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# ‘Environmental approaches of resource owners in open caste coal mining area of Bokaro river basin: challenges and community framework for its redressal’.

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This paper is an anthology of the learning during intervention made under ‘biodiversity conservation through community based natural resource management in Bokaro river basin’ project in Jharkhand state. The Bokaro river sub-basin is part of the Upper-Damodar river basin. The Bokaro river meets Konar river one of the major tributaries of Damodar, and at their confluence at Kathara is located the Bokaro thermal power station (one of the oldest thermal power station of India). The river catchment has several coal fields, coal washeries and coal loading points dotting the landscape. With most of the area under open cast mines, which has since disturbed the ecosystem, changed the flow regime, lead to immigration and change in land use there has been a detrimental effect on local ecosystem.

The project has been an effort to map out the matrix of factors affecting resource degradation and to take steps to restore bio-diversity and livelihoods through community effort. The project was implemented in 11 villages of Bokaro river basin and the villages were selected from upstream, mid stream and downstream areas of Bokaro basin overlapping with coal mining regions. This paper specifically deals with the major challenges in the basin for different stakeholders, linkages between biodiversity and different kinds of livelihood, the efforts made to capacitate and generate interest within the community for understanding biodiversity vis-à-vis livelihood and to work accordingly for eco-restoration. It also captures the efforts for facilitating habitats (aquatic and terrestrial), rejuvenating soils (agricultural and forest) for sustainable livelihood and community institutions for conservation and management. The unique experiences of economic approaches of sustainability through usage of bio-friendly equipment, improved agricultural practices and involvement of panchayat leaders are creating rays of hope to work in positive direction. Some economics of small holders from available resources are covered in the paper to highlight the eco-friendly interventions. The community led institutional arrangements in the name of Biodiversity Management Committee (BMC), Women Self Help Groups (WSHGs) and Resource users group (RUGs) are playing pivotal role in reverting the local ecological degradation. Some glimpses of effort are covered in the paper.

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## **Environmental approaches of resource owners in open caste coal mining area of Bokaro river basin: challenges and community framework for its redressal**

### **1 Background:**

The state of Jharkhand is home to as much as thirty tribes, rich in mineral wealth and forest cover. Munda, Ho, Oraon and Santhal are the major tribes. Physio-graphically the state can be divided into 4 zones Santhal Pargana, North Chottanagpur plateau, South Chotanagpur plateau and Palamau. The area is undulating, and receives more than 1200mm as average annual rainfall. About forty percent mineral of the country is found in this state. The region accounts for 35.5 percent of the country's coal reserve, 90 % of its coking coal deposit, 40% of its copper, 22% of its iron ore, 90% of its mica and huge deposit of bauxite quartz and ceramics. The total population of the state 26.91 million of which 77.8 percent is rural population and 22.2 urban-population. The tribal population of the state is quite high and constitutes 27.5 percent of the state population. Jharkhand is richly endowed with forest, mineral and water resources but paradoxically is also the poorest region of the country.

Historically the main source of livelihood has been from forest and agriculture. Most rural households are engaged in subsistence farming under adverse and risky environmental conditions. The families are often engaged in low paying non-agricultural activities. The livelihood basket consists of agriculture (that meets food security only for few months in a year), income from forest (fuel wood and NTFP<sup>3</sup>), livestock, and wage labour (local as well as migration). The weak links in the livelihood basket are low agricultural productivity, small and fragmented land holding, poor soil and water resource condition, degraded forest, lack of access to quality and certified seeds, fertilizers/compost, poorly/ non-managed CPR, lack of marketing linkages for forest produce and non availability of local wage labour.

