

Integrated Watershed Management Programme

EXECUTIVE SUMMARY

&

THE DETAILED PROJECT REPORT

OF

RUPRU Watershed

Micro Watershed Code – 4H3C6b1k

Block – ANGARA

District – RANCHI

2009 to 2014 -15



Submitted To

Jharkhand State Watershed Mission

Deptt. of Rural Development, Govt. of Jharkhand

Project Implementing Agency

RAMAKRISHNA MISSION ASHRAMA

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Chapter I

EXECUTIVE SUMMARY

1.1 Present Status and Situation analysis of the Area:

The Rupru micro watershed is situated in the Angara Block of Ranchi District in Jharkhand. The total geographical area of the micro watershed is 464 Ha, out of which proposed project area is 376.8 Ha. The Project area is located at the latitude of 23°21'37"N to 23°23'23"N and Longitude 85°33'13"E to 85°36'47"E. The elevation of the project area ranges from 660 m to 775 m. This Project will benefit 147 house hold covering only one village i.e. Rupru. Total population of the project area is 806 out of which 79% of the total population is ST, 0% is SC, 7% is OBC and the remaining 14% belongs to other community. The topography of the area is rolling and undulating. The annual average rainfall of the area ranges from 800 mm to 1400 mm with an average 60 to 65 rainy days. May and June are the hottest months and the temperature goes up to 42 degree Centigrade. December and January are the coldest months and temperature Comes down from 5 to 6 degree Centigrade. Around 89% people in the project area depends upon agriculture and allied livelihood system. Erratic rainfall, continuous drought has forced the farmers to give least priority to agriculture. The present agriculture scenario is unable to provide either sustenance or employment opportunities round the year due to low Land holding capacity, poor soil productivity, lack of irrigation facility and absence of proper agricultural practices. Ultimately it leads to unemployment and distress migration in project area.

Vision Statement

1. The overall vision of the villagers in the project areas is upliftment of socio economic conditions through interventions of IWMP project.
2. The netsown area are chapping identity will be increased in over five year period.
3. Every house hold will have access to safe drinking water
4. To stop the migration of people to other state in search of Job by increasing the income level of landless farmers through various income generation activities

5. The community member themselves enough to take decisions for development of villages

6. The community based organization will be empowered enough to continue and expand their activities after completion of project

1.3 Institutional Arrangements

The PIA ,Ramakrishna Mission Ashrama, Morabadi, Ranchi is a Spiritual and Non-profit making organization with its Headquarters at Belur Math Howrah. It is one of the branch centres of Ramakrishna Math and Ramakrishna Mission which has 230 centres in India and abroad and has been registered under society registration act XXI of 1860 in 1909. This branch centre has objectives of integrated development of the rural tribal people by providing training in modern technologies applicable to the field of agriculture and allied areas, by imbibing the spirit of community living, group dynamism and developing sense of co-operation, organizing medical camps, special medical camps, providing educational facilities to the rural students etc. The activities include conservation of natural resources and locally suitable economic activities, introduction of improved and high yield varieties as per land use land pattern, rapport building and community mobilization etc. Over the years intervention got further strengthened through by establishing proper relationship with Govt agency, International Voluntary Organization, Civic bodies, Community level Organization for continuous growth of KVK.. Here the role of KVK will be to facilitate the programme by supporting Community Based Organization like Watershed Committee (WC), Self Help Group (SHG), and User's Group (UG). The role of Watershed Committee will be the Implementation of the Programme as well as assured the Contribution in the NRM works. The Secretary of the Committee will be treated as most responsible member for WC. The Watershed Development Team (WDT) will act as a catalyst for support CBOs for implementation of programme successfully. A total no of 15 SHG and 25 UG have been linked within the Project activities.

1.4 Salient Project Activities

Rapport building and awareness generation of community members is the first stage for building self confidence to take decisions for implementation of activities. The broad head includes Capacity Building, EPA, Natural Resources Management, Livelihood promotion, Productivity Enhancement and Micro Enterprises, Monitoring and Evaluation, Convergence with Others departments, Exit protocol etc. The major proposed activities are Drinking well & Drinking Dari renovation, Soak Pit construction, Kitchen Garden, Awareness programme on Health and hygiene, Potato seed distribution and demonstration

of summer crop etc. under EPA activities ,which covers 4% budget of the total Programme Cost. Under Natural Resources Management (NRM) component which constitutes 50% of project fund, the activities are Farm pond, Pond Reno, Percolation tank, Loose boulder Checks, Farm bunding, Land leveling & Bench terracing, Commercial Timber Plantation etc. For the Productivity enhancement and micro enterprises which constitutes 13% of the project fund, the activities are Production of Paddy through SRI method, production of off-season vegetable, pulses and oilseed etc. For Livelihood promotion activities which constitute 10% of the project fund, the activities are Poultry, duckery, goatery, piggery, vermicomposting. A comprehensive training and Capacity building Plan (which constitutes 5% of the project fund) have been designed for various CBO like SHG, UG, and Watershed Committee. The basic aim of this training programme will be for Project Orientation as well as Skill Improvement.

