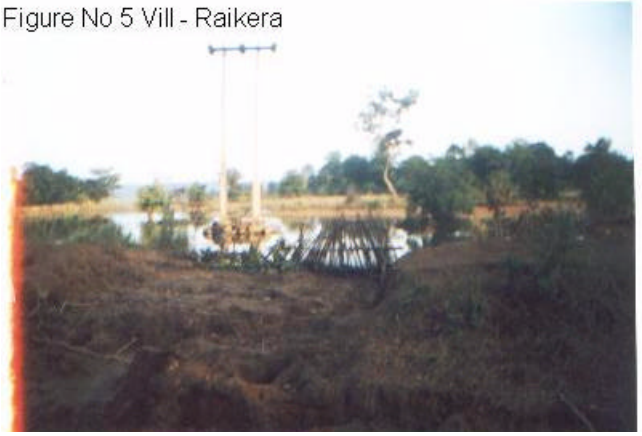
This village is established 18 km from Sirpur and 2 km from Kasdol road by a Malgugar. The villagers depend mainly on labours work later farming. \

Figure No 2 Vill - Pasid

Figure no 3 Vill - Amlore

Figure No 4 Vill - Pasid

Figure No 5 Vill - Raikera



Before the construction of this Tar bandh it was the small place where the rain water stored and the people use its water for growing paddy crops in their fields. In 1993 it caught the attention of the government and a Tar bandh was constructed under "Draught relief programme."

Finding from the field survey

The demographic detail of the studded villages is given in table 1 it can be seen from the table that all the villages are tribal goands dominated with large population of backward and schedule caste tribles agriculture is the primary occupation. The distribution of size of holding indicated that more than 75% cultivators fall under the category of marginal and small farmers the cultivators in all the villages monocropping intensity is prevalent. Details about land resources are given in table 2 & 3. It is important to note that all the villages have poor quality soil and the land is subject to erosion. The water holding capacity of the soil in the study villages have poor water retention capacity. As a result the Rabi Crop cannot be cultivated in rain fed farming system.

Table 1 - Demography Features

S	Particular	Senkapat	Raikera	Amlore	Borid	Pasid
1	Population					
	(a) Total	375	332	574	352	744
	(b) Male	195	160	293	184	346
	(c) Female	180	172	281	168	398
	(d) Schedule Caste	0	0	0	61	38
	Male	0	0	0	29	19
	Female	0	0	0	32	19
	(e) Schedule Tribe	169	145	324	155	175
	Male	87	74	166	71	86
	Female	82	71	158	84	89
	(f) Other Backward Class	206	139	243	136	524
	Male	108	61	125	84	239
	Female	98	78	118	52	285
	(g) General	0	48	07	0	07
	Male	0	25	02	0	02
	Female	0	23	05	0	05

	(h) Literacy (%)	98%(356)	85%(283)	43%(250)	55%(195)	75%(558)
	Male	188	174	166	93	238
	Female	168	109	84	102	320
2	Industrial Categories of workers					
	Main workers					
	(1) Cultivators	23	40	25	30	8
	(2) Agriculture Labour	300	247	120	225	275
	(3) Household Industries, Manufacturing	6	20	20	10	10
	Preserving service and repairs					
	(4) Other Worker	1	2			
	(5) Marginal Workers	4	25	0	25	15
	(6) Non-workers	0	0	2	5	8
	Operational Holdings					
	(1) Small Farmers (>1 ha)	26	39	40	20	57
	(2) Marginal farmers (1-2 ha)	30	5	20	10	30
	(3) Semi-medium (2-4 ha)	22	2	15	15	22
	(4) Medium farmers (4-10 ha)	0	3	1	5	15
	(5) Large farmers (above 10 ha)	0	1	1	1	3

Table 2 - Land Use Classification

S.No.	Particulars	Hect				
		Senkapat	Raiker	Amlore	Borid	Pasid
1	Total Geographical Area	192	212	440	248	600
2	Area Under forest	8	50	26	20	-
3	Land not available for cultivation	-	20	24	38	30
4	Other uncultivated land excluding fallow land	-	-	-		100
	a. Permanent Pasture and others grazing land	4	-		12	
	b. Cultivable waste land	20	12	80	20	
5	Fallow land	0	0	-	40	40
	a. Fallow land other than current follows					

	b. Current follow land					
6	Net Area Sown	100	100	280	118	140
7	Area sown more than once	0	11.02	7.4	0	6
8	Gross cropped area	180	108	360	180	280
9	Cropping intensity (%)	100	100	100	100	100

