



Empowering Tribal Communities through Climate Resilient Good Agricultural Practices and Livelihood Enterprises in Eastern Ghats Region of Odisha

Compiled and Edited by

M. Madhu ■ Ch. Jyotiprava Dash ■ Charan Singh ■ D.C. Sahoo
P.P. Adhikary ■ Suresh Kumar ■ H.C. Hombegowda ■ G.B. Naik
G.W. Barla ■ S. Kindal ■ Surender Kumar



ICAR-INDIAN INSTITUTE OF SOIL AND WATER CONSERVATION (ICAR-IISWC)
Research Center, Sunabeda-763 002, Koraput, Odisha



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Team-ICAR-IISWC, RC, Sunabeda



Foreword



डॉ. सुरेश कुमार चौधरी
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Eastern Ghats region of Odisha is known for its rich and diverse tribal culture and natural resources. The Food and Agricultural Organization (FAO) in 2012 recognized the service of the communities of Koraput in ensuring food security by declaring Koraput district as a Global Agricultural Heritage Site. More than 90% of the population depends on farming for their livelihood. At present, region is facing issue of substantiality because of shifting cultivation practices, uncontrolled grazing, large-scale mining, unsustainable agricultural practices, soil erosion and over-exploitation of the forests, leading severe degradation of natural resources. Consequently, the region is in the grip of vicious cycle of land degradation-low productivity-low farm income-poverty, the situation is aggravated by climate change and increasing climate variability, manifesting in the form of frequent cyclone and extreme weather conditions.

In the region, rainfed agriculture is predominating with around 58.8% area is dependent on the vagaries of the monsoon, resulting in lower cropping intensity (116%), which is noticeably lower than that of the State (133%). Moreover, the average yields of major crops are also lower than the state level average, resulting to poor average monthly income per agricultural households, which is only Rs 2757, which is nearly 57% lower as compared to the state level average (Rs 4838/month/family).

Holistic and sustainable development of Eastern Ghats region of Odisha is of the paramount importance for ensuing food, nutritional, livelihood and ecological security of the region. There is a need to develop and disseminate climate resilience good agricultural practices for socio-economic uplifting of resource poor tribal community.

The present Book entitled “**Empowering Tribal Communities through Climate Resilient Good Agricultural Practices and Livelihood Enterprises in Eastern Ghats Region of Odisha**” provides a holistic view of various technologies and practices for achieving food and livelihood security of tribal farmers. I firmly believe that this book is of a great importance for researchers, policy planners, field functionaries, natural resource managers, farmers and other stakeholders to bring overall improvement of the region in general and tribal communities in particular.

Dated: 25th March, 2022


(S.K. Chaudhari)



Summary of Impacts



- The Food and Agriculture Organisation (FAO) of the United Nations has accorded the status of Globally Important Agricultural Heritage System (GIAHS) to the traditional agricultural system being practiced in Koraput region of Odisha. The Koraput District represents the home of 62 tribes.
- Food security, Low crop productivity and income, Traditional farming, Migration, Soil erosion and deforestation, Water scarcity for drinking and irrigation are the key issues of the tribal's.
- The climate resilient good agricultural practices and livelihood technologies were implemented in Koraput and Gajapathi district covering 48 villages (> 90% tribal population) in 8 blocks with 3638 households (15,377 population) out of which 255 are land less.

Livelihood Enterprises

- As a start-up, mushroom spawn production tribal entrepreneur was developed to support livelihood of more than 120 women's SHGs for mushroom production. Entrepreneur incremental increase in income by ₹ 30,000 per month.
- Turning Waste to Wealth: Imparted skill to 21 women's SHGs in (252 HH) 16 villages for mushroom production and supported by mushroom spawn and developing marketing linkages through Odisha Rural Development and Marketing Society (ORMAS), DRDA, Koraput. Increased annual income of each women member by ₹ 4800/- with increase in income by 13.8% (7.6 – 20.6%).
- Rearing Japanese quail for doubling income in short term has benefited a total of 72 households (HH). Average per rearing net return is ₹ 2307/-, BCR is about 1.5 – 2.5, indicating a highly profitable enterprise for a short duration of 30 days. Increasing monthly average income of farmers by 35.3% over the base month.
- Backyard poultry empowered 123 HH of tribal rural women's to generate income when harvest fails. Average per rearing net return is ₹ 4500/- with BCR (Benefits:Cost Ratio) is about 2.5-4.0 and increasing monthly average income of HH by 28.3% over the base month.