1.5 Convergence with Various Schemes

The aim of the Convergence is to saturate the possible NRM activities in the project area which is planned under IWMP Programme. In this Process there is a total amount of 12.46lakhs will be converged through various govt. departments and schemes like Forest, Fisheries, RKVY, NABARD etc. For some of the intervention like plantation, land leveling, capacity development special proposals will be made and submitted to Forest department and NABARD. During the Convergence Process SLNA, DWDU and PIA will take the leading role to facilitate the convergence activities.

1.6 Exit Policy

Suitable systems and processes proposed to be designed and implemented to manage and maintain all the assets created under the project with the help of Watershed Development Fund (WDF) collected from the beneficiaries in the form of contribution and deposited in a separate bank account. WDF will not be utilized during the project period. At the time of Exit period it is important that the community should be strong enough to maintain the development works and the systems during the project period. A specific benefit sharing mechanism for the common assets will be formulated through User's Group. Proper utilization of WDF will be occurred after the project period for the need based work of community assets. The Watershed Committee will be also responsible for Conflict management within User's Group and SHG. The Watershed Committee will take leading role for the Institutional linkages with Govt dept., Banks, other financial institutions, as well as various NGOs. A social audit system will be established for proper management of fund and further Development works.

1.7 Action Plan at a Glance

State Level Nodal Agency - Jharkhand State Watershed Mission (SLNA-JSWM)									
Name of PIA : Ramakrishna Mission Ashrama Divyayan Krishi Vigyan Kendra, Morabadi, Ranchi-8				Number of Land Less House Holdings - 25 Total Budget (Rs. In Lakhs) : 45.22 Lakhs					
Code of Micro Watershed : 4H3c6b1k				No of families existing under Micro Watershed : 147 Nos					
Name of Micro Watershed : Rupru				No of existing SHG : 2 No , No of SHG formed : 4 No					
Districts : Ranchi				No of existing UG : Nill, No of UG Formed : 12 NO					
Blocks Covered : Angara				No of Trainees Proposed : 209 No					
Name of Village : Rupru				No of Exposure Visits to be Conducted : 02 No					
Total Geog. Area of Micro Watershed (Ha) : 907 ha				Nos of Persons Days to be Generated : 9579 No					
Total Proposed Area to be Treated (Ha) : 376.8 ha				Date of Approval from Gram Sabha : 31/01/2011					
Abstract of Year Wise Physical Plan Proposed for the Micro-watershed (Rmt/Ha/Smt/Cum/No)									
Budget Head	Details of Activities	Unit	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Grand Total
Entry Point Activities (EPA)	a. Drinking well repairing	Nos.		10	0	0	0	0	10
	b. Drinking dari repairing	Nos.		3	0	0	0	0	3
	c. Soak pit	Nos.	IWMP	8	0	0	0	0	8
	d. Kitchen Garden Plantation	Families	PROJECT	140	0	0	0	0	140
	e. Vaccination of caedal animals	Nos.	SAITTED &	1250	0	0	0	0	1250
	f. Watershed & Health awareness Programme through Audio-Visual & Yog & Acupressure	Nos.	APPROVEDI		3	0	0	0	3
	g. Potato seed distribution	Kg.		1850	0	0	0	0	1850
	h. Wall & Poster writing	Nos.		1	0	0	0	0	1
	g. Summer Crop Demonstration cum miscellaneous	Nos.		1	0	0	0	0	1
Soil & Water Conservation on Arable Land	a)Bench terracing and Land Leveling	Ha		0		0	4	--	4
	b)Field Bunding (Rmt)	Ha		7809 Rmt		3000 Rmt	9191 Rmt	--	20000Rmt (33Ha)
	c) Percolation Tank(10' X 10' X 10')	Nos.			30	7		--	37
	d)Continious Trange	Nos			25	32			57
Drainage Line Treatment	a)Loose Builder Structure	Nos.		-	--	--	10	--	10
Water Harvesting Structures	a)Farm Pond	Nos.		-	-	4	2	--	6
Afforestation Woks	a)Commercial Timber Plantation of Teak (Acre)	Ha			10	--	--	--	10Ha

Budget Head	Details of Activities	Unit	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Grand Total
Training and Capacity Building	a) Motivational Training for SHG	Nos		1	1	--	--	--	2
	b) Motivational Training for Watershed Committee	Nos		1	1	--	--	--	2
	c) Training of W.C. measurement MB	Nos.		--	1	1	--	--	2
	d) Exposure Visit SHG	Nos.		--	--		1	--	1
	e) Exposure visit W.C. and Progressive farmers & U.G	Nos.		--	--	1	--	--	1
	f) SHG Leadership Development	Nos.		--	1	--	--	--	1
	g) Motivational Training of Motivator	Nos.		--	--	--	--	1	1
	h) Accounts Keeping training of SHG, WC & WDT	Nos.		--	1	--	--	--	1
productivity Enhancement & Micro Enterprise	a) Demonstration of seed of paddy with SRI	Ha		--		6Ha	10.5Ha	--	16.5Ha
	b) Agro Clinic & Agro Service	Nos.			1	--	--	--	1
	Off Seasons Vegetable(5dis.each)	dis		--	24		50	0	74
	d) Pulses (Arhar)	Ha.		--	-	-	8Ha	0	8Ha
	e) Oil Seed (Til)	Ha		--	-	4Ha	4Ha	--	8Ha
	f) Cow dung & urine pits	Families		--	--	40	--	--	40
	g) Kitchen Garden (10 plant each)	Families		150	--	--	--	--	150
	h) Maize	Ha					4.5		4.5
	i) Ground Nut	Ha					2.5		2.5
	j) Gram	Ha					4		4
Livelihood for Asset-less	a) Vermicompost (1 pit each SHG)	Nos		2	2	--	--	--	4
	b) Poultry	SHG Member		--	20	--	0	0	20
	c) Poultry (Economical)(500)	SHG Member		--	--	4	0	0	4
	d) Duckery (Back Yard) SHG	SHG Member		--	16	--	--	--	16
	e) Duckery (Back Yard) Landless	SHG Member		--	--	16	--	--	16
	f) Duckery small ponds tie-up to soak pit (50% contribution)	SHG Member		--	--	8	--	--	8
	g) Live stock management of Goatery each family of goat 50% contribution	SHG Families		--	--		80	--	80
	h) Live Stock Management of Piggery for Landless	SHG Families		--	--	12		--	12