Table 3 - Details of Land Resources

S.No.	Particulars	Hec				
		Senkapat	Raiker	Amlore	Borid	Pasid
1	Topography of Land	Undulating	Undulating	Undulating	Undulating	Undulating
2	Low land area		40	0	24	10
3	Upland Area	6	4	0	24	8
4	Soil Type	I				
	a	Alluvial	Alluvial			
	b			Sandy loam	Sandy loam i	Sandy loam
5	Quality of land	Low fertile	Low fertile	Low fertile	Low fertile	Low fertile
6	Degradation of land	Slow degraded	Slow degraded	Slow degraded	Slow degraded	Slow degraded
7	Land leased system (Contract/half-half)	No	No	No	No	No
	a. Leased in					
	b. Leased out					
8	Land rent	No	No	No	No	No
9	Land Revenue	60 Paise/acre	60 Paise/acre	60 Paise/acre	60 Paise/acre	60 Paise/acre

Tar bands contribute maximum share to the irrigated area in all the villages table 4. Most of the Tar bands have been receiving nominal amount for maintains and repair on the need base however the community is largely using the Tar band water without formal waters user association table 5.

Table 4 - Source wise irrigated area

		Senkapat		Raikera		Amlore		Borid		Pasid	
S.No.	Particulars	No.	Area (Ha)	No.	Area (Ha)	No.	Area (Ha)	No.	Area (Ha)	No.	Area (Ha)
1	Canal	-	-	-	-	-	-	-	-	-	-
2	Tanks	-	-	-	-	-	-	-	-	-	-
3	Wells	3	-	1	-	2	-	10	-	5	-
4	Tubewells	-	-	3	11.02	4	7.4	1	0	2	6
5	River	1	-	-	-	1	-	0	-	1	-
6	Nala	2	-	-	-	1	-	1	0	1	20
7	TarBandh	1	100	1	100	1	280	1	118	1	140
8	Check Dam	-	-	-	-	-	-	1	-	-	-
9	Reservoir(	-	-	-	-	-	-	-	-	-	-
10	Net irrigated area	-	100	-	100	-	280	-	118	-	140
11	Gross irrigated area		180		108		360		180		280

Table 5 - Details of Water Bodies

S.No.	Particulars		Senkapat	Raiker	Amlore	Borid	Pasid
	Seasonal	Perennial	Seasonal	Seasonal	Seasonal	Seasonal	Seasonal
1	Private		No	No	-	-	-
2	Government (Implementation)		Yes	Yes	-	Yes	Yes
3	Panchayat		Yes	Yes	-	Yes	Yes
4	Community		Yes	Yes	Yes	-	-
5	Status (Polluted, Degraded)		Degraded	Degraded	Degraded	Degraded	Degraded
6	Conflicts		No	No	No	No	No
7	Waters Spread area (hect)		3	3	14	4	4
8	Catchments area (hect)		70	70	100	100	90
9	Command area (hect)		100	100	280	118	140

10	Number of Users					
	a. SC	0	0		61	38
	b. ST	169	145	324	155	175
	c. Others	206	187	250	136	531
11	Utilization Percentage	100%	100%	100%	100%	100%
12	Irrigation Fees(Rs.)	No	No	No	No	No
13	Management funds (Rs.)	No	5000	No	No	No
14	Uses					
	a.Irrigation	yes	yes	yes	yes	yes
	b. Fishing	No	No	No	yes	yes
	c. Bathing	No	No	No	yes	yes
	d. Washing of cloths	No	No	No	yes	yes
	e. Tending cattle	No	No	No	yes	yes
	f. Drinking	No	No	No	no	no
	g.					
15	Production					
	a. Fish	No	3000.00 this yers	No	no	25000.00 in 10 yrs
	b. Silt Sale	No	No	-	no	
	c. No. of trees in catchments area	25	25	109	84	48
	d. Mango					
	e. Guava					
16	Responsibility of maintenance	Village community	Committee	Village community	Village community or Panchayt	Village community or Panchayt
17	Societies/Committees	Societies	Committee	Societies	Societies	Societies
18	Water Markets	No	No	No	No	No
19	Encroachment area (ha)	No	No	No	No	No
20	Institutional Arrangement	Villagers	Committee	Village	Panchyat	Panchyat

				community		
21	Approximate cost (Rs.)					
22	Source of Water					
	a. Rain	Yes	Yes	Yes	yes	yes
	b. Canal					
	c.					
	d.					
	e.					