According to the Wasteland atlas of National Remote Sensing Agency (NRSA-2005), Jharkhand has the highest area under wasteland followed by Orissa, Bihar and West Bengal in the eastern region. In Jharkhand 70% of the total wasteland belongs to the category of degraded forest and 17% wasteland is under the category land with scrub. *Jharkhand in particular has the second*

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<sup>3</sup> Non Timber Forest Produce

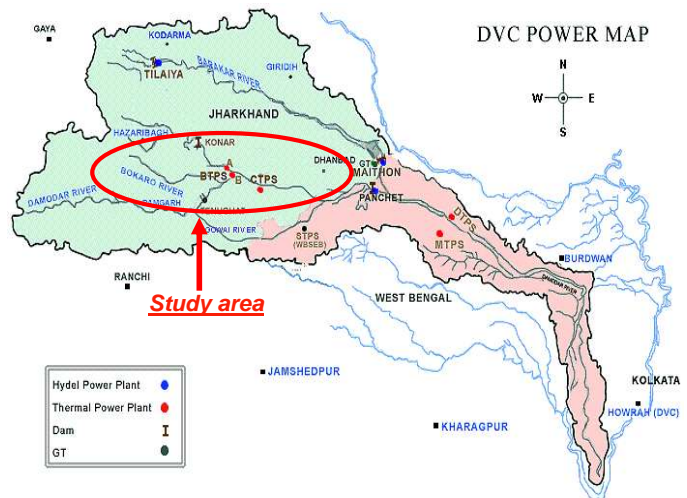
*highest industrial wasteland in the country. Nationally the area under mining and industrial waste has increased from 1252.13 sq Km to 1977.35 sq km in a span of just three years between 2000 and 2003 and much of it is contributed by the eastern region. This has created more problems with displacement of people, loss of biodiversity, and change in land use and land form. With the increasing demand of the economy more mining companies are setting up units in the state, there is an urgent need to involve the community in restoration of mined dumps and wastelands and prepare a model wherein all the stakeholders are involved to save the fragile ecosystem of the area.*

### 1.1 Area and the problem

Damodar river sub-basin is one of oldest mined sub-basin of the country. The area has been witnessing mining before independence. Damodar has a catchment area of 990780 ha. Starting from Chulhapani in Latehar district, it meets Bhagirathi near Kolkata. Major tributaries of Damodar are **Konar**, Barakar, , Haharo, Devnad, Dhopdhab, Marmaha and Jamunia.

**The study area of the titles article lies in the Bokaro River sub basin a tributary of Konar River.**

The area is confined to Bokaro river sub-basin which falls in Hazaribagh, Ramgarh & Bokaro districts. Geographic bounds are between latitude (+23, 46.0. to +23, 56 approx) and longitude (+85, 15.0 to 85, 55 approx). The Bokaro river basin is part of the Damodar river sub-basin. The Bokaro river meets Konar river one of the major tributaries of Damodar, and at their confluence at Kathara is located at the Bokaro thermal power station (one of the oldest thermal power station of India). It



was closed following orders of the Supreme Court. A new thermal power station Tenughat Thermal Power Station (TPC) is located just beside it. This has been disposing the fly ash in Konar. The fly ash is also being transported to fill the open cast mines. The Bokaro River originates from Siso Protected Forest in Hazaribagh, and is fed with **chotha nala** flowing from Hesagadha on the south and **Chutua nala** in the north. The river flows from Bansadih reserved

forest and Monemorha protected forest on the upstream while draining Jhumra hills, it passes between the Jhumra pahar and Lugu pahar to meet Konar River near Kathara. The river catchment has a number of coal fields namely West Bokaro, Ghato, Lalpania and Parej coal field. Within the catchment there are coal washeries at Basantpur and Kedla, with a number of coal loading points dotting the landscape. The river caters mostly to industries with no major or minor irrigation projects on it. With most of the area under open cast mines, which has since disturbed the ecosystem, changed the flow regime, lead to immigration and change in land use there has been a detrimental effect on agriculture.

Eleven villages from the catchment area of the Bokaro river basin have been covered in this study. These villages are the

part of project namely ***'Biodiversity conservation through community based natural resource management'***<sup>4</sup>.