Table -2

Jharkhand State Watershed Mission - Dtate Level Nodal Agency (JSWM - SLNA)

Name of PIA : Ramakrishna Mission Ashrama, Morabadi, Ranchi

Code of Micro Watershed :4H3c6b1k

Name of Village Covered :Rupru

Abstract of Year Wise Financial Plan Proposed for the Rupru Micro-watershed (Rs. in Lakhs)

Budget Head	Details of Activities	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Grand Total
Admin (10%)	PIA Level (5.8%)		0.52	0.52	0.52	0.52	0.52	2.62
	WC Level (4.2%)	N	0.38	0.38	0.38	0.38	0.38	1.9
Monitoring (1%)	PIA level	A	0.09	0.09	0.09	0.09	0.09	0.45
Evaluation (1%)	SLNA level		0.09	0.09	0.09	0.09	0.09	0.45
Sub total			1.08	1.08	1.08	1.09	1.09	5.42
Entry Point Activities (EPA)9.5%	a. Drinking well repairing		1.84	0.00	0.00	0.00	0.00	1.84
	b. Drinking dari repairing		0.69	0.00	0.00	0.00	0.00	0.69
	c. Soakpit		0.63	0.00	0.00	0.00	0.00	0.63
	d. Kitchen Garden Plantation		0.12	0.00	0.00	0.00	0.00	0.12
	e. Vaccination of cadeal animals		0.25	0.00	0.00	0.00	0.00	0.25
	f. Watershed & Health awareness Programme through Audio-Visual & Yog & Acupressure		0.15	0.00	0.00	0.00	0.00	0.15
	g. Potato seed distribution		0.18	0.00	0.00	0.00	0.00	0.18
	h. Wall & Poster writing		0.20	0.00	0.00	0.00	0.00	0.20
	g. Summer Crop Demonstration cum miscellaneous		0.26	0.00	0.00	0.00	0.00	0.26
Sub Total			4.32					4.32
DPR(1%)	PIA Level		0.45					0.45
Soil & Water Conservation on Arable Land (44.5%)	a)Bench terracing and Land Leveling		0.00	0.00	0.00	0.53	0.00	0.53
	b)Field Bunding (Rmt)		1.64	0.00	0.63	1.93	0.00	4.27
	c) Percolation Tank(10' X 10' X 10')		0.00	0.60	0.00	0.14	0.00	0.74
	d)Continious Trange)		0.00	0.25	0.32	0.00	0.00	0.57