Climate Resilience Good Agricultural Technologies

- Paired row eucalyptus in agroforestry system has benefited over 48 HHs covering 65 ha. Over a period of five years, a total net returns of ₹ 1.11 lakh from agroforestry system as against ₹ 0.46 lakh from sole crop of finger millet is realized from one ha. Annual increase in family income over base year is 18.5% and net monthly returns increased from ₹ 771/- to ₹ 1854/-.
- Rehabilitation of degraded lands and enhance family income through cashew plantation has benefited over 97 HH in 90 ha. Economic returns over a period of 15 years with 15% discount rate is estimated at ₹ 21520/ha, BCR of 2.2 and internal rate of returns of 19%.
- Towards climate resilient farming through mango based agroforestry system has benefited over 211 HH in 130 ha area. Crops productivity increased by 8 – 14%, Economic returns over a period of 15 years with 15% discount rate is estimated at ₹ 26520/ha, BCR of 2.7 and Internal rate of returns of 22% with a payback period of 6 years. Increase in family income is about 19.5% over the base year.
- Diversion based irrigation has enhancing livelihood of 60 HH through crop diversification from millets to vegetables. Realised net return of ₹ 3, 50,000/- per ha within a period of 4 months (COVID-19 Lockdown period), BCR (Benefits: Cost Ratio) is about 2.3 with net profit per family per month is ₹ 10,500/- and generated additional family employment of 29 man days.

- Multiple use of water through fish farming benefited 18 HH which impacted of average family income upto ₹ 8000/- per unit and contributed to the monthly family income by 16.8%.
- Farm Ponds enhanced the climate resilience and supported a total of 5 HH. Increased net return of ₹ 23,000 to 42500/- per farm pond, Net profit per family per month of ₹ 6,500/- and generated family employment of 65 man days.
- Diversification of crops for enhancing income through use of harvested rainwater has benefited 288 HH in 76 ha area. Cropping intensity increased from 100% to 200%, Average monthly family income increased by 3800/ with increase in monthly income by 70%.
- Maximizing family income through offseason vegetable farming has benefited over 123 HH in 55 ha. Increased in yield by 15-54% with Benefit cost ratio of 2.1 to 3.5, Net increase in income by ₹ 43500/-, annual increase in family income over base year by 22.8%, Net monthly returns increased from ₹ 2586/- to ₹ 4854/- and additional family employment generation by 35-46 man days.
- Climate resilient through rainwater conservation impacted on 104 HH with increasing crop yield upto 14% and total cost of nutrient saved is about ₹ 3823/- per ha.
- Farm implements and tools reduced the drudgery & increased efficiency in farming operations of 419 HH. Man days saved over traditional practice is about 7-35, reduction in cost on cultivation by ₹ 1100 -4800/ha & contribution to the family monthly income by 3.0- 4.5%.
- Exposure to the tribal farmers on good agricultural practices has benefited over 350 HH which enhanced motivation and contributed for the adoption level of technologies.

Background

Agriculture in Odisha is characterized by low productivity on account of various factors. Agriculture is the main stay of State's economy and providing livelihood support to a large section of population (70%). Development in agriculture holds the key to socio-economic development of the state. The major goals of the agriculture sector have been food safety, food security, food quality, increase in production and productivity, conservation of environment and economic stability. The Food and Agriculture Organisation (FAO) of the United Nations has accorded the status of Globally Important Agricultural Heritage System (GIAHS) to the traditional agricultural system being practiced in Koraput region of Odisha. The Koraput District represents the home of 62 tribes. The major tribes are *Bhumia*, *Paroja*, *Kond / khond* followed by *Santal*, *Gond*, *Kolha*, *Munda* having more dominated by population and the least is *Chenchu* tribe. By occupation *Paroja* and *Bhumai* had more land or cultivation in the district. The normal rainfall of the State is 1451.2 mm. The average size of holding in the State is 1.25 ha. The small and marginal farmers constitute about 83% of the farming community.