The West Bokaro coalfield straddles the Bokaro River with mines washeries and power plant on its bank. The river has borne the brunt of pollution. The



*Satellite imagery of Bokaro river basin (Source: Google map)*

The livelihood basket of the people consisted of agriculture and forest in the early 20<sup>th</sup> century but with advent of mining it has changed. There has been heavy influx of people in the area and people have taken to mining and other service as vocations. The indiscriminate and unscientific mining and absence of post mining treatment and management of mined areas are making the fragile ecosystems more vulnerable to environmental degradation and leading to large scale land cover/land use changes. The current modus operandi of surface mining in the area generates huge quantity of mine spoil or overburden (consolidated and unconsolidated materials overlying the coal seam) in the form of gravels, rocks, sand, soil, etc., which are dumped over a large area adjacent to the mine pits. The dumping of overburden and coal destroys the surrounding vegetation and leads to severe soil and water pollution. Large scale denudation of forest cover,

<sup>4</sup> It is UNDP/MoEF/CCF-II/IFP supported project addressing biodiversity conservation

scarcity of water, pollution of air, water and soil, and degradation of agricultural lands, loss of terrestrial as well as aquatic biodiversity are some of the environmental implications of coal mining. The ecology of the area has also been threatened by unprecedented rise in human population.

The shrinking of agricultural land due to acquisition for mining, undulating topography and non remunerative agriculture added to people's alienation from land and has caused a great damage to the biodiversity of the region. The people of areas above the mining areas are still dependent on agriculture. Though the focus is shifting back to agriculture, as opportunities of jobs in mines and other industries is shrinking. The coal mines which have destroyed the biodiversity also presents an opportunity for restoration of vegetation through efforts on its mines overburden dumps.

The Bokaro-river is mostly fed by small streams. The river flow is based on monsoon. Smaller streams and rivers of the area, which served as life lines for the people, are either completely disappearing or becoming seasonal. Consequently, the area is facing acute shortage of clean drinking and irrigation water.

A study of zooplankton and benthic micro invertebrate diversity of Damodar River done by Dr.



*Open caste coal mine filled with water*

Gopal Sharma (Zoological Survey of India) recommends action to arrest fast depleting aquatic biodiversity. The study found out that the species richness (number) was less than 5 for Bokaro-river and its sampling points. The zooplankton richness was 8 at Gomia and below the bokaro steel plant reduced to less than 5. Reasons are high levels of pollution and very less lean season flow. The situation warrants action for improving vegetation on uplands, water conservation and reclaiming of wastelands.

**2. Challenges for stakeholders (community, mining companies, Civil society, scientific community in the form of ...overburden dumps, poor soil... water bodies..unused...poor soil ...agriculture, ...)**

The intervention area consists of villages namely Sarwaha, Keribanda, Toyra, Gargali, Govindpur, KK- Basodi, Pundi, Bongahara, Semra, Parej and Siyari. These villages were rich in biodiversity and natural resources before mining activities. The Santhal tribe is in majority in the area followed by agricultural community Mahto. The other local communities are Birhor<sup>5</sup> and Turi<sup>6</sup> tribes which are mainly forest dependent. These communities have



*Open caste mining and ugly topography*

Agriculture as major source of livelihood, but in current scenario they are mostly working in coal mines as laborer. The road construction, railway construction and building construction are the other sources of livelihood which is available for them. Most of the villages mentioned above are falling in core mining area. Coal is the major mineral which is available in this basin. The lands of these villages are acquired by the mining companies namely Central Coalfields Limited (CCL) and Tata Steel so the land left for agriculture and other livelihood activities are less. Several families whose all the land was acquired are left with no options, So they are selling coal by extracting from unused coal mines or working as daily labour in the mines or in nearby markets. The area is full of unused open coal mines debris also called overburden dumps, big water bodies (old open caste mines), denuded forest, distorted topography, Vegetation with coal dust over it and fields, water-bodies full of coal dust. In habitation area cracked walls due to blast in nearby mining areas are also very common features.