Detail Project Report of Rupru Micro Watershed

Drainage Line Treatment	a)Loose Builder Structure		0.00	0.00	0.00	1.00	0.00	1.00
Water Harvesting Structures	a)Farm Pond		0.00		5.42	2.16	0.00	7.58
Afforestation Woks	a)Commercial Timber Plantation of Teak (Acre)		0.00	5.50	0.00	0.00	0.00	5.50
Sub-total			1.64	6.35	6.35	5.76	0.00	20.10
Training and Capacity Building (5%)	a)Motivational Training for SHG		0.20	0.18	0.00	0.00	0.00	0.38
	b)Motivational Training for Watershed Committee	N	0.10	0.10	0.00	0.00	0.00	0.20
	c)Training of W.C. measurement MB	A	0.00	0.08	0.06	0.00	0.00	0.14
	d)Exposure Visit SHG		0.00	0.00	0.00	0.60	0.00	0.60
	e)Exposure visit W.C. and Progressive farmers &UG		0.00	0.00	0.60	0.00	0.00	0.60
	f)SHG Leadership Development		0.00	0.15	0.00	0.00	0.00	0.15
	g)Accounts Keeping training of SHG ,WC & WDT		0.00	0.15	0.00	0.00	0.00	0.15
	h) Motivational Training of Motivator		0.00	0.00	0.00	0.00	0.04	0.04
Sub - Total			0.30	0.66	0.66	0.60	0.04	2.26
productivity Enhancement & Micro Enterprise (13%)	a)Production of seed of paddy with SRI		0.00	0.00	0.21	0.36	0	0.57
	b)Agro Clinic & Agro Service		0.00	1.82	0.00	0.00	0.00	1.82
	c)Off Season vegetable		0.00	0.00	0.12	0.25	0.00	0.37
	d)Pulses		0.00	0.00	0.00	0.24	0.00	0.24
	e)Oil Seed		0.00	0.00	0.09	0.09	0.00	0.18
	f)Cow dung & urine pits		0.00	0.00	1.40	0.00	0.00	1.40
	g)Kitchen Garden (10 plant each)		0.75	0.00	0.00	0.00	0.00	0.75
	h) Maize		0.00	0.00	0.00	0.24	0.00	0.24
	i) Ground Nut		0.00	0.00	0.00	0.25	0.00	0.25
	j) Gram		0.00	0.00	0.00	0.22	0.00	0.22
Sub-Total			0.75	1.82	1.82	1.51	0.00	5.9
Livelihood for Assetless (10%)	a)Vermicompost (1 pit each SHG)		0.50	0.50	0.00	0.00	0.00	1.00
	b)Poultry		0.00	0.50	0.00	0.00	0.00	0.50
	c)Poultry (Economical)(500)		0.00	0.00	0.20	0.00	0.00	0.20
	d) Duckery (Back Yard) SHG		0.00	0.40	0.00	0.00	0.00	0.40
	e) Duckery (Back Yard) Landless		0.00	0.00	0.40	0.00	0.00	0.40
	f) Duckery small ponds tie-up to soak pit (50% contribution)		0.00	0.00	0.34	0.00	0.00	0.34
	g) Live stock management of Goatery each family of goat 50% contribution		0.00	0.00	0.00	1.21	0.00	1.21
	h) Live Stock Management of Piggery for Landless		0.00	0.00	0.46	0.00	0.00	0.46
Sub-Total			0.50	1.40	1.40	1.21	0.00	4.51
Consolidation(5%)	PIA Level		0.00	0.00	0.00	0.00	2.26	2.26
Grand-Total			9.04	11.31	11.31	10.17	3.39	45.22
% Allocation			20%	25%	25%	22.5%	7.5%	100%

Table -3

*** Administrative cost at (5%), Monitoring cost (1%), and evaluation cost (1%) have not been included in total project cost because these expenses are supposed to be at PIA and SLNA level**

State Level Nodal Agency - Jharkhand State Watershed Mission (SLNA-JSWM)										
Abstract of Year Wise Physical Plan Proposed for the Micro-watershed (Rmt/Ha/Smt/Cum/No) Under Convergence Plan										
Budget Head	Details of Activities	Agency	Unit	2010-11	2011-12	2012-13	2013-14	2014-15	Grand Total	
Convergence	a) Fishery Training of ponds workers of 5 days (FISHERY DEPT.)	Fishery	Persons	--	10	--	--	--	10	
	b) Plantation on roadside (Neem/Karanj & Other) (FOREST DEPT.)	Forest	Nos.	--	2000	3000	--	--	5000	
	c) Fodder Bank (FOREST DEPT.)		Ha	--	2	2	--	--	4	
	d) Agro clinics & Agro services (Drum Seeder/paddy paydol/Thresher/Powertiller /Sparyer/Conoweeder State level=25.42% Centre level=54.67% (RKVY)	Forest	Unit	--	1	--	--	--	1	
	e) Capacity Building Training of 20 progressive & 10 watershed member (RKVY)	RKVY	Nos.	--	1	--	--	--	1	
	f) Interstate exposure visit of progressive (RKVY)		Nos.	--	--	1	--	--	1	
	i) Off season vegetable flower with net poly house (RKVY)		Nos.	--	1	--	--	--	1	
	j) Land leveling (R.K.V.Y.)		Acre	--	--	10	--	--	10	
	g) Motivational Training for SHG 2 days (NABARD)	NABARD/SGSY	Nos.	--	1	--	--	--	1	
	h) Training on mobile repairing for youth (NABARD)		Boys	--	10	--	--	--	10	
	Total				0	12013	13011	0	0	25024

Table-4

State Level Nodal Agency - Jharkhand State Watershed Mission (SLNA-JSWM)									
Abstract of Year Wise Financial Plan Proposed for the Micro-watershed (Rmt/Ha/Smt/Cum/No) Under Convergence Plan									
Budget Head	Details of Activities	Agency	Unit	2010-11	2011-12	2012-13	2013-14	2014-15	Grand Total
Convergence	a) Fishery Training of ponds workers of 5 days (FISHERY DEPT.)	Fishery	Rs		10000.00	--	--	--	10000.00
	b) Plantation on roadside (Neem/Karanj & Other) (FOREST DEPT.)	Forest	Rs	--	40000.00	60000.00	--	--	100000.00
	c) Fodder Bank (FOREST DEPT.)		Rs	--	50000.00	50000.00	--	--	100000.00
	d) Agro clinics & Agro services (Drum Seeder/paddy paydol/Thresher/Power tiller/Sparyer/Conowee der State level=25.42% Centre level=54.67% (RKVY)		Rs	--	716850.00	--	--	--	716850.00
	e) Capacity Building Training of 20 progressive & 10 watershed member (RKVY)	RKVY	Rs	--	54000.00	--	--	--	54000.00
	f) Interstate exposure visit of progressive (RKVY)		Rs	--	--	70000.00	--	--	70000.00
	i) Off season vegetable flower with net poly house (RKVY)		Rs	--	0.00	370000.00	--	--	370000.00
	j) Land leveling (R.K.V.Y.)		Rs	--	--	10.00	--	--	10.00
	g) Motivational Training for SHG 2days (NABARD)	NABARD/SGSY	Rs	--	20000.00	--	--	--	20000.00
	h) Training on mobile repairing for youth (NABARD)		Rs	--	50000.00	--	--	--	50000.00
	Total		Rs	--	940850.00	550010.00	--	--	1490860.00