Key Issues in Tribal Villages of the Koraput District, Odisha

- Food security
- Low income
- Migration
- Malnutrition
- Illiteracy
- Alcoholism
- Indebt
- Exploitation by outsiders
- Soil erosion and deforestation
- Water scarcity for drinking and irrigation
- Low crop productivity
- Traditional farming
- Poor market access

Objectives

The Indian Institute of Soil and Water Conservation (IISWC), Research Centre, Sunabeda, Koraput District in Odisha was established to cater the problems of Eastern Ghats in Agro Ecological Region No-12 through undertaking research, development, extension / outreach and capacity building activities in the field of soil and water conservation, water resource development and watershed management. Exclusively for the development of tribal community in the region, the Research Centre is implementing Tribal Sub-Plan (TSP) which is a centrally sponsored programme to improve the overall living standard of the tribal community in the region with the following objectives:

- (a) To empowerment of tribal community through transfer of agricultural technologies for enhancing livelihood security
- (b) To increase the socio-economic standard of the tribal community through enhancing productivity of crops and other livelihood enterprises.



Bhatta Das



Bhumia



Durua



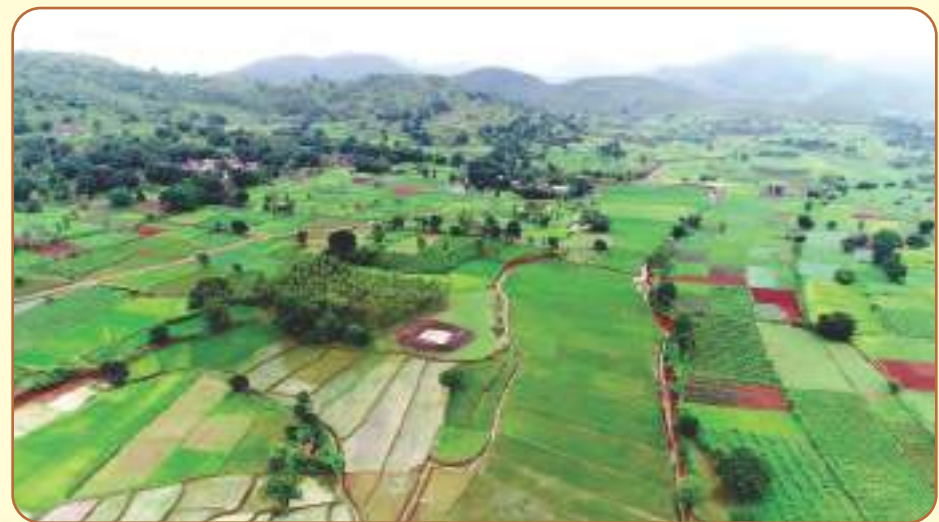
Gadaba



Omanatya



Paroja



About the Tribal Villages Under the Programme

● State	: Odisha	● Total House Holds (HH)	: 3399 + 239 = 3638	● Average Land Holding	: 2.1 ha
● District	: Koraput and Gajapati	● Total Population	: 14324 + 1053 = 15377	● Annual Family Income (₹)	: 52.6 K
● No. of Blocks	: 7 + 1	● Land Less HH	: 255	● Major Occupation	: Agriculture and labours
● Total Villages	: 43 + 5 = 48	● Tribal Population	: 90%		

S.No.	Blocks	Villages	No. HH	Tribal Population (%)	Land Less HH	Avg. Land Holding (ha)	Annual Family Income (₹ in K)
1.	Katpod	1	105	100	5	1.9	46.0
2.	Koraput	6	454	81 (75-92)	32	2.7	50.0
3.	Laxmipur	1	60	93	2	2.9	48.3
4.	Nandapur	1	86	88	4	3.5	66.9
5.	Narayanpatnam	5	372	98 (91-100)	30	0.8	37.0
6.	Pottangi	4	197	100	8	2.2	65.5
7.	Semiliguda	25	2125	89 (62-100)	159	1.9	71.7
8.	R-Udayagiri (Gajapati District)	5	239	100	15	1.3	35.2
	Total	48	3638	90 (62-100)	255	2.1	52.6



Technological Interventions for Tribal Empowerment

The technological interventions are transferred and demonstrated for empowerment of tribal communities to enhance livelihood security and socio-economic status.