The impact of Tar band irrigation on gender issues is given in table 6 it can been seen from table that with the additional irrigation facilities the agriculture process had been advance and the female work load has also incresead . in turned the income of the family also increase. It is interesting to note the female participants have visible and farming decision.

Table 6 - Work Load of Men and Women in Villages

March	Storage of Rabi crops, Labour work, Timber collection, Weeding.
April	Field ploughing, weeding, F.Y.M. application.
May	Direct sowing, Nursery preparation, F.Y.M. application, Labour work, Ploughing of Badi (Home stead), Timber collection from forest.
June	Weeding sowing of crops-maize, Brinjal, Chili etc, Labour work, Timber collection
July	Weeding, Nursery Preparation, Maintenance of Badi crop, Daily Maintenance of Cattle, Labour work and Timber collection.
August	Weeding, Maintenance of Badi, Daily Maintenance of Cattle, Labour work and Timber collection.
September	Weeding, Harvesting of Up-Land paddy, Maintenance of Badi crop, Labour work and Timber collection.

October	Paddy Harvesting processing, Threshing, Winnowing, Maintenance of Badi crop.
November	Paddy Harvesting processing, Ploughing of field, Labour work, Timber collection and Maintenance of Badi crop.
December	Men-Daily maintenance of cattle, Women- collection of Timber and laour work.
January	Field preparation, Maintenance of cattle, Timber collection.
February	Braking of Clumps, Leveling collection of Timber & Labour work.

Financing of the scheme we can see on table no.10. There is no base of loan for the construction. The Tar bandh at Senkapat and Borid was constructed by the ancestors. At the same time the Government has built Tar bandh at Pasid and Amlor. But Tar bandh of Raikera built by the villagers by the loan from the bank

Governance we can see on table 11.The role of the government is not limited here. While at Barid, Amlor and Pasid panchayats do the repairing work and small kind of repairing is done by the villagers, who has the sum of Rs 5000 as a fund and takes decision according to the necessity but there is no direct role of committee and panchayat in it at Senkapat. As per as the repairing is concerned here, it is done according to the decision taken by the elders of the village.

Operating procedures in table no 12 we can see, since no water tax is taken here therefore there is no limit for irrigation, nor there do necessity of big tool here. Generally the repairing is done by the villagers. At Senkapat there is no proper maintenance of the income and expenditure.

The tables designed for case study protocol given in tables 7, 8, 9, 10, 11, 12, 13, 14. Most of the attributes given in this table have all ready been disguised in the above paragraphs. However this summary all the five Tar bands presented in the tables.

Table 7 - Physical and Agro-climatic Features

S.No.	Item	Senkapat	Raikera	Amlore	Borid	Pasid
	Locale					
	Rainfall	2090.6	2090.6	2090.6	2090.6	2090.6

		m.m.	m.m.	m.m.	m.m.	m.m.
	Rainy Days	80	80	80	80	
	Rainfall Pattern					
	Soil Type	Sandy loam	Sandy loam	Sandy loam	Sandy loam	Sandy loam
	Formation					
	Main Kharif Crop	Paddy	Paddy	Paddy	Paddy	Paddy
	Length of flow in stream in recent years	1 km	1 km	3 km	2 km	1 km
	Forest cover	8 Hect	50 Hect	26 Hect	20 Hect	-+
	Social ecology					
	District's agri-output per ha					
	District's CMIE devt index					

Table 8 Infrastructure Development and Economic Opportunities

Item	Particulars
Roads	WBM
Electricity	Yes
Diesel Supply	Maroud,Tumgaon,Mahasamund
Livelihoods from Jungles	Tendu,
Role models in agriculture	Settled Agriculture
Nearest Development poles	

