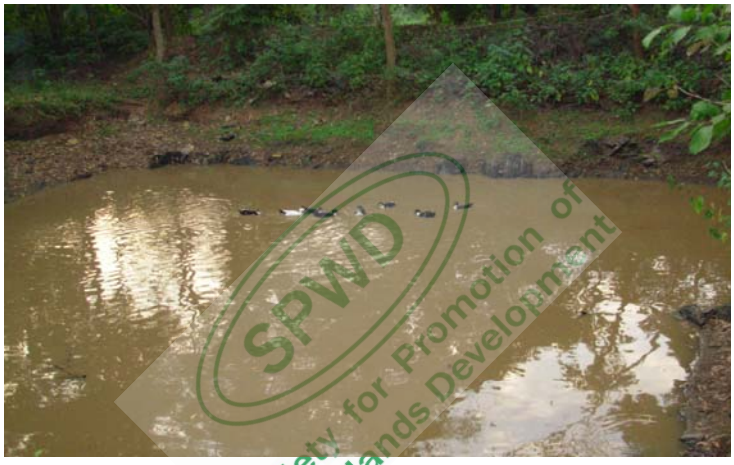
An
Assessment
of
The impact of
Wasteland development and in situ water conservation SPWD- SVT intervention
In Purulia District (W.Bengal)



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Preface

The present study was undertaken with a basic objective of evaluating the impact direct and indirect of the SPWD-SVT intervention particularly on the livelihood of the beneficiary community in the area and to assess the effectiveness of the interventions in qualitative and qualitative improvement of the physical environment in Purulia district which happens to be one of the least developed areas in the State of W. Bengal. The area is characterized by undulating and hilly topography, high rainfall, high run off, low farm productivity; rain fed farming often leading to crop failure due to delayed rainfall and high prevalence of poverty. One of the key challenges in areas has been to evolve a low cost, local specific, labor intensive technological package that could reverse the degradation of soil, conserve water and reduce the fluctuations in agriculture. The project was initiated with Sevabrata , at that time one of the emerging NGOs with very committed social workers drawn from the village youth clubs, for the development of private wasteland /uplands in 1989 in three villages of the district namely in Chanpati, Rakdih and Jamgoria.The interventions were for all the categories of land. The experiment has now extended to almost 30 odd villages and has been accepted by many funding agencies. The evaluation has been based on the field visit, discussions with the beneficiary community, field workers, youth club members, farmers committees, members of Mahila mandals ,SHG groups and SVT members and secondary data from the office of SVT.

I would like to put on record my sincere thanks to all those who have helped me in the evaluation. I have been personally enriched by the discussions and the field visits I made.I in particular thank Shri Nakul Mahto, Brihaspati Mahto ,Mansaand Bhim SinghSardar of SVT for the help and giving me valuable. insights. I also express my gratitude to all the villagers who shred their experiences and extended all help during my field visits. I express my sincere thanks to Shri Sharad Singh ,Pran Ranjan for their support and comments on my earlier draft and Sanjay for his constant support and bearing with my unorganized functioning. I also thank SPWD for reposing faith on me and giving me this opportunity of learning .The report has been unduly delayed for which I am solely responsible.

(Ramesh Sharan)

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Definition of local terms

Bahal	The low lying arable land most suited for paddy as water from uplands collect in this type of plot enabling a good crop of paddy even in rain fed conditions
Baid	The mid uplands where good rainfall or assured source of irrigation is required to harvest paddy
Bigha	A local unit of land measurement. One hectare is approximately 7.5 bigha or 2.5 acres.
Hapa	A water tank larger than a 5%
Katta	Local unit of land measurement. Twenty katta is equal to one bigha in Purulia. However from place to place the relation between katta and bigha varies.
Pucca	Permanent used with reference to house made of brick and cement mortar or a metalled tarmac road
Rabi	There are three seasons in the agriculture calendar kharif, rabi and zaid. Rabi refers to the cultivation done in November December and harvested in March.

Models

5%	It's a pit, representing 5% of the total area, which is dug in a plot of land to harvest the rainwater and excess run off.
30x40	The 30*40 Technique derives the name from calculations done in terms of feet . The unterraced and unbunded lands are treated with water collection pits in each plot to retain runfall. Water seepage from a large number of such pits travel down-stream below the earth to recharge the soil moisture regime, enabling vegetation to grow the less water.
LI	Lift irrigation
Bund	This refers to the boundary to the plot or around a pit made by piling the excavated earth.

LOCAL UNITS OF MEASUREMENT

Bigha	A local unit of land measurement. One hectare is approximately 7.5 *bigha* or 2.5 acres.
decimal	Unit of land measurement. 33 decimals are equal to one *bigha*
Katta	This is a unit of land measurement and its relation to *bigha* varies from place to place. In Purulia 20 *katta* make a *bigha*.

An Assessment of the impact of the wasteland development and in situ water conservation SPWD- SVT intervention in Purulia District

Section I

Background

SPWD initiated a small project with Sevabrata for the development of private wasteland /uplands in 1989 in three villages of the Purulia district of W.Bengal namely in Chanpati, Rakdih and Jamgoria. Sevabrata, at that time was one of the emerging NGOs with very committed social workers drawn from the village youth clubs. The organization has considerably matured now. The primary objective of the project was to evolve a low cost, local specific, labor intensive technological package that could reverse the degradation of soil ,conserve water and meet the challenges of a vulnerable agriculture, rain fed and susceptible to frequent droughts and mono cropped economy .This was envisaged to enhance the livelihood options of the people living in the fragile resource zones through participatory natural resource management . With the passage of time both the content and the geographical coverage of the program increased from three villages to almost 32 villages in the area .The program has also been adopted by other funding agencies also. Both the program and the organization have traveled along distance in the project area. The program has important leanings in terms of the evolution of institutional mechanisms in terms of sharing and management of NRM based programs and projects, environmental and socio impacts of various models and experiments.

Objective of the present evaluation

The present study was undertaken with a basic objective of evaluating the direct and indirect impacts of the project intervention particularly on the livelihood of the beneficiary community in the area and to assess the effectiveness of the interventions in qualitative and qualitative improvement of the physical environment. Another important objective was also to understand the evolution of sharing mechanisms evolved during the intervention and non intervention period.

Methodology of the evaluation

The evaluation has been based on the field visit, discussions with the beneficiary community, field workers, youth club members, farmers committees, members of Mahila mandals, SHG groups and SVT members. And secondary data from the office of SVT. The field visit was made in two phases. In selection of the village for field visit due care was taken that villagers of different typologies were covered with varying interventions were covered Out of 25 villages for which data was obtained ,the field visit was made to Basantpur/ Gwalapara, Pitidiri, Bagdega, Dhadkigora and Sijadih. All these villages are initial phase villages and a number of interventions have been made

.

Project area

The project area is spread over six Blocks of Purulia district namely Manbazar I and II, Kashipur, Hura, Puncha and Barabazar but the primary concentration happens to be in Manbazar I and Manbazar II where almost 3/4th of the project villages are located. The area is primarily inhabited by tribal, dalit and other backward caste population. The major adivasis communities are Santal, Bhumij, Mahali, Sabar, Bade (Snake Cather), Mudi,and SC communities are Kalindi, Bauri, Sahis, Rajowar, Ruhidas, Bagdi, Rajak (Dhopa), Patikar etc.bresides, Mahatos, Karmakar, Vaisnavs are also important communities in the area. The area has very high proportion of people below poverty line.In the district almost 43.65% of people live below poverty line .The literacy rates are very low. .In Manbazar I and II the tribal and dalit population constitute almost 57% of the total population. Almost 85% of the farmers belong to marginal and small category in the area. The basic statistics for Purulia district is given in Annexure I

Land and resources

The project area is characterized by undulating and hilly topography, high rainfall, high run off, low farm productivity; rain fed farming often leading to crop failure due to delayed rainfall and high prevalence of poverty. Although, there happens to be some variation between villages, it is estimated that almost 35% of the land is upland almost same proportion medium land, while 15% medium low land and around 10% of the land is basically lowland in the area around 5% of the area has water bodies.