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<sup>5</sup> Primitive Tribal Group

<sup>6</sup> A forest based community depends on Bamboo for their livelihood

### ***Trend analysis of land use changes in Bokaro river basin:***

A study was conducted by SPWD in the year 2009 for DoLR<sup>7</sup> under Ministry of Rural development. The study has tried to access the change in status of different category of lands in Bokaro river basin. The findings are given in the table below:

<i>SL</i>	<i>Class name</i>	<i>Area in sq. km</i>		
		<i>2000</i>	<i>2004</i>	<i>2008</i>
<i>1</i>	<i>Settlement</i>	<i>15.49</i>	<i>20.08</i>	<i>27.94</i>
<i>2</i>	<i>Forest</i>	<i>335.95</i>	<i>330.71</i>	<i>322.21</i>
<i>3</i>	<i>Wastelands</i>	<i>48.46</i>	<i>52.95</i>	<i>66.41</i>
<i>4</i>	<i>Non Forest</i>	<i>249.15</i>	<i>245.31</i>	<i>232.54</i>
	<i>Total</i>	<i>649</i>	<i>649</i>	<i>649</i>

*The wastelands category was understood in more details are:*

<i>SL</i>	<i>Land type</i>	<i>Area in sq km.</i>
<i>1</i>	<i>Land with /without scrub</i>	<i>2.43</i>
<i>2</i>	<i>Waterlogged / Marshy area</i>	<i>1.18</i>
<i>3</i>	<i>Degraded forest</i>	<i>43.19</i>
<i>4</i>	<i>Mining Industrial waste</i>	<i>18.51 (27.8%)</i>
<i>5</i>	<i>Barren rock</i>	<i>1.1</i>

Apart of local population the new crowd has also increased in and around the mining colonies namely Charhi, Ghato-tanr, Kujju etc. The urbanization of these areas has increased the demands of daily need of fuel-wood, firewood, agricultural products and mainly water. These all have affected the local eco-system very badly. Though most of the people in the area is using coal as major fuel due to its plenty of availability and cheaper in cost but it also created a mis-use of coal and so the per capita energy consumption in the area is higher than other areas.

### **3 Environmental approaches for Linking biodiversity & livelihoods**

Micro planning activities through Participatory Rural Appraisal has been carried out in identified 11 villages which were selected as a representative sample for the study of Bokaro River Sub-Basin. With proper understanding of their Social- cum Resource map, the problems faced by the community used to be written down separately with their possible solutions. These solutions

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<sup>7</sup> Department of Land Resources



were the potential activities that were carried out in these villages. Revenue maps of the villages were also used to demarcate the areas where any kind of activity could be carried out. It was possible only in some of the villages, as availability of revenue maps was an issue in some of the villages, while in others the community could not identify the areas in the revenue map. Nevertheless the activities were marked and represented in the resource map.

Three of the eleven villages namely Pundi, Parej, Bongahara are the severely affected areas due to mining. Parej has no land remaining for the village. C.C.L has taken almost the entire land under its jurisdiction and people have been paid compensation for the same along with staying arrangements in other areas. So migration from the village is in its full swing. A visit to the place at any time of the day, would fail to have an interaction with the community. The members work as laborers in the dumping site and hence with no proper time for work, they are away most of the time. Apart from C.C.L, Tata Steel also has its mine in the area, quite adjacent to the village Pundi. The village Bongahara is near to the West Bokaro Mines. The rest of the villages like Gargali, Gobindpur, Simra, Toerra, Keribanda etc. do not have active mines any more. Whatever amount of coal is remaining there, it is being used by the local community for their household purpose and for sale too but at small scale. The closed mines now have been filled by water. These mines are very deep and hold lots of water. Restoration of biodiversity in these villages is possible. Forest department has already started taking steps through plantation. As far as the severely affected villages are concerned, biodiversity is getting lost at a very rapid pace. Moreover, these villages do not have enough space of their own to carry out any restoration activity. Biodiversity conservation is a real challenge for these villages.

