Farmers' Participatory Research
Thirty-four Years of Operational Research Project on Dryland Agriculture (1984-2018)

K. Bhargavi, Y. Padmalatha, G. Narayana Swamy,
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Operational Research Project

All India Coordinated Research Project for Dryland Agriculture
Acharya N.G. Ranga Agricultural University
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Location specific water saving technologies are the order of present day agriculture especially in the dryland agriculture along the transect of all agro-climatic zones of our country. It is in this direction, All India Coordinated Research Project for Dryland Agriculture (AICRPDA) is coming up with excellent results in generating technologies. The "Operational Research Project" on Dryland Agriculture is a ramification of AICRPDA that in turn verifies the devised technologies on a participatory mode in scarce rainfall zones of AP. Sustainability is a key factor for technological adoption in rainfed areas and it is precisely at this juncture, the role of "ORP" in identifying farmer feasible, highly adoptable technologies that are upscalable. The devised technologies should be invariably tested and refined at farmers' fields. When once, a particular technology gains acceptance by farmers, it can be tested in areas with common climatic and edaphic factors.

The ORP team of ARS, Anantapuramu had made tremendous contribution to AIRCPDA in testing the feasibility and viability of certain invaluable technologies that are suited to dryland areas of AP. As many as 49 technologies were verified in watershed, the outcomes so far have many interesting lessons that are worth sharing with wide range of stakeholders. Overall, the project has made significant impact in some of the watersheds by increasing the rainwater harvesting capability along with crop production activities. Thus far, 49 technologies were verified in this ORP that was functional in AP from 1984 to 2017 in different mandals of Kurnool and Anantapuramu districts. Introduction of improved technologies; addressing cost reduction technologies; soil test based fertilizer management, supplemental irrigation, seed to seed mechanization, in situ soil moisture conservation through chisel plough are some examples that have brought in new options to dryland farmers in watershed areas.

The decision of ORP team of scientists in coming up with a compilation that embodies the outcome of their strenuous efforts in testing different technologies in farmers' fields and their impact on socio-economic status of dryland farmers of AP. Indeed, the efforts of this team is commendable in putting together their 34 years of research. I am sure that this compilation will be useful to researchers, academicians, students and all other stakeholders in dryland agriculture.

వల్లభనేని దామోదర నాయుడు

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PREFACE

The majority population to the tune of 70% depends on rainfed agriculture in India. The initiation of the Operational Research Project with the main objectives of evaluating the performance of each component of dryland technology under the farmer's management condition, to provide feedback to the research stations for refinement of the recommendations and to achieve a firsthand working experience in the development of micro watersheds so that they may serve as models for extension agencies. The Operational Research Project worked from 1984 to 1993 in Yerracheruvu from 1994 to 2001 in Pennar Manirevu National Watershed and from 2002 to 2006 in Narasapuram National Watershed in Anantapuram district and from 2010 to 2017 in Kurnool district.

The Operational Research Project emphasized on soil and moisture conservation measures, crop production programmes and alternate land use systems during initial period. Since 2002, the concept of research has been changed to the development of technologies from the enhancement of production to cost reduction technologies.

These technologies basically address rainwater harvesting and reuse for resource efficiency and higher income with specific emphasis on soil conservation, evaluation of crops and varieties, cropping and farming systems and contingency crop planning, integrated nutrient management, energy management and alternate land use systems with more concern on reduction in cost of production in rainfed crops.

I appreciate contributing scientists for their effort to prepare this document for the benefit of rainfed farming community, students and extension functionaries and all other involved in the improvement of dryland agriculture. I wish them all success in future research in farmers' fields.

N Varadaraju Naidu

(N.V. NAIDU)

ACKNOWLEDGEMENTS

Operational Research Project on Dryland Agriculture was initiated at Ananthapuramu under All India Coordinated Research Project for Dryland Agriculture under ICAR and Canadian International Development Agency (CIDA) to meet the dryland research needs on farmers' participatory approach in Scarce Rainfall Zone of Andhra Pradesh and similar land topography rainfall and other natural resources in the country. The research experiences are documented as "Farmers' Participatory Research-Three Decades of Operational Research Project onDrylandAgriculture (1984-2018)".

This book contains enormous analysis and feedback and research finding of ORP on DrylandAgriculture over three decades in different watersheds. We are sure that the book will be of immense use of extension scientists, students and agriculture and allied department staff working in DrylandAgriculture and watershed management.

The authors express their profound gratitude to Dr.V.Damodara Naidu, Honb'le Vice Chancellor, Dr.N.V.Naidu, Director of Research, ANGRAU, Lam,Guntur and Dr.M.Subba Rao, Associate Director of Research, RARS, Nandyal for their encouragement, valuable guidance in bringing out this publication.

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Authors

AICRPDA – ORP, Main Centre, Ananthapuramu5

Introduction

The Operational Research Project functions under All India Coordinated Research Project on Dryland Agriculture with the main objective of testing the feasibility in adoption of developed technologies on dryland agriculture on farmers' participatory approach in integrated watershed areas. One such Operational research project has been implemented since 1984 under AICRPDA, with the following objectives upto 1993 in Yerracheruvu model watershed, covering Kandukuru and Krishnamreddipalli villages, Ananthapuramu district.

Initial Phase (1984-1993)

- To test the technologies developed at the research centre for the validity and adoptability under farmer's condition.
- Stabilizing the crop production under particular environment.
- To identify the constraints involved at the time of implementation of the recommended technologies on the farmers' fields.
- To feed back the constraints to the research station to modify or alter the research recommendation to suit the farmer's conditions.

Initially the programme was concentrated mainly on crop production in the drylands, but from 1991-92 onwards, the approach was on watershed basis and the objectives are redefined as follows.

- To develop location specific practices.
- To conserve natural resources and to improve the productivity of both arable and non-arable lands.
- To take up validation and verification trails on the technology developed at research station.
- To provide feedback to the scientists at research stations.
- To develop alternate land use systems.
- To organize training programmes for the farmers to acquire skills of latest techniques in dryland agriculture.
- To mobilize the farmers to make to involve in watershed development programmes and maintain the developed land as such.

Middle Phase (1994 – 2001)

During the period 1994 to 2001, the dryland technologies developed at ARS, Ananthapuramu were tested for their feasibility in Pennar - Manirevu National Watershed under three different components as given here under.

1. Soil and water conservation measures, in-situ moisture conservation measures, land management practices etc.,
2. Crop production programmes (improved varieties, improved package of practices, evaluation of production factors, intercropping systems, management of weeds, management of diseases, farming systems, etc.,).
3. Alternate land use systems (planting of *Acacia nelotica,* introducing *Stylosanthus hamata*, testing of suitable trees)

While implementing these technologies some of the constraints were identified and those constraints were fed back to research station, Ananthapuramu for their refinement.

Advanced Phase (2002- 2017)

Since 2002, the concept of research has undergone series of change *i.e.,* from development of technologies for enhancement of production to cost reduction technologies. Accordingly, the cost reduction technologies developed under different themes at Ananthapuramu under AICRPDA have been tested on farmers' participatory mode covering three different watersheds in Ananthapuramu and Kurnool districts.

Thus, since inception of Operational Research Project (1984) till the year 2017, the following watershed areas were covered with different concepts as detailed here:

S. No	Name of the watershed	Villages covered/ Mandal	Concept	Period
1	Vajralavanka watershed	Yerraguntlapalli (v) Peapully (M) Kurnool (D)	1. Rain water management 2. Cropping systems 3. Participatory varietal selection 4. Integrated nutrient management 5. Energy management 6. Integrated farming systems Alternate land use systems	2015 to 2017
2	Girigetla micro watershed	Girigetla (V) Thuggali (M) Kurnool (D)	1. Rain water management 2. Cropping systems 3. Participatory varietal selection 4. Integrated nutrient management 5. Energy management 6. Integrated farming systems 7. Alternate land use systems	2010 to 2014
3	K. Agraharam watershed	Eguvapalli (V) Garladinne (M) Ananthapuramu (D)	1. Rain water management 2. Cropping systems 3. Participatory varietal selection 4. Integrated nutrient management 5. Energy management 6. Integrated farming systems 7. Alternate land use systems	2007 to 2009
4	Narasapuram watershed	Nagalaguddam Thanda (V) Singanamala (M) Ananthapuramu (D)	1. Rain water management 2. Cropping systems 3. Participatory varietal selection 4. Integrated nutrient management 5. Energy management 6. Integrated farming systems 7. Alternate land use systems	2002 to 2006
5	Pennar - Manirevu watershed	Nusikottala, Thanda	Crop production, soil conservation, Improved variety selection and alternate land use	1994 to 2001
6.	Yerracheruvu model watershed	Kandukuru, Krishnamreddipalli	Crop production, soil conservation, Improved variety selection and alternate land use	1984 to 1993

While implementing the technologies the identified constraints which were feedback to the research Station in order to refine some of the technologies.

1. Village (s) Profile – Benchmark/Baseline information

Domain regions and Villages and Agro-climatic characterization (crops/soils/climate/socio-economic). Enclose location map and village maps**.**

1.1 Village settings

Village	Latitude/ Longitude/ Altitude	Tehsil/ District	Year of Start	Year of end
V1: Yerraguntlapalli	15^0 $15^1.597^{11}$ &77^0 $42^{1.}$ 280^{11}	Kurnool	Current village: 2015	2017
V2:Girigetla	76°50′ E &13°40′N	Kurnool	2010	2014
V3: Eguvapalli	77^042^1 E & 14^0 49^1 N	Ananthapuramu	2007	2009
V4: Nagalaguddam Thanda	77^043^1 E & 14^0 48^0 N	Ananthapuramu	2002	2006
V5: Nusikottala, Thanda	77^o13 E & 21^o1^1 N	Ananthapuramu	1994	2001
V6: Kandukuru, Krishnamreddipalli	77^0 41^1 E & 14^0 34^1 N	Ananthapuramu	1984	1993

Operational Research Project under Ananthapuramu centre was initiated in 1984 at Krishnam Reddipalli, Kandukuru villages (77^0 41’ E and $14^0$34’ N) of Yerracheruvu model watershed. It was continued there up to 1993. From 1994 to 2001, the project was at Pennar-Manirevu National Watershed and the villages were Nusikottala and N.Thanda (71^0 13’ E and 21^{01}’ N). From 2002 to 2006, it was at Nagulaguddam Thanda in Narasapuram National Watershed (77^0 43’ E and $14^0$48’ N). Then, project was shifted to Eguvapalli of K.Agraharam watershed area (77^0 42’ E and $14^0$49’ N) during 2007 to 2009 in Ananthapuramu District. From 2010 to 2014 the project was continued in the village Girigetla (77^0 50’ E and $13^0$40’ N) of Girigetla Micro watershed area in Kurnool district. Then, project was shifted to Yerraguntlapalli village of Vajralavanka watershed area during 2015 to 2017 in Kurnool District.

1.2.Location and Climate

Village	Climate	Rainfall (mm)				Temperature (^{o}C)	
		Annual	Kharif	Rabi	Summer	Max	Min
V1: Yerraguntlapalli	semiarid	654	431	156	67	32.8	25.2
V2: Girigetla	semiarid	620	358	168	94	35.3	21.9
V3: Eguvapalli	semiarid	567.0	444.8	54.0	72.4	32.5	22.6
V4: Nagalaguddam Thanda	semiarid	645.5	418.1	151.1	70.3	34.5	23.4
V5: Nusikottala, Thanda	semiarid	709.2	522.2	55.9	131.5	31.5	23.9
V6: Kandukuru, Krishnamreddipalli	semiarid	535.6	431.7	61.7	42.5	35.1	17.3

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1.3. Land Use (ha)

Village	Cultivated	Grazing land	Uncultivable	Fallows	Forest	Others	Total
V1: Yerraguntlapalli	797.2	--	156.4	--	--	--	953.6
V2: Girigetla	1154.7	214.5	--	--	--	--	1369.2
V3: Eguvapalli	794.4	--	52.0	15.0	--	--	861.4
V4: Nagalaguddam Thanda	734.3	22.7	456.0	--	--	--	1213.7
V5: Nusikottala, Thanda	2100.0	--	162.0	--	--	--	2262.0
V6: Kandukuru, Krishnamreddipalli	358.0	-	--	--	--	211.0	569.0

The total land available was more in Nusikottala watershed area with less area in Kandukuru watershed. Total land available was 953.6 ha in Yerraguntlapalli village.

1.4. Soil Types

Village	Soil Types and Extent*						Total Area (ha)
	Soil Type 1	Area (ha)	Soil Type 2	Area (ha)	Soil Type 3	Area (ha)	
V1: Yerraguntlapalli	Red loam	797.2	--	--	--	--	797.2
V2: Girigetla	Red loam	1349.2	Black	20.0	--	--	1369.2
V3: Eguvapalli	Red loams	694.5	Vertisols	166.9	--	--	861.4
V4: Nagalaguddam Thanda	Red sandy loams	384.8	Deep loamy sand	146.8	Shallow sandy loams	317.7	1213.9
V5: Nusikottala, Thanda	Red loams	600.0	Loamy Sand	1362.0	Deep clays	150.0	2262.0
V6: Kandukuru, Krishnamreddipalli	Red sandy loams	513.0	Rocky	56.0	--	--	513.0

It clearly indicates that the red soils are the predominant soil type in all the project areas. Thus, the technologies developed at Agricultural Research Station, Ananthapuramu on red soils are found suitable for adoption in the Operational Research Project areas also.

1.5. Cultivated Area details

Village	Net Irrigated Area (ha)	Net Rainfed Area (ha)	Total Net Cultivated area (ha)	Gross Cultivated Area (ha)	Cropping Intensity (%)
V1: Yerraguntlapalli	35.2	749.2	797.2	797.2	100
V2: Girigetla	16.0	1138.0	1154.7	1154.7	100
V3: Eguvapalli	249.5	445.9	674.5	694.4	100
V4: Nagalaguddam Thanda	13.0	124.0	137.0	734.3	100

V5: Nusikottala, Thanda	249.5	444.9	694.5	2100.0	100
V6: Kandukuru, Krishnamreddipalli	48.0	200.9	248.9	358.0	100

Among the five ORP villages, Girigetla is the only village having practice of double cropping when north east monsoon is extended and in rest of villages, intercropping of groundnut with redgram is in vogue. The net rainfed area of 1138.0, 445.9, 124.0, 444.9, 200.9and749.2 ha is under cultivation in Girigetla, K.Agraharam, Narasapuram, Nusikottala Kandukuru and Yerraguntlaplli respectively.

1.6. Sources of Irrigation (area)

Village	Canal	Tanks/Nadis	Farm ponds	Open wells	Bore wells	Others	Total
V1: Yerraguntlapalli	--	1.5	--	--	31.6	--	33.1
V2: Girigetla	--	--	--	--	16.0	--	16.0
V3: Eguvapalli	249.5	--	--	--	--	--	249.5
V4: Nagalaguddam Thanda	--	--	--	--	--	--	--
V5: Nusikottala, Thanda	--	1	--	50.0	--	--	50.0
V6: Kandukuru, Krishnamreddipalli	--	1	--	19.4	--	--	19.4

Though the ORP adopted villages are dominant with rainfed farming, there was 16 and 31.6 ha irrigated area under borewells at Girigetla and Yerraguntlapalli respectively, 249.5 ha under canals at K.Agraharam, 50 ha and 19.4 ha under open wells at Nusikottala and Kandukuru respectively at the time of initiation of project. At present, underground water is depleted and hence the open wells are used as in-well borewells by drilling bores in the open wells.

1.7. Area (ha) under dominant Crops/ Cropping Systems

Village	Kharif		Rabi		Summer	
	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated
Crops						
V1: Yerraguntlapalli	Groundnut/ Pigeonpea	Tomato/ chillies/ Mulberry	--	Ground nut	--	Tomato/ chillies
V2: Girigetla	Groundnut	--	--	--	--	--
V3: Eguvapalli	Groundnut	Rice	--	--	--	--
V4: Nagalaguddam Thanda	Groundnut	--	--	--	--	--
V5: Nusikottala, Thanda	Groundnut	--	--	--	--	--
V6: Kandukuru, Krishnamreddipalli	Groundnut	Rice	--	--	--	--
Cropping Systems						
V1: Yerraguntlapalli	Groundnut + pigeonpea	Pigeonpea + tomato	--	--	--	--
V2: Girigetla	Groundnut+ pigeonpea	--	--	--	--	--
V3: Eguvapalli	Groundnut+ Pigeonpea	--	--	--	--	--
V4: Nagalaguddam Thanda	Groundnut+	--	--	--	--	--

	Pigeonpea					
V5: Nusikottala, Thanda	Groundnut+ Pigeonpea	--	--	--	--	--
V6: Kandukuru, Krishnamreddipalli	Groundnut+ Pigeonpea	--	--	--	--	--

In all ORP adopted villages, the dominant crop was groundnut as rainfed crop and paddy under irrigated condition during *Kharif* in some pockets only in Eguvapalli and Kandukuru villages. In Yerraguntlapalli pigeonpea was predominant crop during *kharif*.