Chart no.1.1 land characteristic and normal uses in the project areas

Land category		Approx area	characteristics	Normal use
Upland Tanr	Slope more than 8 owner ship individual , ommon property, forest department	35%	Sloppy land with gravels /poor quality/no vegetation/high level of erosion	Barren wasteland /traditionally covered by forest of kusum ,sa ,palash,ber etc.and bushes/grass
	Slope less than 8		Poor quality soil with ravels/isolated trees of palash	Fallow/ isolated trees sal,ber kusum/palashtrees ,traditio nally good forest ,in between patches of unbunded fields oilseeds/pulses/
Bari			Quality of soil good	Vegetables/maize/pulses / oilseeds/ fruit trees
Baid mid land		35%	Thin topsoil,sandy/loamy/org anic content low,bunded water retention capacity low	Upland rice short duration with low productivity grown/highly sucsceptible to early rainfall failures
Kanali		15%	Terraced bunded	Paddy but susceptible to rainfall failures in last phase of Monsoon/ Hathia nakkhshatra
Bohal		10%	Good alluvial soil/less susceptible to rainfall fluctuations	Two crops of paddy in many land Bodo(summer), Kharif(Aman)

Water and rainfall

The area is drained by at least six rivers namely Kansabati, Kumari, Shilabati, Darkeshwar, Totko and Gowai. The full potential of these rivers have hardly been utilized in the area.Besides, almost 75% of the rainfall is received in Monsoon period.The drought of this area is not primarily not in sufficient rainfall but failure at critical periods.The district receives almost 1200-1300 mm of rainfall every year but the rains are erratic in many areas. The probability of rainfall failures and coefficient of variations is quite high in the last weeks of June-July and in the last weeks of September-October. Hence, drought in the state primarily occurs at the start or end of the kharif season. In July, upland crops grow to maturity and seedlings for transplanted rice are established. If there is deficient rain, the upland crop—mainly paddy and maize, which provides food security in August-September— is affected. Seedlings for the transplanted paddy start to wilt or become over-mature. As most of the land is mono cropped, the lowland paddy is crucial for employment and food security. A delay in rainfall affects the transplantation of *long duratiom* paddy, the major crops in the area. October *(Hathia)* rains are required for paddy and provide the necessary residual moisture for the rabi crop.
When the rains fail, agriculture is usually the first to be affected because of its critical dependence on stored soil water. First, soil water in the uplands starts to deplete. Then shortage of water starts to affect people collectively and individually. The socio-economic impact of drought occurs sooner in as frequent droughts have weakened the capacity of the people to bear shock. While drought is basically caused by erratic and deficient rain, the problem has been aggravated by large-scale degradation of soil due to runoffs deforestation; The districts very high level of distress migration to different areas of Jharkhand, Orissa and neighboring districts.

About Sevabrata

The initiation of the project and the evolution of the SVT has commence almost simultaneously in the project area. It is worth mentioning here that the establishment of Sevabrata in 1986 as a Community Based Organization (CBO) was the result of the initiative taken by a handful of social workers and village youth clubs. The village youth clubs are very important youth organization in different villages of the state .These clubs organize pujas, sports, jatras, mansa puja and other cultural festivals .A number of youth belonging to various youth clubs during the period were concerned about the ground economic realities and the political processes .After a long discussion they decided to form a non political organization for serving the poor and the marginalized in the area working for providing information to people and working for the food security in the region. This happened to be a very different role as played by the older youth clubs.. .Even within the group there was a detailed discussion whether education or livelihood promotion would lead to development of the people. SVT began the work in the field of in the reclamation, regeneration and sustainable management of natural resource of Purulia, Bankura districts of West Bengal. Sevabrata is now a coalition of different youth clubs and village committees supporting long term development of socially and economically disadvantaged people in Purulia, Bankura districts of West Bengal since its inspection in 1986; Sevabrata has grown to include twenty village clubs.

The General Body (GB) of SVT consists of one member from each clubs. The GB selects Governing Board and this board elects Executive Committee (EC). It is a democratic organization, with the President, Secretary and four other office bearers chosen from Governing Body, which is freshly selected every 5 years. One of the very important fact is that the capacity of SVT has increased many fold with the learning's and support of SPWD project as this happened to be the first major funding support intervention for the team.

Interventions in Project villages

Soil and water conservation, reclamation of degraded land and sustainable management of natural resources had been the basic objective of the project which could lead to increase in livelihood through improvement of agriculture, agro forestry, plantation, fodder development on private and community land. For this a number of technologies were planned and applied in different villages as per the requirements and the socioeconomic conditions of the area. The technology was evolved with the help of PRADAN and the local people who also modified it depending on their needs .The interventions are for various category of land .The treatments include staggered trenches for primarily degraded up land having slope of more than 8 degrees, 30X40 model for uplands having slope of less than 8 degrees, 5% model baid land, HAPA for bari land, Tank renovation, dug well and LI.

In all the categories land appropriate trees, legumes and grasses has been established on the trenches and the bunds. The major trees planted are Sisoo,Gamhar, Arjun ,Acasia, Euclyptus ,mango etc.

Table 1.1 Time profile of Interventions (no. of villages)

year	30x40/plantation	Staggered trench	5%	tank	Hapa	LI
1990	2					
1991	1			1		
1992	3		3		4	
1994						
1995	4		2		2	
1996	3	1	5		1	
1997	5	1	4			1
1998	1		1	1		
1999		1	1	1		
2001	2		2	3	1	
2002						1
2004						2
Total	21*	3	18	6	8	4

* In two villages the interventions were spread over two years

The village wise data of intervention for the SPWD intervened villages was collected from the project files for 25 major villages . Only a limited number of villages have multiple interventions and multiple benefits could reach a single family. In the analysis we have classified according to interventions. In terms of the timeline of the interventions, 30x40/ plantation and 5% model is spread over the period of intervention. The tanks and hapas have breaks and LI began very late.. In 3 villages staggered trenches have been made namely in Basantpur, Gwalapara and Dhuliapara villages. The reported area treated has been 31 ha all the three villages taken together having 39 direct beneficiaries all belonging to STs .In almost 75% of the villages intervened ,30X40 and 5% model has been experimented .Around 8 hapas have been excavated in eight villages and nine tanks in six villages. Plantation has been carried on extensively on all the models .LI was started in 1997 and the intervention is currently in four villages namely Bagdega ,Salghati ,Pitidiri and Nawadih .In Nawadih the component of LI had been stolen. during the field visit the LI was being once again installed.

Table 1. 2 Interventions in Project villages

Interventions		village	Area ha	Investment	Direct beneficiary
Staggered trench		3	31	85272	39
30*40 model		19	175.5	409784	581
5% model		18	169	673428	769
Hapa	N0	8	35	156450	87
Tank	no	6	9	764048	250
Plantation		16	216	104885	106
Li	no	4		486624	183
	total village	25		2680491	2015

Table 1.3. Ethnic distribution of beneficiaries from interventions

	Sc	ST	OBC	Total
Staggered trench		100		
30*40 model	6.0	63.3	30.6	100
5% model	3.3	75.9	20.8	100
Hapa	4.6	47.1	48.3	100
Tank	0.0	36.8	63.2	100
Plantation	9.4	51.9	38.7	100
Li	10.4	48.6	41.0	100
Total	4.6	62.9	32.5	100

It is worth noting here that almost 62.9% of the beneficiaries belonged to STs, only 4.6% to SCs and 32.5% to OBCs. Around 63.3% of 30X40 model beneficiaries, 75.9% of 5% model beneficiaries and 47.1% of the HAPA beneficiaries belonged to STs.