The understanding of the problems about the village biodiversity, land, water and vegetation was suggesting community participation as key word to initiate the revival plan for the area. Hence the community itself was asked to suggest measures to counter these issues keeping in mind the ultimate objective of Biodiversity Conservation and restoration. The area of the village, type of land, land ownership, the purpose of the activity, beneficiaries, scale of activity etc. are some of the issues that were kept in mind while preparing the list of activities in each of these villages. In fact the process of micro-planning was itself an initial task through which the whole community was involved in the process of designing the revival plan for their own villages. There were

activities to understand the critical issues of the area in details and a capacity building process was part of the intervention in following areas;

- Training of micro-plan preparation
- Community micro plan preparation
- Preparation of Peoples' Biodiversity Register (PBRs)
- Formation/ revival of community based institutions

Different activities serving the same purpose were proposed. It was observed that water problem is very severe and if it is resolved then the other issues can take care of themselves.

#### **4. Community based awareness process (capacity building, PBR preparation)**

Communities residing in the study villages were the key players who were targeted to meet the project objective of Biodiversity conservation. The two important aspects were kept in priority;

- ❖ Homogeneity of people in the formed group
- ❖ Linking people with viable livelihood opportunities

The male members of the area migrate to nearby places for work in places such as mines, road and rail constructions and other opportunities in urban areas. The women were available in the villages and they have to face the real hardship while doing agriculture, cooking food or maintaining cattle. To meet the urgent regular need of cash for day to day life the women self help groups was formed in most of the studied villages. The livelihood support was promoted like poultry, piggery, and fisheries by keeping human, animal relation in food cycle and also in the local ecosystem. The application was chemical fertilizer has affected the soil biodiversity by killing microbial living organisms. Vermi-compost units were promoted which has helped the soil to regain its natural strength and initiated the revival process. The impact of organic fertilizer is being seen and realised by the local mass and they are now becoming aware about their own nutritional intake in their food. The institution created/ revived in the study area are:

SL	Institution	Nos.	Members	Role
1	Women Self Help Group	15	210	<ul style="list-style-type: none"> <li>• Saving and inter loaning</li> </ul>
2	Biodiversity management committee	11	176	<ul style="list-style-type: none"> <li>• PBR preparation and updation</li> <li>• Advocate forestation and conservation of local biodiversity (plantation)</li> </ul>
3	Lift Irrigation committee	02	23	<ul style="list-style-type: none"> <li>• LI maintenance and promotion of organic agriculture</li> </ul>
4	Pond / Check dam / Treddle pumd users groups	08	168	<ul style="list-style-type: none"> <li>• Conservation and management of water for agriculture</li> </ul>

#### **4.1 The activities decided upon in most of the villages through a consensus:**

##### **4.1.1 Plantation of fruit bearing trees**

With decreasing forest cover and consequential loosening of soil and receding water table, plantation activity can help restoring these crucial aspects of biodiversity. Plantation of fruit bearing trees is important as a sustainable source of livelihood as well. To some extent they can serve the fuel wood needs of the villages. Plantation activities have been proposed in villages like *Semra, Kekebasaudi, Gobindpur, Toerra, Siyari and Keribanda*. Such activities were proposed by the community in *Parej and Pundi* as well but in these villages there is scarcity of community land which is continuously being given to C.C.L for mining operations. The above mentioned villages are facing acute water scarcity. The ponds and wells need renovation and are not able to retain water.

##### **4.1.2 Lift Irrigation**

Lift irrigation is a very practical, efficient and effective way of utilizing the water of a closed mine which is no more in use. These types of mines are very deep and hold huge quantity of water. These mines have water throughout the year which is sufficient to solve the lack of irrigation facilities in the village. The drawback is that water can get wasted and there will be no check on its use. Point system can reduce wastage and will ensure utilization as per the use. Many points can be established in fields throughout the village. When one point is opened, the other can be kept closed. It will reduce wastage and ensure effective utilization of available water.