Table-5

Chapter 2

INTRODUCTION AND BACKGROUND

2.1. Project background:

In India, hundreds of millions of poor and marginal farmers rely on degraded land and water resources and struggle to cope with a diverse array of agro-climatic, production and market risks. It is estimated that the rate of land degradation in rain fed areas in India in the 1990s is likely to have proceeded at more than twice the rate observed in 1980s, basically on account of soil erosion from run-off. The rate is increasing day by day. At the same time, these regions in particular and the world in general does not have enough utilizable water needed to grow the food to adequately feed the future generations. The world is rapidly converting forest, wetlands and other critical habitats into agricultural land to meet growing demands and diverting major rivers to produce food. How to produce more and better food and maintain or improve critical ecosystem services without further undermining our environment is a major challenge.

Rainwater, a scarce and critical resource for growing food and providing livelihood support for rural populations, is under threat particularly in the arid and semi-arid regions of the world. Rain fed agriculture that constitutes the livelihood base for the vast majority of rural inhabitants in the developing countries is a source of food security, and livelihoods. It is estimated that about 80 percent of the world's agricultural land is rain fed, contributing to about 60 per cent of the global food production.

The current rainwater-use efficiency for crop production is low ranging from 30 to 45 percent; thus annually about 300-800 mm of seasonal rainfall goes unproductive, lost either as surface run-off or deep drainage. An insight into the rain-fed regions shows a grim picture of water-scarcity, fragile ecosystems, drought and land degradation due to soil erosion by wind and water, low rainwater-use efficiency, high population pressure, poverty, low investments in water use efficiency measures, poor infrastructure and inappropriate policies.

The state has predominant agrarian economy. Despite the abundance of mineral wealth and fair smattering of industries in these regions, the state's economy is basically depending on agriculture, forest and animal husbandry. Nearly 31% of the geographical area is under cultivation, 27% is under forest and current fellow represents 12% of the area. Majority of the people depend on growing rice, animal husbandry and forest, but such agriculture production

is not so cost-effective due to the unfavorable agro climatic conditions viz. water scarcity, rain fed condition of land and high frequency of drought. Poor management and other different interacting factors of both land and water bodies hamper the productivity of the area.

Previously, the tribal people of this area were purely dependent on the forest for their food and occupation. Due to crude urbanization of the forest areas, tribal people were compelled not to survive on the forest based economy as well as they had lost their ethno-cultural values of their society. The demographic and environmental changes in this area had continued even more rapidly after independence, which provided some impetus to the formal economy but deprived the tribal who mainly depends on natural resources for maintaining their livelihood.

Land of the blocks can be crudely divided into 3 categories: Tanr (Upland); Done/Bad (Medium land) and Bahal (Low land). The soil of the Tanr is very loose, gravel and with low pH acidic in nature. Which is suitable for forest plant plantation, horticulture and herbi culture. The soil of Bad is of sandy loam/sandy loam type with moderate low pH can be brought under cultivation of all crops. The soil of Bahal is clay loam type with slightly acidic nature. Most of the nutrients are available in this type of soil and it is suitable for practice of more than one crop.

Annual rainfall is steadily declining last few decades. Major rainfall is concentrating in July & August. The average rainfall of the area is 1200 mm but it is mostly uneven and erratic and poor windflow.

The people of this area could be classified as resource poor because they have to do agriculture under rain fed conditions. The main crop of kharif is paddy and maize. The uplands, which are degraded due to runoff water, are used for cultivation of pulses, oilseeds and millets. The produces could feed the cultivators for maximum 6-8 months and for the rest of the year they have to search for job as wage labour or migrate to nearby cities & some prefer to migrate in other states. Since last few years the situation has improved due to our continuous efforts to promote horticulture especially orchard and commercial vegetable cultivation.

Owing to indiscriminate use of chemical fertilizer and pesticides, the productivity and problem of pests have increased. Maintenance cost of cattle is increasing and farmers prefer to sale their cattle after agriculture and even if they keep, they don't feed those cattle. The cattle are seen to graze everywhere. As a result, the shortage of cow dung and organic matter in the soil decreasing the soil health, reducing the moisture conservation capacity of the soil.

Where water for irrigation is available, the wrong choice of crop, flood irrigation system, is reducing the area of irrigation. The better off farmers are controlling the water bodies thus leaving the small & marginal farmers hopeless.