The present report is divided into three sections including the present one. Section II has documented the observations from the villages visited during the field survey and Section III gives the overall assessment of the project interventions

Section II

Reflections from the villages visited

I. Dhatkigora is a Santal village in Gopalnagar Panchayat of Manbazar I Block .It has approximately 76 households. The village has one youth club named Dhatkigora Adivasi Susardahar Gaonta which was formed in1996 and a Mahila Mandal having 12 members. There are also three SHGs in the village. The group lending happened to be Rs. 1500 while savinf was a modest Rs.5000.The youth club is primarily engaged in cultural festivals, sports activities and gram pujas. The Mahila mandal has taken over the responsibility of cooking Mid day meal provided by the Government in the school from which they are able to earn around Rs.400 per month which goes to group fund to be used in the case of need by the group .In the village two households received land patta of 4 bigha each from the government .The land is unproductive and only til can be cultivated in the plot. The village also had one grain gola which could not continue after 2000 due to the persistent defaults .This default was primarily due to low income of the households highly vulnerable to rainfall fluctuations.

Interventions n the village

Tank 01

The tank was constructed in the year 2000.The agreement for the first five years was that 1/3 rd of the fish will go to club, 1/3rd to SVP and 1/3rd to the owner of the land after deducting the cost which is paid by the club .The tank leads to irrigation of 10 bighas of land around the pond.

After 2005, the following agreement is working

- The land owner will allowed production of fish , take all the fish and also will bear all the cost
- The villagers will be allowed to use water for all social purpose
- The villagers will be allowed water till chaitra month for irrigation.
- Water will not be allowed for summer paddy

***5% 7*-8 hectares and plantation on field bundhs and Bari land.**

This has helped in plantation around the bundhs of the field in the upland. The plantation in the village is highly visible. The trees planted included fruit, timber and fuel trees. As a result of the water in the field trenches the farmers could save the plants as well as their rice crop .There had been also change in the variety grown on these bad lands .Earlier Bhutmuri, Asanlewa was grown which has a lower productivity around 15-20 mounds per bigha .The availability of water helped the farmers in switching to other varieties normally grown in kanali and bohal land Suvarna and lalat in these land yielding around 30 mounds of paddy. However, the last two years 2003-04 and 2004-05 seasons were years of severe drought in the area as a result the paddy crop was severely damaged and due to the scarcity of rains in the initial periods there was hardly any water in the trenches.

Upland treatment / plantation in the village plantation was done, sabai and trees of Gamhar,acasia in 5 Ha area. Besides the sabai plantation also did not succeed in the vilge. But majority of the plants were lost .In the night the trees were stolen as the village did not have any protection committee .Unlike, other interventions no sharing mechanism was developed in the village as a result the plantation could not survive.

One dug well

Agriculture

In agriculture, the villagers were given necessary help for growing vegetables for three years and were also given Arhar seeds which were grown in the Bari land.

Migration

The proportion of migration from the village is very high .During the field visit it was reported that almost 75% of the young people had migrated. The primary reason had been the two successive drought .Besides in the village the proportion of upland is relatively higher as compared to low land which affects the food security due to differential effect on productivity..

Impacts

1. The village now has good coverage of trees on the bundhs created under 5% model and the upland/ bari land. of various types .During the last two droughts the trees particularly acasia were sold which helped to mitigate the effects.
2. The cultivation of pulses and vegetables has improved the food security of all the families in the village partially.
3. In normal rainfall years, 5% pits in the baid lands have helped in providing irrigation during the later phases and also they have provided water for the plants in the initial phases of their growth. However, in case of the drought in the first phase the pits being totally rain dependent, could not give the supplementary/distress irrigation in last two years.

II. Pitidiri

Pitidiri village is in Manbazar –II block of Purulia District. It is inhabited by 105 families out of which only ten farmers are big, 50 are small farmers and 45 are marginal farmers. Pitidiri happened to be one of the typical villages with Almost 75 families belonged to Mahato community, 15 are patikars and 15 Bhumij The village youth is named as “Pitidhiri Kisore Sangha” .which has eighty families as members. Initially the main activity of the club was sports, cultural functions & cultivation. The club later on the initiation of SVT started initiatives about development of the village. The village also has one women organization Nari Kalyan Samiti constituted in 1995 which was not only a thrift and credit society but also important organization of sharing their experiences by women .The women in the village did not have the habit of sitting together. The youth

clubs are basically male domain. The group distributed the principal amount collected amongst themselves in 2001and now the lending is from the interest accrued during earlier period. The village also has three SHG groups namely Ma Santoshi,Nari Kalyan and Palli shri . The group has given credit for vegetable cultivation. After LI was installed in 1997, a farmer's organization named Krishjivi Unnayan Samiti was formed for management of LI by the beneficiary. The farmers were also able to get Panchayt fund for making permanent puccca field channels

Interventions in the village

- During 1992-93, 30X40 model in 5 ha, 5% model in 7 ha, plantation on wasteland 5 ha, Hapa 3 and 2 dug wells.
- LI in 1997-98 from Kumari river irrigating aroung 80 bighas of land although the area covered is around 145 bighas of tanr and baid land benefiting around 45 families

Impacts of the Interventions in the village

30X40 models/plantation

The trees have come up well in 30X40 treatment area the upland which was almost barren has turned into a good forest. This has solved the problem of fuel wood and has also yields revenue from sale of trees when required. Some benefit is also coming out of sale of sabai. Wild life small reptiles all have converged to the plantation area.
The beneficiaries now understand that the waste land has become income earning asset as result people have now started measuring their land earlier almost abandoned.

5% model

In the initial phases the ditches helped in irrigating the plantation on the bunds of the baid land. This water storage has also helped in stabilizing

LI

It has a very good impact on the village economy. The second crop of wheat, mustard and vegetables have now been guaranteed on at least 80 bighas of land which was earlier fallow, for at least last eight years has impacted on the poverty, food security and employment. The profit from the second cash crop has given financial stability to the families. Illustrative gains for some farmers is given as annexure II which has given protection from year to

- Distress migration has almost become negligible from the village. One Bhaskar mahto who used to migrate to Delhi, has now come back and is cultivating vegetables.
- Income from vegetables particularly cucumber has been substantial. Poorer having have taken land on lease and cultivated for e.gg. one Savitri Devi from the village had a profit of almost Rs.26000 from the leased land in one year.

- Market for lease of land is slowly emerging for the land which was consderd fallow and useless are now hired by poorer families
- Water market is emerging .One Vimal Mahto who is a pump operator bought his own pump and is now providing water from his own in other villages at cost and earning income from the operation
- In a nearby village people have initiated a LI of their own and started cultivation .The project has thus a spillover effects
- As the vegetables are grown in substantial quantity, the traders are now coming to the village itself .Earlier they had to go to Gopalnagar for selling their products. As one beneficiary remarked that the village itself has become market. This leads to reduction in transaction cost of farmers and also saves their time .They are able to get immediate cash.
- Indebtedness has fallen considerably. The hold of the money lenders has decreased substantially. It is worth mentioning here that earlier all the debts of the moneylenders had been waived/ not paid under political mobilization program so the money lending from the village has become nonexistent.In the case of credit requirements people used to get loans from Gopalnagar traders. SHG and surplus from agriculture has helped in reducing the dependence for agricultural loans substantially
- One veterinary doctor and one homeopathic doctor have their clinics in the village now as people's ability to pay has increased significantly.

III. Bagdega

It is a village in Gopalnagar Panchayat Manbazar I Block inhabited by 246 families out of which 154 belonged to Mahto community, 50 Manjhis, 15 kalindi and rest belonging to other communities. A small rivulet flows around the village. The topography of the village is relatively flat but there happens to be considerable baid and wasteland. The upland in parts is highly degraded but is relatively flat .The first intervention in village was 30X40 model in 2 ha where plantation of acacia was done and 5% model in 5 ha. Dug well has been given to poor families. In the village 5 hapas have been constructed and 2 tanks have been renovated .The village also had LI intervention in 2002.the village was suffering from a severe fuel wood crisis during late eighties when the pressure on the palash trees has increased and a number of families shifted to coal as fuel for cooking.