Table – 9 Social Attributes

Item	Senkapat	Raikera	Amlore	Borid	Pasid
Name of the Tribe	Gond	Gond	Gond	Gond	Gond
Literacy	95%	85%	44%	55%	75%
Population density of the locale	154 Per/Sqr K.M	154 Per/Sqr K.	154 Per/Sqr K.	154 Per/Sqr K.	154 Per/Sqr K.
Development category	Gond	Gond	OBC	OBC	OBC

Table 10 Financing of the scheme (Tarbhand)

Item	Particulars				
	Senkapat	Raikera	Amlore	Borid	Pasid
Capital Cost	-	22000 by Loan	30000 by Govt.	-	45,000 by Govt
Direct cash contribution by users	-	22000		-	No.
Labor contribution by users	Total Labor contribution	1000	9000	Total Labor contribution	11250
Price of water	No.	1 Rs / acre	No.	No.	No.
Creation of a maintenance fund	Villagers	5000 in gram vikash samitte	Villagers	Panchayat & villagers	Panchayat & villagers
Collection mechanism	Not found	Not found	Not found	Not found	Not found

Table 11 Governance

Item	Particulars
Extent User control	No.
Training of users in governance	No.
Group building process	Village meeting
Clarity and transparency in rules	Group discussion in committee
Rule making Process	Group discussion
Enforcement mechanism	No.
Role of traditional leadership	By guidance
CBO network	No.

Table 12 Operating Procedures

Item	Particulars				
	Senkapat	Raikera	Amlore	Borid	Pasid
Fixing crop restrictions	No.	No.	No.	No.	No.
Fixing limit on area	No.	No.	No.	No.	No.
Start data of the irrigation each year	Ist July	Ist July	1-July	Ist July	Ist July

Responsibility of running hardware	No.	No.	No.	No.	No.
Deciding turns	Community	Committee	Community	Panchyat & comm..	Panchyat & comm..
Rationing turns	No	No	No.	No.	No.
Rationing rules	No.	No.	No.	No.	No.
Maintenance procedure	Labour contribution by villager	Committee	Labour contribution by villager	Gram Panchyat	Gram Panchyat
Compensation of the operator	villager	Committee	No.	No.	No.
Accounting process	No	Committee	No	Panchyat	Panchyat

Table – 13 Water Plus

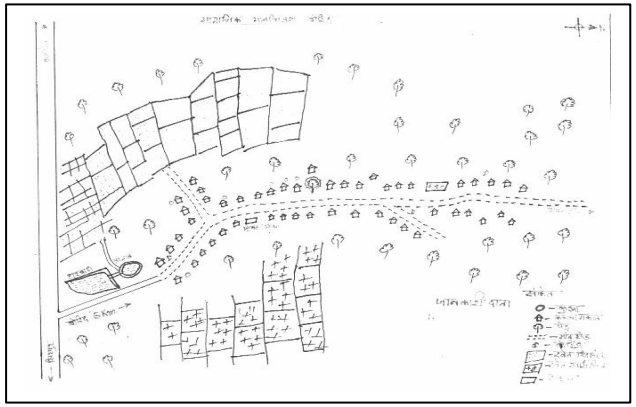
Item	Particulars
UA procures seed	Own
UA procures fertilizers	No.
UA procure sapling for plantations	No.
UA mediate for credit supply	Yes
UA arranges for collective marketing	No.
UA has taken moves for SWS	No.
US is mediating irrigation technology	No.

Table 14 Has the Intervention Worked?

Item	Particulars				
	Senkapat	Raikera	Amlore	Borid	Pasid
Capital cost; Cost per acre	35000/-acre	25000/-acre	60000/-acre	60000/-acre	60000
Capital cost; Cost beneficiary	375	332	574	352	744
Does water reach every one in command	No(only80 htc)	No(only20 Hect lost)	Yes(280 Hect)	No(only118 Hect)	No(only140)
What proportion of area actually receives Water ?	50% (only 100 Hect)	80% (only 100 Hect)	100%	65% (only 118 Hect)	50% only 140 Hect)