● Livelihood Enhancement

- Mushroom Spawn Production
- Mushroom Production
- Rearing of Japanese Quail
- Backyard Poultry
- Fish Farming

● Productivity Enhancement

- Vegetable Farming
- Mango with Conservation Measures
- Cashew with Conservation Measures
- Kitchen Gardens
- Agroforestry systems

● Crop Diversification through Water Governance

- Diversion Based Irrigation
- Water Lifting Pumps
- Sprinklers Guns

● Resource Conservation for Sustainability

- Field Bunding
- Contour Bunding
- Stone Bunding
- Brushwood Check Dam
- Loose Boulder Check Dam

● Farm Tools and Equipments for Reducing Drudgery

- Tools and Implements
- Power Tillers

● Awareness and Skill Development

● Convergence Interventions



Startup:- Mushroom Spawn Production Unit- To Produce Wealth from Waste

Aim

- To enhance livelihood of the small and marginal farmers and landless resource poor community of tribal villages.

Beneficiary

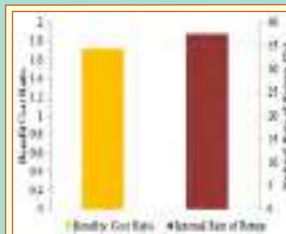
- Shri Hari Pangi and his family, Tentuliguda village (*Kandha* Tribe), Pottangi Block, Koraput district, Odisha.

Description of intervention

- Trained on quality mushroom spawn production at M.S. Swaminathan Research Centre Foundation (MSSRF), Jeypore, Koraput under Tribal Sub Plan (TSP) in 2014.
- In 2015, ICAR-IISWC, Research Centre, Koraput supported as a STARTUP activity under TSP to produce quality mushroom spawn to meet the demands of the local Women's SHGs.

Impact

- Incremental increase in income is ₹ 30,000 per month.
- NPV (Net Present Value) is ₹ 4,54,254 indicating that enterprise is financially viable.
- Further, other indicators such as BCR (Benefits:Cost Ratio) and IRR (Internal Rate of Return) is 1.72 and 37.56%, respectively showing that undertaking of such enterprises are financially viable.
- Recognized as a progressive mushroom spawn producing entrepreneur in the region.
- As a resource person to State, Central and NGOs implementing programmes to train SHGs.
- Supplies mushroom spawn to more than 120 SHGs (self-help groups) in all the blocks of the Koraput district.



Lesson learnt

- Given the climatic conditions of the region, such enterprise could be instrumental in generating employment opportunities and thereby livelihood security for the resource poor/landless farmers of the region.
- Mushroom cultivation using paddy, ragi, niger and other millets straw is a sustainable solution for to produce mushroom from crop residues in the region.



Doubling Family Income Through Mushroom Production:- Turning Waste to Wealth



Aim

- To doubling family income of the small & marginal farmers and landless resource poor community of tribal villages.

Beneficiary

- No. of Villages: 16
- No. of Household: 174
- No. of SHGs: 21

Description of intervention

- Utilization of crops residue like paddy, ragi, other millets, niger for mushroom production to increase the family income.
- Since 2015, ICAR-IISWC, Research Centre, Koraput imparted skill of 21 women's SHGs in 16 villages for mushroom production and supported by supplying mushroom spawn and developing marketing linkages.

Impact

- Total annual turnover from 21 groups: ₹ 10.08 lakhs
- Average annual income of each SHGs: ₹ 48000/-
- Increased annual income of each women member: ₹ 4800/-
- Percent increase in income: 13.8% (7.6 – 20.6%)
- Family employment generation
- Utilization of available crop residues
- Increased nutritional status

Lesson learnt

- Conducive climatic conditions of the region, this enterprise could be instrumental in generating employment opportunities and increased income of resource poor/landless farmers.
- Mushroom cultivation using paddy, ragi, niger and other millets straw is a sustainable solution to turning waste to wealth.





Startup:- Rearing Japanese Quail for Doubling Income in Short Term



Aim

- To enhance income of the small, marginal farmers and landless resource poor community of tribal villages in short term.

