Progress Report
(April 2015 – March 2016)

Improving Rural Livelihoods through **Farmer-centric** Integrated Watershed Management

Submitted to

POWERGRID Corporation of India Ltd
Gurgaon, India

Submitted by

ICRISAT
Science with a human face
International Crops Research Institute for the Semi-Arid Tropics

Progress Report
(April 2015 – March 2016)

Improving Rural Livelihoods through Farmer-centric Integrated Watershed Management

Submitted to

POWERGRID Corporation of India
Gurgaon, India

Submitted by

ICRISAT
Science with a human face
International Crops Research Institute for the Semi-Arid Tropics

Contents

Improving Rural Livelihoods through Farmer-centric Integrated Watershed Management

Executive Summary

POWERGRID Corporation of India, Gurgaon, India supported ICRISAT-led consortium to improve rural livelihoods through farmer-centric integrated watershed management in Kurnool district of Andhra Pradesh. During 2015-16, based on the need appropriate watershed interventions were undertaken which comprised activities like soil and water conservation through rock-filled dams, farm ponds, masonry check dams and well recharge pits. These soil and water conservation structures have created a net storage capacity of 6860 m^3 resulting in total conservation of about 24000 m^3 of surface runoff water in 4-5 filling in addition to increased groundwater table, while reducing the soil loss. Productivity enhancements through crop demonstrations, crop diversification and livelihood improvement activities like vermicomposting, goatary, afforestation, avenue plantation were done. Based on soil analysis results fertilizer recommendations were developed to target optimum yields by adopting the principle to recommend full dose of a nutrient in case of >50% farmers' fields are found deficient and half dose if <50% farmers' fields are found deficient. Participatory varietal trials (34 no.) and balanced fertilizer management (100 no.) were conducted to evaluate soil test-based recommendations.

In order to make the initiative sustainable over the long run, capacity building is a focused activity in the watershed. During 2015-16, six formal capacity development programs were conducted in which capacity of around 96 farmers was strengthened one field day was conducted.

Background

The Bethamcherla watershed, where the project target area of about 6852 ha encompassing 10 villages four revenue villages viz. Pendekal,Muddavaram, Emboy, Bugginipalli in Bethamcherla Mandal of Kurnool district. During the second year (March – September 2015), various activities under taken are: soil and water conservation that include - farm ponds, well recharge pits, check dams, percolation tanks and in-situ moisture conservation system; land development; productivity enhancement initiatives like – soil test based fertilizer application, improved crop varieties selection; afforestation with pongamia and gliricidia; livelihood activities like supporting women SHGs for dairy, ram rearing, etc.

Soil and water conservation

Various rainwater harvesting and groundwater recharge structures constructed during the year were: five check dam, fifteen farm pond, two percolation tank and seven rock filled dams (RFD), ten loose boulder structures (LBS) have been constructed (Fig. 1). Land development to small farmers belonging to schedule cast (SC) has been done. In these activities stone removal is supported by the project and silt transportation and spreading under MGNREGS. These 12 SC farmers now will have land for cultivation. This year is being a poor rainfall, agricultural

activities were affected severely. In such situation, watershed interventions like water conservation and climate resilient new crop have shown good impact to farmers.

Figure 1. Soil and water conservation structures and land development works in PowerGrid-ICRISAT watershed, Bethamcherla, Kurnool district.

Productivity enhancement and crop diversification

During kharif 2015, participatory crop demonstration has been taken up with 34 farmers in 14 ha (Table1 and Fig.2) and crops included were foxtail millet, groundnut, maize and pigeonpea. Soil-test based fertilizer particularly micronutrients were used by 100 farmers. The results showed productivity improvement by 15% in fox tail millet, 17% in pigeonpea and 22% in groundnut (Table 2).

Table 1. Farmer participatory crop demonstration in Bethamchrla watershed, 2015.

village	No. of farmers	Area (ha)
Bugganipalli	10	4
Pendekal	5	2
Marrikunta	5	2
Repalle	4	2
Muddavaram	10	4

Table 2. Crop yield (t/ha) from improved practices during 2015-16 in PowerGrid-ICRISAT watershed, Kurnool.