Is "tail end" like problem endemic?	No.	No.	No.	No.	No.
Do people get enough water to raise second crop?	No	No	No	No	No
If not why ?	Low deep of tar bandh	Low deep of tar bandh	Low deep of tar bandh	Low deep of tarbandh	Low deep of tar bandh
What proportion of the tribal in the command does not use water ?	20%	No	0%	5%	10%
Has the UA done anything about it ?	No	No	NO	No	No
How many years running is irrigation being given?	1955	1952	1968	1953	1993
How is the repair of equipment managed?	Yes	Yes			
Does on see big increment in income. ?	Yes	Yes	Yes	Yes	Yes
Does on see reduced migration?	Yes	No	N0	No	No
Does on see evidence of increasing household assets?	Yes	Yes	Yes	Yes	Yes
Have the major equipment come up for replacement?	Yes	Yes		Yes	Yes
Who replaced them?	Villagers	Committee		Panchyat	Panchyat
Other evidence of success.	low cost no use of power & machine				

Social & Resource Map of Study Village



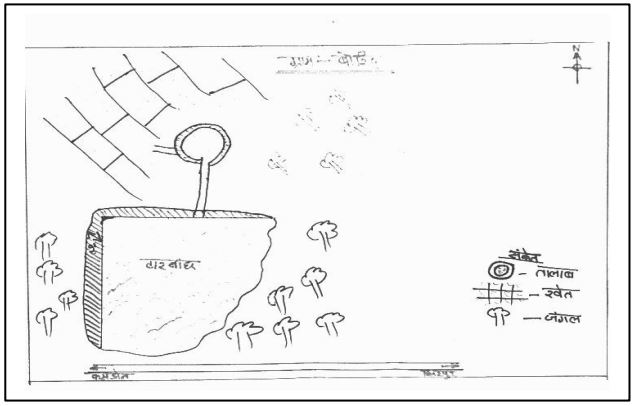


Figure 6 & 7

Vill – Borid

Social Activities

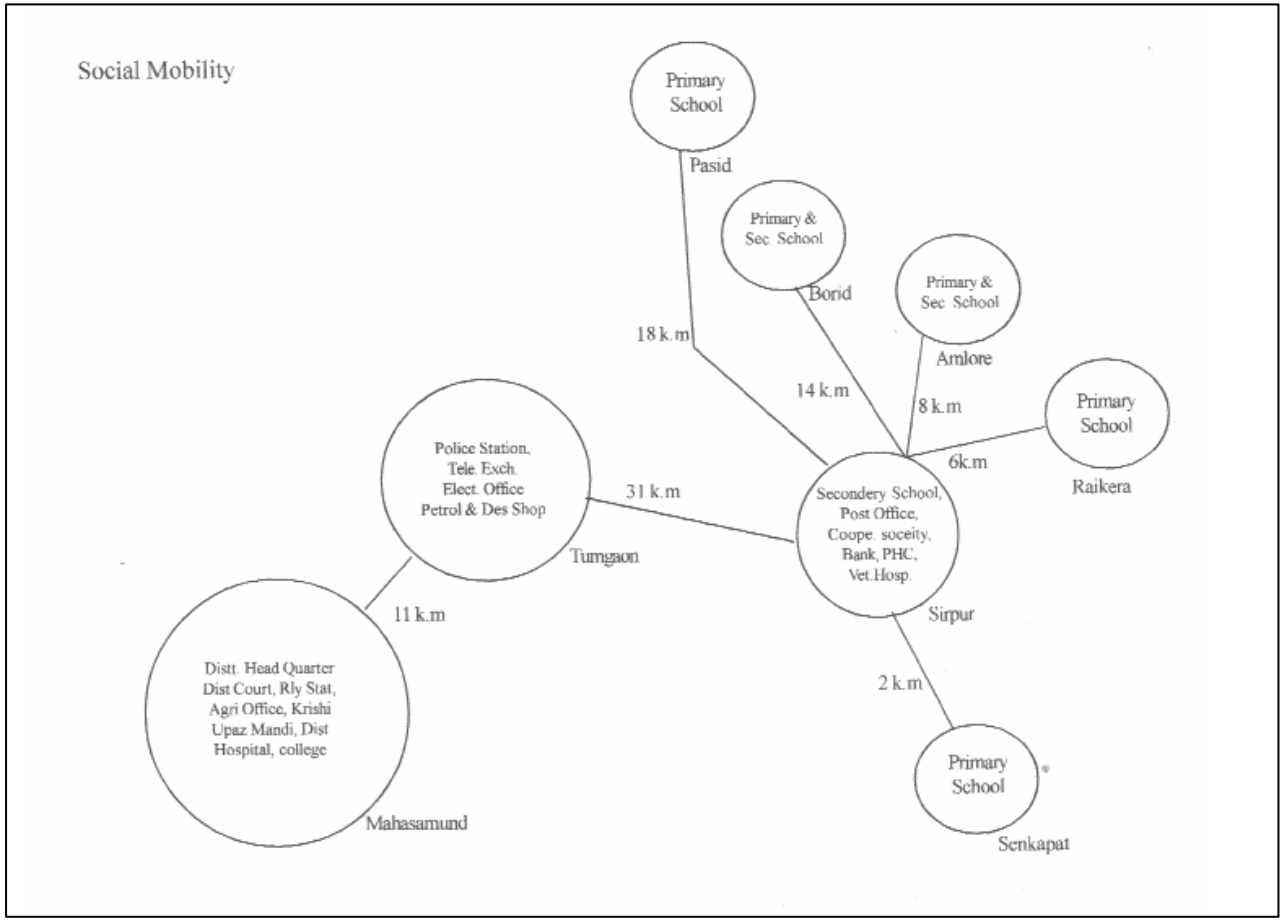

Social Mobility
Primary School
Pasid
Primary & Sec. School
Borid
Primary & Sec. School
Amlore
18 k.m
14 k.m
8 k.m
Primary School
Raikera
6k.m
Police Station, Tele. Exch. Elect. Office Petrol & Des Shop
Tumgaon
31 k.m
Secondery School, Post Office, Coope. soceity, Bank, PHC, Vet.Hosp.
Sirpur
11 k.m
2 k.m
Distt. Head Quarter Dist Court, Rly Stat, Agri Office, Krishi Upaz Mandi, Dist Hospital, college
Mahasamund
Primary School
Senkapat

Figure 8

Conclusions

The above study indicates that Tar bands technology is appropriate even to meet modern agriculture requirement of the tribal farmers. Based on the existing structure of the Tar bands an appropriate engineering design can be developed for replication at large scale. Few