2.2. Need and scope of watershed development:

The challenge is to develop sustainable and eco-friendly options to manage natural resources in the fragile ecosystem to increase the farm productivity and incomes of thousands of poor farmers who are dependent on the natural resources for their survival. The way forward to address this gigantic task is by sustainable management of rainwater and other natural resources in a manageable land unit, which is a watershed. There is a large yield gap for Rain-fed farming between Potential Yield and Current Productivity. However, number of studies has shown that productivity of rain-fed farming systems could be doubled or in some situations could even be quadrupled through adoption of improved soil, water, crop and nutrient management options. Crop growth simulation models in an integrated watershed management approach provide an opportunity to simulate the crop yields in a given climate and soil environment that can be used for yield gap and constraint identification. Conventional watershed approaches in the past focused only on soil and water conservation measures hence did not bring in much productivity gains or contributed to improve the rural livelihoods. The important components of the farmer participatory integrated watershed management model are:

- Farmer participatory approach through cooperation and not through contractual mode.
- Use of new scientific tools for management and monitoring of watersheds through linking of on-station and on-farm watersheds.
- A holistic system's approach to improve livelihoods of people and not merely conservation of soil and water compartmental approach.
- A consortium of institutions for technical backstopping of the on-farm watersheds.
- A micro-watershed within the watershed where farmers conduct strategic research with technical guidance from the scientists. Planned gradual shift from contractual mode of participation to consultative and collective mode of participation.
- Low-cost soil and water conservation measures and structures throughout the top sequence to achieve equity.
- Amalgamation of traditional knowledge and new knowledge for efficient management of natural resources.
- Emphasis on individual farmer-based conservation measures for increasing productivity of individual farms and private economic gains along with community-based soil and water conservation measures for ecosystem services.
- Minimize free supply of inputs for undertaking evaluation of technologies. Farmers are encouraged to evaluate new technologies themselves with empowerment.
- Continuous monitoring, evaluation and refinement of options by the stakeholders.

- Empowerment of community individuals and strengthening of village institutions for managing natural resources.

Thus, the challenge is to manage land and water sustainably to achieve higher productivity levels, husbandry resources for future generations, and derive livelihoods in the most equitable manner possible. These are laudable goals; yet, specific management options must focus at the level of what is practical. Small holder farmers, livestock keepers, forest users, and others who derive livelihoods from land and water find that their interactions affect others in a watershed context. As a unit of land and water management, the watershed offers immense scope to improve crop productivity—whether of rain fed crops or under small-scale irrigation—and biomass for livestock. The concept of integrated and participatory watershed development and management has emerged as the cornerstone of rural development in the dry and semi-arid regions and other rain fed regions of the world, and is a paradigm shift from earlier plot-based approaches to soil and water conservation.

2.3. Weight age for selection of Watershed:

Sl. No.	Particulars	Criteria	Weight age
i	Poverty index (% of poor to population)	80 to 50 %	7.5
ii	% of SC/ ST population	More than 40 %	10
iii	Actual wages	Actual wages are significantly lower than minimum wages	10
iv	% of small and marginal farmers	50 to 80 %	5
v	Ground water status	Critical	3
vi	Moisture index	-33.3 to -66.6	10
vii	Area under rain-fed agriculture	80 to 90 %	10
viii	Drinking water	Problematic village	7.5
ix	Degraded land	High – above 20 %	15
x	Productivity potential of the land	Lands with moderate production & where productivity can be enhanced with reasonable efforts	10
xi	Contiguity to another watershed that has already been developed/ treated	Contiguity within the micro watersheds in the project but non contiguous to previously treated watershed	5
xii	Cluster approach in the plains (more than one contiguous micro-watersheds in the project)	4 to 6 micro watersheds in cluster	10
xiii	Cluster approach in the hills (more than one contiguous micro-	3 to 5 micro watersheds in cluster	5

	watersheds in the project)		
		Total	108

Table -6

2.4. Watershed Information:

What is watershed?

A watershed is a land area where all the rain, falling there does remains within that area and over the time, part of it drains out to the downstream through a common pond/lake/drain/river or any other identifiable water body.

It is bound by all sides (except the entry point, the outlet and open to the sky) by a natural divide (called watershed divide or a ridge line) and is easy to identify.

Primary components of watershed are water, biomass – living or dead and land/soil/rock. Watershed development refers to the conservation, regeneration and the judicious use of all the resources – natural (land, water, plants and animals) and human – within a particular watershed. Watershed management tries to bring about the best possible balances in the environment between natural resources on the one side, and human and other living beings on the other. The environment is a living space on which the human community living within that area depends on for its livelihood. When the economic condition of a community deteriorates it leads to over-exploitation and degradation of natural resources, which, in turn, further exacerbates poverty. It is thus necessary for people to see the relationship between their poverty and the degraded environment they live in.

Watershed Approach:

The watershed approach is based on Ridge to Valley approach for in situ soil and water conservation. While planning for the management of a watershed, an integrated approach is the most desirable and sustainable way. In order to achieve this, it is necessary to have a thorough knowledge of present condition of watershed, the physical features, resource potential, social and economic factors, dynamic of causes and effect and interrelationship among different factors. However, the interventions have to be planned, keeping in view the desired results, such as ground water recharge, surface water detection, soil moisture replenishment, soil and water conservation.