Crop	Improved practice (IP)	Farmers Practice (FP)	% increase in IP
Groundnut	1.1	0.90	22
Foxtail millet	1.0	0.87	15
Pigeonpea	0.9	0.77	17

Figure. 2. Improved crop varieties of groundnut (ICGV 91114) and pigeonpea (ICPH 2740) in Bugginapalli, , PowerGrid_ICRISAT watershed, Kurnool. (Mr AS Pandey of PowerGrid is visiting farmers field).

Intensification of vegetable crops

Vegetable crops like tomato, and onion, were cultivated using micronutrients. In this regard, 50 farmers in 3.8 ha were provided from project with vegetable seeds and micronutrients for enhanced productivity (Table 3 and 4; Fig. 3). In addition to this to encourage and create awareness among school children for cultivation of vegetables and improve the nutrition, vegetable seed kit (350 units of 10m^2 each) has been provided.

Table 3. Vegetable crops cultivation in Bethamcherla watershed, Kurnool.		
Village	No. of farmers	Area (ha)
Muddavaram	10	1
Mandlavaripalli	10	1
Pendekal	10	1
Bugginapalli	10	0.4
G. Tanda	10	0.4

Table 4. Vegetable crop yield (t/ha) from improved practices during 2015-16 in PowerGrid-ICRISAT watershed, Kurnool.			
Vegetable crop	**Improved practice (IP)**	**Farmers Practice (FP)**	**% increase in IP**
Onion	26.25	21.25	24
Tomato	16.25	13.75	18

Figure 3. Vegetable cultivation in Bethamcherla watershed, Kurnool.

Decentralized wastewater treatment system

Four potential sites were visited and selected M Pendekal for the construction of wastewater treatment unit (Fig.4). In this site wastewater flows under natural gradient and collects outside the village. High NH_4-N, NO_3-N and phosphate compared to other three villages (Table 5). Panchayat land is available outside the village for construction of wetland. Design details are shown in Table 6 and Figure 5.

.

Table 5. Wastewater characteristics of watershed sites (Bethamcherla) near Kurnool AP

Village name	Wastewater characteristics								
	pH	**EC ms/ cm**	**NH_4-N (mg/L)**	**NO_3-N (mg/L)**	**COD (mg/L)**	**TDS (mg/L)**	**TSS (mg/L)**	**Sulphate (mg/L)**	**Phosphate (mg/L)**
M. Pendakal	7.6	1.1	73.05	6.10	64	1044	200	18.4	0.81
Marrikunta nalla wastewater	7.5	0.8	67.64	7.41	112	767	688	12.3	0.64
Marrikunta wastewater+rain water	7.6	0.9	23.49	2.61	80	909	108	20.4	0
Musalaicheruvu	7.3	1.1	87.99	3.32	80	1113	476	22.04	0
Muddavaram	7.3	1.0	35.40	3.72	72	1020	68	17.23	0.37

Figure 4. Wastewater treatment site and work in progress in M.Pendakal, Kurnool.

Table 6. Design parameters for wastewater treatment system at watershed village M.Pendakal.

Number of households connected to common drainage	400
Wastewater generation (m^3/d)	51
Component of Constructed wetland	
Required volume of wetland considering 3 day HRT and 0.5 porosity total volume in (m^3)	307
Total depth of wetland (m)	0.8 m
Width of wetland (m)	3 m
Length (m)	56 m
Length of wetland total 56 m divided into 4 treatments each having length of 13 m.	
Vegetation	*Typha latifolia*
Inlet sedimentation tank has to be constructed before wastewater enters constructed wetland L x W x D	L (2m) x W (3m) x D(1.5 m)
Filter bed - Quantity of gravel and sand required for filter bed	
Coarse Sand (top-most layer)	Depth= 20 cm
20 mm gravel (0.2 m layer below 10 mm gravel layer)	Depth= 20 cm
40 mm gravel (0.2 m layer below 40 mm gravel layer)	Depth= 20 cm
Treated wastewater outlet storage tank	L (2m) x W (3m) x D (0.8m)
Construction of the wetland with concrete or stone pitching material	