1.8. Livestock status

Village	Cattle	Cows	Buffaloes	Goats	Sheep	Poultry	Others
V1: Yerraguntlapalli	20	15	25	--	50	350	--
V2: Girigetla	111	190	33	5	297	142	--
V3: Eguvapalli	107	85	160	42	52	52	11
V4: Nagalaguddam Thanda	23	83	--	131	52	88	--
V5: Nusikottala, Thanda	60	25	30	25	40	50	--
V6: Kandukuru, Krishnamreddipalli	170	128	126	--	50	--	--

Among the livestock, sheep rearing (297) and cows (190) are preferred in Girigetla. In Eguvapalli, cattle (107) and buffaloes the major group. Goats were more (131) in Nagalaguddam Thanda followed by poultry (88). In Nusikottala and Kandukuru areas all the groups of livestock existed. Poultry (350) was more in Yerraguntlapalli village.

1.9. Fodder availability status

Village	Adequate	Scarce	Surplus	Supply from outside the village	Met from the natural resources like grazing lands, forest etc.
V1: Yerraguntlapalli	--	√	--	--	--
V2: Girigetla	--	√	--	--	√
V3: Eguvapalli	√	--	--	--	√
V4: Nagalaguddam Thanda	--	√	--	--	√
V5: Nusikottala, Thanda	--		--	√	√
V6: Kandukuru, Krishnamreddipalli	--	√	--	--	--

To meet the needs of livestock, fodder availability was scarce at Yerraguntlapalli, Girigetla, Nagalaguddam Thanda and Kandukuru, while it was adequate in Eguvapalli. In Nusikottala, fodder was brought from outside the village. Except at Kandukuru, all villages depend mainly on the natural resources like grazing lands, forest etc., for fodder.

1.10. Soil and water conservation structures existing in Village

S.No.	Structures	V1: Yerraguntlapalli	V2: Girigetla	V3: Eguvapalli	V4: Nagalaguddam Thanda	V5: Nusikottala, Thanda	V6: Kandukuru Krishnam

							reddipalli
1	Farm ponds	2	4	15	4	--	--
2	Percolation Tank	2	1	1	1	1	1
3	Check dam	8	10	8	5	619	2
4	Irrigation tank	--	2	1	23	--	--
5	Stone checks	--	--	--	--	446	148
6	Rock fill dam	120	--	--	--	21	151
7	Bunding	--	--	--	--	453	509
8	Wells	46	3	12	16	50	16

Since the water is the prime factor deciding the productivity of all rainfed crops in general and Ananthapuramu in particular, the Department of Agriculture and other institutions concentrated on the water conservation structures. Thus, there are 8 Check dams, 2 farm ponds and 2 percolation tanks are present in Yerraguntlapalli.There are ten Check dams, 4 farm ponds and 3dug out wells are present in Girigetla. Fifteen farm ponds in Eguvapalli, 23 small percolation ponds in Nagalaguddam Thanda, 619 checkdams in Nusikottala and 509 bunds in Kandukuru were the major soil water conservation structures present in the respective villages during project period. Soil and water conservation structures are more in Kandukuru and Nusikottala villages.

1.11. Socioeconomic Details

a. Land holding size and area under each group

Village	Small		Marginal		Medium		Large		Total	
	Number	Area (ha)	Number	Area (ha)	Number	Area (ha)	Number	Area (ha)	Number	Area (ha)
V1: Yerraguntlapalli	20	35.7	30	63.7	15	56.8	10	641	75	797.2
V2: Girigetla	34	273.8	8	68.5	123	992.7	4	34.2	169	1369.2
V3: Eguvapalli	22	95.3	19	23.8	30	238.3	21	436.9	92	794.4
V4: Nagalaguddam Thanda	31	154.2	34	169.6	19	212.9	24	117.5	108	734.4
V5: Nusikottala, Thanda	30	840	17	210	30	840.0	10	210.0	87	2100.0
V6: Kandukuru, Krishnamreddipalli	28	89.5	10	107.4	7	35.8	7	125.3	52	358

The major rainfed area is with small, medium and marginal farmers in all the water sheds except in Eguvapalli and Yerraguntlaplli where most of the area is in the hands of large farmers.

b. Educational status

Village	Primary	Secondary	Higher Secondary	Graduation	Post-graduation	Illiterate	Total
V1: Yerraguntlapalli	110	25	10	8	--	47	200
V2: Girigetla	220(25.9)	115(13.5)	50(5.9)	10(1.2)	5(0.6)	450(52.9)	850
V3: Eguvapalli	179(26.6)	734(5.1)	71(10.6)	5(0.7)	2(0.3)	282(41.9)	673
V4: Nagalaguddam Thanda	30(4.6)	40(6.2)	3(0.5)	2(0.3)	--	572(88.4)	647
V5: Nusikottala,	20(4.7)	25(5.8)	--	4(0.9)	--	381(88.6)	430

Thanda							
V6: Kandukuru, Krishnamreddipalli	75(18.3)	29(7.1)	6(1.5)	15(3.7)	5(1.2)	280(68.3)	410

Highest literacy rate is recorded in Eguvapalli (58.1%) and Girigetla (47.1%) villages. But higher no. of graduates in Kandukuru village. In the other villages illiteracy is prevalent.

c. Demographic features*

Village	No. of households	Total population	Males	Females	Caste-wise			
					General	OBC	SC	ST
V1: Yerraguntlapalli	57	350	150	200	27	30	--	--
V2: Girigetla	169	850	429	421	40	720	70	20
V3: Eguvapalli	142	673	325	348	10	653	10	--
V4: Nagalaguddam Thanda	147	647	221	189	6	--	--	641
V5: Nusikottala, Thanda	162	472	272	200	10	362	--	--
V6:Kandukuru, Krishnamreddipalli	177	674	333	341	42	72	51	--

***For benchmark year**

The individuals mostly belong to Other Backward Castes in Yerraguntlaplli, Girigetla and Eguvapalli villages. The majority are converted Christians in Nusikottala village while majority of population belongs to ST (641) in Nagalaguddam Thanda.

d. Infrastructure facilities

Infrastructure facilities	V1: Yerragun tlapalli	V2: Girigetla	V2: Eguvapalli	V3: Nagalagudd am Thanda	V4: Nusikottala, Thanda	V5: Kandukur, Krishnam reddipalli
1.Communication (Post office/Telephone)	Yes	Yes	√	√	x	x
2.Road (Kaccha/pucca)	Yes	Yes	√	√	√	x
3.Transport mode	Bus	Train, Bus	Bus	Bus	Bus	Bus
4. Market Type (ex. Local Shandy / Cooperative etc.) and produce sold (ex. Grain, vegetable etc.,)	No	No	x	x	x	x
5.Agro processing available, if so, manual or mechanical	No	No	x	x	x	x
6.Bank or credit societies available	No	No	x	x	x	x
7.Godowns/warehouse available	No	No	x	x	x	x
8. Others (specify)	No	No	x	x	Community hall	x

Post office/Telephone facility is available for communication in Yerraguntlapalli,Girigetla, Eguvapalli, Nagalaguddam Thanda. In all the villages the accessibility is by bus and private autos facility.

e. Source of inputs

Input	V1: Yerraguntlapalli		V2: Girigetla		V3: Eguvapalli		V4: Nagalaguddam Thanda		V5: Nusikottala, Thanda		V6: Kandukuru, Krishnamreddipalli	
	Govt.	Private	Govt.	Private	Govt.	Private	Govt.	Private	Govt.	Private	Govt.	Private
Seed/planting material	√	√	√	√	√	√	√	√	√	√	√	√
Fertilizers	--	√	--	√	--	√	--	√	--	√	--	√
Pesticides	--	√	--	√	--	√	--	√	--	√	--	√
Agricultural machinery	--	√	--	√	--	√	--	--	--	--	--	--
Credit	√	√	√	√	√	√	√	√	√	√	√	√
Any other (specify)	--	--	--	--	--	--	--	--	--	--	--	--

Credit and Loan, Seed/planting materials are made available in all six villages by both government agencies and private money lenders. Farmers bring fertilizers and pesticides from private dealers. Girigetla and Eguvapalli villages have a facility to hire the agricultural machinery from fellow farmer.

f. Labour Status for agricultural operations:

Village	Labour is not adequate	Labour is not adequate	Locally available	Hired from other locality or else
V1: Yerraguntlapalli	Dec - April	June - Oct	June - October	June - October
V2:Girigetla	Dec - April	June - Oct	June - October	June - October
V3:Eguvapalli	x	√	√	√
V4: Nagalaguddam Thanda	x	√	√	√
V5:Nusikottala, Thanda	x	√	√	√
V6:Kandukuru, Krishnamreddipalli	x	√	√	√

In all Operational Research Project villages, since locally available labour power is not adequate for agricultural operations during the peak crop season, the needs could be met by hiring items from other locality. As the interventions from Operational Research Project to meet the labour demand, mechanization is introduced in Nagalaguddam Thanda, Eguvapalli and Girigetla villages.

g. Constraints identified related to rainfed agricultural production and productivity

Village	Weather related	Soil and water conservation related	Soil related	Crop based	Animal based	Socio-economic
V1: Yerraguntlapalli	1,2,3	1,2	1,2,3,4	1,2,4,5	1,3	3,4,,5,8,9,10
V2: Girigetla	1,2,3	1,2	1,2,3,4	1,2,3,4, 5	1,3	3,5,7,8,9
V3: Eguvapalli	1,2,3	1,2	2,3,4	1,2,4,5	1,3	1,4,6,7,9
V4: Nagalaguddam Thanda	1,2,3	1,2	1,3,4	1,2,4,5	1,2,3	1,2,4,7,8,9
V5: Nusikottala, Thanda	1,2,3	1	1,2,3,4	1,2,4,5	1,3	1,2,4,7,8
V6: Kandukuru,	1,2,3	1,2	1,2,3	1,2,4	1,3	1,3,4,7,10

Krishnamreddipalli						

All the five villages are prone to chronic drought with prolonged dry spells and affected with uneven distribution and erratic rainfall. All five villages receive off-season rains which cause damage to the crops at the time of harvest/post-harvest stage. In all the five villages adequate insitu moisture conservation structures and measures were adopted.

Though the rainfall is low, it occurs with higher intensity, causing heavy runoff, which is further accelerated due to rolling topography and low water retentive capacity of soils. Hence these types of situations can be better utilized by storing rain water into farm ponds for its recycling during prolonged dryspells which are very common during crop growth periods. Monocropping with traditional crops & their varieties are in practice with lack of awareness about climate change;

contingency measures related rainfed production are not adopted in all villages during respective periods.

Non availability of draught power restricting farming operation in time and declining livestock population tends to lower income generation in almost all villages. Other than these constraints, many socioeconomic and soil related low organic carbon, low fertile soil, etc., are the other identified constraints to rainfed agricultural production and productivity.

Weather related constraints

1. Uneven distribution and erratic rainfall
2. Prolonged dry spells
3. Chronic drought prone
4. Any other

Soil and water conservation related constraints

1. Inadequate in-situ moisture conservation and runoff management measures
2. Off season rains causing damage to harvested crops
3. Any other

Soil related constraints

1. Susceptibility of soil to severe erosion hazards
2. Sub-soil graviliness limiting root ramification
3. Lower fertility (N P) and important micro nutrients causing nutrient imbalance
4. Low infiltration rate and organic carbon content
5. Low organic carbon
6. Any other

Crop based constraints

1. Traditional crops/varieties/cropping system
2. Lack of awareness about climate change-contingency measures.

3. Monocropping
4. Poor fertility level (including micro nutrient status) and imbalance use of fertilizer
5. Weed infestation and higher incidence of disease – pests
6. Spreading of Parthenium grass water logging
7. Any other

Animal based constraints

1. Declining livestock population
2. Non-availability of improved breeds of livestock (improper breeding policy)
3. Non-availability of draught power restricting farming operations (in time)
4. Any other

Socio-economic constraints

1. Fragmented holdings
2. Lack of access to commodity oriented development
3. Lack of access to credit facilities
4. Lack of input supply
5. Lack of marketing facilities and price to promote alternate promising & remunerative crops, dairying and other subsidiary enterprises.
6. Problems of wild animals
7. Poor storage facilities
8. Low adoption of improved crop production technology
9. Poor farm mechanical unit
10. Threat of crop failure
11. Any other

2.0. ORP Programme in the adopted village (s)

Village	Total Area (ha)	Operational area (ha)
V1: Yerraguntlapalli	953.6	526
V2: Girigetla	1369.2	1154.7
V3: Eguvapalli	861.4	794.4
V4: Nagalaguddam Thanda	1213.7	734.3
V5: Nusikottala, Thanda	2262.0	2100.0
V6: Kandukuru, Krishnamreddipalli	569.1	358.0

In all the Operational Research Project adopted villages, almost entire area was put under operations over different years, covering with different improved dryland technologies.

2.1. Traditional practices adopted

Crops	Variety	Seed rate (kg/ha)	Row x plant spacing (cm)	NPK fertilizer (kg/ha)	Yield (kg/ha)	Cost of cultivation (Rs/ha)
V1:Yerraguntlapalli						
Groundnut	local	120	30x10	11:29:00	650-850	24350
Pigeonpea	Local	12.5	180x20	-	250-450	12300

V2:Girigetla						
Groundnut	local	120	30x10	11:29:00	650-850	19500
Tomato	local		60x45		3300	13000
V3:Eguvapalli						
Groundnut	local	130	30x10	11:29:00		
V4:Nagalaguddam Thanda						
Groundnut	local	150	30x10	50 kg DAP	200-1250	7500
V5:Nusikottala, Thanda						
Groundnut	local	120	30x10	8:18:00	500	6500
V6:Kandukuru, Krishnamreddipalli						
Groundnut	local	60	30xsolid row	40 kg DAP	594	2079

Groundnut cultivation with local variety with spacing 30x10cm / 30 x solid rows is the common traditional practice adopted in all villages. Except in Kandukuru (60 kg/ha), in the rest of ORP villages 120 kg/ha or more of seed rate was adopted. Both the yield and the cost of cultivation were increased over the period.

2.2. Yield Gaps

2.2.1 Yield gaps (kg/ha) – Baseline (starting year)

Dominant rainfed crop	V1:Yerraguntlapalli		V2: Girigetla		V3: Eguvapalli		V4: Nagalaguddam Thanda		V5: Nusikottala Thanda		V6: Kandukuru, Krishnam reddipalli	
	Best yield in the village	Average yield in the village	Best yield in the village	Average yield in the village	Best yield in the village	Average yield in the village	Best yield in the village	Average yield in the village	Best yield in the village	Average yield in the village	Best yield in the village	Average yield in the village
Groundnut	760	640	890	800	1600	1244	910	780	1185	500	597	587
Redgram	490	450	1100	1000	--	--	--	--	132	75	262	150
Bajra	--	--	--	--	--	--	--	--	--	--	175	135
Castor	--	--	479	400	--	--	--	-	--	--	--	--
Tomato	--	--	550	500	--	--	--	--	--	--	--	--

The above table indicates that there was no difference between the best groundnut yield and average yield in Kandukuru village since the area of operation is small where the area of operations is largest like Nusikottala village, much difference was found between the best yield and average yield.