Impacts

30X40 and plantation

- The plantation has led to solving of fuel wood problem of families in the village as the dried and fallen leaves of acacia and other trees are allowed to be collected by all in the village. The households store it for use during the rainy season
- As a result of availability of fuel ,the pressure on palash has decreased and it has regenerating in the area .The use of coal has also stopped and people are using free source of fuel wood.

- The sale of mature trees of acacia have brought additional income to the families ranging from Rs.10000 to 20000.This helped in coping with the drought in last two years.
- The landowners are now planting the trees by themselves after harvesting as they now understand the benefits.
- The success of plantation has encouraged other farmers to plant trees without any support. A few plantation sites have emerged in the village.
- The wasteland is now considered as asset the price of such land has increased now.

The plantation has two problems one is of fencing as a considerable portion is still fallow particularly belonging to the forest department has remained barren and secondly the deficiency of planting material as not many nurseries are raising the palnts. The supply is quite less than the demand.

LI

LI in the village is not very successful because the rivulet has insufficient water. The Government has constructed one check dam but the villagers have constructed their own earthen bundh on the rivulet a little ahead of the Government bundh .As result the irrigation has been far less than the planned area. However, the water has helped in getting mustard and potato in baid and Bari land. The shift to mustard and potatoes has been due to rising prices of these commodities particularly the mustard oil which happens to be main cooking medium in the area. Some farmers were also growing brinjal and tomatoes.

Tanks

Tanks are important for both supplementary irrigation and for fish cultivation. One tank was constructed in the village while the other had been renovated. The first tank has not been very successful as the soil is not able to hold water for longer period .In the other tank there has been some conflict whether the water should be used for fishing or for irrigation for growing vegetables. The youth club and the owners of the tank have agreed to share the benefits from pisciculture 50 :50 for eight years .In normal contracts ,the sharing is 60% by the youth club and 40% by the land owners for five years but in this case the owners wanted a share of 50% so the period was extended to 8 years .It is also worth noting here that there happen to be 12 main shareholders and almost 40 total share holders of the tank. In the case of fish some of the share holders get 2-5 kgs which is very small so they prefer that the water is used for irrigation.

Dugwell

Dug well in the village provided has helped a poor farmer to cultivate vegetables and earn good income from a very small patch of land .Dug wells are very useful for smaller areas particularly the bari lands where vegetables can be easily grown.

IV Basantpur/Gwalapara

Basantapur village is under Manbazar – II block of Purulia district which is a tribal village.The village has 206 families out of which 181 are.Santals,11 are Bhumij and 3 Karmakars The location of the village is at the southern east of Purulia. The village has a hillock, Dungri in the northern west of the village. Most of the families are marginal farmers. The main occupation of the villagers is migration to Burdwan, The major portion of land is Tanr & Baid .whioch suffers from production losses due to erratic rainfall The intervention began in 1995 – 96. At first 30' X 40' model upland treatment was made in 16 hac. land in the year 1995 and also plantation & intercropping was made. In the year 1996, 5% model was started in 20 hac. Baid lands. Two Hapa were excavating in homestead land for vegetable cultivation. Staggered trench was made in 10 hac on hillock land. In the year 1996 ,30' x 40' model was made in 19 ha up land and plantation on this land. Sabai Plantation was made on10 ha land in hillock area. The village has a youth club which has been involved in the development work in the village .The youth club has taken all the sabai harvested in the first three years after which all the benefits go to the landowners.The responsibility o protection was with Youth club for three years afterwhich it was responsbilty of the landowners. For the protection of the plants guard has been kept by the land owners who is paid 12 mound (1mound = 27 K.g.) of paddy for 1 ha of land by the owners of the land. The youth club also cultivated Tisi in 3 ha last year on the waste bid land and kept all the tisi with them after giving back the seed provided by SVT. The landowners were not given any rent for land but they had the benefit that the land was ploughed and made cultivable in the process. The village also has Mahila Mandal and 5 SHG groups.

Impacts

Staggered trench /30X40 and plantation

- The trees and the plantation has changed the landscape of the village which can be easily distinguished from the untreated dungri belonging to Forest department nearby .The forest on the hillocks with biomass is slowly coming out.
- The water conservation due to treatment in the upland has helped in making the rivulet flowing in the village as perennial one .Earlier it used to dry during the summer months.

Sabai

Sabai plantation has made substantial visible impact on the local economy. Sabai has been planted by other farmers not covered by the project on their baid land in the village and nearby village.

- Sabai gives perennial income for almost ten years twice in an year.The illustrative benefits for ten farmers is given below.
- Sabai has generated additional employment to at least 15 families who make it into finished products ropes

- Sabai has replaced maize in many cases in baid land because of perceived advantages as it is less labor consuming as the land for maize has to be ploughed in summer when the earth use to be hard and it is hot. The risk in maize was higher .In case of heavy rains it is destroyed and it is also difficult to digest.

Table 2.1 Sabai Cultivation on Basantapur Village in Hillocks for the year 2004

Name of the Farmers	Cultivated Area (bigha)	Production (Qnt)	Rate / Qnt.	Amount (Rs)
Jatilal Sing	1	3	250.00	750.00
Gatilal Sing	1	2	250.00	500.00
Haladhar Sing	1	3	250.00	750.00
Bharat Sing	1	3	250.00	750.00
Banamali Sing	1	3	250.00	750.00
Kalipada Sing	1.5	4	250.00	1000.00
Parameshwar Hembram	7.5	20	250.00	5000.00
Chunaram Baskey	3.5	7	250.00	1750.00
Ukil Baskey	4	15	250.00	3750.00
Total	**21.5**	**60.00**	**250.00**	**15000.00**

- The labor saved in maize is used for earning outside and also for leisure.
- The problem with sabai is that the traders pay lower price during the havesting season The mahila mandal were thinking of buying and reselling when the price was high. Sometimes the price fell to Rs.200 per quintal and then rose to Rs.400-450.

Wasteland as assets

At first the villagers did not know their own land in hillock area where sabai plantation was made. After sabai plantation the villagers knew their own land from the B.L.L.R.O. office. And started contesting and measuring and protecting the space.

Gwalapara is a nearby village of 152 families out of which 136 belong to Santal tribe.In the village 3 ha land was treated with staggered trench and plantation, in 1999-00, 18 ha treated with 30X40 model in1997-98, and in 12.5 ha ,5% model has been tried .The results have been very good .The acasia plantation has been sold this year and the people are replanting trees on their land. The hillock is now full of trees and solved the problem of fuel wood and other timber needs of the village .The plantation of Sabai has been taken over on a very a large areas on their own initiatives.

Sijadih

Sijadih is in Manbazar –I block, is one of the interior village of Purulia districts. Sijadih is 6 to 7 KM west from Manbazar Police Station. Mouza Sijadih consists of Village Sijadih and Tola Rakdih. The village is inhabited by 145 families.y. Most of the families of the villages are belong to "Kurmi" caste one of the Other Backward Caste (OBC), 7 belongs to ST, Four are Muslim and two families are General. Agriculture is the main occupation of the villagers. The majority of the farmers are small and marginal. The village is one of the oldest in terms of the interventions by SPWD in collaboration with SVT. .Tagore Society, another NGO has also done plantation in the area.