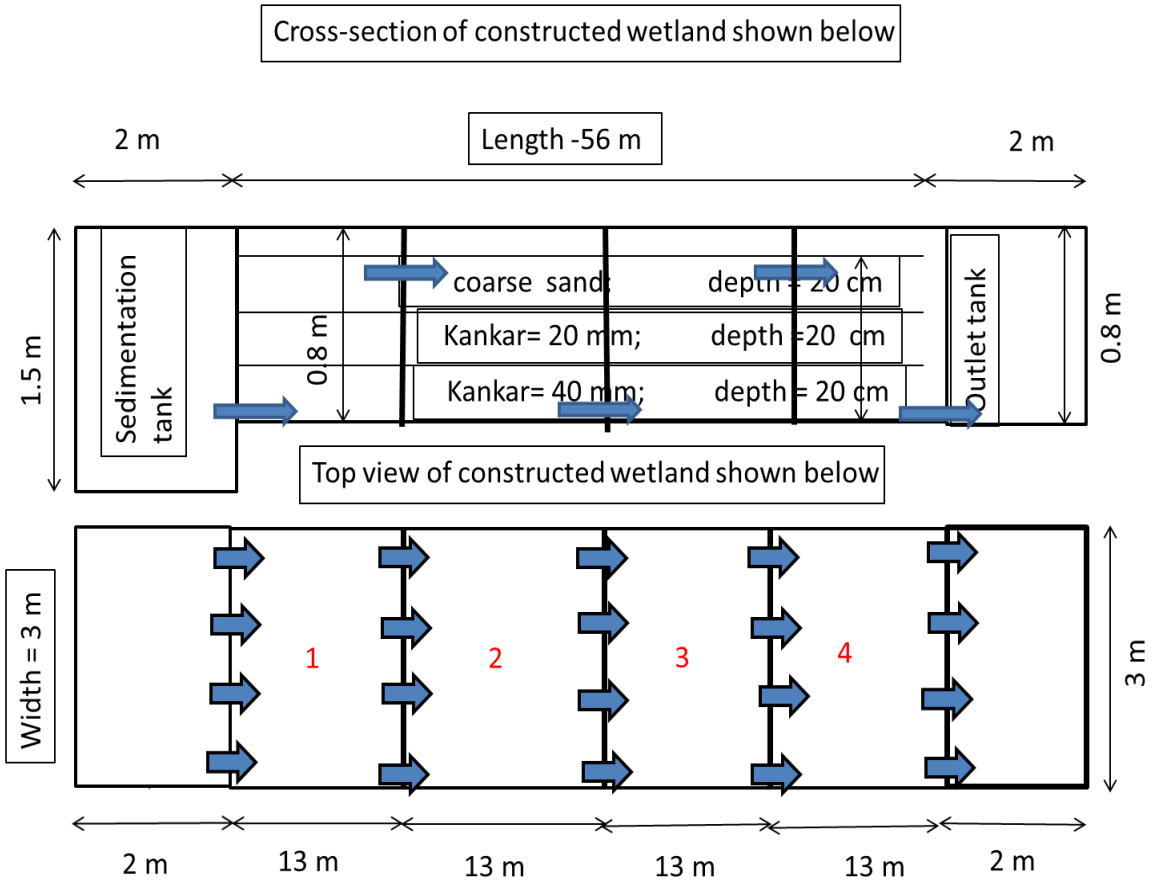

Figure 5. Design of wastewater treatment unit taken up in M Pendekal village, Kurnool.

Livelihood activities

Under revolving fund, five SHG groups (Madhuri and Geetanjali) consisting 10 members in each group in three villages (Veeraiahpalli, Muddavaram and G Tanda) were supported to buy ten during this year ram lambs in improve the livelihoods in addition to agricultural income (Figure 6 and 7). Vermicomposting is taken up by 5 farmers (Figure 5). One petty shop and one Xerox machine were supported from revolving fund as a livelihood activity .

Figure 6. SHG Women farmers with ram lamb and petty shop supported by the project.

Figure 7. A vermi-compost unit in Bethamcherla watershed, Kurnool.

Afforestation

Forest tree species viz. teak, red sandal and *Gliricidia* (25000 plants) were distributed farmers in five villages to plant on field bunds and wasteland (Fig. 8). Due to poor rainfall afforestation has been affected in Kurnool.