##### **4.1.3 Renovation of existing ponds**

A well constructed pond is a beautiful addition to any landscape apart from flourishing the biodiversity. They can be a potential water sources for livestock and irrigation, as well a source of livelihood for the community by promoting fishing. Renovation of existing ponds is required when they fail structurally, i.e. the water level goes down by several feet. Same has happened in many of the villages under study. Increasing the depth of the ponds in such cases can help them retain water for a larger period of time.

Renovation of ponds has been proposed in almost all the villages. Creation of a new pond is very expensive and at the same time will go through the same problems which the existing ones are

going through. So repairing the older ones is a far more economical option and sustainable too. The site that has been chosen in almost all the villages are ponds which are near to either the forested uplands or agricultural fields so that sustaining water for a longer duration is made possible. Also the water table will slowly rise increasing the amount of water in these ponds. In many villages where the plantation activity has been proposed, usually there is a pond nearby. So in case the pond needs to be revived, plantation activity will help in sustaining it. Renovation of ponds will serve the following purposes:

## **5. Biodiversity Conservation**

Community participation has been the key word in Micro Planning activity. Hence the community itself was asked to suggest measures to counter these issues keeping in mind the ultimate objective of Biodiversity Conservation and restoration. The area of the village, type of land, land ownership, the purpose of the activity, beneficiaries, scale of activity etc. are some of the issues that were kept in mind while preparing the list of activities in each of these villages.

### **5.1 Recognizing cultural strength which supports biodiversity:**

While planning for the villages certain important component was always kept in priority as it was having strong relation with the cultural part of the people. Like the Jaherthan<sup>8</sup> in Semra was fenced with the people's support and contribution from the project. Similarly while doing biodiversity conservation activity the plantation of bamboo was given priority in patches of Turi community in village Gargali. Sindwar was planted as bund plant in the entire plantation site as it has symbiotic relation with local people and plants too.

### **5.2. Facilitating habitats:**

The local habitats of terrestrial biodiversity and aquatic biodiversity were addressed with priority and considering peoples' need through planning in participatory way. A large no of saplings were planted (18654 plants) in different plots spread in 7 villages. The plant varieties included timber, fruit and firewood varieties. The emphasis was given on plants which is the part of local biodiversity. The plants planted are Sisam (*Dalbergia sissoo*), Mango (*Mangifera indica*), Guava (*Psidium*), Sharifa (*Annona squamosa*), Gamhar (*Gmelina arborea*), Sal (*Shorea robusta*), Imli

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<sup>8</sup> Worship place of santhal tribes in villages

(Terminalia-tomentosa), Bamboo, Amla (*Emlica officinalis*), Jamun (*Syzygium cumini*), Kathal (*Artocarpus heterophyllus*), Semal (*Bombax ceiba*), Mahua (*Madhuca indica*), Karanj (*Pongamia pinnata*), Neem (*Azadirachta indica*), Kend (*Disospyros tomentosa*), Piar (*Buchnamia Lanza*), Kachnar (*Bsuhinia variegata*) & Bel (*Aegle marmelos*) etc. The survival of plantation is assured with the help of cattle proof trench. For Bund plantation Sendwar (*Vitex negundo*) was promoted on large scale along with other local species. The growth of plantation has motivated local people to do plantation by their self initiatives in their own lands. These plants were selected on in the process of PBR<sup>9</sup> preparation. Most of the plants are the part of local biodiversity so the habitats of these plants are also conserved in the process. Certain land and water conservation activities were also taken up. The plantation, creation of cattle proof trench, introduction of 5% model has resulted soil and water conservation in areas where these are introduced. The plantation was introduced as per the peoples' short term, medium term and long term needs.

The aquatic biodiversity was conserved with the process of renovation of local ponds, introduction of check-dams as water bodies, space for more water in flowing streams and 5% model as a small seasonal water bodies. A proper feed management system was practiced in standing water bodies like ponds. Lime treatment, introduction of vermi-compost and other feeds for fish fingerlings have helped the aquatic biodiversity. The varieties introduced are Rohu, Katla, Mrigal, Mangur, Silver carp, and Pothi. People have left certain ponds and not harvested the fish as they wanted them to survive and promote natural expansion.