The main interventions are

Upland treatment: Upland treatment was done on the slope of Dhenkeya Dungri which is in the north east side of the village which had been an eroded wasteland which once used to be a forest.To arrest soil erosion and conserve this rainwater in situ for the purpose of growing trees, shrubs, grasses, pulses and crops like vegetables, oilseeds and rice according to the local conditions upland treatment was done on slopes of less than 8% .Around 13 ha of land was treated in 30X40 model After treatment of the land, water is caught in the land so that the moisture of the medium land and lowest land is increased gradually. Consequently the Rabi cultivation is possible in some lowest land with out irrigation. Many trees and grasses are grown in the field. It also inspired the farmers of the village to take imitative in cultivation. They grows vegetables in the land like tomato, brinjal. Village committee has made a fund by selling one portion of cultivating crops. The rest are allocated among themselves.

Land treatment in the baid land: Due to scarcity of rainfall baid land are commemoratively dry than the lowest land (bahal). Also at the time of rainy season it was found that baid land is unable for cultivation as the rain waters flow to the low land due to lack treatment of land (baid). The drought tendency of baid land is gradually decreased by the treatment of the land through 5 % model. 5% model has been done more than 10 ha in the area. Besides the paddy cultivation many farmers are assured to cultivate wheat, potato, brinjal, tomato, cabbage, oilseeds etc. after the treatment of the land (baid).

Hapa: In the projected year 12 Hapas have been dug in the house attached plots of 12 marginalized farmers. The objective was to increase the income be means of duckery, pisicluture and some vegetables cultivation from these Hapa. Few trees have been planted in the bund of the Hapa's.

Dug Well: To encourage the farmers for vegetable cultivation 3 wells have been dug in the plots of 3 villagers.

Excavation of Ganesh Goria: In the year_ Ganesh Goria have been excavated in 72 decimals area. Before the excavation of the goria this plot was a wasteland. About 45 bighas of land can be irrigated from this Goria. A Lift Irrigation system in this tank has also been set up. From this tank farmers are now growing vegetables like potato, tomato,

cabbage etc. Rabi crops are being cultivated in more than 20 bighas areas.This jhas helped in pisciculture

Renovation of Tank (Majhir Bandh): In the year 1998 renovation of Majhir Bandh tank have been started. Total area of the tank is 3 acres.

Impacts of interventions

30X40 /plantation/treatment of upland

As a result of the treatment , the forest his back on the wasteland which is clearly distinguishable from the untreated Dungri (Hillock) under the ownership of forest department. As result of regeneration , the wild life, reptiles have returned back .The treatment has increased the moisture in the lower fields. This has helped in the cultivation of vegetables particularly potato, brinjal ,tomato and mustard in the wastelands and uplands. One of the most important thing has been due to increased moisture and water availability, there has been shift in the varieties of paddy grown on some of the the baid land .The longer duration paddy is now grown in such fields. Some of the farmers also have adopted hybrid paddy in some areas.The difference in water and moisture of untreated and treated areas is very visible.

5% model

The 5% model has helped in vegetable cultivation as well as small fishes .The plantation on the bundhs earlier could be given water due to this storage .However, the problem of moisture retention continues in these fields during prolonged droughts. These structures can mitigate the effects of the drought in later phases..

Assessment of overall impacts

The interventions have a favorable impact on the villages and on the community. The success of different interventions have varied across villages depending on the community and the topography and physical conditions of the villages . But one thing is very visible that is the plantation and the biomass which has been generated in one of the worst eroded private wastelands. The differences between the treatred and non treated part village bears testimony to this fact in almost all the villages The forests in Gwalapara, Basantpur ,Sijadih, Pitidirri and Bagdega are clear example of thistestimony to this The water levels and the moisture has gone up significantly .However , the partial failures in Gastosoria and Dhatkigora also sends reminders of difficulties in such strategies of protection of plantation due to outside poaching threats. From being considered as waste are now being treated as assets by the community as such a low expense. In the process of interventions the learnings particularly of sharing mechanisms is very important .These institutions and mechanisms have evolved naturally due to the flexibility in the program and working with the local youth clubs .The impacts on the local village economy is visible in many areas like Pitidiri with LI and Basantpur /Gwalapara area with sabai.

Staggered trench/30X40 model/plantations

The impacts are relatively more as almost waste and abandoned land has been brought to use. The spillover effects are even more going beyond the land owners and other direct beneficiaries like youth club going to the other landowners whose land has not been directly treated in the program.

Environmental impacts

- Increase in forest cover on the private wastelands
- Increase in moisture and level of underground water levels.
- Return of wild life in such areas and generation of biomass
- Improvement in soil conditions and soil conservation
- Pressure on palash and other forest trees for fuel wood reduced in the intervened village leading to regeneration of trees especially on the field bunds
- Scenic beauty of the area has increased

Economic impacts

- Increase in income from the sale of acacia, sabai and other trees
- Income from fruit trees like mango
- Pulses, vegetables and oilseeds in earlier wastelands gave additional production both for consumption and sale
- Supplementary income during construction phase as wage income
- Rise in employment especially in lift irrigation areas where two to three crops are now being taken.

5 % model

- This has been experimented widely and has mixed impacts in the villages. The contribution of 5% pit cannot entirely offset cash and survival needs of the people, majority of whom are not food self sufficient during the construction period it generated immediate cash benefits for the people engaged in digging the pits. But the cash generation is hardly enough to make substantial impacts. In case of normal rain years, the pits have been quite useful in dry spells in a critical grain filling stages. The general perception is that these failures are once in three years and the pits have helped in salvaging the crop / enhancing the paddy yield by 10-15%.These pits also helped in irrigating the plantation on the bund the pits are of larger size they have helped in second crop irrigation for smaller areas as in Sijadih. The other perceived benefits have been that these pits are in the control of the individual farmers In the two successive drought years, the utility of the pits are drastically reduced. The success of the pits have depended on the other factors like soil quality particularly its water holding capacity ,the position of land upper or lower baid, the relative position of the pit within the zone of treatment and the seepage line in relation to the depth.

Sharing agreements

The evolution of sharing mechanisms in the project has been very interesting The sharing agreements had been written in the resolution book of the Youth club and signed by the parties .The contracts have not been breached by the land owners as it was beneficial for the land owners as their land became productive for which giving share for three years was not high as the gains in long period is not very high. It is also worth noting here that the land being taken up for treatment in the initial phases of the program happened to be wasteland of no use to the landowners as result they agreed for treatment. They had all the suspicion in mind about the success of treatment .However, with the vegetation coming up and the moisture being retained the probability of contracts being breached also increased. In the initial phase the program worked in grant mode .The risks and uncertainty of investment in the on these land was very high .Besides, the ability to pay for treatment of land for the poorer farmers had been low and the returns from plantation and the generation of biomass took time for return for which the poorer households could not wait. It was later realized that if there is no provision for return of money there was no fund left for maintenance of the assets the spread was non sustainable.

- In case of plantation and 30X40 model in the space before the plants come up the vegetables and pulses no share given to the land owners after which the property belonged to the land owners
- In the case of Hapa/tanks 15% of the fishes to youth club and 85% to the land owner .Water for social purpose and irrigation to be used by all in the vicinity.

Chart no 3.1 Sharing of benefits in initial phase (first three years)

Intervention	Youth club	Land owners	others	Nature of agreement
Staggered trench/plantation	All Inter cropping benefits	Wages for work/no share in output/improvement in land /plants and grasses stabilized	Wages if worked	Informal/ resolutions in village meeting registers
30X40/palntation	Intercropping benefits	Wages for work/no share in output/improvement in alnd	Wages if worked	Informal/ resolutions in village meeting registers
5%/plantation on bundhs	No share	Water for plantation on bundh/support irrigation for paddy/some small fish	No direct benefit	Informal/ resolutions in village meeting registers
Tank fishing initial agreements 3 years	1/3rd	1/3rd /water for other uses	1/3rdof fishes/water for other uses including irrigation	Informal/ resolutions in village meeting registers
Later after 2001 agreements for 5 years	40% to SVT 10% to community organizations/youth club (variations between villages	50%	Water for social use/irrigation if water is available/no water for Boro paddy	Formal agreements on judicial paper
Wells	No share	Irrigation/ water for other uses	Water for other uses allowed	
Hapa	15% fish	Water for vegetables ,small quantity of fish/ water for plants on the bundhs/ duck rearing /85% fish	Water for vegetables if plots contiguous	Water recharge/harvesting.