Beneficiary

- No. of Villages: 6
- No. of Household: 72
- No. of SHGs: 6

Description of intervention

- Japanese quail chicks purchased from Central Poultry Development Organization (CPDO), Bhubaneswar and distributed to the beneficiaries.
- Rearing is only over a period of 30 – 45 days without much caring like poultry. Birds also having medicinal value.

Impact

- Average per rearing net return is ₹ 2307/- and ranges between ₹ 898/- and ₹ 16859/-
- BCR (Benefits: Cost Ratio) is about 1.5 – 2.5, indicating a highly profitable enterprise for a short duration of 30 days.
- Increasing monthly average income of farmers by 35.3% over the base month.
- Most widely adopted by landless tribal community due to high return in a short period with less investment and effort.
- Helps in enhancing the nutritional security of Tribals.

Lesson learnt

- One of the most profitable livelihood security options for landless farmers, and can be considered as a good option for creating employment opportunity if done in a large scale.
- Can be promoted as a one of the sources to fulfill nutritional security of poor farmers, along with backyard kitchen garden.





Backyard Poultry Empowers Tribal Rural Women's:- To Generate Income When Even Harvest Fails



Aim

- To support the small, marginal & land less tribal family income through rearing backyard poultry in order to scope up the risk.

Beneficiary

- No. of Villages: 10
- No. of Household: 123

Description of intervention

- Backyard poultry birds were distributed to the tribal community to support their family income without much capital investment. One unit consisting of 10 birds was distributed to the households (*Vanaraja* and *Giriraj* birds).
- Rearing is only over a period of 60-120 days without much capital investment and resources.

Impact

- Average per rearing net return is ₹ 4500/- and ranges between ₹ 3500/- and ₹ 6250/.
- BCR (Benefits:Cost Ratio) is about 2.5-4.0, indicating a highly profitable enterprise for a short duration.
- Increasing monthly average income of farmers by 28.3% over the base month.
- Most widely adopted by landless tribal community due to high return in a short period with less investment and effort.

Lesson learnt

- One of the most profitable livelihood security options for landless farmers, and can be considered as a good option for creating employment opportunity if done in a large scale.
- Can be promoted as a one of the sources to fulfill nutritional security of poor farmers, along with backyard kitchen garden.





Enhancing Livelihood Through Diversion Based Irrigation: From Ripple to Tide



Aim

- To ensure assured irrigation during post monsoon season for enhancing income of small and marginal tribal farmers.

Beneficiary

- No. of Villages: 2
- No. of Household: 60
- Extent of Area: 15 ha

Description of intervention

- Perennial stream water was tapped, conveyed through 750 m underground pipe and stored in a silpaulin pond.
- Stored water used for cultivation of bitter gourd using drip during post monsoon.

Impact

- Produced about 30 tons of bitter gourd, with an average productivity of 25 ton per ha.
- Gross return is ₹ 5,00,000/- per ha with a net return of ₹ 3,50,000/- per ha within a period of 4 months.
- BCR (Benefits:Cost Ratio) is about 2.3.
- Net profit per family per month is ₹ 10,500/-.
- Helps in generating per family employment as 29 man days.

Lesson learnt

- As there are numerous small perennial streams flow through the district, water of these streams can be stored and used for cultivation during summer season.
- Can be promoted alongwith modern irrigation techniques such as drip or sprinkler irrigation, which will not only increase farmers' income, but will conserve water.



Multiple Use of Water through Fish Farming for Doubling Income

Aim

- To maximizing the family income through fish farming and utilization of available water resources

Beneficiary

- No. of Villages: 8
- No. of Household: 18

Description of intervention

- Fish fingerlings were provided to the tribal community having farm ponds for fish farming and also distributed fishing nets to harvest fish. The beneficiaries used household available feeds and local feeds were used to rearing fishes.

Impact

Parameter	Unit	Impact
Avg. Net Returns per Demonstration	₹	15,329
Avg. BCR per Demonstration		2.5
Avg. Monthly Family income	₹/month	8000
Avg. Monthly Net Returns per Demonstration	₹	1277
Avg. Percent Increase in Monthly Family Income	Percent	16.8 (4-28%)

Lesson learnt

- Small and marginal farmers can utilize available limited water resource more efficiently.
- Provided additional income and nutritional security of family.