Figure 8. Nursery for raising Gliricidia, red sandals and teak in Muddavaram, PowerGrid_ICRISAT watershed, Kurnool.

Capacity building activities

Several capacity building activities like trainings, scientist-farmers interactions, field days were conducted (Table 7 and Fig.9). Wall writings in prominent location were displayed. An innovative digital extension system was introduced to reach large number of farmers using a hand held picco projects to show the videos of improved practices to farmers as an effective tool. Watershed activities were covered in newspaper for wider publicity (Fig.10).

Table 7.Capacity building activities in Bethamcherla watershed, Kurnool.

Sl No.	Details of Training	No of Trainings	Participants	
			Men	Women
1	Training on improved agricultural practices	3	43	6
2	Watershed Implementation (soil & water conservation)	2	35	2
3	Digital extension for watershed staff and lead farmers	1	10	-
4	Field day	1	20	2

Figure 9. Capacity building activities throughmeeting and farmer-sKVK scientist interaction, PowerGrid-ICRISAT watershed, Kurnool, 2015.

ఆంధ్రజ్యోతి

కర్నూలు • గురువారం
16 జూలై 2015

వరుణుడు కరుణించెన్

కర్నూలు(అగ్రికల్చర్): జిల్లాలో మంగళవారం అర్ధరాత్రి నుంచి తెల్లవారుజాము వరకు వర్షం కురిసింది. వెల్దుర్తి మండలంలో అత్యధికంగా 11.6 సెంమీలు, క్రిష్ణగిరిలో 11.1 సెంమీలు, బేతంచేర్లలో 8.8 సెంమీల వర్షం కురిసిందని జేడీఏ రాగావర్ నాయక్ తెలిపారు. 2 సెంమీలకు పైగా వర్షం 25 మండలాల్లో కురిసిందన్నారు. ఎండ తీవ్రత బాగా తగ్గిపోయిందని, ఆకాశం మేఘావృతమై గాలి ఉధృతి లేకపోవడంవల్ల బుధవారం రాత్రి కూడా వర్షం వచ్చే అవకాశం వుందని తెలిపారు. హాలహర్వి మండలంలో వాగులు, వంకలు పొంగిపొర్లాయి. బాపురం, సిద్ధాపురం, అమృతాపురం గ్రామాల్లో రాకపోకలు స్తంభించిపోయాయి. ఆలూరు మండలంలో హత్తిబెళగల్, కురువల్లి, అరికెర చెరువులు నిండిపోయాయి. కౌతాళంతో పాటు బంటుగుంట, ఉరుకుంద, కామవరం, బదినేహాల్ గ్రామాల్లో రైతులు పత్తి విత్తనాలను నాటారు. వెల్దుర్తి మండలం నర్సాపురం గ్రామ సమీపంలో చెరువులో ఉన్న గొర్రెల మందపై పిడుగు పడింది. ఈ ఘటనలో 20 గొర్రెలు మృతిచెందాయి.

రూ.2లక్షల దాకా నష్టం జరిగిందని బాధితులు వాపోయారు. జిల్లాలో ఇప్పటిదాకా 44వేల హెక్టార్లలో సాగుచేసిన పంటలు ఎండలు, గాలి ఉధృతికి వాడుపట్టిన తరుణంలో ప్రస్తుత వర్షాలకు తేరుకుంటున్నాయి.

ప్రత్యామ్నాయం అవసరం ఉండదు: జేడీఏ

అధిక మండలాల్లో పదునైన వర్షాలు పడటం వల్ల రైతులు పత్తి, వేరుశనగ పంటలసాగుకు సిద్ధమవుతున్నారన్నారు. వాతావరణ అనుకూలించడం వల్ల ప్రత్యామ్నాయ చర్యలు అవసరం ఉండకపోవచ్చన్నారు.