Chart no. 3.2 Benefits in later phases

Intervention	Direct	Benefits	Indirect benefits to all
	LOI	others	
Staggered trench/plantation	Income from plants/grasses/sabai every year/making of ropes from snbai	Dried leaves for fuel/ making of ropes from sabai	Bio mass/flora/fauna/natural beauty/water recharging at lower fields/pressure on trees like palash for fuel decreased/ regeneration of traditional trees/soil conservation
30X40/plantation	Income from plants/fuel for cooking/ used as drought coping mechanism by selling trees /cultivation of oilseeds, pulses ,upland rice very limited area	Dried leaves for fuel	Bio mass/flora/fauna/natural beauty/water recharging at lower fields/pressure on trees like palash for fuel decreased/ regeneration of traditional trees/soil conservation
5%	Cultivation of oilseeds/pulses/irrigation for plantation on bundh /stablisation of paddy in later phase drought		Water recharge
Tank	Fishing and water for other uses including irrigation	Water for irrigation, social purpose	Water recharging
well	Water and irrigation in bari land/small areas	water	
Hapa	Fishing ,duckery, water for plantation on bundhs	Some irrigation but very few families	Water recharging
Lift irrigation	Increase in cropping intensity Vegetables/pulses/oilseeds	Employment to Pump operators/mechanics etc.	

Agreements for LI's

1. Sevabrata will give the expenses as loan to be repaid by the Farmers Committee pay the expenses in five years.
2. . The farmers will not object to lying of pipe project area of, 1500 ft pipelines and the Kaccha channel of the land.
3. .Sevabrata shall under no circumstances liable to pay for any burglary, theft, robbery of the Pump and Pipelines. The farmers and SHG groups will take responsibility of the Pump and Pipelines in their own risk.
4. Farmers will deposit the amount of installment @ Rs75 per bigna in SHG group or in the farmers committee. The installment to be paid Sevabrata office each year or the 1st of the Bengali calendar year.
5. Sevabrata will handover the lease agreement to the farmers after completion of the amount of installment.
6. Planning of cultivation and income expenditure of the production will be done in presence of Sevabrata representative, Farmers committee, Beneficiaries and SHG group.
7. .That the farmers committee shall be liable to pay the maintenance cost of the pump, wages of the operator, fuel, Pump rate will be charged which will be fixed from time to time .
8. A Bank account will be in the name of the committee. Chairman and Cashier of the committee will make transaction.
9. .Amount received from the pump hour rate after abstracting the operator wages, fuel & maintenance cost will be deposit in the bank account.
10. .That the farmers shall pay the cost of digging pipelines and the transporting cost of related materials from Sevabrata office to field.
11. 45 farmers made a group of 7-members in 6 groups for take care of the machine. The responsibility of the each group will one day in a week.
12. Before starting the second machine the machine operator will give the total contribution to the committee. The facility would be first payment basis.
13. Money will be received through voucher. An account will be opened in local Bank in the name of the Committee.
14. The farmers will continue meeting for their development.
15. Committee will take decision for construction a building for the machine and how to look after the machine.

Sharing agreements for tanks

In the case of tanks , the agreements from 2001 onwards have become registered and formal .The agreements have varied between villages depending on the negotiations .SVT has now become a shareholder which will help in developing a corpus .This has been lately realized by the organization that for the sustainability of the organization and replication of the model such sharing arrangements are required. Some of the sharing arrangements are as follows

Chart no. 3.3 Sharing arrangements for tanks (net income for fishing) SVT to provide for all cost

Village	SVT	Community organizations for cluster development	Land owners	All villagers
Bhelagora (2001-05	40%	50%	10%	Water for social purpose, irrigation/ boro paddy not allowed
Bagdega 2001-09	40%	10%	50%	Same as above
Bagdega 200-05	40%	50%	10%	Same as above
Makerkendih 2006-11	40%	50%	10%	Same as above

It is important to note here that the institute and sharing arrangements have evolved in the project as per the needs .In the beginning of the project, it was youth clubs which were central for all the activities .But the youth clubs are only male clubs and have been formed primarily for cultural needs, Mahila groups were therefore formed and in the LI areas farmers club has been constituted .The roles of these organizations have been complementary and supporting.

Impacts on income

The increase in income depends on the extent to which the land of beneficiary is treated and the type of interventions. During the evaluation, although no systematic attempt was made to estimate the additional income to the households but from the discussions with the beneficiaries and the records of SVT the following broad facts emerged.

- For almost 80% of the families the increase in income per annum works out to be less than Rs. 2000 and it is only for 20% of the families the increase is more than Rs. 3000.Around 25% 0f the families the increase in income is modest Rs 1000 .This income is almost regular which has given an additional permanent income for the beneficiaries. Approximately 5% of the families have been able to increase their income by more than Rs.8000 p.a.
- the income changes have varied over the villages depending on the success of the interventions
- The year to year fluctuations in income has depended on the rainfall fluctuations as almost all interventions have been to catch the rainfall but the impact of drought has been mitigated especially in the villages where sabai had been planted

- the increment in productivity is modest 15-25% for paddy ,and in the case of oilseeds 15 to 75 kgs per family, the amount happens to be almost same for pulses.
- The income increase is relatively more in the case of vegetables from tanks and LIs The income from wheat in Pitidiri varied from Rs.2598 to a loss of Rs.329, from mustard Rs. 450 to Rs.5790 for cucumber from Rs. 18962 to Rs. 6575 and from bitter gourd Rs.340 to Rs.3382.The variations of income has been due to the abilities of the farmers to manage resources and amount of land holding.
- Cash income has also come from and fish rearing .From a Hapa the additional income is around Rs.1000 to Rs.1500
- From the ponds as per the records of SVT the change in income varied from Rs.9000 to Rs.2700 during 2004. But these gains are shared and the share holders may be as large as 40 as in the case of Bagdega where the number of main share holders was around 12 and others may be co share holders
- The income from trees is lumped after say 8-10 years and the value received depends on the size of the trees. The traders have been taking advantage of the situation prevailing by paying less for the trees .A few farmers have been able to sell trees for more than Rs.10000.

Impact on consumption and nutrition

The increased income and production has been able to raise the consumption level of the beneficiaries .For almost all the beneficiaries , the food and nutritional security had increased due to the extra income and production .The consumption of oil and pulses, fish from hapa ,fields and tanks both from self production and purchase has increased .However, one of the negative development has been that for a very few families the consumption of alcohol has also increased after the cash income has started coming. In all the villages visited people said that the seasonal insecurity has also decreased and also the consumption impacts of drought could be mitigated by selling the trees .In Pitidiri ,Basantpur the change has been while in Dhatkigora it has been moderate.

.**Impact on migration**

The impact on migration has been varied for the beneficiary families This has depended on the increase in income, employment and other non economic factors .In Pitidiri for e.g. as the second crop has become guaranteed the migration has almost stopped for the beneficiary families while in Dhatkigora where the impacts has been modest the migration has continued .The droughts aggravated the scenario in the village. In Basantpur, the availability of time has increased due to sabai a shift from maize This extra time has been used for earning extra income from migration. A few beneficiaries admitted that they migrate because they want to avoid relatives/friends who frequent as guests and also asking for loans as they have become better off. It is important to note that the distress migration for the beneficiary families has decreased.

Impact on women

The intervention has important implications for the women.