A number of birds are seen in the paddy fields and near to water bodies. Some of the bird which were seen in the basin area are; Peacock More (*Pavo cristatus*), Vulture Gidh (*Pseudogyps bengalensis*), Koel (*Edynamis seolopaceous*), Panduk (Patridges Panduk), Hill Myna (*Aeridotheres tristix*), Parrot Tota, Wood picker, Neel kanth (Blue jay), Bulbul, Duck, Crane, Canary (Golden oriole) and Drango Koyler.

Animals are very less in the area. The habitat of wild animals are affected so their number also. The animal which are seen in the basin are; *Monkey, Peacock, Wolf, Bear, Hyena, Elephant,*

*Wild dog, and Fox.* The plantation will assure growth in no of animals and birds in coming years as their habitats are being conserved.

### **5.3 Moving towards living soils**

The introduction of certain soil and water conservation measures like introduction of 5% model in paddy fields, use of vermi- compost, plantation has increased the soil fertility by addition of more biomass in the soil. The use of System of Rice Intensification (SRI) in paddy cultivation has supported soil quality by introduction of more green manure in the field so the soil is moving towards life from death path. In vegetable fields vermin compost is used and it is maintaining the soil health. The local seed preservation



*Agriculture promotion in mining areas*

is an essential practice of each farmer. After learning intensification method they are now giving emphasis on seed preservation and treatment. The soil health improvement is promoting habitat for local edible plants. It is also increasing the microbial activities in soil so the unseen living things are getting active in the soils.

## **6. Impact on village economy:**

### **6.1 Lift Irrigation and irrigation for livelihood:**

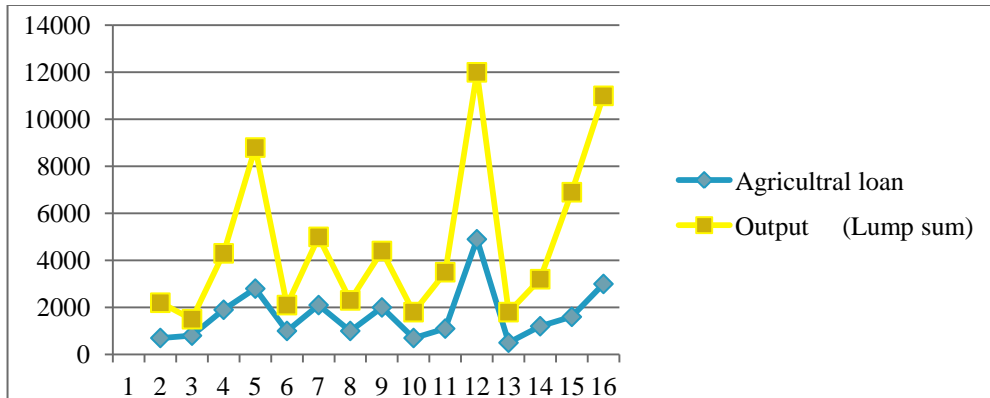
The interventions in the villages have helped local mass to add their daily income with the support of project. The total SHGs formed under the project support has saved around 3 lakhs of Rupees and they have a turnover of Rs. 2, 76,000/- in last financial year. They are easily taking credits for their daily needs and special occasions like illness, education, agricultural need, opening shops, etc. The members of LI committee have earned upto 2 lack of Rs. In last one season. The increase in paddy production from 30% to 240 % has provided food security to 84 families. The irrigation facilities created through check-dam, LI, ponds have increased irrigation in around 200 acres. The small and marginal farmers affected by mining and depending upon encroached mine land near excavated mines and doing agriculture of mines water are supported

by Surface paddle pump and bamboo paddle pump in groups. They are cultivation vegetables and meeting their daily vegetable need and also earn some revenue.