బేతంచర్లలో పారుతున్న చెక్‌డ్యాం

రైతులకోసమే పశుగ్రాసం పెంపకానికి చేయూత

బేతంచెర్ల: వ్యవసాయంతోపాటు పాడి పరిశ్రమతో రైతులు అభివృద్ధి చెందాలనే పశుగ్రాసం పెంపకాన్ని ప్రోత్సాహిస్తున్నట్లు ఆర్ఎస్డీఎస్ సంస్థ అధ్యక్షుడు విజయ్ అన్నారు. సోమవారం మండల పరిధిలోని ముద్దవరం, గోరుమాను కొండ తాండ, బుగ్గనిపల్లె, యం పేండేకల్లు గ్రామాల్లో రైతులు పశుగ్రాసం పెంపకంపై అవగాహన కల్పించారు. గ్రామీణ ప్రాంతాల్లో రైతుల అభివృద్ధే ధ్యేయంగా ఇక్రిశాట్ పవర్‌గ్రిడ్ సహకారంతో రూరల్ స్టడీస్ డెవలప్‌మెంట్ సొసైటీ ఆధ్వర్యంలో గ్లైడీసిరియా మొక్కలను రైతులకు ఉచితంగా అందజేస్తున్నట్లు తెలిపారు. ఈ మొక్కలు పెంచుకోవడం వలన భూములు సారవంతమవడమే కాకుండా, పశుగ్రాసం కొరత తీరడంతోపాటు, పర్యావరణం పరిరక్షించబడుతున్నట్లు సంస్థ అధ్యక్షుడు విజయ్ తెలిపారు. కార్యక్రమంలో రైతులు అయ్యస్వామి, రంగస్వామి, పద్మావతి,నాయుడు, ఓబులేసు, నాగశంకర్, రామకృష్ణ తదితరులు పాల్గొన్నారు.

గడ్డి పెంపకంపై అవగాహనకల్పిస్తున్న ఆర్ఎస్డీయస్ అధ్యక్షుడు విజయ్

Figure 10. Media clipping in news paper.

International women day

International womens day was celebrated on 8 March 2016 in PowerGrid-ICRISAT watershed. During the event invited guests spoke and it was followed by a rally. Resource persons participated in the event were: Smt.Vijayalaxmi, Principal, Adarsha School, Bethamcherla, Smt. Padmavathi,President, Mandal Mahila Samakya, Smt.Sunitha, President, Vilage Organisation, Veeraipalli, andSmt.Ramadevi, President, Bugganipalli Village. The event was attended by 120 women (Fig. 11).

Figure 11. International women's day, PowerGrid_ICRISAT watershed, Kurnool.

Annexure 1

PowerGrid – ICRISAT watershed activities in Kurnool, Andhra Pradesh, 2015-16.

Sl. No		Activities	Unit	April 2015 – March 2016	Total Achievements	No. of farmers Benefitted
A		**Soil and Water conservation structures**				
	1	Farm/dugout pond (FP)	No.	4	7	15
	2	Check Dam (CD)	No.	5	7	150
	3	Check wall	No.		2	8
	4	Rock filled dam (RFD)	No.	7	12	12
	5	Loose boulder structures	No.	10	14	15
	6	Open well recharge system	No.	4	4	4
	7	Mini percolation tank	No.	1	1	50
	8	Land development (stone removal and silt spreading)	ha	1	5	12
	9	Field bunding	ha	4	4	15
	10	Wastewater treatment unit	No.	01	In progress	10
B		**Horticulture and Income generating activities**				
	1	Vermi composting	No.	05	05	05
	2	Ram lamb distribution	No.	10	30	150
	3	Revolving fund to SHGs	Group	02	02	30
C		**Afforestation, horticulture and Livestock Improvement**				
	1	Bund planting forest trees	No.	500	1800	20
	2	Avenue plantation forest trees	No.	1600	2000	several
	3	Vegetable seed distribution to school children for kitchen gardening (350 units of 10 m^2 each)	No.	350	350	1000
	4	Vegetable cultivation	ha	50	50	50
	5	Horticulture plants provided	No.	50	100	150
D		**Productivity Enhancement conducted trails**				
	1	Participatory varietal demonstration	No.	30	34	34
	2	Soil test based micronutrients	ha	100	100	100
E		**Capacity building /training/awareness conducted**				
	1	Farmers trainings	No.	2	10	250
	2	Field day	No.	01	01	22
	3	Wall writing	No.	30	50	several
	4	Exposure visit to ICRISAT	No.	1	1	25