Diversification of Crops for Enhancing Income Through Use of Harvested Rainwater



Aim

- To utilize stored surface rain water efficiently for irrigating crops during winter and summer season

Beneficiary

- No. of Villages: 20
- No. of Household: 288
- Extent of Area: 76 ha

Description of intervention

- Provided water lifting pumps with accessories like pipes, sprinklers etc to the tribal farmers to grow off-season vegetable crops to increase the cropping intensity and income.

Impact

- Irrigated area increased by 76 ha.
- Average monthly family income increased by ₹ 3800/-
- Average percentage increase in monthly income is 70%.
- Cropping intensity increased by 140%.
- Provided offseason employment to the family members.
- Efficiently utilized the available water resources.

Lesson learnt

- Can be promoted in large scale to increase farmers' income and generate employment.
- Solar pumping and other zero energy water lifting mechanism are to explored.





Maximizing Family Income Through Offseason Vegetable Farming



Aim

- To maximizing the family income and family employment generation through growing offseason vegetables

Beneficiary

- No. of Villages: 12
- No. of Households: 123
- Extant of Area: 55 ha

Description of intervention

- Cropping during monsoon season is most common but during post monsoon season growing of offseason vegetables provides employment and enhances the family income. Tribal farmers were exposed to cultivation of vegetables during offseason by using available water resources. Growing of vegetables like cabbage, cauliflower, peas, ladies finger, beans, tomato, leafy vegetables etc. proved to be more economical and enhancing nutritional security of tribal farmers.

Impact

- Percent increased in yield is 15-54%
- Benefit cost ratio of 2.1 to 3.5.
- Net increase in income is ₹ 43500/-
- Percent annual increase in family income over base year: 22.8%
- Net monthly returns increased from ₹ 2586/- to ₹ 4854/-
- Additional family employment generation: 35-46 mandays

Lesson learnt

- Small and marginal farmers greatly benefits by cultivation offseason vegetables to get regular weekly income.
- Water resource play an important role and need to harness available water resources through ponds etc with improved water saving techniques.





Mango Based Agroforestry System:- Towards Climate Resilient Farming



Aim

- To minimize the risk and maximizing income of tribal farmers through mango based agroforestry system

Beneficiary

- No. of Villages: 34
- No. of Household: 211
- Extent of Area: 130 ha

Description of intervention

- Rainfed upland farming system growing only crops like ragi and millets are most common and its subsistence traditional farming is strengthened through introduction of mango.
- Mango at wider spacing (8 x 8 m) with conservation measures. Inter space is used for growing seasonal crops during monsoon.

Impact

- Crops productivity increased : 8-14%
- Economic returns over a period of 15 years with 15% discount rate is estimated at ₹ 26520 per ha, BCR of 2.7 and Internal rate of returns of 22%.
- Payback period is 6.0 year

Lesson learnt

- Horticultural rainfed fruit crops are promising in uplands in the tribal dominated areas.
- Enhance Climate resilient and increase the productivity of crops and increased the risk bearing ability of tribal farmers.





Cashew Plantation:-Rehabilitation of Degraded Lands and Enhance Family Income



Aim

- To maximizing the family income and minimizing risk due to climatic aberrations through utilization of degraded lands

Beneficiary

- No. of Villages: 13
- No. of Household: 97
- Extant of Area: 80 ha

Description of intervention

- Cashew grafted seedlings are planted at eight meter spacing in degraded wastelands for enhancing income. Some tribal community use to grow rainfed crops in the initial stage of cashew plantation. Cashew is a hardy crops with minimum inputs and management requirements.

Impact

- Average Economic returns over a period of 15 years with 15% discount rate is estimated at ₹ 21520 per ha, BCR of 2.2 and Internal rate of returns of 19%.
- Percent increase in family income is about 19.5% over the base year and also compare with the upland sole crops of millets.