2.2.2. Village-wise/Crop-wise yield gaps

Village	ORP mean yield (farmers practice) (kg/ha)	Yield gap I (District mean - ORP mean yield	Factors contributing to Yield Gap I*	Yield gap II (Research station - ORP yield)	Factors contributing to Yield Gap II*
V1:Yerraguntlapalli					
Groundnut	615 (552)	384-615 = 231	1,2,6,17,20	965-615= 350	1,2,6,14,17,20
V2:Girigetla					
Groundnut	683(467)	323-683=-360	1,2,6,17,20	1588-683=905	1,2,6,14,17,20

V3:Eguvapalli					
Groundnut	1099(918)	810-1099=-289	1,2,6,17,20	988-1099= -111	1,2,6,14,17,20
V4:Nagalaguddam Thanda					
Groundnut	923(772)	438-923=-485	1,2,6,17,20	363-923= -560	1,2,6,14,17,20
V5:Nusikottala, Thanda					
Groundnut	1637(1379)	558-1637=-1079	1,2,6,17,20	558-1637= -979	1,2,6,14,17,20
V6:Kandukuru, Krishnamreddipalli					
Groundnut	606(580)	890-606=-+284	1,2,6,17,20	1367-606=761	1,2,6,14,17,20

Uneven distribution and erratic rainfall
Prolonged dry spells
Inadequate in-situ moisture conservation and runoff management measures
Off season rains causing damage to harvested crops
Susceptibility of soil to severe erosion hazards
Lower fertility (N P) and important micro nutrients causing nutrient imbalance
Low infiltration rate and organic carbon content
Low organic carbon
Traditional crops/varieties/cropping system
Lack of awareness about climate change-contingency measures.
Monocropping
Weed infestation
Incidence of disease and insect pests
Fragmented holdings
Lack of access to commodity oriented development
Lack of access to credit facilities
Lack of input supply
Lack of marketing facilities and price to promote alternate promising & remunerative crops, dairying and other subsidiary enterprises.
Problems of wild animals
Low adoption of improved crop production technology

2.3 Interventions

V1: Yerraguntlaplli

Crop	**Theme**					
	Rain Water Management (RWM)	**Cropping Systems (CS)**	**Nutrient Management (NM)**	**Participatory varietal selection (PVS)**	**Energy Management (EM)**	**Any other**
Groundnut	Supplemental irrigation	Groundnut + Redgram	Soil Test Based Fertilizer	K6, Narayani, K9, Dharani	Mechanical seed drill, mechanization	Late leaf spot control, value addition, IFS

V2: Girigetla

Crop	Theme					
	Rain Water Management (RWM)	**Cropping Systems (CS)**	**Nutrient Management (NM)**	**Participatory varietal selection (PVS)**	**Energy Management (EM)**	**Any other**
Groundnut	Supplemental irrigation	Groundnut + Redgram	Soil Test Based Fertilizer	K6, Narayani, K9, Dharani	Mechanical seed drill, mechanization	Late leaf spot control, value addition, IFS
Castor	--	--	--	PCH-111, Haritha, Jwala	--	--
Cotton	--	--	Micro nutrient	--	--	--
Tomato	--	--	Micro nutrient	--	--	value addition

The cost reduction technologies as well as location specific problems were identified in crops and cropping systems in Girigetla village of Girigetla micro watershed area of Kurnool district. The supplemental irrigation, intercropping with mixed pulses, cost reduction technologies in soil test based fertilizer, farm mechanization, micro nutrient application to tomato and cotton improved varieties of castor and groundnut were tested.

V3: Eguvapalli

Crop	Theme					
	RWM	**CS**	**NM**	**PVS**	**EM**	**Any other**
Groundnut	Supplemental Irrigation	Groundnut+ Redgram	Soil Test Based Fertilizer application	K6, Narayani , Vemana	Anantha tractor drawn planter	Small seed, alternate crops to groundnut

The improved dryland technologies verified in Eguvapalli village of K. Agraharam watershed area include rainwater harvesting and recycling, improved production systems, intercropping with mixed pulses, cost reduction technologies, contingency crops, soil test based fertilizer application, farm mechanization, integrated farming systems, participatory varietal selection and improving the livelihood activities.

V4: Nagalaguddam Thanda

Crop	Theme					
	RWM	**CS**	**NM**	**PVS**	**EM**	**Any other**
Groundnut	Farm pond technology	Groundnut+ Redgram	Soil Test Based Fertilizer application	K6, Narayani , Vemana	Mechanical seed drill	Small Seed, alternate crops to groundnut

The verification trials conducted in Nagulaguddam Thanda in Narasapuram National Watershed area comprises of cost reduction technologies. Some of the most prominent cost

reduction technologies are use of small seed of groundnut for sowing, soil test based fertilizer application, use of tractor drawn mechanical seed drill etc., The farm pond technology was found beneficial under rainwater harvesting and recycling through micro irrigation system during moisture stress period which opened a new era in rainfed groundnut production system. Integrated farming system with sheep was tried in farmer's fields. Improved groundnut varieties, alternate crops to groundnut, such as jowar and castor were also tried.

V5: Nusikottala, Thanda

Crop	Theme					
	RWM	**CS**	**NM**	**PVS**	**EM**	**Any other**
Groundnut	Deep ploughing, compartmental bunding, contour cultivation, dead furrow	Groundnut+ Redgram+ mixed pulses intercropping system	Soil Test Based Fertilizer application	Vemana, ICGV-87354	Eenati gorru	Weed management

The technologies verified in Pennar - Manirevu National Watershed area

a.i.1. Soil and water conservation measures viz., compartmental bunding coupled with contour cultivations and dead furrow, different cultivation methods.

a.i.2. Crop production programmes viz., improved varieties, improved package of practices, evaluation of production factors, intercropping systems with mixed pulses management of weeds, management of diseases, farming system etc.,

a.i.3. Alternate land use systems (Planting of *Acacianelotica* introduction *Stylosanthus hamata*, testing suitable trees etc.,) were verified for their feasibility and adoptability.

V6: Kandukuru, Krishnamreddipalli

Crop	Theme					
	RWM	**CS**	**NM**	**PVS**	**EM**	**Any other**
Groundnut	*In situ* soil moisture conservation measures	Groundnut+ Redgram	--	ICGSE-27,TPT1 & TPT2	--	Chemical weed control

The technologies verified in Yerra cheruvu model Watershed area

a.i.3.a.i.1. Soil and water conservation measures viz., compartmental bunding coupled with contour cultivations and dead furrow, different cultivation methods.

a.i.3.a.i.2. Crop production programmes viz., improved varieties, improved package of practices, evaluation of production factors, intercropping systems with mixed pulses management of weeds, management of diseases, farming system etc.,

a.i.3.a.i.3. Alternate land use systems (Planting of *Acacianelotica* introduction *Stylosanthus hamata*, testing suitable trees etc.,) were verified for their feasibility and adoptability

2.4. Impact of interventions in the adopted ORP villages

2.4.1. Productivity and Profitability of Interventions during ORP Programme in each village

V1: Yerraguntlapalli

Theme		
1.RWM	**Groundnut**	**Pigeonpea**
Farmers' Practice		
Mean Yield (kg/ha)	512	660
Improved Practice – Sub soiling with chisel plough		
Area (ha) covered	1.8	1.8
Number of farmers	2	2
Mean Yield (kg/ha)	573	743
Yield Advantage (% increase over farmers' practice)	11.8	12.5
Cost of cultivation (Rs/ha) for FP	26100	15370
Net returns (Rs/ha) for FP	-2274	24307
BCR for FP	0.92	2058
Cost of cultivation (Rs/ha) for IP	26850	16770
Net returns (Rs/ha) for IP	1380	30974
BCR for IP	1.05	2.87

Pod yield of groundnut was high with improved practice compared to farmers practice and resulted 11.8 per cent yield increase over farmers practice. Pod yield was higher with improved practice (573 kg/ha) compared to farmers practice (512 kg/ha). Net returns and B:C ratio were higher with improved practice (Rs.1380/ha and 1.05) compared to farmers practice (Rs. -2274/ha and 0.92). Seed yield of pigeonpea was high with improved practice compared to farmers practice and resulted 12.5 per cent yield increase over farmers practice. Seed yield was higher with improved practice (743 kg/ha) compared to farmers practice (660 kg/ha). Net returns and B:C ratio were higher with improved practice (30974 Rs/ha and 2.87) compared to farmers practice (24307 Rs/ha and 2.58). On an average additional net returns of Rs.9177/- per ha can be obtained due to improved practice.

Theme		
1.RWM	**Groundnut**	**Pigeonpea**
Farmers' Practice		
Mean Yield (kg/ha)	1113	312
Improved Practice – Formation of conservation furrows		
Area (ha) covered	1.6	1.6
Number of farmers	4	4
Mean Yield (kg/ha)	1283	377
Yield Advantage (% increase over farmers' practice)	15.2	20.8
Cost of cultivation (Rs/ha) for FP	28750	12500
Net returns (Rs/ha) for FP	22830	4348
BCR for FP	1.79	1.35

Cost of cultivation (Rs/ha) for IP	29850	13500
Net returns (Rs/ha) for IP	29557	6858
BCR for IP	1.99	1.51

Seed yield of pigeonpea was high with improved practice compared to farmers practice and resulted 20.8 per cent yield increase over farmers practice. Seed yield was higher with improved practice (377 kg/ha) compared to farmers practice (312 kg/ha). Net returns and B:C ratio were higher with improved practice (6858 Rs/ha and 1.51) compared to farmers practice (4348 Rs/ha and 1.35). pod yield of groundnut was high with improved practice compared to farmers practice and resulted 15.2 per cent yield increase over farmers practice. Pod yield was higher with improved practice (1283 kg/ha) compared to farmers practice (1113 kg/ha). Net returns and B:C ratio were higher with improved practice (29557 Rs/ha and 1.99) compared to farmers practice (22830 Rs/ha and 1.79).

Theme	
2.NM	**Groundnut**
Farmers' Practice – Applying 50kg DAP/ha	
Mean Yield (kg/ha)	897
Improved Practice – Soil test based fertilizer application	
Area (ha) covered	6.0
Number of farmers	15
Mean Yield (kg/ha)	954
Yield Advantage (% increase over farmers' practice)	6.4
Cost of cultivation (Rs/ha) for FP	27730
Net returns (Rs/ha) for FP	15167
BCR for FP	1.52
Cost of cultivation (Rs/ha) for IP	26644
Net returns (Rs/ha) for IP	19016
BCR for IP	1.71

Pod yield of groundnut was improved with fertilizer application based on soil test values resulted 6.4 per cent yield increase compared to farmers' way of fertilizer application. Pod yield was higher with soil test based fertilizer application (954 kg/ha) compared to farmer's practice (897 kg/ha). Net returns and B:C ratio were higher with soil test based fertilizer application (Rs. 19016/ha and 1.71) compared to farmers practice (Rs. 15167/ha and 1.52). On an average additional net returns of Rs.3849/- per ha can be obtained due to improved practice. This might be due to reduced cost on fertilizer through balanced fertilizer use and improved pod yield of groundnut.

Theme	
3. CS	**Pigeonpea**
Farmers practice (Pearlmillet + pigeonpea in 1: 1 ratio)	
Mean Yield (kg/ha)	858
Improved Practice(Groundnut + pigeonpea (15:1))	
Area (ha) covered	6.0
Number of farmers	4

Mean Yield (kg/ha)	1109
Yield Advantage (% increase over farmers' practice)	29.2
Cost of cultivation (Rs/ha) for FP	16500
Net returns (Rs/ha) for FP	31916
BCR for FP	2093
Cost of cultivation (Rs/ha) for IP	31500
Net returns (Rs/ha) for IP	33645
BCR for IP	2.07

Pigeonpea equivalent yield was high with improved practice compared to farmers practice. Pigeonpea equivalent yield was higher with improved practice (1109 kg/ha) compared to farmers practice (858 kg/ha). Net returns and B:C ratio were higher with improved practice (Rs. 33645 /ha and 2.07) compared to farmers practice (Rs.31916/ha and 2.93). On an average additional net returns of Rs.1729/- per ha can be obtained due to improved practice.

Theme		
4.Improved Varieties	**Groundnut**	**Pigeonpea**
FP – Local variety		
Mean Yield (kg/ha)	892	396
Improved Practice – Improved variety		
Area (ha) covered	7.2	6.0
Number of farmers	6	4
Mean Yield (kg/ha)	975	429
Yield Advantage (% increase over farmers' practice)	9.3	8.7
Cost of cultivation (Rs/ha) for FP	28346	15000
Net returns (Rs/ha) for FP	13188	4806
BCR for FP	1.44	1.32
Cost of cultivation (Rs/ha) for IP	28848	15000
Net returns (Rs/ha) for IP	16559	6430
BCR for IP	1.54	1.4

Yield of improved pigeonpea variety (PRG 158) was high compared to local variety (Aishwarya) resulted 8.7 per cent yield increase over local variety. Seed yield was higher with improved variety (429 kg/ha) compared to local variety (396 kg/ha). Net returns and B:C ratio were higher with improved variety (Rs. 6430/ha and 1.43) compared to local variety (Rs. 4806/ha and 1.32). On an average additional net returns of Rs.1624/- per ha can be obtained due to improved variety.

Theme	
5. Energy Management	**Foxtailmillet**
Farmers Practice – Sowing by traditional bullock - drawn seed drill	
Mean Yield (kg/ha)	1080
Improved Practice – Sowing by mechanical seed drill	
Area (ha) covered	2.4
Number of farmers	3
Mean Yield (kg/ha)	1125
Yield Advantage (% increase over farmers' practice)	4.2
Cost of cultivation (Rs/ha) for FP	6950
Net returns (Rs/ha) for FP	22400

BCR for FP	3.2
Cost of cultivation (Rs/ha) for IP	6200
Net returns (Rs/ha) for IP	23750
BCR for IP	3.3

Seed yield of foxtail millet was high with improved practice (sowing of foxtail millet with bullock drawn anantha planter) compared to farmers practice (sowing with local bullock drawn seed drill) resulted 4.2 per cent yield increase over farmers practice. Seed yield was higher with improved practice (1125 kg/ha) compared to farmers practice (1080 g/ha). Net returns and B:C ratio were higher with improved practice (Rs. 23750/ha and 3.3) compared to farmers practice (Rs. 22400/ha and 3.2).

V2: Girigetla

Theme		
1.RWM	**Groundnut**	**Castor**
Farmers' Practice		
Mean Yield (kg/ha)	467	490
Improved Practice – Supplemental irrigation		
Area (ha) covered	1	1
Number of farmers	1	1
Mean Yield (kg/ha)	683	625
Yield Advantage (% increase over farmers' practice)	46	27.5
Cost of cultivation (Rs/ha) for FP	14875	10000
Net returns (Rs/ha) for FP	1937	8620
BCR for FP	1.13	1.8
Cost of cultivation (Rs/ha) for IP	14875	10000
Net returns (Rs/ha) for IP	9713	13750
BCR for IP	1.65	2.3

Under rainwater management, two farm ponds were dug with 10 m X 10m X 2.5 m dimensions (250 m^3 capacity). The water from nearby stream was used for supplemental irrigation to groundnut and castor. There was 46% yield advantage in groundnut and 27.5 in castor with supplemental irrigation over control. The benefit cost ratio was 1.65 in groundnut and 2.3 in castor with supplemental irrigation compared to 1.13 and 1.8 with farmers practice respectively.

Our family got benefited by learning tips in dryland agriculture. We experienced the benefits from the cropping systems instead of monocropping though ORP. ***Sri M. Naidu, Krishnamreddypalli, Kandukuru watershed, Ananthapuramu Dist.***

Theme			
2.NM	**Groundnut**	**Cotton**	**Tomato**
Farmers' Practice – Applying 50kg DAP/ha			
Mean Yield (kg/ha)	421	300	3500
Improved Practice – Soil test based fertilizer application			
Area (ha) covered	3.6	6.4	3.6

Number of farmers	9	16	9
Mean Yield (kg/ha)	505	364	4016
Yield Advantage (% increase over farmers' practice)	20	21	14.8
Cost of cultivation (Rs/ha) for FP	14875	7644	15500
Net returns (Rs/ha) for FP	3530	3156	23000
BCR for FP	1.19	1.41	2.48
Cost of cultivation (Rs/ha) for IP	15630	8045	16000
Net returns (Rs/ha) for IP	6144	5060	28176
BCR for IP	1.39	1.63	2.76

Soil test based fertilizer application resulted in increased yield by 20% over farmers practice. Micro nutrient management in rainfed cotton reduced reddening by 33% over no spray. The two sprays containing 19-19-19, 1% zinc sulphate, 1% magnesium sulphate, boron 0.5% at flowering and 20 days after flowering in rainfed cotton increased yield. The gross returns were Rs.2160 more with the use of micro nutrient spraying compared to control.

Micro nutrient management in rainfed tomato increased yield by 27% with two spraying before flowering and fruit setting stages. The spray containing zinc sulphate (2g/l) and boran (2g/l) improved size and quality of rainfed tomato. The gross returns were improved by 27% through micro nutrient sprays in rainfed tomato.

Theme	
3. CS	**Groundnut**
Farmers practice	
Mean Yield (kg/ha)	421
Improved Practice	K6
Area (ha) covered	10.8
Number of farmers	19
Mean Yield (kg/ha)	475
Yield Advantage (% increase over farmers' practice)	12.8
Cost of cultivation (Rs/ha) for FP	14875
Net returns (Rs/ha) for FP	3503
BCR for FP	1.19
Cost of cultivation (Rs/ha) for IP	15000
Net returns (Rs/ha) for IP	4500
BCR for IP	1.8

Groundnut recorded 12.8% higher yield with improved package of practices over farmers practice.