## 6.2 Self Help Group, Gender and Environment:

The 15 SHGs formed under the project support have very strongly supported the women mass in the different project villages in the form of credit facility to support their livelihood activities. The range of livelihood activities varies from agricultural need to education, entrepreneurship promotion and also sometimes for poultry and health issues. The women folk from the locality has very seriously participated in the Biodiversity conservation activities like plantation and all. We have tried to collect the information on loan taken for agriculture purpose by different SHGs and benefit out of that in last two years;

SL.	Name of SHG	Village	Total saving	Inter loaning	Agricultural loan	Purpose	Output (Lump sum)
1	Kamal mahila vikas samiti	Gargali(indrabad)	9500	7000	700	for vegetable seeds and fertilizers	2200
2	Varsha mahila vikas samiti	Gargali(indrabad)	16817	1100	800	vegetable seeds	1500
3	Laxmi mahila vikas samiti	Gargali(indrabad)	12309	10000	1900	wheat seeds	4300
4	Jyoti mahila vikas samiti	Gargali(indrabad)	13122	9000	2800	paddy and vegetable seeds	8800
5	Laxmi mahila vikas samiti	Gargali(thakurtola)	14374	11500	1000	paddy seeds and fertilizers	2100
6	Sarswati mahila vikas samiti	Garali(thakurtola)	12249	7000	2100	potato seeds	5000
7	Deepjyoti mahila vikas samiti	Govindpur	13000	10500	1000	fertilizers	2300
8	Annand mahila vikas samiti	Govindpur	11708	6000	2000	vegetable seeds	4400
9	Sarna mahila vikas samiti	KK Basodi	18417	9000	700	wheat seeds	1800
10	Puja mahila vikas samiti	KK Basodi	16881	10050	1100	paddy seeds	3500
11	Khushbu mahila vikas samiti	Sarwaha	15298	8200	4900	paddy seeds and fertilizers	12000
12	Rupa mahila vikas samiti	Pundi	8900	4300	500	Wheat seeds and fertilizer	1800
13	Bharti mahila vikas samiti	Toyera	20500	16000	1200	vegetable seeds	3200
14	Patel mahila vikas samiti	Toyera	25470	13300	1600	paddy seeds and fertilizers	6900
15	Suraj mahila vikas samiti	Toyera	32756	21500	3000	paddy seeds and fertilizers	11000
		<b>Total</b>	<b>241301</b>	<b>144450</b>	<b>25300</b>		<b>70800</b>



### 7. Constraint for local biodiversity:

The Bokaro river basin is highly eco-frazile and in the process of getting damaged day to day. Increase in mining area, more anthropogenic activities, anti environmental approach, lack of people’s participation, Non implementation of environmental management plans by mining authority, poor rehabilitation approach all together is creating serious threat for local biodiversity. The local communities have fewer lands or no lands and they have several work opportunity which gives them more money and quick money than agriculture. The mining authorities are also looking for quick money and they have no plans for reclamation of mining land. Till now after 1972 (nationalization of coal mining) no mines were reverted back to people after proper restoration. In such situation keeping community alarmed and attentive for conserving biodiversity is a real challenge.

### 8. Intervention cost and output :

The whole intervention has an important part which was its cost to initiate an impact through awareness, building institutional structures, resource document and interventions in the area of biodiversity conservation, land and water management, agriculture, aquaculture, etc. The project was for three years and its cost was Rs. 35 lakhs. The actual cost on manpower support was not possible to calculate as the community has helped to ground each component of the project with great interest. Though the provision was only 5 lakhs but its importance is far- far than this.



## 9. Environmental approached and PRIs

The way forward was indication some sustainable action to keep the issue alive and communities role. During the phasing out of the process two steps were taken by the community level created institutions. The prepared PBRs' were taken up by the community to their local village representatives namely PRI-Panchayati raj members. This document was having all detailed information about the local flora-fauna and many more natural and human resources. Since most of the local PRI members are well aware about the ecological destruction process and wanted to have some concrete action against it, so this document and project interventions were a way forward indicator for them. The event in which all PRI members, Government representatives were called was also a best platform to discuss and orient everybody about the environmental approaches of actual coal mines owner to handle the issue properly.

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