- The rise in family income has important implications for family food security of the family particularly the women .It was reported by the women that the food and nutritional security has increased for the beneficiary families.
- The time required for fuel collection has fallen down as enough biomass/ dried leaves is now available in the village
- As the migration has fallen down, the drudgery of women has decreased on the one hand as they have male members to support during the lean periods but it h also s increased on the other hand the women have to work for more hours also in their own fields.
- Water availability has increased which has reduced the drudgery of women In Basantpur the women reported that the dried river is back to life so water for bathing is available during the even up to May. However in Pitidiri the women complained that the quality of drinking water was not good and they continue to get water from the river as the water of the government tube well.
- Mahila mandals have empowered the women .Due to increased income, the level of thrift has increased and the women groups are now giving agricultural credit .In Pitidiri women have taken to cultivation by taking loans from the women SHG groups. In Basantpur the women have also taken up the sale and purchase of sabai and also helped in processing of sabai by advancing loans.
- The extra income in the hands of women has enhanced their capacity of decision making as one women in Basantpur stated that earlier for small sums of money they had to depend on their men folks now they can take decisions as the formation of SHG along with rise in their income from natural resources has helped in their autonomy .

Education and enrolment of children

The district is one of the least literate districts in the state. There have been efforts from the government in terms of increasing the access to education. Mid day meal has also been started in the project villages. In the sample villages, it was reported that the enrolment has increased .The expenditure on education has also increased for the beneficiary families Some of the respondents confided that the expenditure on education has increased as now they can afford it. The reduction in migration has also helped in improving .The attendance also.

Health

Health has been of the important concerns in the area .Malaria has been big problem The expenditure on health has increased .But he access of quality health services is low in the area .In Pitidiri , the RMP has now started sitting regularly after the increase in income in the village. The improvement in water availability has reduced the incidence of diarrhea has decreased but the quality of drinking water happens to be an area of concern.

Youth club

Youth clubs have been central to the intervention in the project areas .They happen to be initiators, implementators, motivators and guides for the project .SVT itself has emerged

out of the youth club thinking and urge for doing something for the development of the society .The basic function of the youth clubs had been organizing of various puja, sports and cultural festivals ,jatra .It was for the first time in the project that such activities was carried on The youth clubs mobilized people having wasteland and motivated them to allow them to intervene .The expenditure was made through them The youth clubs also developed the sharing mechanisms in the initial phases of the project Fencing in such projects is important This is also provided in the initial phases. Youth club continues to play important role even now. It was realized that the maintenance also requires fund so now new funding and sharing arrangements have been tried especially in the case of tanks when the sharing is now for 5 years .SVT, the village organizations and the landowners are now joint beneficiaries of the project. In some villages there is overlap between SVT and the youth club the members are not mutually exclusive .The youth clubs had more acceptability as they happen to be non political organization .The level of politicalisation is considerably high in the villages of W .Bengal .Political rivalry is also very high on the ideological levels.

One of the important impacts in the project area has been that the youth clubs have been sensitized in terms of need for development and regeneration of natural resources .The youth clubs have lately started giving credit for agriculture and other purpose. But the main weakness has been that the participation in the clubs is limited in the villages all the youth are not members. The clubs are basically all male organization hence gender needs are overlooked. The clubs are yet to become very organized .The accounts with the bank has not been opened in many cases .The cash is kept with some members and the revenue generated continues to be used primarily in cultural and social activities which continue to be primary focus The villagers hardly know about the income and expenditure of these clubs.

Replicability and acceptance of the models

Another important impact of the interventions has been that other funding agencies have also funded similar interventions in collaboration with SVT. The replication possibilities with funding support has increased .CRS has adopted the model in 12 villages .CASA ahs also financed some of the interventions the possibility of replication with other funding agencies can be tried which will help in the spread of the models.

Replicability and possibilities of individual private investment / bank financing of the interventions models

The interventions have been supported fully by SPWD for all the models .The direct financial contributions of the beneficiaries has been minimal .After the benefits have been observed and experienced by the direct and indirect beneficiaries, one of the important questions is whether the interventions are replicable and whether individual private investment would be coming forth or some sharing mechanisms of cost be evolved.? The investment and cost sharing depends on a number of factors like abilities to pay ,risk and returns, gestation period , period of return, cash returns ,directly accessible benefits , externalities, fencing of the assets The .replicability of the models

depends on the expected stream of benefits arising out in the future and the technical feasibility of the interventions. In terms of the technical feasibility and the results obtained the interventions are feasible have resulted into the more or less desired output in terms of regeneration of natural resources. One of the basic constraints in the replication is the low investment and risk taking capacity of the land owners in the area. A large part of the wasteland is owned by the poorer communities, a considerable number of whom are surviving on day to day to basis at a very low level of income without any savings.

Staggered trench/30X40 model

In both of these intervention, the gestation period is higher in which returns start coming , the risks are moderate but the risks of poaching increase as the plants grow up the direct cash benefits are around Rs 500-750 per bigha. The indirect/ non quantifiable benefits in terms of water recharge, soil conservation, moisture retention are relatively higher .As result of high externalities and social benefits risks of free riders the likelihood of private investment reducing the probability of private investment in the initial phases .However, once the outputs start coming people are willing to invest in plantation and in cultivation of grasses like sabai. Thus for replication some outside agency like youth club or NGO can take the risks initial capital investment with clear sharing mechanisms and also well defined risk sharing. One of the models has been by Tagore society which has taken over the land, made the investment and has also taken the responsibility of fencing and protecting the plantation .The output would be shared when the plants are harvested. But this has an important risk of policy changes or the trees not being allowed to felled by the forest and concerned departments .The other model of SVT can also be used with modifications when after three years a part of income is shared with the SVT which can start repaying the loans if taken or build up a corpus for replication of the model if grant has been received for the same.

However, in the light of the strong externalities and distributive implications of the interventions, the public investment on such model is highly desirable. NREGA can be a very important opportunity for this for which some advocacy is requires for the modifications. Presently under the act the treatment of land, afforestation and water structures are possible on government land, forest land, common land, land of SC/ST, Indira awas beneficiaries, beneficiaries of land reforms .A large chunk of land is covered by the above categories. In the case of land of SC/ST a little ambiguity continues for which advocacy is required. It is important that a joint planning is done for treating the land and water structures which will go along way in reducing poverty.

Hapa/Wells

Hapas/wells are quite useful for the individual families but the investment may not be possible by the poor households. On the average the investment may be Rs.15000 to Rs.25000. The returns vary depending on the land holdings of the poor household. In both the interventions the gestation period is low and they add to the family income substantially. The direct benefits are high as the asset is controlled by The risks are relatively less if land is treated for water recharge at all levels The income is regular .In

the two intervention for replcability soft loans of longer durations with an inbuilt subsidy component can be tried .A number of government schemes are there .The linkages can be developed.

5% model

The usefulness of the model is for getting emergency support irrigation and water for plantation on bunds. In the initial phases the natural acceptance was less as the structure was rigid .the farmers felt that the depth of 3 ½ feet was insufficient for storage of sufficient water and they did not want thee pits in all plots if they had contiguous plots. The gains from this model have been moderate and it is unlikely that private investment will come about. The model has been modified in the newer areas by increasing the depth and by having one bigger dimension pit for contiguous plots. It is also important to note that due to successive drought since almost few years the farmers find that the model is not of much use as part of the land is lost for ever .However, this can be tried for the SC and AT farmers , land reform beneficiaries and with NREGA funding as land improvement.

Tanks and LI

Tanks and LI are two important interventions where the possibility of replication with private investment is relatively higher .This is primarily because tanks results into cash incomes from fishing. LI results into intensive agriculture particularly from vegetables giving regular cash income if there is untapped perennial source of water nearby .The returns have been regular in some villages .In Pitidiri, the returns have been regular .In Nawadih there happens to be enough water but the machine was not working and some pipes were stolen so a new pump was being installed. In Bagdega, the water is insufficient so the desired result has not come. In Kuruktuka the capacity of land is limited for LI to succeed. In Ghastoria also LI has limited success. The possibilities of bank and institutional finance is relatively higher in these two interventions and the replicablity is also higher the cash income has been high and new areas have been taken into cultivation. The average profits have been higher in vegetables as compared to wheat. The farmer wise profit for wheat, mustard, and vegetable is given in Annexure II.