Theme		
4.Improved Varieties	**Groundnut**	**Castor**
FP – Local variety		
Mean Yield (kg/ha)	390	350
Improved Practice – Improved variety		
Area (ha) covered	4.8	16
Number of farmers	12	40
Mean Yield (kg/ha)	467	491
Yield Advantage (% increase over farmers' practice)	19.7	40.2
Cost of cultivation (Rs/ha) for FP	14875	10000

Net returns (Rs/ha) for FP	1505	3300
BCR for FP	1.10	1.33
Cost of cultivation (Rs/ha) for IP	14875	10000
Net returns (Rs/ha) for IP	4785	8658
BCR for IP	1.3	1.8

Improved varieties of groundnut and castor performed better than the respective local varieties.

Theme	
5. Energy Management	
Farmers Practice – Sowing by traditional bullock - drawn seed drill	
Mean Yield (kg/ha)	499
Improved Practice – Sowing by mechanical seed drill	
Area (ha) covered	11.4
Number of farmers	15
Mean Yield (kg/ha)	533
Yield Advantage (% increase over farmers' practice)	6.8
Cost of cultivation (Rs/ha) for FP	14875
Net returns (Rs/ha) for FP	6232
BCR for FP	1.20
Cost of cultivation (Rs/ha) for IP	13550
Net returns (Rs/ha) for IP	9817
BCR for IP	1.4

The sowing with tractor drawn Ananta planter covered 11.4 ha area in Girigetla micro watershed area in two days. The advantage of covering more area with in less time was realized by farmers when the sowing window was very short. Net returns of Rs.9817/ha with the sowing by tractor drawn Ananta planter compared to Rs.6232/ha with farmers practice

Rearing of sheep on groundnut haulms during off season is lucrative. This farming system is fetching the additional returns than agriculture alone. I have learnt more about the usage of herbicides also: ***Sri.Chinnapu Reddy, Nusikottala, Pennaru Manirevu watershed, Ananthapur Dist.***

V3: Eguvapalli

Theme	**Supplemental irrigation to Groundnut**	**Groundnut**	**Groundnut**
1.RWM			
FP – Rainfed			
Mean Yield (kg/ha)	812	642	642
Improved Practice – Supplemental irrigation	Flooding	With sprinklers	With rain gun
Area (ha) covered	5	1.0	1.0
Number of farmers	4	1.0	1.0
Mean Yield (kg/ha)	1010	848	867
Yield Advantage (% increase over farmers' practice)	24.3	32%	35%
Cost of cultivation (Rs/ha) for FP	7885	7885	7885

Net returns (Rs/ha) for FP	9978	6239	6239
BCR for FP	2.2	1.8	1.8
Cost of cultivation (Rs/ha) for IP	7975	7975	7975
Net returns (Rs/ha) for IP	14230	10681	11099
BCR for IP	2.8	2.3	2.4

Three farm ponds were dug in Eguvapalli village and two farm ponds lined with soil + cement at 6:1 ratio. The water collected in farm pond due to seepage from channel passing nearby were utilized for supplemental irrigation using rain gun and sprinklers. Shelling percent was improved by 5% with supplemental irrigation by both methods. There was 32-35% increase in pod yield of groundnut with supplemental irrigation over rainfed groundnut.

Theme	
2.NM	**Soil test based fertilizer application in groundnut**
FP –Application of 50kg DAP/ha	
Mean Yield (kg/ha)	921
Improved Practice – Soil test based fertilizer application	
Area (ha) covered	30
Number of farmers	30
Mean Yield (kg/ha)	974
Yield Advantage (% increase over farmers' practice)	5.75
Cost of cultivation (Rs/ha) for FP	6550
Net returns (Rs/ha) for FP	13712
BCR for FP	2.0
Cost of cultivation(Rs/ha) for IP	5700
Net returns (Rs/ha) for IP	15728
BCR for IP	2.3

Though the economic yields are more or less equal with soil test based fertilizer application and farmers practice, net returns were higher by Rs.2016/ha in soil test based fertilizer applied field compared to farmers method which might be due to reduced cost on fertilizers (Rs.500-1000/ha). Soil test based fertilizer application is recommended in rainfed groundnut production system for getting not only higher economic yields but also for higher net returns from unit area.

Theme	
3.Cropping systems	**Size of the seed Groundnut**
FP – Bold seed for sowing	
Mean Yield (kg/ha)	1115
Improved Practice – Small seed for sowing	
Area (ha) covered	30
Number of farmers	28
Mean Yield (kg/ha)	1044
Yield Advantage (% increase over farmers' practice)	-6.36
Cost of cultivation (Rs/ha) for FP	9331
Net returns (Rs/ha) for FP	18863
BCR for FP	1.2
Cost of cultivation (Rs/ha) for IP	8315

Net returns (Rs/ha) for IP	18315
BCR for IP	1.4

The difference in groundnut pod and haulm yield was also not recorded with use of small seed or bold seed for sowing. However, the benefit cost ratio with small seed for sowing was 1.42 compared to 1.28 with the use of bold seed.

Theme	
3.Cropping systems	**Improved dry land technology**
Farmers Practice	
Mean Yield (kg/ha)	918
Improved Practice – Improved variety, recommended seed rate (100 kg/ha) seed treatment, soil test based fertilizer application, need based plant protection measures, intercropping of groundnut and pigeonpea + mixed pulses in 11:1 ratio	
Area (ha) covered	15
Number of farmers	15
Mean Yield (kg/ha)	1099
Yield Advantage (% increase over farmers' practice)	19.7
Cost of cultivation (Rs/ha) for FP	7886
Net returns (Rs/ha) for FP	14198
BCR for FP	1.9
Cost of cultivation (Rs/ha) for IP	7975
Net returns (Rs/ha) for IP	19592
BCR for IP	2.5

The pod yield with improved dryland technology was higher compared to farmers practice. Net returns (Rs.13260) and benefit cost ratio (1.21) were higher in improved dryland technology compared to farmers practice.

Theme			
4.Participatory Varietal Selection	**Groundnut**	**Groundnut**	**Groundnut**
Farmers' Practice – Local variety			
Mean Yield (kg/ha)	707	707	707
Improved Practice – Improved variety	Vemana	Narayani	K-6
Area (ha) covered	15	15	15
Number of farmers	15	15	15
Mean Yield (kg/ha)	723	830	928
Yield Advantage (% increase over farmers' practice)	2.26	17.3	31.2
Cost of cultivation (Rs/ha) for FP	9331	9331	9331
Net returns (Rs/ha) for FP	6223	6223	6223
BCR for FP	1.6	1.6	1.6
Cost of cultivation (Rs/ha) for IP	9331	9331	9331
Net returns (Rs/ha) for IP	6575	8929	11085
BCR for IP	1.7	1.9	2.1

Among the improved varieties, K-6 exhibited its superiority in pod yield over local variety.

Theme		
5.EM	**Mechanical seed drill**	**Mechanization**
Farmers' Practice – Country plough		

Mean Yield (kg/ha)	787	823
Improved Practice – Mechanical seed drill		
Area (ha) covered	60	15
Number of farmers	52	15
Mean Yield (kg/ha)	796	841
Yield Advantage (% increase over farmers' practice)	11.4	2.1
Cost of cultivation (Rs/ha) for FP	7500	8386
Net returns (Rs/ha) for FP	10928	9720
BCR for FP	1.5	1.6
Cost of cultivation (Rs/ha) for IP	7151	6674
Net returns (Rs/ha) for IP	11787	11828
BCR for IP	1.7	2.0

Though pod yields were similar with both methods of planting, net returns were higher by Rs 860/ha with mechanical seed drill. The seed rate was 85 kg/ha with mechanical seed drill as against 100 kg/ha with bullock –drawn traditional seed drill. Though much difference was not found with both methods of sowing. In Scarce Rainfall Zone, where sowing window is very short, it is recommended to takeup sowing groundnut with tractor–drawn mechanical seed drill as it covers one hector area in two hours 15 minutes, while bullock drawn traditional seed drill takes 4 hours 18 minutes to cover 1 ha area.

The advantage of mechanization was observed over farmers practice net returns and benefit cost ratio were higher in mechanized continuation. The time taken for sowing was 2 hours 15 minutesha^{-1} while it was 4 hours 18 minutesha^{-1} with local seed drill. Time taken for intercultivation was 2 hours 50 minutes ha^{-1}. While, it was 4 hours 30 minutes hr/ha^{-1} bullock drawn guntaka.

V4: Nagalaguddam Thanda

Theme	
1.RWM	**Groundnut**
Farmers' Practice – Rainfed	
Mean Yield (kg/ha)	810
Improved Practice – Supplemental irrigation	
Area (ha) covered	4.0
Number of farmers	4.0
Mean Yield (kg/ha)	1010
Yield Advantage (% increase over farmers' practice)	24.7
Cost of cultivation (Rs/ha) for FP	7885
Net returns (Rs/ha) for FP	9935
BCR for FP	2.2
Cost of cultivation (Rs/ha) for IP	7975
Net returns (Rs/ha) for IP	14245
BCR for IP	2.7

Two farm ponds of size 10 m length, 10 m width and 2.5 m depth were dug in Nagulaguddam Thanda village in Narasapuram watershed area. Two defunct old wells were lined with cuddapah slabs for conservation of rain. One farm pond was lined with cuddapah slabs in which seepage losses were more and another farm ponds was lined with soil and cement at 6:1 ratio. At least two run off events were observed and the farm pond was filled with water. The

collected rain water was applied to groundnut through sprinklers using oil engine. The yield advantage was 24.7 percent with supplemental irrigation compared to rainfed groundnut. The net returns were Rs.4310/ha higher than rainfed groundnut.

Theme	
2.NM	**Groundnut**
Farmers' Practice	
Mean Yield (kg/ha)	807
Improved Practice – Soil test based fertilizer application	
Area (ha) covered	50
Number of farmers	50
Mean Yield (kg/ha)	929
Yield Advantage (% increase over farmers' practice)	15.1
Cost of cultivation (Rs/ha) for FP	7163
Net returns (Rs/ha) for FP	5391
BCR for FP	1.7
Cost of cultivation(Rs/ha) for IP	7217
Net returns (Rs/ha) for IP	7323
BCR for IP	1.9

Soil analysis was done for almost all farmers fields. Based on status of nutrients, fertilizers were applied. If status is low – recommended dose; medium – half the recommended dose; higher – no fertilizer use was applied. There was reduction in fertilizer cost and improvement in yield was obtained might be due to balanced nutrient availability in soil. The net returns of Rs.1932/- were recorded with soil test based fertilizer application compared to farmers practice.

Theme	
3.CS	**Size of the seed in groundnut**
Farmers' Practice – Bold seed	**--**
Mean Yield (kg/ha)	842
Improved Practice – Small seed	**--**
Area (ha) covered	58
Number of farmers	40
Mean Yield (kg/ha)	842
Yield Advantage (% increase over farmers' practice)	--
Cost of cultivation (Rs/ha) for FP	7633
Net returns (Rs/ha) for FP	5744
BCR for FP	1.7
Cost of cultivation (Rs/ha) for IP	6788
Net returns (Rs/ha) for IP	6383
BCR for IP	1.9

Small, medium size of the groundnut seed usage for sowing influenced the cost of production. There was no difference in yield with the use of small seed or bold seed for sowing. Besides reducing cost of cultivation of groundnut, saving in seed rate was observed to the tune of 20 kg/ha. The net returns were higher by Rs.639 per ha over farmers practice.

Theme	
3.CS	**Improved dry land technology**
Farmers' Practice	**--**
Mean Yield (kg/ha)	772
Improved Practice - Improved variety, recommended seed rate (100 kg/ha) seed treatment, soil test based fertilizer application, need based plant protection measures, intercropping of groundnut and pigeonpea + mixed pulses in 11:1 ratio	--
Area (ha) covered	40
Number of farmers	40
Mean Yield (kg/ha)	923
Yield Advantage (% increase over farmers' practice)	19.5
Cost of cultivation (Rs/ha) for FP	7345
Net returns (Rs/ha) for FP	8841
BCR for FP	1.7
Cost of cultivation (Rs/ha) for IP	5995
Net returns (Rs/ha) for IP	12472
BCR for IP	2.3

Adoption of improved dryland practices enhanced yield by 19.5% and improved net returns (Rs.12472/ha) compared to farmers.

Theme	
3.CS	**Alternate crop**
Farmers' Practice – Bold seed	**Groundnut**
Mean Yield (kg/ha)	858
Improved Practice – Small seed	**Jowar**
Area (ha) covered	10
Number of farmers	10
Mean Yield (kg/ha)	806
Yield Advantage (% increase over farmers' practice)	
Cost of cultivation (Rs/ha) for FP	7423
Net returns (Rs/ha) for FP	5840
BCR for FP	1.7
Cost of cultivation (Rs/ha) for IP	2450
Net returns (Rs/ha) for IP	4098
BCR for IP	2.6

Alternate crop to groundnut was tried and found that jowar was next best crop to give fodder as well as grains. The net returns recorded with jowar was Rs.4098/ha while with groundnut, it was Rs.5840/ha.

Theme	
4.EM	**Mechanical seed drill**
Farmers' Practice	
Mean Yield (kg/ha)	833
Improved Practice – Mechanical seed drill	
Area (ha) covered	19

Number of farmers	19
Mean Yield (kg/ha)	851
Yield Advantage (% increase over farmers' practice)	2.16
Cost of cultivation (Rs/ha) for FP	7345
Net returns (Rs/ha) for FP	6148
BCR for FP	1.8
Cost of cultivation (Rs/ha) for IP	7270
Net returns (Rs/ha) for IP	6614
BCR for IP	1.9

The use of tractor drawn mechanical seed drill for sowing of groundnut not only completed the sowing with in short time but also reduced seed rate. The returns were higher (Rs.6614/ha) with tractor drawn mechanical seed drill compared to farmers practice (Rs.6148/ha).

V5: Nusikottala, Thanda

Theme	
1.RWM	**Groundnut**
Farmers' Practice	Sowing across the slope
Mean Yield (kg/ha)	1102
Improved Practice	Contour cultivation + Compartmental bunding
Area (ha) covered	10
Number of farmers	10
Mean Yield (kg/ha)	1269
Yield Advantage (% increase over farmers' practice)	15
Cost of cultivation (Rs/ha) for FP	8200
Net returns (Rs/ha) for FP	6270
BCR for FP	1.7
Cost of cultivation (Rs/ha) for IP	8300
Net returns (Rs/ha) for IP	7221
BCR for IP	1.8

Contour cultivation along with compartmental bunding resulted in 15% higher yield advantage and higher net returns Rs.915/ha over farmers practice.

Theme	
2.RWM	**Groundnut**
Farmers' Practice	Normal ploughing
Mean Yield (kg/ha)	1029
Improved Practice	Deep Ploughing
Area (ha) covered	2
Number of farmers	2
Mean Yield (kg/ha)	1402
Yield Advantage (% increase over farmers' practice)	36
Cost of cultivation (Rs/ha) for FP	8200
Net returns (Rs/ha) for FP	5855
BCR for FP	1.7
Cost of cultivation (Rs/ha) for IP	8300
Net returns (Rs/ha) for IP	7977
BCR for IP	1.9

Deep ploughing recorded 36% yield advantage over normal cultivation. Due to high cost of operation net returns and benefit cost ratio was less compared to farmers practice.

Theme	
3.NM	**Groundnut**
Farmers' Practice	40 kg DAP ha^{-1}
Mean Yield (kg/ha)	1830
Improved Practice	STBF
Area (ha) covered	7.0
Number of farmers	7.0
Mean Yield (kg/ha)	2040
Yield Advantage (% increase over farmers' practice)	11.4
Cost of cultivation (Rs/ha) for FP	8200
Net returns (Rs/ha) for FP	14920
BCR for FP	2.9
Cost of cultivation(Rs/ha) for IP	8200
Net returns (Rs/ha) for IP	17626
BCR for IP	3.6

Based soil test values the nutrients were applied as per recommended dose to groundnut. Due to input cost reduction, there was an increase in net returns with the use of fertilizer management compared to blanket application of 20-40-40 N,P_2O_5, K_2O kg/ha.

Theme	
4.CS	**Improved practices groundnut**
Farmers' Practice	--
Mean Yield (kg/ha)	1379
Improved Practice – Complete block demonstration	--
Area (ha) covered	30
Number of farmers	30
Mean Yield (kg/ha)	1637
Yield Advantage (% increase over farmers' practice)	18.7
Cost of cultivation (Rs/ha) for FP	7650
Net returns (Rs/ha) for FP	10841
BCR for FP	2.3
Cost of cultivation (Rs/ha) for IP	8200
Net returns (Rs/ha) for IP	13793
BCR for IP	2.6

Improved practices resulted in increased yield by 18.7% and net returns of Rs.13793/ha over farmers practice (Rs. 10841/ha) with net returns of Rs. 13569 compared to Rs. 8504/ha in farmers practice.