Further, watershed being a natural hydrological entity, it responds most effectively to various engineering, biological and cultural treatments. Water is the best index of watershed management; it provides an excellent monitoring mechanism for evaluation of the impact of the programme at the outlet. Physical Geo-environmental parameters of a watershed, such as slope, soil and rainfall (climatic) characteristic could not be changed. However, it may be possible to change the land use, vegetation pattern and introduce some structural measures for soil and water conservation. These measures will help in the management of land, water and bio-resources of

watershed. By adopting appropriate measures in a spatial framework, ground water recharge can be enhanced, peak flow can be moderated, low-flows can be enhanced, soil moisture can be replenished, health of soil can be retained and the habitat of plants, trees and animals in watershed improved, thereby creating a healthy watershed ecosystem. Such an ecosystem will be sustained and the most appropriate for meeting the human needs. In addition to the argument that a watershed is a logical and rational unit for natural resources management, it also is a unit for man-environment interaction, economic planning, eco-restoration, etc.

The demographic pattern of an agricultural society, more so in a watershed scenario at the micro level, is determined by the land use pattern of the user community. These patterns are diverse characteristics dominated by land-man ratio, population growth, livestock population, soil conditions, occupational facilities, presence and / or absence of natural forest and social forestry activities and communication facilities, etc. The ever-increasing population and its support system in the livestock population in the villages are putting intense pressure on the available productive land; thereby productivity of the land-base is primarily achieved and / or attempted through either farm mechanization or by use of chemical fertilizers and pesticides. The associated cost, in turn, is both high and is also affecting the health of the soil. As a matter of fact, the intensive cultivation depletes the soil of its organic matter, which is not fully replenished before the next phase of cultivation. This in effect pushes the land to a wasteland condition of under-nourished land parcels. All these need ecological balancing of soil condition, while accommodating the need of the land-based system.

For stable and growing economy, proper and optimum utilization of the land and water resources is essential, particularly in the field of agriculture. It is a well-known fact that land and water interact to produce necessities of the dwellers of the watershed. The inherent potential of the soil and water resources in a particular area is governed by physiography, land slope, nature and depth of soil, present land use, geology, climate, socio-economic and legal aspects, etc. and the hydrological behavior, responsible for obtaining most productive interaction.

The management of watersheds, arising at appropriate development of land, water and bio-resources within their capability and treated according to their needs, has the following objectives:

- i) To protect the land against all forms of soil deterioration;
- ii) To rebuild eroded and depleted soil;
- iii) To build up soil fertility;
- iv) To stabilize critical runoff and sediment producing areas;
- v) To improve grass land, woods lands, and wildlife lands;
- vi) To conserve water for beneficial use;

- vii) To improve necessary drainage and irrigation; and
- viii) To reduce floods and sediment damage.

For the implementation of this concept, groundwork at the grass root level needed to be carried out with regard to the preparation of framework of watershed. Selection to suitable sizes of watersheds for different programmes; development methodology for watershed planning; creating trained cadres of technical personnel for survey, planning and implementation; motivation of the population dwelling in the watersheds; providing necessary infrastructure for adequate financial back up and dealing with necessary socio-economic changes. In addition, there must be adequate research data regarding the best way of conservation and developing local resources. This calls for an integrated approach to the management of watershed which considers the following points.

Soil and water conservation measures:

Our failure to properly manage the basic natural resources of land, vegetation and water has been a major cause of our impoverishment. The treatment will be from ridge to valley. There cannot be an artificial division of the forest and non-forest land, as well as private and community lands, while applying various methods of treatment. Therefore, the issue of degraded and wastelands will be taken up to ensure that every drop of water and every square foot of land are best utilized by integrated aqua-agri-horti production system.

While taking due care of such "wasted" lands, we should not over look the need to improve the efficiency of even non-degraded lands whether they are under forest or agricultural cover. It is a matter of concern that even our good forests are subject to illegal exploitation and that the sustainability of our agricultural lands is threatened by the over use of irrigation, chemical fertilizer and pesticides, besides being susceptible to depletion through diversion for other uses. Special care should be taken to save both these categories of land from degradation. To save the soil from erosion hazards a number of methods can be adopted.

2.5 Objectives of the project:

The project objective had been proposed with the concern for holistic development of the villagers through watershed development approach. The proposed objectives of the watershed project includes

Objective 1:

To protect soil erosion, conserve surface and ground water and enhance water retention/ discharge capacity of soil to promote sustainable ecological and economic development of resource poor community of the area.

Project activities involved (Objective 1):

Soil and Water Conservation, Drainage line treatment measures as: Water Harvesting Structure (WHS), Field bunding, Contour bunding, Bench Terracing, Percolation tank, etc.

Objective 2:

To conserve and increase vegetative cover of the area through social forestry, agro-forestry etc as well as massive afforestation programme.

Project Activities involved (Objective 2):

Plantation.

Objective 3:

To increase cropping intensity by promoting soil health management and sustainable integrated agriculture through dry land farming techniques for sustainable livelihood of the area.

Project Activities involved (Objective 3):

SRI paddy cultivation, Improved vegetable cultivation, Commercial vegetable-cereals-spices & oil seeds cultivation, Seed production, Mushroom, Compost (Pit & Vermi compost), Bio-mass based rural industry, Integrated Farming etc.