Lesson learnt

- Small and marginal farmers can utilize available limited resource more efficiently.
- This system provides greening of degraded lands and climate resilient





Pulp Wood Based Agroforestry System for Maximising Returns



Aim

- To maximizing the family income and minimizing risk due to climatic aberrations

Beneficiary

- No. of Villages: 5; No. of Household: 48; Extant of Area: 65 ha

Description of intervention

- Eucalyptus clones are planted at eight meter spacing in east-west orientation. In between the paired row of Eucalyptus, agriculture crops were cultivated with standard practice. The annual soil turnover helps in pruning of surface lateral roots and helps in mixing of fallen leaf and bark. The crops such as Niger, Finger millet, Small millet, Zinger, Chilli and Maize are cultivated. Over a period of five years, a total net returns of ₹ 1.11 lakh from agroforestry system as against ₹ 0.46 lakh from sole crop of finger millet is realized.

Impact

Economics of eucalyptus paired agroforestry system

S.No.	Particulars	Sole Finger millet	Finger millet with Eucalyptus
1	Gross return (₹/ha upto 4 th Year)	₹ 26,250/- (12.5q @ ₹ 2100)	₹ 24,360/- (11.6 q @ ₹ 2100)
2	Gross return (₹/ha 5 th Year) (Expected)	₹ 26,250/- (12.5q @ ₹ 2100)	₹ 1,44,360/- (Finger millet: ₹ 24,360 Eucalyptus: ₹ 1,20,000 (40 ton @ ₹ 3000)
3	Gross return for 5 years	₹ 1,31,250/-	₹ 2,41,800/-
4	Net profit for 5 years	₹ 46,250	₹ 1,11,250/-

Percent annual increase in family income over base year : 18.5%
Net monthly returns increased from ₹ 771/- to ₹ 1854/-

Lesson learnt

- Small and marginal farmers can utilize available limited resource more efficiently.
- Availability of good market linkages with the pulp wood industries, tribal farmers can easily sale the eucalyptus for maximizing the farm income.



Farm Ponds for Enhancing Climate Resilience and Multiple Use of Water

Aim

- To ensure assured irrigation during post monsoon season for enhancing income of small and marginal tribal farmers

Beneficiary

- No. of Villages: 3
- No. of Households: 5
- Extant of Area: 5 ha

Description of intervention

- Construction of farm ponds for rainwater harvesting and recycling for multipurpose and to protect crops from any seasonal droughts.
- Harvested water used for growing vegetables etc.

Impact

- Gross return of ₹ 35000-65000/- per ha with a net return of ₹ 23,000 to 42500/- per farm pond.
- BCR (Benefits:Cost Ratio) is about 2.56.
- Net profit per family per month is ₹ 6, 500/-.
- Helps in generating per family employment as 65 man days.

Lesson learnt

- Farm ponds to be provided to all the farmers to mitigate the drought like situations
- Integrated farming to be encouraged to maximize the income





Climate Resilient Through Erosion Control and Rainwater Conservation



Aim

- To enhance sustainability of soil and rainwater conservation through field bunding for increasing crop productivity.

Beneficiary

- No. of Villages: 6
- No. of Household: 104
- Extent of Area: 38.0 ha

Description of intervention

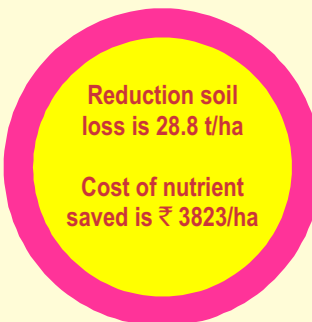
- Farmers cultivate without practicing any soil conservation measures, causing excess runoff and top soil erosion, resulting in deterioration of soil health and decrease in productivity.
- Field and contour bunding constructed on the agricultural fields having slope range of 2-10%.



View of field and contour bunding

Impact

- Crops productivity increased : 8 – 14%
- Reduction in soil loss is 28.8 t/ha
- Cost of silt retention is of ₹ 471/- per tonne per year.
- Groundwater recharge per year is upto 500 m³ /ha/yr.
- Total nutrient (NPK) saved is 170 kg per ha per year
- Total cost of nutrient saved is about ₹ 3823/- per ha
- Payback period is 3.0 year



Lesson learnt

- Field and contour bunding is effective in improving soil health by reducing soil loss and runoff.
- Enhance Climate resilient through conserving soil carbon, nutrients, rainwater etc, minimize the impacts of drought and increase the productivity of crops.





Conserving Soil Through DLT Measures:- LBCD and Brush Wood Check Dam



Aim

- To conserve soil and water using locally available low cost material.