Theme	
5.Participatory Varietal Selection	**Groundnut**
Farmers' Practice	TMV-2
Mean Yield (kg/ha)	1110
Improved Practice – Improved varieties	Vemana
Area (ha) covered	20

Number of farmers	20
Mean Yield (kg/ha)	1252
Yield Advantage (% increase over farmers' practice)	12.8
Cost of cultivation (Rs/ha) for FP	7650
Net returns (Rs/ha) for FP	8504
BCR for FP	2.1
Cost of cultivation (Rs/ha) for IP	7750
Net returns (Rs/ha) for IP	11138
BCR for IP	2.4

Among varieties Vemana performed better than TMV-2 in Nusikottala village.

V6: Kandukur and Krishnamreddipalli

Theme	
1.RWM	**In-situ conservation practices**
Farmers' Practice – Sowing across the slope	--
Mean Yield (kg/ha)	571
Improved Practice – contour cultivation on + dead furrow	--
Area (ha) covered	20
Number of farmers	20
Mean Yield (kg/ha)	622
Yield Advantage (% increase over farmers' practice)	9
Cost of cultivation (Rs/ha) for FP	3250
Net returns (Rs/ha) for FP	3031
BCR for FP	1.9
Cost of cultivation (Rs/ha) for IP	3300
Net returns (Rs/ha) for IP	3542
BCR for IP	2.0

Though entire watershed area was covered with earthern bunding, run off was observed even after taking up sowing of erosion resistant crop like groundnut along the contour bund. The water stagnation along the contour bund was also observed. To remove these bottle necks, agronomic manipulation of the inter terraced area was found necessary. Contour cultivation and dead furrow formation increased yield and realized higher net returns of Rs.242/ha and benefit cost ratio of 2.07 over farmer practice.

From ORP trails I came to know that improved groundnut varieties (Vemana) will have impact on yield. Since then I have been changing variety once in three years. ***Sri Sudhakar Reddy, Nusikottala, Pennaru Manirevu watershed, Ananthapur Dist****.*

Theme	
2.CS	**Application of sand**
Farmers' Practice	--
Mean Yield (kg/ha)	580
Improved Practice – Improved practices	Sand application
Area (ha) covered	2

Number of farmers	2
Mean Yield (kg/ha)	705
Yield Advantage (% increase over farmers' practice)	21.6
Cost of cultivation (Rs/ha) for FP	3050
Net returns (Rs/ha) for FP	3330
BCR for FP	2.09
Cost of cultivation (Rs/ha) for IP	3250
Net returns (Rs/ha) for IP	4505
BCR for IP	2.30

Application of sand improved yield by 125 kg/ha over farmers practice and Rs. 1175/ha increased net returns over normal practice.

Theme	
2.CS	**Groundnut complete block demo**
Farmers' Practice	--
Mean Yield (kg/ha)	480
Improved Practice – Improved practices	CBD
Area (ha) covered	5.0
Number of farmers	5.0
Mean Yield (kg/ha)	594
Yield Advantage (% increase over farmers' practice)	23.8
Cost of cultivation (Rs/ha) for FP	3050
Net returns (Rs/ha) for FP	2230
BCR for FP	1.73
Cost of cultivation (Rs/ha) for IP	3250
Net returns (Rs/ha) for IP	3284
BCR for IP	2.01

Adoption of improved dryland practices in complete block demonstration revealed that 23.8 percent higher pod yield in groundnut was recorded with higher net returns of Rs.1054/ha over control.

Theme	
2.CS	**Chemical weed control**
Farmers' Practice	--
Mean Yield (kg/ha)	564
Improved Practice – Improved practices	Chemical weed control stamp
Area (ha) covered	3.0
Number of farmers	3.0
Mean Yield (kg/ha)	603
Yield Advantage (% increase over farmers' practice)	6.92
Cost of cultivation (Rs/ha) for FP	3050
Net returns (Rs/ha) for FP	3154
BCR for FP	2.03
Cost of cultivation (Rs/ha) for IP	3540
Net returns (Rs/ha) for IP	3093
BCR for IP	1.87

Application of pendimethalin did not influence the pod yield of groundnut but reduced weed density in farmer's fields. In precarious condition like continuous drizzling immediately after sowing or more moisture which inhibit working of implement or manual weeding in field.

Theme	**Groundnut**	**Groundnut**	**Groundnut**
3.Participatory Varietal Selection			
Farmers' Practice – TMV2	TMV2	TMV2	TMV2
Mean Yield (kg/ha)	590	590	590
Improved Practice – Improved varieties	TPT1	TPT2	ICGS(E)-27
Area (ha) covered	1.0	1.0	1.0
Number of farmers	1.0	1.0	2.0
Mean Yield (kg/ha)	545	490	502
Yield Advantage (% increase over farmers' practice)	--	--	--
Cost of cultivation (Rs/ha) for FP	3250	3250	3250
Net returns (Rs/ha) for FP	2690	2690	2690
BCR for FP	1.8	1.8	1.8
Cost of cultivation (Rs/ha) for IP	3250	3250	3250
Net returns (Rs/ha) for IP	2745	2140	2272
BCR for IP	1.85	1.66	1.69

Among improved varieties of TPT1, TPT2 and ICGs (E)-27 none of the varieties proved better than TMV-2 under drought situation.

2.4.2. Input cost reductions due to use of organics/ reduced seed rate/ reduced cost of inputs/ effective agricultural operations

Village	**Crop**	**Cost of cultivation (Rs/ha)**		**Increase (Rs/ha)or Decrease (Rs/ha) in Cost of cultivation from the Initial year**	**If increased, list reasons***	**If decreased, list reasons****
		Initial Year	**End Year**			
V1:Yerraguntlapalli	Groundnut	27730	26644	-1086	--	Adoption of improved STBF, Anantha planter
V2:Girigetla	Groundnut	13875	12049	-1826	--	Adoption of improved STBF, Anantha planter
V3:Eguvapalli	Groundnut	7345	5995	-1350	--	Adoption of improved dryland technology of small seed, seed drill, STBF, mechanized harvesting
V4:Nagalaguddam Thanda	Groundnut	7500	6835	-665	--	Use of assorted seed for sowing & reduced seed rate by seed drill
V5:Nusikottal, Thanda	Groundnut	6500	8200	+1700	Increased labour, seed cost	--

V6:Kandukuru Krishnamreddipalli	Groundnut	2079	3250	+1171	Increased seed, labour cost	--

*Increase in COC due to: labour, fertilizer, seed, mechanization, etc
**Decrease in COC due to: use of organics,seed rate, other inputs, any other aspects.

It is better to cultivate more than one crop viz., Greengram, Bajra, Jowar and Redgram under rainfed situation through intercropping system instead of monocropping of groundnut. I learnt more about the importance of contigent crops: ***Sri AK Narasimhulu, Eguvapalli, K. Agraharam watershed, Ananthapuramu Dist.***

2.4.3. Environmental services (Soil fertility improvement)

Village	Crop	Number of farmers' fields	SOC	SN	SP	SK
V1:Yerraguntlapalli	Groundnut	50	0.18 – 0.81	127-229	24-42	132-241
V2:Girigetla	Groundnut	50	0.15-0.84 (0.533)	138-238 (187.9)	1578 (36.7)	126-389 (248.9)
V3:Eguvapalli	Groundnut	54	0.21-0.69	139-212	20-39	61-177
V4:Nagalaguddam Thanda	Groundnut	38	0.05-0.63	113-250	4.5-33.6	69-270
V5:Nusikottal, Thanda	Groundnut	23	0.12-0.7	121-209	113-236	101-364
V6:Kandukuru Krishnamreddipalli	Groundnut	5	NA	NA	12	100

2.4.4. Employment generation (man days) related to agriculture and allied sectors

Village	Initial Year	End Year	Increase in employment due to*	Decrease in employment due to*	Overall impact on migration
V1:Yerraguntlapalli	260	340	2,3		
V2:Girigetla	270	330	2,3	--	--
V3:Eguvapalli	150	270	2,3,4	--	--
V4:Nagalaguddam Thanda	120	240	2,3,4	--	--
V5:Nusikottal, Thanda	120	240	2,3,4	--	--
V6:Kandukuru Krishnamreddipalli	120	120	2,3	--	--

❖ **Increase in employment due to:** 1.Increased cropping intensity, 2. Adoption of improved soil/water/crop management practices 3. Crop diversification/alternated land use/IFS, 4. Any other agriculture and allied enterprises (specify)

❖ **Decrease in employment due to:** 1.Decreased cropping intensity, 2. low or non- adoption of improved soil/water/crop management practices 3. Less dependence on agriculture 3. biophysical stresses(climate variability/degraded lands etc)

2.4.5. Livelihood improvement:

a. NRM based Livelihoods enhancement activities*

Village	NRM intervention	Area covered (ha)/ (No. of farmers)		Adopters		Non adopters	
				Net returns (Rs/ha)	BCR	Net returns (Rs/ha)	BCR
V1:Yerraguntlapalli	1,2,4	585	68	2650	1.75	1304	1.31
V2:Girigetla	1,2,4	1154	169	4500	1.8	3503	1.19
V3:Eguvapalli	1,2,3,6	794	142	19592	2.53	14198	1.95
V4:Nagalaguddam Thanda	1,2,3	734	147	12472	2.37	8841	1.7
V5:Nusikottal, Thanda	1,3,4	2100	162	11888	--	8725	--
V6:Kandukuru Krishnamreddipalli	1,2,3,4	358	170	3284	2.01	2230	1.73

1. *In situ*moisture conservation 2. Rainwater harvesting and efficient utilization with or without microirrigation systems, crop diversification to high value crops/vegetables or increase in area/productivity of dominant rainfed crops 3.Multiple use of water for profitability 4. Soil and water conservation/watershed programmes 5. Improved soil quality/fertility 6. Mechanization 7. Any other

b. Land use diversification / Crop-livestock based activities

Village	Land use diversification / Crop-livestock based activities	Area covered (ha)/ (No. of farmers)	Adopters		Non adopters	
			Net returns (Rs/ha)	BCR	Net returns (Rs/ha)	BCR
V1:Yerraguntlapalli	Sheep + groundnut haulms, Sheep rearing 2/head by land less labour	10 No.	2412	1.51	--	--
V2:Girigetla	Sheep + groundnut haulms, Sheep rearing 2/head by land less labour	15 No.	2158	1.45	--	--
V3:Eguvapalli	Sheep in sweet orange	5/2	9938	1.75	--	--
V4:Nagalaguddam Thanda	Sheep rearing in tamarind	1/1	5100	2.20	--	--
V5:Nusikottal, Thanda	Sheep rearing (groundnut based)	10/2	9832	1.57	3800	1.46
V6:Kandukuru Krishnamreddipalli	Sheep + groundnut haulms	--	--	--	--	--

2.5 Overall Impact of the ORP programme

2.5.1 Reduction in Yield gap (Mean of Villages)

Crop	Adopters		Non-adopters		Overall yield increase or decrease
	Number	Productivity	Number	Productivity	
Groundnut	573	990	218	823	3+166.4

2.5.2 How individual or as package of technologies performed?

Technology	Productivity (P1)	Profitability (P2)
Amelioration of drought through application of small amount of supplemental irrigation	The mean pod and haulm yield was increased by 25-30% with supplementary irrigation	There was profitability of Rs. 2100/- per ha with one supplemental irrigation.
Participatory evaluation of different micro irrigation methods for re-use of rainwater in groundnut.	The pod yield was 848, 867 kg/ha compared to rainfed groundnut i.e., 642 kg/ha.	There was increase in gross and net returns with sprinkers, raingun (Rs. 7440 and 7910/ha respectively) over rainfed groundnut while benefit cost ratio with supplemental irrigation to groundnut was 2.31 with sprinkler and 2.35 with raingun compared to rainfed groundnut (1.64).
Implementation of improved production system through farmers participatory approach on watershed basis	Complete package in groundnut and redgram cropping system resulted in 762 kg/ha compared to 699 kg/ha of pod yield. (1495 kg/ha and 1360 kg/ha of haulm yield respectively)	By following complete package, net returns of Rs. 3543/ha was achieved over farmer practice.
Validation of ITK – Groundnut + mixed pulses in different proportions with different row ratios	Groundnut equivalent pod yield of 917 kg/ha was recorded with groundnut+ redgram, greengram, cow pea, horsegram compared to groundnut 790 kg/ha.	Net returns were Rs. 14912/ha with groundnut + mixed pulses compared to farmers practice Rs. 11365/ha. Benefit cost ratio was 2.3 with groundnut + mixed pulses compared to Farmers' practice (benefit cost ratio of 2.01).
Reducing the cost of cultivation of groundnut through soil test based fertilizer application	Pod and haulm yield were higher with soil tst based fertilizer application (525 and 945 kg/ha respectively) compared to farmers' practice (462 kg/ha and 827 kg/ha respectively).	Net returns were higher (Rs. 4758/ha) with soil test based fertilizer application compared to farmer practice (Rs. 2855/ha). Benefit cost ratio was 1.55, 1.25 for soil test based fertilizer and farmers' Practice.
Maintenance of optimum plant population by using mechanical seed drill	Pod and haulm yields did not differ either with use of mechanical seed drill or manually local bullock drawn operated seed drill.	The time taken for sowing was 2.15 liters per acre compared to local practice (4.18ltr/ac). But net returns was higher Rs. 6613/ha with mechanical Seed drill compared to Farmers' practice (Rs.

		6372/ha)
Studies on the performance of mechanization in groundnut production on system of watershed area	Pod and haulm yield were similar with mechanization compared to farmers' practice.	Net returns Rs. 10739/ha with benefit cost ratio of 2.29 were recorded with mechanization compared to farmers practice with net returns of Rs. 7340/ha with benefit cost ratio of 1.65.
Improving the monetary returns of sweet orange farmer through farming system approach.	A unit of five number sheep were introduced in two sweet orange orchards. The percent increased in body weight of ram lambs was 67% in 120 days	The returns per month per farmer was Rs.2047 with 5 no.s sheep.
Improving the monetary returns of land less labour through sheep rearing while working as an agricultural labour.	Growth rate of ram (48.2 g/day) was higher than (108%) that of eve (23.2 g/day) during 150 days period.	Mean net returns with ram and eve were Rs. 1278/- and Rs. 880/- respectively at the end of 5 months. Agricultural land less labourer recorded net returns ranged from 1300 to 3100 and with a mean of Rs. 2158/- from two no.s sheep rearing over a period of 5 months.
Identification of suitable groundnut variety for different locations in watershed area.	Among the improved varieties K-9 (685 kg/ha) exhibited its superiority in out yielding the other two varieties viz., K6 (650 kg/ha) and Narayani (620 kg/ha) but on par with local groundnut variety (724 kg/ha).	K9, K6, new varieties fetched Rs.100/- more per bag i.e., Rs.600/acre compared to local varieties.

2.5.3 Farmer-wise how many technologies were adopted?

One technology per farmer which may be individual or package of practices as per approved technical programme of work**.**

2.5.4 Which technologies gave better yield and monetary returns?

- Reducing the cost of cultivation of groundnut through soil test based fertilizer application
- Studies on the performance of mechanization in groundnut production on system of watershed area
- Amelioration of drought through application of small amount of supplemental irrigation
- Identification of suitable groundnut variety for different locations in watershed area.
- Improving the monetary returns of land less labour through sheep rearing while working as an agricultural labour.

Increased groundnut pod yield and higher returns realized are realisedfrom variety K6, the cost of cultivation was reduced with tractor drawn Anantha planter. We are now cultivating rainfed groundnut, duly testing the soils for its nutrient status: ***Sri Ramachandraiah, Eguvapalli, K. Agraharam watershed , Ananthapur Dist****.*	

Fig .1. Influence of improved technologies on pod yield of groundnut Vs farmers practice

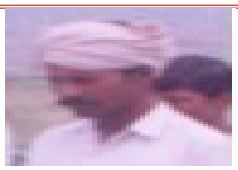
Jowar is found next best crop to groundnut. I am happy with farmpond technology and realised the importance of protective irrigations in groundnut crop: ***Sri Gampa Mallaiah, Nagulaguddam Thanda, Narasapuram watershed, Ananthapur Dist****.*	

Fig .2. Influence of improved technologies on net returns from groundnut Vs farmers practice.