Objective 4:

To empower the community, CIG/SHG's, UG's etc. and individual beneficiary through organizing awareness generation programme, training, workshop, exposure visit etc.

Project Activities involved (Objective 4):

IEC material development, Organise awareness generation programme, Training, Exposures, Meetings, Demonstration, Workshops and Exposure visit etc.

Objective 5:

To generate employment through IGP activities for wellbeing of the community and promote saving practices.

Project Activities involved (Objective 5):

Involvement of the village community within the watershed as laborers and promotion of the Agriculture, Mushroom, Poultry, Piggery, Ducky, Dairy etc. in the project villages.

2.6 Basic Information of project:

2.6.1 Rurpru Watershed

1. Name of the watershed : Rupru
2. SLUIS CODE : 4H3C6b1j
3. Panchayat : Rupru
4. Block : Angara
5. District : Ranchi
6. State : Jharkhand
7. Co-ordinates of the project area are : Latitude 23°21'37"N to 23°23'23"N and
Longitude 85°33'13"E to 85°36'47"E.
8. Slope : 2 to 8 %
9. Agro Climatic Zone : VIIth Zone
10. Sub Zone : Western Plateau
11. Total Watershed Geographical Area : 464 Ha.
12. Total Forest area : 85.19 Ha.
13. Arable Land : 298.25 Ha.
14. Non Arable Land : 80.24 Ha.
15. Irrigated Land : 2.01 Ha
16. Un irrigated Land : 296.24 Ha
17. Culturable Wasteland : 40.10 Ha.
18. Area not available for Cultivation : 40.14 Ha
19. Total Population (persons, Survey,2009) :
20. Total family (nos.) :
21. Project cost per Hectare : Rs. 12000/-
22. Total Project Cost : **55.68 lakhs.**
23. Duration of the project : 5 years (2009 -10 To 2014-15)

Villages covered in the Rupru Watershed area:

Sl. No	Name of the Villages	Village Code	Thana No.
1	Rupru	2455300	84

Table -7

2.7. Status of previous development programme of the area:

Under Backward Region Grand Fund (BRGF) programme Primary School, Anganwadi Kendra, Sub Health Centre were developed in the proposed project area. Under Mahatmagandhi National Rural Employment Gurantee Act. (MNREGA) activities like Village Link Road, Excavation/Reexcavation of pond were taken up. Under dairy Development Programme Artificial Insemination have been taken up. Under National Horticulture Mission (NHM) fruits plant like mango, kaju and speses like zinger, turmarik, chilli etc. were planted.

2.8. Problems analysis:

The watershed is characterized by undulating topography, uneven rainfall, frequent occurrence of drought, acidic soil, lack of irrigation facility, low organic carbon, traditional method of cultivation and over grazing in summer. Lack of water holding capacity and poor soil moisture conservation resulted mono cropping and low yield. The high soil erosion is resulted in low productivity of arable land. The upland area is mostly subject to sheet and rill erosion. Agri-production was evenly destroyed by wild bird and domestic animals. Attack of pest and diseases in agriculture production system is also one of the major problem areas in the area.

Lack of post harvest technology resulting distress sale and wastage of agricultural produces. High level of BPL population. Poor technical aptitude, financial management ability and resource mobilization.

2.9. SWOT analysis of the project area:

Strength:

- i. Near by river Raru (water available all through the year)
- ii. There is culture of animal rearing.
- iii. Availability of diversified resources.
- iv. Proximity to District head quarter & town Ranchi
- v. Normal rainfall is quite adequate

Weakness:

- i. Majority households are small and marginal farmers
- ii. Rain fed & soil is erosion prone
- iii. Main occupation is rain fed agriculture
- iv. Most of the households are in BPL category
- v. Low literacy rate and lack of scientific knowledge regarding adoption of technology.
- vi. Monsoon is uneven and erratic.

- vii. Poor water holding capacity of soil.
- viii. Poor quality of vegetable seed sown by the farmers
- ix. Poor capacity of resource and financial management.
- x. Low soil fertility.
- xi. Consumption of Country Liquor.

Opportunities:

- i. Scope for soil and water conservation activities
- ii. Scope for commercial cultivation of vegetables, pulses, oilseed.
- iii. Scope of fodder & animal (Poultry, goat, sheep, cattle) rearing.
- iv. Scope of plantation-Horti-Herbi-Flori crops
- v. Scope of processing of agro & allied products
- vi. Scope for introduction of off-season and organic vegetable
- vii. Scope of group activities for resource mobilization.
- viii. Scope for Micro Enterprise Development
- ix. Convergence with other government programmes
- x. Scope of lac industry.
- xi. Scope of aquaculture development.

Threat:

- i. Severe soil erosion & wastage of major part of run-off water
- ii. Frequent drought disturb land based rainfed activities
- iii. Low level of literacy & skill.
- iv. Poor level of food security
- v. High poverty percentage and depletion of natural resources
- vi. Very fast depletion of ground water table
- vii. Crisis of safe drinking water
- viii. Non judicious use of chemical fertilizer
- ix. Problem of weed, disease and pests in agriculture.