Beneficiary

- 98 beneficiaries from different villages of Koraput district, Odisha.

Description of intervention

- About 70 double row-post brush wood check dam and 35 Loose Boulder Check Dam (LBCD) constructed across existing gullies covering 53 ha of land.

Impact

- A single LBCD able to retain silt @1.5 ton per year, whereas brush wood check dam retain silt @0.4 ton per year.
- Use of locally available stone.
- Most widely adopted DLT measure with less investment and effort.
- Helps in retaining soil nutrient and increase in groundwater recharge.
- Reduced siltation of water bodies and increased perannuality of streams

Lesson learnt

- One of the most widely adopted low cost and maintenance free technology for conservation of natural resources.
- Widely adopted and being followed by the tribal community to protect land and to conserve rainwater.



Farm Implements and Tools:- To Decrease Drudgery and To Increase Efficiency

Aim

- To reduce the drudgery in field operations and to enhance the efficiency of farming operations

Beneficiary

- No. of Villages: 9
- No. of Household: 419

Description of intervention

- To improve the agricultural operations in the tribal traditional farming implements and tools like potato diggers, paddy threshers, winnowers, paddy transplanter, power tiller, spades, sickles, etc. were demonstrated and distributed to the beneficiaries

Impact

- Number of man days saved over traditional practice: 7-35 man days
- Reduction in cost on cultivation: ₹ 1100-4800 /ha
- Contribution to the family monthly income: 3.0- 4.5%
- Timely operations and reduced drudgery
- Increased efficiency of farming operations

Lesson learnt

- Scope to introduce other suitable farm implements and tools to increase the efficiency of farming operations.
- Community level custom hiring centers having a greater role to play at rural tribal villages





Exposure to the Tribal Farmers on Good Agricultural Practices:- Learning to Progress



Aim

- To increase tribal farmers knowledge through exposing them to the good agricultural practices

Beneficiary

- No. of Villages: 18
- No. of Households: 350

Description of intervention

- To prove that seeing is believing, exposures visits were organized to the tribal farmers on good agricultural practices which are being practiced in the region. This learning opportunities enhanced the knowledge and motivated them to adopt the suitable technologies for increasing family income.

Impact

- Exposed farmers adopted IFS in 25 ha of land.
- Agro-forestry model was implemented in 105 ha.
- Various conservation measures were adopted in an about 150 ha.
- Mango and cashew plantation technologies adopted in 115 ha for restoration of marginal and degraded lands

Lesson learnt

- More exposure visits should be conducted which will give an idea to farmers about new farmer friendly technologies and how to implement those in the field.
- Women farmers should also to be encouraged to learn good agricultural practices.





Enhancing Skill and Knowledge of Tribal Farmers Through Need Based Training



Aim

- To enhancing skill and knowledge of tribal farmers through need based training

Beneficiary

- 7574 beneficiaries from 48 villages of Koraput district, Odisha.

Description of intervention

- A total of 143 skill development and demonstration both onsite and offsite trainings were conducted on various topics such related to livelihood enterprises, climate resilient good agricultural practices, natural resource conservation, rainwater harvesting and utilization, Multiple use of water, IFS, INM, IPM, Mushroom cultivation, Poultry farming, Agro-forestry, Package and practices of cultivation of fruits and vegetables.

Impact

- More than 1294 households covering 141 SHGs are gained the skill of mushroom cultivation.
- Various conservation measures implemented in 58 ha of land by farmers themselves.
- Integrated Farming System is now adopted by many farmers of Koraput district.
- About 70 farmers have adopted Mango based Agro-forestry system (105 ha) and 49 farmers adopted Eucalyptus based agro-forestry system (140 ha).
- About 195 households women farmers are preferring to do poultry farming and rearing of *Japaneese Quail*.
- About 70 farmers rearing Chhabro-chicks.

Lesson learnt

- More training should be conducted which will give an idea to farmers about new farmer friendly technologies and how to implement those in the field.
- Women farmers should encourage to participate in skill and knowledge development programmes





Indigenous people believe that Man belongs to the World;
civilized people believe that the
world belongs to Man

Daniel Quinn



You got to try and reach for the stars or
try and achieve the unreachable

Cathy Freeman