Factors contributed to larger yield gaps (Water, soil fertility, low yielding varieties, lack of implements, awareness, institutions etc)

The following are the main factors which contributed to larger yield gaps cultivation of groundnut.

- Supplemental irrigation
- Timely field operations through mechanization
- Following complete improved package

2.5.5 Profitability (Mean of Villages)

Crop	Adopters		Non-adopters		Overall income increase or decrease(Rs/ha)
	Number	Net returns (Rs/ha)	Number	Net returns (Rs/ha)	
Groundnut	**790**	**10347**	**--**	**7499**	**+2848**

Totally 790 farmers were covered with improved dryland technologies cutting across different ORP adopted villages in watershed areas, with mean income advantage of Rs.2848/ha when compared to non – adopters.

2.5.6 Environmental services (Mean of farmers/crops)

Village	Adopters		Non-adopters		Overall impact on fertility status (N-P-K-OC)
	Number	Fertility status (N-P-K-OC)	Number	Fertility status (N-P-K-OC)	
V1:Yerraguntlapalli	57	Improved due to balanced nutrients application reduced cost of inputs and effective agricultural operations	15	--	Sustained
V2:Girigetla	50	Improved due to balanced nutrients application reduced cost of inputs and effective agricultural operations	119	--	Sustained
V3:Eguvapalli	54	Improved due to reduced cost of inputs.	92	--	Sustained
V4:Nagalaguddam Thanda	38	Improved due to reduced cost of inputs and use of organics.	109	--	Sustained
V5:Nusikottal, Thanda	23	Improved due to reduced cost of inputs and effective agricultural operations	139	--	Sustained
V6:Kandukuru Krishnamreddipalli	5	Improved due to use of organics	165	--	Sustained

2.5.7 Employment generation (man days)

Village	Adopters		Non-adopters		Overall impact (difference in
	Number	Man days	Number	Man days	
V1:Yerraguntlapalli	57	320	15	130	190
V2:Girigetla	123	330	46	120	210
V3:Eguvapalli	120	270	22	120	150
V4:Nagalaguddam Thanda	120	240	27	120	120
V5:Nusikottal, Thanda	102	240	54	120	120

V6:Kandukuru Krishnamreddipalli	108	180	69	120	60

On an average, there is improvement in employment generation with adopters of improved dryland technology by 132 days which is mainly due to adoption of intercropping system double cropping in some years and also due to introduction of groundnut based sheep farming system.

3. Post-project adoption, and reasons for such gaps Technologies usage

-	**Most of the farmers are unaware of the technology due to illiteracy (88.4%)**
-	**Poor plant stand due to**
*	Delay in seeding
*	Seeding in receding moisture due to short sowing window
*	Shortage of implements and draught animals
*	Non adoption of seed treatment
-	**High cost of cultivation due to usage of**
*	Higher seed rate than recommended (by 74%)
*	Higher fertilizer rates than recommended (by 31%)
-	**Imbalanced nutrient applications**
-	**Weed problem**
-	**Prolonged dry spells during crop growing season**
-	**Non adoption of plant protection measures due to**
*	Lack of equipment (22.6%)
*	Lack of guidance (44.0%)
*	Lack of money (33.3%)
*	Non availability of sufficient quality seed at appropriate time

Fertilizer application based on soil test values of my field was very useful in reducing the investment on crop production. I have been following the technology: ***Sri Omla Naik, Nagulaguddam Thanda, Narasapuram watershed, Ananthapuramu Dist.***

4. Which technologies were implemented?

S.No	Name of the Technology	Advantages
1	Intercropping with redgram 11:1/15:1	• Improved net returns.

2	Use of small seed also for sowing in groundnut	• Labour saving in grading the seed for sowing • Reduced cost of seed for sowing as bold seed is costly than small seed. • Less seed rate there by lower cost of seed.
3	Intercropping with mixed pulses	• Increased net returns • .Conserved soil moisture
4	Use of improved varieties	• Tolerates diseases and moisture stress. • Quality and quantity of produce were improved
5	Contingency crops under delayed onset of monsoon.	• Under delayed monsoon conditions, instead of groundnut, sowing of suitable contingent crops like jowar, pearlmillet, horsegram and cowpea realized positive net returns.
6	Soil test based fertilizer application	• Reduced cost on fertilizers. • Balanced fertilizer increased yield of groundnut. • Improved net returns
7	Anantha mechanical seed drill	• More area will be sown in less time even with receipt of less amount of rainfall • Two persons are enough to sow groundnut. • Seed rate saving due to precise sowing.
8	Mechanization in groundnut	• Mechanization for time and labour saving.
9	Rain water harvesting and recycling	• Higher yields due to mitigation of drought with technology. • Efficient use of rainwater is possible.
10	Sweet orange + sheep based farming systems	• Additional income from sheep within a short time was possible. • Increased man-hours and improves livelihoods
11	Stall feeding of sheep on groundnut haulms	• Additional income from sheep within a short time was possible. • Increased man-hours and improves livelihoods
12	Livelihood opportunities to landless agricultural laborers through sheep rearing while working	• Additional income from sheep within short time is possible. • Increases livelihood opportunities.
13	Value addition to redgram and groundnut for higher net returns per unit area.	• Increased returns with value addition to groundnut/redgram. • Increased livelihood activities.

5. **How many demonstrations were conducted / horizontally expanded up to 2017?**

- Soil test based fertilizer application.
- Use of small seed
- Sowing groundnut with mechanical seed drill
- Intercropping groundnut + redgram. 11:1
- Contingency crop under delayed monsoon
- Use of improve groundnut varieties like K-6, Narayani

6. **Horizontal expansion to other adjoining villages in the domain region: Technology-wise adoption and diffusion**

Name of the Technology	Adopted		Diffused (Spill over to other non-ORP areas)		Remarks /reasons
	No. of farmers	Area (ha)	No.	Area (ha)	
1.Use of small seed	81	222	3100	5100	--
2.Sowing groundnut with mechanical seed drill	82	120	620	21400	--
3.Soil test based fertilizer application	100	107	140100	560100	--
4. Intercropping groundnut + redgram. 11:1	179	160	240000	960000	--
5. Contingency crop under delayed monsoon	135	100	28000	130000	--
6. Use of improve groundnut varieties like K-6, Narayani	95	60	80010	420020	--

7. **Adopted farmers vs Non-adopted farmers (village-wise):**

Village	Adopters	Non-adopters
	Number	Number
V1:Yerraguntlapalli	57	15
V2:Girigetla	123	46
V3:Eguvapalli	120	22
V4:Nagalaguddam Thanda	120	27
V5:Nusikottala Thanda	102	54
V6:Kandukuru Krishnamreddipalli	108	69
Mean	**630**	**233**

8. **If not-expanded, why not expanded to other areas (same village or other villages)?**

Technology	Condition (support) required for spread
1.Inter cropping of groundnut + redgram in 11:1/15:1 row ratio	* Subsidy on redgram seed is required for wider adoptability.
2.Use of small seed also for sowing in groundnut cultivation	* No support is required. * Awareness is to be created for wider adoption
3.Soil test based fertilizer application in rainfed groundnut	* For every three years, the department of agriculture should analyze the soils and soil health cards are to be issued.
4.Use of improved varieties of groundnut and redgram	* Seed village concept is to be spread in all villages. * Sufficient quantity of seed is to be made available in time.
5. Sowing of groundnut with tractor drawn Anantha mechanical seed drill	* Sufficient no of units are to be fabricated and made available on subsidized cost. * Custom hiring services are to be promoted.
6.Groundnut+sheep based farming system	* Initial cost for purchase of sheep to be provided through short term loans.
7.Rain water harvesting in farm ponds and recycling	* Digging & lining of ponds and provision of water lifting devices are to be made through converging NREG, RKVY, watershed and other programmes.
8.Promotion of value addition to groundnut and redgram	* Sufficient revolving fund is to be made available in the village by fixing responsibility to selfhelp groups.

9.Supplemental irrigation	*Low level of adoption is due to high const –involved in digging and hiring the farm pond, purchasing the irrigation method.
10.Soil test based fertilizer application in rainfed groundnut	*Lack of awareness and illiteracy
11.Sowing with mechanical seed drill	*Non availability of seed drill at the time of sowing availability of tractor with big farmers only but need is with small and marginal farmers.
12.Improved varieties	*Higher cost of groundnut seed inhibiting the farmers to take up groundnut cultivation.
13. Small seed also for sowing	*Lack of awareness and illiteracy

9. **Details of seed sales of company (s); drips/ sprinklers; solar systems; improved implements for different agricultural operations (before-ORP/after-ORP)**

Village	Seed/ implement	No. of farmers in the village who are currently using the improved seed/ implement	
		Before-ORP	After-ORP
Yerraguntlapalli	Sprinklers	1	7
	Threshers	--	2
	Tractors	1	4
	Drips	1	10
	Seed-cum-fertilizer drills	--	3
Girigetla	Tractors	1	4
	Sprinklers	1	8
	Drips	1	15
	Seed-cum-fertilizer drills	--	8
Eguvapalli	Seed	2	70
	Drips	--	5
	Sprinklers	--	5
	Threshers	--	2
	Tractors	1	4
	Seed-cum-fertilizer drills	--	2
	Other improved implements	--	5
Nagulaguddam Thanda	Seed	2	88
	Drips	1	10
	Sprinklers	1	10
	Threshers	--	1
	Tractors	1	5
	Seed-cum-fertilizer drills	--	3
	Other improved implements	--	4
Nusikottala	Seed	4	80
	Drips	--	10
	Sprinklers	--	10
	Solar systems	--	--
	Threshers	--	4
	Tractors	1	6
	Seed-cum-fertilizer drills	--	2
	Other improved implements	--	4
Kandukuru	Seed	2	70

	Drips	--	15
	Sprinklers	--	15
	Threshers	--	2
	Tractors	1	5
	Seed-cum-fertilizer drills	--	3
	Other improved implements	--	4

10. **Capacity building/ Training/ Extension material (English/Hindi/Regional language) documented and circulated to farmers**

	Theme	**Capacity building/ Training/ Extension material**		
		Regional language (Telugu)		
		Capacity building	**Training material**	**Extension material**
Village (1 to 6)	**RWM**	√	√	√
	INM	√	√	√
	EM	√	√	√
	CS	√	√	--
	PVS	√	√	√
	ALU	√	--	--
	IFS	√	√	√

11. **Livelihood improvement: Livestock and ruminants (status before and after ORP)**

Village	**Livestock and ruminants**	**Livestock and ruminants (No.s)**	
		Before-ORP	**After-ORP**
Yerraguntlapalli	Cows	62	83
	Goats	35	64
	Sheep	63	278
	Buffaloes	85	154
Girigetla	Buffaloes	152	236
	Goats	53	75
	Cows	45	94
	Sheep	75	315
Eguvapalli	Cattle	107	80
	Cows	85	94
	Buffaloes	160	200
	Goats	42	64
	Sheep	52	200
	Poultry	52	65
	Others	11	24
Nagulaguddam Thanda	Cattle	23	15
	Cows	83	110
	Buffaloes	--	20
	Goats	131	201
	Sheep	52	305
	Poultry	88	96
	Others	--	--
Nusikottala	Cattle	60	52
	Cows	25	35
	Buffaloes	30	51

	Goats	25	58
	Sheep	40	104
	Poultry	50	369
	Others	--	23
Kandukuru	Cattle	170	58
	Cows	128	111
	Buffaloes	126	154
	Goats	--	26
	Sheep	50	94
	Poultry	--	34
	Others	--	16

12. Technologies modified/refined

S.No.	Name of Technology	Refinement suggestions
1.	**Tractor drawn Anantha mechanical seed drill**	a.i.1. Alteration to seed carrying box a.i.2. Different sizes of seed carrying discs matching with size of seed
	Reason	* Seed box should always be half filled. Otherwise seed will not be carried properly * Low plant population if same size discs are used for bold seeds also
2.	**Tractor drawn Anantha intercultivator** Refinement(s) Reason	 Different types of shovels were advised Different types of shovels are needed for running in different ages of the crop for efficient weed removal
3.	Name of Technology Refinement(s) Reason	Rainwater harvesting and recycling Different sealant materials were tested to minimize losses to the harvested rainwater. Even in farm ponds lined with Kadapa slabs, seepage losses were high. Hence, studies on different sealant materials were advised.

Groundnut improved variety K6 is very good even under low rainfall and gave higher yield: ***Sri. Vadde Ganganna, Girigetla, Girigetla micro watershed, Kurnool Dist.***

13. Success stories

13.1. Mechanization in groundnut production system

1.	Name of the farmer	:	Sri.P.Pidugu Ramakrishna

2.	**Address**		:		
	i)	Village	:	Eguvapalli	
	ii)	Post	:	Kalluru (RS)	
	iii)	Tehsil	:	Garladinne (M)	
	iv)	District	:	Ananthapuramu	
	v)	State	:	Andhra Pradesh	
3.	Contact details		:	--	
4.	Details of the farm (size, location, water availability etc.)		:	35 acres	
5.	Memberhip in Self-Help Group, Producers Cooperative/ Company, Cooperative Society etc., (give details)		:	Member in Velugu	
6.	Names of the Central Sector / State Schemes utilized by the farmer and the period		:	State Department of Agricultural Subsidy for Tractor drawn tiller	
7.	Technologies / Good Agricultural Practices / Facilities / Benefits obtained with details		:	Mechanization in groundnut production system(tractor drawn plantar for sowing, harvester and thresher were used)	
8.	Details of results obtained due to the adoption of technologies (Season-wise crops grown techniques adopted, results achieved etc.)		:	**Improved / present production technologies**	**Traditional / past production practices**
	i)	Productivity per hectare	:	870 kg/ha	861 kg/ha
	ii)	Cost of production per hectare	:	Rs. 10013=00 /ha	Rs. 11163=00 /ha
	iii)	Net income per hectare	:	Rs.13208/ha	Rs.11761/ha
	iv)	Price realized (Rs./ton)	:	Rs.26690.00	Rs.26624.00
	v)	Natural Resources saved /conserved like soil, water etc.	:	--	--
	vi)	Product quality improvement	:	--	--
9.	Marketing Strategy – Access to market (through private, cooperative, contract farming etc.) -Export market (details of exports made)		:	Private marketing	
10	Factors contributing to success		:	The Bullock drawn seed drills and intercultivation implements are of time consuming, and laborious. Present mechanization in agriculture consumes less time and labour and cover more land area for each operation.	
11	Any other relevant information		:	--	

13.2. Soil test based fertilizer application in rainfed groundnut

1.	Name of the farmer		:	Sri. M. Narayana Reddy
2.	**Address**		:	
	i)	Village	:	Eguvapalli
	ii)	Post	:	Kalluru (RS)

	iii)	Tehsil	:	Garladinne (M)	
	iv)	District	:	Ananthapuramu	
	v)	State	:	Andhra Pradesh	
3.	Contact details		:	--	
4.	Details of the farm (size, location, water availability etc.)		:	12 acres	
5.	Memberhip in Self-Help Group, Producers Cooperative/ Company, Cooperative Society etc., (give details)		:	Member in Velugu	
6.	Names of the Central Sector / State Schemes utilized by the farmer and the period		:	State Department of Agricultural Subsidy for machine	
7.	Technologies / Good Agricultural Practices / Facilities / Benefits obtained with details		:	Soil test based fertilizer application in rainfed groundnut	
8.	Details of results obtained due to the adoption of technologies (Season-wise crops grown techniques adopted, results achieved etc.)		:	**Improved / present production technologies**	**Traditional / past production practices**
	i)	Productivity per hectare	:	1118 kg/ha	1053 kg/ha
	ii)	Cost of production per hectare	:	Rs.1098-/ha	Rs .11078-/ha
	iii)	Net income per hectare	:	Rs.18846	Rs.16537
	iv)	Price realized (Rs./ton)	:	Rs.26330/-	Rs.26220/-
	v)	Natural Resources saved /conserved like soil, water etc.	:	--	--
	vi)	Product quality improvement	:	--	---
9.	Marketing Strategy – Access to market (through private, cooperative, contract farming etc.) -Export market (details of exports made)		:	Private marketing	
10	Factors contributing to success		:	Personal contacts with scientists and listening the FM radio improved his knowledge.	
11	Any other relevant information		:	Soil test based fertilizer application to groundnut not only reduces the cost of cultivation of groundnut, but also improves the net returns from the system	

13.3. Improved production system in rainfed groundnut

1.	Name of the farmer		:	Sri.AK Narasimhulu
2	**Address**		:	
	i)	Village	:	Eguvapalli
	ii)	Post	:	Kalluru (RS)
	iii)	Tehsil	:	Garladinne (M)
	iv)	District	:	Ananthapuramu
	v)	State	:	Andhra Pradesh
3	Contact details		:	--
4	Details of the farm (size, location, water availability etc.)		:	12 acres