Table 3.1 Crop area and profit per bigha in Pitidiri LI

CROPS	No. of Farmers	Total Acre (in Bigha)	Ave. Profit Per Bigha	S.D.
Wheat	33	51	448.48	224.95
Mustard Oil	25	28	1875.66	888.7
Cucumber	06	08	9572.0	2196.5
Karela	05	03	1811.6	1005.0
CROPS	No. of Farmers	Total Acre (in Bigha)	Ave. Profit Per Bigha	S.D.
Wheat	33	51	448.48	224.95
Mustard Oil	25	28	1875.66	888.7
Cucumber	06	08	9572.0	2196.5
Karela	05	03	1811.6	1005.0

Table 3.2 Crop Areas from LI (Additional Crop Areas in LI)

Village Name	Mustard	potato	Wheat	Vegetables	Area in Bighas (Total)
Nowadih	17.5	25	23	16.5	84
Shalghati	31.5	11	16.5	3.5	62.5
Bagbega	15	7	3.5	0	25.5
Pitdiri	28	-	51	11	90

The intervention has been quite successful and has been able to create models which have potentials of replication .The success of the interventions have varied both due to physical and socio economic reasons. The models have potentials of replication. The successes of 30x40, staggered trenches, plantation, Hapas and tanks have been satisfactory but 5% model seems to be only partial success. But it will require public investment for improving even the private lands as the externalities are quite high. The intervention requires a comprehensive integrated treatment of all categories of wasteland belonging to government, forest and individuals .The treatment of public land and the land belonging to SC and STs ,Indira Awas beneficiaries and land reform beneficiaries can well be carried on under NREGA under which such districts are covered. An integrated approach is also required for treating all lands, getting private investment especially in plantation with suitable subsidies, loaning and simultaneous development of public land under JFM .

ANNEXURE-I

DISTRICT PROFILE OF PURULIA

1. Location:

Latitude		Longitude	
North	South	East	West
23° 43'	22° 43'	86° 54'	85° 49'
N	N	E	E

2. Subdivision: (Three) 1. Sadar East 2. Sader West 3. Raghunathpur.

Total Block	:	20	**Total Population**	:	2535278
Total GP	:	170	Male	:	1298079
			Female	:	1237154
Total GS	:	1360			
Total Mouza	:	2685	**SC**	:	489783 (19.22%)
			Male	:	251998
			Female	:	237785
Total Family	:	452092	**ST**	:	4882243 (20.78%)
Total Area	**:**	6259 Sq.Km.			
			Male	:	245781
			Female	:	236442
Up land	:	35%	**Total no of**	:	197381 (43.65%)
Medium land	:	35%	**BPL family**		
M.Low land	:	10%	SC	:	(40.64%)
Low land	:	15%			
Water Body	:	5%	ST	:	(47.66%)

W. Headed family : 8573

P. Handicapped : 1676

SF : 28923

MF : 42728

R. Artisans : 11303

<u>Stream</u> :

1. **Kansabati**
2. **Kumari**
3. **Shilabati**
4. **Darkeshwar**
5. **Totko**
6. **Gowai**

Source : District Census-2001.

ANNEXURE-II

CROP CULTIVATION AND PROFITS

	Wheat cultivation IN PITIDIRI LI					
Name of the Benificary	Area	Production	Total	Total Amount	Profit	pr/bigha
	(Bigha)	in qunt.	Expenses			
Kamalakanta Mahato	1.0	2	1029	1400	371	371.0
Mahananda Mahato	8.0	1	554	700	146	18.3
Hrishikesh Mahato	1.5	3.2	1448	2240	792	528.0
Laxman Mahato	1.0	1	1029	700	-329	-329.0
Pasupati Mahato	1.0	2.1	970	1470	500	500.0
Naren Mahato	0.5	1.15	568	805	237	474.0
Chutulal Mahato	0.5	1	564	700	136	272.0
Niranjan Mahato	1.5	3.5	1645	2450	805	536.7
Nemai Sing	0.5	1.05	549	735	186	372.0
Diptimedha Mahato	0.5	1.15	536	805	269	538.0
Debendranath Mahato	2.0	4.3	2100	3010	910	455.0
Bijoy Krishna Mahato	1.0	2.1	1029	1470	441	441.0
Chandramohan Mahato	1.0	2	1089	1400	311	311.0
Ajit Mahato	3.0	8	3002	5600	2598	866.0
Biswanath Mahato	3.0	7	3144	4900	1756	585.3
Mahadev Mahato	0.5	1	550	700	150	300.0
Matar Mahato	1.0	2.15	1080	1505	425	425.0
Sagar Mahato	2.5	5.5	2770	3850	1080	432.0
Bhusan Mahato	1.5	3.2	1571	2240	669	446.0
Banamali Mahato	1.0	2.25	1094	1575	481	481.0
Kiriti Mahato	1.0	2.2	1135	1540	405	405.0
Rabilochan Mahato	1.0	2.1	1014	1470	456	456.0
Abinash Mahato	1.5	3.15	1615	2205	590	393.3
Nabakishore Mahato	1.5	3.1	1625	2170	545	363.3
Birinchi Mahato	1.0	2	945	1400	455	455.0
Ananda Mahato	3.0	7	3301	4900	1599	533.0
Kritibas Mahato	1.0	2.2	1093	1540	447	447.0
Amulya Mahato	1.0	2.5	1039	1750	711	711.0
Sanjoy Mahato	3.0	7	3165	4900	1735	578.3
Mangal Mahato	0.5	1.1	580	770	190	380.0
Krishnapada Mahato	1.0	2.2	1071	1540	469	469.0
Haradhan Mahato	1.0	2.25	1120	1575	455	455.0
Prabhat Mahato	1.0	3.1	1041	2170	1129	1129.0
Birbal Mahato	1.0	2.15	1099	1505	406	406.0
Total	51	96.7	46164	67690	21526	

MUSTARD

Name of the Benificary	Area	Production	Total	Total Amount	Profit	PROFIT PER BIGHA
	(Bigha)	in kg	Expenses			
Kamalakanta Mahato	0.5	50	360	1000	640	1280
Mahananda Mahato	0.5	40	275	800	525	1050
Hrishikesh Mahato	1	120	645	2400	1755	1755
Laxman Mahato	1	150	695	3000	2305	2305
Pasupati Mahato	0.5	45	335	900	565	1130
Chutulal Mahato	0.5	40	365	800	435	870
Naren Mahato	0.5	40	350	800	450	900
Niranjan Mahato	1	150	650	3000	2350	2350
Chandramohan Mahato	1	150	700	3000	2300	2300
Ajit Mahato	2	350	1210	7000	5790	2895
Biswanath Mahato	2	300	1370	6000	4630	2315
Matar Mahato	0.5	150	500	3000	2500	5000
Sagar Mahato	1	60	495	1200	705	705
Banamali Mahato	0.5	50	310	1000	690	1380
Kiriti Mahato	0.5	40	335	800	465	930
Rabilochan Mahato	1	90	645	1800	1155	1155
Laxmikanta Mahato	1	100	700	2000	1300	1300
Birinchi Mahato	1	125	660	2500	1840	1840
Narasing Mahato	1	110	600	2200	1600	1600
Abinash Mahato	1	150	665	3000	2335	2335
Arun Mahato	1	140	685	2800	2115	2115
Ananda Mahato	2	250	1210	5000	3790	1895
Kritibas Mahato	1	150	525	3000	2475	2475
Sanjoy Mahato	2	300	1160	6000	4840	2420
Debdas Mahato	2	250	1010	5000	3990	1995
Goutam Mahato	2	300	1320	6000	4680	2340
Total	28	3700	17775	74000	56225	2008.036