attempts have been made by CAPART to improve the existing design of the Tar band. To some extent the CAPART design worked well. This technology is well suited to the tribles socio economics biophysical and cultural parameters of the tribal farmers of Chhattisgarh. Table 15

b. Cost of cultivation in per acre		**Paddy Crop.**	
Tar bandh Irrigated area	Amount(Rs)	Unirrigated area	Amount(Rs)
Land preparation	300.00	Land preparation	300.00
Transplanting / Biasi (own)		Transplanting / Biasi (own)	
(20 labour /acre @25 Rs)	500.00	(20 labour /acre @25 Rs)	500.00
seed (own)	400.00	seed (own)	400.00
Fertilizer/ acre	750.00	Fertilizer/ acre	750.00
Weeding		Weeding	
(10 labours / acre @ 20Rs)	200.00	(10 labours / acre @ 20Rs)	200.00
Pesticide / Weedicide	150.00	Pesticide / Weedicide	150.00
Harvesting / Thresing		Harvesting / Thresing	
(20 Labours / acre @ 20 Rs	400.00	(20 Labours / acre @ 20 Rs	400.00
A. Total cost	2700.00	D. Total cost	2700.00
B. Production 15 Bags		E. Production 5 Bags	
Per bag 75 kg $ 5.60 Per /kg		Per bag 75 kg $ 5.60 Per /kg	
12 bags x 75 = 900 kg		5 bags x 75 = 375 kg	
900 kg x 5.60 = 5040 Rs	5040.00	375 kg x 5.60 = 2100 Rs	2100.00
C. Net profit (B-A)	2340.00	F. Net profit (E-D)	-600.00

Cost benefic ratio of paddy crop in irrigated & un irrigated area			
Tar bandh Irrigated area	2340.00		
Tar bandh Unirrigated	600.00		

The Tar bands have also intangible benefits in terms of recharging ground water, increasing biomass, promoting livestock farming system and aqua culture development. In ordered to maintain Tar band sustainable it is essential to community-based organization with technical support form NGO's and related aggriculted department The Tar band technology doesn't required power and ecological friendly and low cost technology .