5	Memberhip in Self-Help Group, Producers Cooperative/ Company, Cooperative Society etc., (give details)		:	Member in Velugu	
6	Names of the Central Sector / State Schemes utilized by the farmer and the period		:	---	
7	Technologies / Good Agricultural Practices / Facilities / Benefits obtained with details		:	Improved production system in rainfed groundnut	
8	Details of results obtained due to the adoption of technologies (Season-wise crops grown techniques adopted, results achieved etc.)		:	**Improved / present production technologies**	**Traditional / past production practices**
	i)	Productivity per hectare	:	1267 kg/ha	1027 kg/ha
	ii)	Cost of production per hectare	:	Rs.8757-/ha	Rs .9525-/ha
	iii)	Net income per hectare	:	Rs.2255	Rs.16231
	vi)	Price realized (Rs./ton)	:	Rs.26510/-	Rs.26500/-
	v)	Natural Resources saved /conserved like soil, water etc.	:	--	--
	i)	Product quality improvement	:	--	---
9	Marketing Strategy – Access to market (through private, cooperative, contract farming etc.) -Export market (details of exports made)		:	Private marketing	
10	Factors contributing to success		:	Regular visit to the near by Research Station, personal meeting with scientists and participating in informal discussions with scientists /Agricultural Officers.	
11	Any other relevant information		:	Net returns may be improved substantially when all the recommended practices are adopted	

13.4. Use of Anantha Mechanical Seeddrill for groundnut sowing

1	Name of the farmer		:	Sri.C.B.Gopal
2	**Address**		:	
	i)	Village	:	Eguvapalli
	ii)	Post	:	Kalluru (RS)
	iii)	Tehsil	:	Garladinne (M)
	iv)	District	:	Ananthapuramu
	v)	State	:	Andhra Pradesh
3	Contact details		:	--
4	Details of the farm (size, location, water availability etc.)		:	35 acres
5	Memberhip in Self-Help Group, Producers Cooperative/ Company, Cooperative Society etc., (give details)		:	Member in Velugu
6	Names of the Central Sector / State Schemes utilized by the farmer and the period		:	State Department of Agricultural Subsidy for tractor drawn mechanical seed drill
7	Technologies / Good Agricultural Practices / Facilities / Benefits obtained with details		:	Use of Anantha Mechanical Seed planter for groundnut sowing

8	Details of results obtained due to the adoption of technologies (Season-wise crops grown techniques adopted, results achieved etc.)		:	**Improved / present production technologies**	**Traditional / past production practices**
	i)	Productivity per hectare	:	874 kg/ha	866 kg/ha
	ii)	Cost of production per hectare	:	Rs.10013-/ha	Rs .11163-/ha
	iii)	Net income per hectare	:	Rs.13382	Rs.11949
	iv)	Price realized (Rs./ton)	:	Rs.26760.00	Rs.26750.00
	v)	Natural Resources saved /conserved like soil, water etc.	:	--	--
	vi)	Product quality improvement	:	--	---
9	Marketing Strategy – Access to market (through private, cooperative, contract farming etc.) -Export market (details of exports made)		:	Private marketing	
10	Factors contributing to success		:	Knowledge about mechanical seed planter from the scientists of Agricultural Research Station, Ananthapuramu and through method demonstrations from ORP scientists	
11	Any other relevant information		:	Sowing by using mechanical seed planter leads to timely sowing, thereby optimum plant population can be maintained resulting in increased pod yield.	

13.5. Use of improved groundnut variety viz., K-6 variety

1	Name of the farmer		:	Sri.A.Hanumanth	
2	**Address**		:		
	i)	Village	:	Eguvapalli	
	ii)	Post	:	Kalluru (RS)	
	iii)	Tehsil	:	Garladinne (M)	
	iv)	District	:	Ananthapuramu	
	v)	State	:	Andhra Pradesh	
3	Contact details		:	--	
4	Details of the farm (size, location, water availability etc.)		:	9.0 acres	
5	Memberhip in Self-Help Group, Producers Cooperative/ Company, Cooperative Society etc., (give details)		:	Member in Velugu	
6	Names of the Central Sector / State Schemes utilized by the farmer and the period		:	---	
7	Technologies / Good Agricultural Practices / Facilities / Benefits obtained with details		:	Use of improved groundnut variety viz., K-6 variety	
8	Details of results obtained due to the adoption of technologies (Season-wise crops grown techniques adopted, results achieved etc.)		:	**Improved / present production technologies**	**Traditional / past production practices**
	i)	Productivity per hectare	:	981 kg/ha	718 kg/ha
	ii)	Cost of production per hectare	:	Rs.12000-/ha	Rs .11163-/ha
	iii)	Net income per hectare	:	Rs.12500.00	Rs.4992.00
	iv)	Price realized (Rs./ton)	:	Rs.25000.00	Rs.22500.00

	v)	Natural Resources saved /conserved like soil, water etc.	:	--	--
	vi)	Product quality improvement	:	Quality is good as the seed is bold and shape of pods is attractive	Quality is poor as the size of the pod as well as seed is very small
9	Marketing Strategy – Access to market (through private, cooperative, contract farming etc.) -Export market (details of exports made)		:	Private marketing	
10	Factors contributing to success		:	Technical knowhow through personal contacts with scientists and training programmes.	
11	Any other relevant information		:	New variety fetched more price than local variety there by increased net returns.	

13.6. Use of improved groundnut variety viz., K-6 variety

1. 1.	Name of the farmer		:	Sri Vadde Ganganna	
2.	**Address**		:		
	i)	Village	:	Girigelta	
	ii)	Post	:	Girigetla	
	iii)	Tehsil	:	Thuggali (M)	
	iv)	District	:	Kurnool	
	v)	State	:	Andhra Pradesh	
3.	Contact details		:	--	
4.	Details of the farm (size, location, water availability etc.)		:	10 acres	
5.	Membership in Self-Help Group, Producers Cooperative/ Company, Cooperative Society etc., (give details)		:	---	
6.	Names of the Central Sector / State Schemes utilized by the farmer and the period		:	Subsidized groundnut seed	
7.	Technologies / Good Agricultural Practices / Facilities / Benefits obtained with details		:	Improved variety K-6	
8.	Details of results obtained due to the adoption of technologies (Season-wise crops grown techniques adopted, results achieved etc.)		:	**Improved / present production technologies**	**Traditional / past production practices**
	i)	Productivity per hectare	:	840 kg/ha	690 kg/ha
	ii)	Cost of production per hectare	:	Rs. 12049=00 /ha	Rs. 13875=00 /ha
	iii)	Net income per hectare	:	--	--
	iv)	Price realized (Rs./ton)	:	--	--
	v)	Natural Resources saved /conserved like soil, water etc.	:	--	--
	vi)	Product quality improvement	:	--	--
9.	Marketing Strategy – Access to market (through private, cooperative, contract farming etc.) -Export market (details of exports made)		:	Private marketing	

10	Factors contributing to success	:	Improved variety K-6 exhibited its superiority in pod yield compared to local bunch.
11	Any other relevant information	:	--

13.7. Rearing ramlambs on groundnut haulms

1.1.	Name of the farmer		:	Sri C.Narasinhulu	
2.	**Address**		:		
	i)	Village	:	Girigelta	
	ii)	Post	:	Girigetla	
	iii)	Tehsil	:	Thuggali (M)	
	iv)	District	:	Kurnool	
	v)	State	:	Andhra Pradesh	
3.	Contact details		:	--	
4.	Details of the farm (size, location, water availability etc.)		:	8 acres	
5.	Membership in Self-Help Group, Producers Cooperative/ Company, Cooperative Society etc., (give details)		:	---	
6.	Names of the Central Sector / State Schemes utilized by the farmer and the period		:	Subsidized groundnut seed	
7.	Technologies / Good Agricultural Practices / Facilities / Benefits obtained with details		:	Rearing ramlambs on groundnut hauls	
8.	Details of results obtained due to the adoption of technologies (Season-wise crops grown techniques adopted, results achieved etc.)		:	**Improved / present production technologies**	**Traditional / past production practices**
	i)	Productivity per hectare	:		
	ii)	Cost of production per 2rams	:	Rs. 5200/-	
	iii)	Net income per 2 rams	:	Rs. 10500/-	
	iv)	Price realized (₹./2 no)	:	Rs.5300/- for 2 no.	--
	v)	Natural Resources saved /conserved like soil, water etc.	:	--	
	vi)	Product quality improvement	:	--	--
9.	Marketing Strategy – Access to market (through private, cooperative, contract farming etc.) -Export market (details of exports made)		:	Private marketing	
10	Factors contributing to success		:	Rearing of ram lambs for 3 to 4 months doubled the income	
11	Any other relevant information		:	--	

13.8. Rearing 1 or 2 ramlambs and carrying them while working in agricultural fields which can browse on the nearby grass on bunds.

2.1.	Name of the farmer	:	Sri. M. Janardhan
2.	**Address**	:	

	i)	Village	:	Girigetla	
	ii)	Post	:	Girigetla	
	iii)	Tehsil	:	Thuggali (M)	
	iv)	District	:	Kurnool	
	v)	State	:	Andhra Pradesh	
3.	Contact details		:	--	
4.	Details of the farm (size, location, water availability etc.)		:	Landless labour	
5.	Memberhip in Self-Help Group, Producers Cooperative/ Company, Cooperative Society etc., (give details)		:	--	
6.	Names of the Central Sector / State Schemes utilized by the farmer and the period		:	--	
7.	Technologies / Good Agricultural Practices / Facilities / Benefits obtained with details		:	Rearing 1 or 2 ramlambs and carrying them while working in agricultural fields which can browse on the nearby grass on bunds. After rearing for 3-4 months during crop season the sheep can be sold to get good returns.	
8.	Details of results obtained due to the adoption of technologies (Season-wise crops grown techniques adopted, results achieved etc.)		:	**Improved farming systems**	**Traditional / past production practices**
	i)	Productivity per hectare	:		
	ii)	Cost of production per 2rams	:	Rs. 2800/-	
	iii)	Net income per 2 rams	:	Rs 4700/-	
	iv)	Price realized (₹./2 no)	:	Rs 7000/- for 2 no.	Rs 6000 per season
	v)	Natural Resources saved /conserved like soil, water etc.	:	--	--
	vi)	Product quality improvement	:	--	---
9.	Marketing Strategy – Access to market (through private, cooperative, contract farming etc.) -Export market (details of exports made)		:	Private marketing	
10	Factors contributing to success		:	Initial cost borne by ORP.	
11	Any other relevant information		:		

13.9. Mechanization in groundnut production system

1.	Name of the farmer		:	Sri.V.Parasuramudu
2.	**Address**		:	
	i)	Village	:	Girigetla
	ii)	Post	:	Girigetla
	iii)	Tehsil	:	Thuggali (M)
	iv)	District	:	Kurnool
	v)	State	:	Andhra Pradesh
3.	Contact details		:	--
4.	Details of the farm (size, location, water availability etc.)		:	10 acres
5.	Memberhip in Self-Help Group, Producers Cooperative/ Company, Cooperative Society etc., (give details)		:	Member in Velugu

6.	Names of the Central Sector / State Schemes utilized by the farmer and the period		:	State Department of Agricultural Subsidy for Tractor drawn tiller	
7.	Technologies / Good Agricultural Practices / Facilities / Benefits obtained with details		:	Mechanization in groundnut production system (Tractor drawn Ananta groundnut planter, intercultivator, blade and wet pod thresher.)	
8.	Details of results obtained due to the adoption of technologies (Season-wise crops grown techniques adopted, results achieved etc.)		:	**Improved / present production technologies**	**Traditional / past production practices**
	i)	Productivity per hectare	:	585 kg/ha	522kg/ha
	ii)	Cost of production per hectare	:	Rs. 14550=00 /ha	Rs. 18150=00 /ha
	iii)	Net income per hectare	:	Rs.20047/ha	Rs.12773/ha
	iv)	Price realized (Rs./ton)	:	Rs.34268.00	Rs.24469.00
	v)	Natural Resources saved /conserved like soil, water etc.	:	--	--
	vi)	Product quality improvement	:	--	--
9.	Marketing Strategy – Access to market (through private, cooperative, contract farming etc.) -Export market (details of exports made)		:	Private marketing	
10	Factors contributing to success		:	The Bullock drawn seed drills and intercultivation implements are of time consuming, and laborious. Present mechanization in agriculture consumes less time and labour and cover more land area for each operation.	
11	Any other relevant information		:	--	

14. Extent and quality of interaction with clientale/institutions etc.,

a. For PTD

Organization with which linkage is developed	Purpose of linkage	Outcome
ICAR institutes /centres	Interaction meetings on common topic for technical discussions and to prepare action plans for following years	On 22.10.08, discussed the reasons for groundnut crop failure during kharif 2008
Any other AICR Projects	AICPMIP, AICRPAM, AICORPO	Based on discussions, Technical programmes were prepared
Self Help Groups (SHGs) in case of ORP	Technology transfer through SHGs Parthenium control programmes Seed production programme of groundnut K-6, Narayani Value addition to groundnut and redgram	Awareness was created on improved varieties Area under improved varieties increased
Depart. of Agriculture	For discussing location	
Dept. of Horticulture	Specific problems in T & Vs.	
Dept. of Animal Husbandry	Development fodder blocks for each farmers through supply of fodder cuttings	Though efforts were made very small area brought under fodder

	for multiplication by Department of Animal Husbandry	production.
	Supply of stylo seed for pasture development in sweet orange orchards.	Stylo seed was purchased from Department of Animal Husbandry and distributed to farmers.
Forestry	Procurement of saplings from forestry	Tree sapling were procured and planted in the premises of Research Station.
ATMA	Funds/materials from ATMA for ORP farmers Seed treatment chemicals for 20 farmers for one acre was supplied	Population reduction was observed if sown without seed treatment in groundnut.
KVK	Imparting training on engineering aspects and post harvest technology to farmers. As resource persons in training programmes organized by them an vis – versa.	Training on sprayers, Tractor repairs helped the farmers to get them repaired.
NGOs	To train the farmers	Gave training on RWM.
Any other (Specify)	---	---

b. For upscaling

Activity	**Clientèle, relevant persons, institutions, organizations, etc.**	**Extent and quality of interaction**
Growing of fodder for milch animals	Mandal veterinary doctor and dairy farm staff for supply of fodder cuttings	Permission was taken for supply of fodder cuttings to farmers.
New varieties	Farmers were enlightened to grow new varieties. New variety of K-9 was procured from ARS, Kadiri and supplied to farmers.	Variety was given by ORP to see the performance of K-9 under low rainfall condition.
Establishment of milk centers	Local farmer maintaining milch animals.	Government milk dairy was established and regularized for collection of milk in ORP village.
Value addition to groundnut, redgram	Farmers were taken to local dahl mill to make redgram dahl from whole redgram seed.	Farmers got higher price for processed redgram dahl.
Sheep to landless labour	Veterinary doctor was consulted for insurance of sheep and health checkup	Good relation was maintained and personal contacts were improved between veterinary doctor and farmers.

15. Role of ORP for extreme events

During the periods of crisis, the officials of Department of Agriculture interacted with the scientists of ORP to get suggestions to overcome the problems. The following are few of the quotable incidents when/how the ORP scientists interacted.

- During Kharif, 2000, the incidence of PBND and PSND in groundnut was observed. In this situation the ORP team along with other faculty scientists and department officials toured in entire Ananthapuramu district and created awareness on virus and control measures to be taken against

PBND/PSND causing virus by conducting extensive diagnostic visits. The ORP scientists assigned for identification of weed species responsible for spread of PSND/PBND virus.

- During kharif, 2006 when the sowing rains were delayed beyond 15th August, the District Collector & Magistrate convened a meeting to monitor the drought situation and contingency crops to be grown and seeds to keep available. In the meeting the scientists of ORP clearly explained about the about the contingency crops. In that year 90% of the groundnut area where monsoon was delayed 80% of cultivable area was occupied by jowar and 10% by horsegram

- During the year 2008 kharif, due to continuous rains during flowering phase of groundnut crop, flower no./plant was reduced flower to peg and peg to pod ratio were drastically reduced due to which there was distress among farming community. At that time, the Government of Andhra Pradesh nominated the ORP in-charge to monitor the situation and instructed to submit the report. Accordingly, the ORP in-charge along with Assistant Director of Agriculture, Ananthapuramu, Assistant Director of Agriculture, Office of the Commissionarate of Agriculture, Hyderabad and Coordinator, DAATT Center, Ananthapuramu toured extensively in Ananthapuramu district on 6th and 7th October, 2008 and monitored the groundnut crop condition and submitted the report to the higher officials.
- The above situation was again repeated during kharif 2009. In nearly 4.5 lakh ha out of 8.5 lakh ha, contingency situation was faced. The ORP scientists printed a pamphlet in Telugu on "Contingency crops for delayed on set of monsoon for Ananthapuramu" and distributed to the farmers during Rythu Sadassus and thus created awareness of contingency crops among the farming community. The ORP farmers were also made aware of the situation through personal discussions, usage of black boards and through pamphlets.

- During 2012-13 reports were prepared by conducting diagnostic visits in Ananthapuramu district regarding drought situation to CRIDA, Hyderabad and to the university officials.

- During 2013-14 reports were prepared by conducting diagnostic visits in Ananthapuramu district regarding drought situation to CRIDA, Hyderabad and to the university officials.

- During 2014 nearly 4.5 lakhs ha out of 8.5 lakh ha were sown with groundnut. The ORP Scientists suggested the contingency crop plan in the district and distributed to farmers and thus created awareness of contingency crops among the Department of Agriculture, farming community.

a. **Dissemination of contingency crop plan**

Activity	put √ mark
Centre-Ananthapuramu	
Target area-Ananthapuramu& Kurnool district	
Participation in SAU level weather watch group meeting	√
Participation in state/ district level contingency plan meetings with line departments	√
On station-Demonstration of contingency plan on real time basis	√
On farm demonstration of contingency plans in ORP and other villages through line departments and KVK adopted villages	√
Dissemination of contingency plans through radio, television and press/ video conference	√
Contribution of weekly crop advisories/ articles on cropping with drought in the local language news papers	√
Production and distribution of late planting varieties through seed project	X

b. **Dissemination of Agro advisories**

Strategic meetings	
Date	**Meeting**
05.04.2005	District Level Coordination Committee meeting at DAATTC centre, Ananthapuramu
19.04.2005to 21.04.2005	ZREAC meeting at Ananthapuramu
04.07.2005	Workshop on "Farm pond technology" at ARS, Ananthapuramu
20.09.2006	Scientific Advisory Committee meeting at KVK, Reddipalli
11.10.2006	District Level Coordination Committee meeting at DAATTC centre ,Ananthapuramu
9.04.2007 to 10.04.2007	ZREAC meeting at Ananthapuramu
14.6.2007	Scientific Advisory Committee meeting at KVK, Reddipalli
20-21 June 2007	Workshop on " Participatory action plan development and up scaling of technology" at Eguvapalli and ARS ,Ananthapuramu
16.08.2007	ZREAC for Southern zone at Tirupati
25.08.2007	Rabi ZREAC for Scarce Rainfall Zone at Nandyal
9.9.2007	Review meeting on Agricultural situation with Principal Secretary, Commissioner& Director of Agriculture at Collector Camp Office, Ananthapuramu
26.10.2007	District Level Coordination Committee meeting at DAATTC centre ,Ananthapuramu
19.2.2008	Scientists-farmers interaction meeting at Singanamala on *rabi* crops production technology under DAATTC
23.2.2008	Regional conference on Agriculture with Hon'ble Minister for Agriculture & Hon'ble Vice Chancellor ,ANGRAU at Tirupati
2.4.2008	ZREAC meeting of Krishna zone
10.4.2008 & 11.4.2008	ZREAC at Nandyal
25.4.2008 to 26.04.2008	ZREAC of Southern Telangana zone
9.6.2008	Rythu Sadassu at Madakasira ,Ananthapuramu district
11.10.2008	Awareness sadassu on crop cutting experiments with Hon'ble Minister for Agriculture and Hon'ble Vice Chancellor ,ANGRAU at Ananthapuramu
20.12.2008	Brain storming meeting at ARS, Ananthapuramu
22.12.2008	Regional Agriculture sadassu at Hyderabad
21.2.2009	Review workshop of tank silt project "Tank silt as an organic amendment for improving soil and water productivity"
4.3.2009	SAC & DLCC meeting at KVK, Reddipalli
25.3.2009 to 26.3.2009	ZREAC at Ananthapuramu
16.11.09	Sheep rearing in sweet orange orchards
05.08.2011	DLCC meeting at DATT Center, Ananthapuramu
05.08.2011	SAC meeting at KVK, Reddipalli
15th to 17th March, 12	Pre ZREAC meeting at RARS, Nandyal
26th to 27th Mach, 12	ZREAC meeting at RARS, Nandyal
14.8.2012	SAC meeting of KVK, Reddipalli,KVK,Kalyanadurgam, DLCC meeting of DAATTC at KVK, Ananthapuramu
23.2.2013	SAC meeting of KVK, Reddipalli,KVK,Kalyanadurgam, DLCC meeting of DAATTC

	at KVK, Ananthapuramu
1 to 4 April,2013	Pre ZREAC meeting at RARS, Nandyal
15th to 16th April,2013	ZREAC meeting at ARS, Ananthapuramu

16. Contribution to Science, Policy, ICT etc.,

16.1. Contribution to Science, Policy

Item	Description	Utilization
Scientific advancement (equipment, methodologies, processes, etc.	1)use of small seed for sowing of groundnut 2)Soil test based fertilizer application 3) Use of mechanical seed planter for sowing of groundnut.	1)Reduces the cost of cultivation of groundnut production system in Ananthapuramu district 2)This technology is well taken by the department of agriculture and the soil testing charts are also modified accordingly 3) At present only 10-15% of farmers are using the mechanical seed rill.
Policy issues (Local/State/ Central)	Tractor drawn mechanical seed planter	State Department of Agriculture promoted the use of mechanical seed planter by giving subsidy to farmers on purchase of seed drills, for which the approval has also been given by the collector and magistrate of the district.
Planning & Development	Run off recycling technology by utilizing water stored in farm pond through sprinkler irrigation system	• The department of agriculture has included this technology as one of the components in watershed development programmes and custom hire services are being provided on the use of oil engines and sprinkler sets. • Under convergence with MNREG works, the technology is being promoted
Technology dissemination	1)Small seed for sowing in groundnut 2)Soil test based fertilizer application 3) Use of mechanical seed planter for sowing of groundnut.	• The technology is disseminated by various training programmes to the farmers in the district, • Scientist's participation in T&V and Bi-monthly meetings. • The technology is accepted by the Department of Agriculture &NGOs and in-turn, it is being disseminated by various method demonstrations and on farm demonstration.
Rural Livelihoods	By introducing groundnut and orchard based farming system with sheep component improved the net returns of the system and extended the employment opportunity to the labour for a period of another three months, thereby improving the livelihood of the farming community.	This technology is suitable to small and marginal farmers who are depending on agriculture alone.
Women empowerment	1. By introducing sheep component with the landless	Improves the economic status of farm women and build-up confidence them.

	labour (either man or women) during the crop period, an amount of Rs. 175/sheep can be earned at the end of crop period of 4 months. 2. Through value addition to groundnut redgram, additionally a farmwomen could get Rs. 1360/ha and Rs. 370/ quintal respectively.	
Reduction in drudgery	1)Selection of bold seed eliminating small seed is the practice involving lot of drudgery to women Use of small seed also for sowing in the watershed area without reduction in yield not only increased the net returns but also reduced the drudgery of women in seed selection 2)Sowing and covering the seed by tractor drawn mechanical seed planter reduced drudgery involved to the labourers while sowing with animal drawn local seed drill	The technology is being used by 40% of farmers in the district and covering 80% of farmers in micro-watershed area. The government is encouraging this technology by giving 50% subsidy on the implement.
Others (specify)	--	--

The supplemental irrigation to castor is very useful during drought situation for higher yields : ***Sri Vadde Sanjanna, Girigetla, Girigetla micro watershed, Kurnool Dist.***	

16.2. Contribution to ICT

Item	Description	Utilization (frequency, beneficiary)
CRIDA Website (Crop Weather Outlook)	Every week agro advisory bulletins and weather date are being sent regularly	Useful for timely agricultural operations.
Other web sites	The research highlights and progress of work are being given to ANGRAU website.	It is reviewed by other scientists of ANGRAU.
Radio	Need based improved dryland technology is being broadcasted in the form of short-talks, phone in	Heard by local farmers of the district and some of the technologies are being followed.

	programmes etc.	
TV	The improved technology pertaining to groundnut, sweet orange, and forest trees is being broadcasted, through Teja TV and Annadata Velugubata.	Some of the farmers are paying attention in adopting the technology
Call Centers at SAU	Suggested remedial measures to the queries raised by farmers by making calls to the call centers of ANGRAU	Farmers are following the control measures against pest, diseases and other queries related to varieties.
State Department	Situation based training with regard to agriculture is given to the ADAs and AOs during the training &visit, Bi-monthly meetings.	They are utilizing this technology in actual field situation.
Others	Contingency crop plans were suggested to the district administration during the aberrant weather situations	Utilizing by department of Agriculture and also by the State Seed corporations for procuring suitable seed material according to the situation

16.3 Linkages

Organization with which linkage is developed	Purpose of linkage also mention at what stage of the ORP program like planning, implementation, monitoring and evaluation)	Outcome
ICAR institutes /centres	Interaction meetings on common topic for technical discussions and to prepare action plans for following years	On 22.10.08, discussed the reasons for groundnut crop failure during kharif 2008
Any other AICR Projects	AICPMIP, AICRPAM	Based on discussions, Technical programmes were prepared
Self Help Groups (SHGs) in case of ORP	Technology transfer through SHGs Parthenium control programmes Seed production programme of groundnut K-6, Narayani Value addition to groundnut and redgram	Awareness was created on improved varieties Area under improved varieties increased
Depart. of Agriculture	For discussing location specific problems during crop period periodically	Diagnostic visits and survey of drought situations for preparing overall scenario in the district to take up crop planning and contingency crop planning
Dept. of Horticulture	Specific problems in T & Vs.	
Dept. of Animal Husbandry	Development fodder blocks for each farmers through supply of fodder cuttings for multiplication by Department of Animal Husbandry	Though efforts were made very small area brought under fodder production.
	Supply of stylo seed for pasture development in sweet orange orchards.	Stylo seed was purchased from Department of Animal Husbandry and distributed to farmers.
Forestry	Procurement of saplings from forestry	Tree sapling were procured and planted in the premises of Research

		Station.
ATMA	Funds/materials from ATMA for ORP farmers Seed treatment chemicals for 20 farmers for one acre was supplied	Population reduction was observed if sown without seed treatment in groundnut.
KVK	Imparting training on engineering aspects and post harvest technology to farmers. As resource persons in training programmes organized by them an vis – versa.	Training on sprayers, Tractor repairs helped the farmers to get them repaired.
NGOs	To train the farmers	Gave training on RWM.
Any other (Specify)	---	---

17. HRD(Technology dissemination activities)

Item	Description	Impact (frequency, beneficiary, feedback)
Farmer's days/ kisan divas	Farmers' days are conducted every year by in sting on various concepts like cost of reduction technologies, WTO, dryland agriculture, crop diversification etc.,	In every occasion more than 200 farmers attended and participated in farmer – scientist's interactions.
Field days	1. Field day on small seed for sowing of groundnut 2. Field day on Soil test based fertilizers application 3. Field day on Mechanical seed planter for sowing of groundnut 4. Field day on alternate crops to groundnut were conducted 5. Field day on improved varieties of groundnut. 6. Field day on contingent crops	Farmers, farm women realized the advantage of improved technology
News media	The concept of improved dryland technology was clearly explained to farmers in Rythu Chaitanya yatras and which was covered in news papers	Awareness was created among all the farmers of the district and some of the farmers contacted personally by telephones and clarified some of the points covered in news papers
Others (Specify)		

18. **Promotion of watershed, custom hiring centres**

Item	Description (Area, Amount, number, units etc.)	Benefit (area, region, number, SC/ST/ Marginal/ small/women/ landless)
Watersheds	--	--
Farm ponds	Includes as one of the components of watershed programmes.	Run off harvesting and recycling could improve the

	Considering its usefulness in alleviating the drought situations lot of importance is being given in MNREG works.	groundnut pod yields by 20%.
SWC structures	--	--
Custom hiring centers	--	--
Organic farming (vermi-compost, NADEP etc.)	--	--
Any others	--	--

19. Honors/Awards

Year	Name of Award	Organization	Name of Recipient	Work (key words)
2003	Merit Certificate	Government of Andhra Pradesh	Dr. Y. Padmalatha	Dryland Agriculture
2003	Vasantha Rao Naik Award	ICAR	Dr. Y. Padmalatha	Dryland Agriculture
2008	A.P. Scientist Award	Andhra Pradesh State Council of Science of Technology	Dr. Y. Padmalatha	Dryland Agriculture
2008	Merit Certificate	Government of Andhra Pradesh	Dr. K . Bhargavi	Commendable work in Agriculture
2009	AICRPDA Award	ICAR	AICRPDA-ORP	Dryland Agriculture
2009	Ground water augmentation award	Ministry of Rural Development	Dr. Y. Padmalatha	Dryland Agriculture
2016	Vasantha Rao Naik Award	ICAR	Dr. K. Bhargavi Dr. C. Radha Kumari	Dryland Agriculture

20. **Overall impacts of the program**

S. No.	AICRPDA Mandate	Theme(s)	Outcome
1.	To understand the strengths and weaknesses in the traditional system of dryland Agriculture	Resource characterization and socio-economic survey	Variation in soil nutrient status is recorded. 44% and 56% of samples are low in available P and K respectively. Surveyed 147 families out of which 23, 21 and 18% are marginal, small and medium farmers and 43% are agricultural labourers.

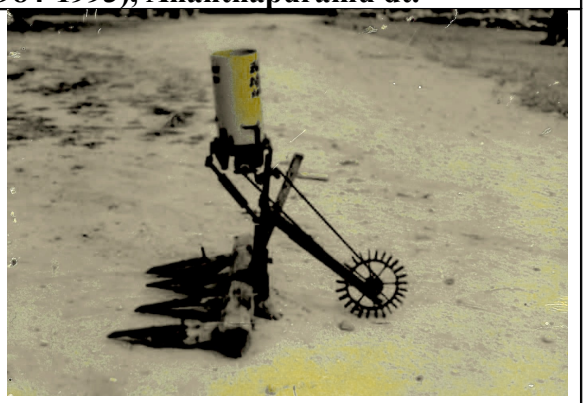
2.	To evaluate the performance of each component of dryland technology under the farmers management conditions both singly and in combination	Crops and cropping systems i.e., improved dryland technology	The difference in pod yield was not observed between small seed and bold seed of farmers practice. Soil test based fertilizer application to groundnut increased pod and haulm yield of groundnut compared to farmers practice. The improved dryland technology through farmers' participatory approach, it resulted in higher yields of groundnut when compared to farmers package. While studying the performance of alternate corps to groundnut, it was found that the crops like Jowar, redgram and castor could not outyielded groundnut crop both in terms of economic yield as well as net returns as per unit area. There was no difference in pod yield of groundnut by sowing either with tractor drawn mechanical seed drill or with bullock drawn local seed drill.
3.	To provide feedback to the research stations for fine tuning sub-optima recommendations	Rainwater management	Though runoff water was collected in farm ponds, it could not be used for recycling as lot of seepage was there even in the farm ponds lined with Kadapa slabs. Moreover the lining material is also costly. These constraints are fed to the research station and experiments are going on to overcome them.
		Energy management	When groundnut was sown using tractor drawn ananta automatic seed planter, precise inter and intra row spacings could be maintained with saving of seed of 15 kg/ha and with 10% of higher net returns over using local bullock drawn seed drill. However, precise intra row spacing of intercrop could not be maintained with mechanical seed drill and this constraint was fed to the research station.
		Crops and cropping systems	Higher net returns were recorded when small and shriveled groundnut seed was used for sowing. However, lot of skill is needed while drilling the seed as most of the labourers are accustomed to sow the bold seed only
4.	To achieve a firsthand working experience in the development of area on watershed basis to serve as a model for extension agencies	Alternate landuse systems	The growth of tamarind plants planted in Class VI lands where land was with rock outs is satisfactory and it has become a model for other farmers of the village
		Rainwater management	The runoff recycling technology through farm ponds and rectification of old wells have become models for extension agencies.
5.	To identify operational and institutional constraints in the transfer of dryland technology	Rainwater management	Though runoff recycling technology, improves the productivity, its investments by way of digging the farm ponds, lining it and purchase of oil engine along with sprinkler set are more and hence it should be included as components in watershed works
		Energy management	Though the use of mechanical seed drill increases the productivity and reduces cost of cultivation, the implement is costly and individual farmer can not afford it. Hence, the use of such implements is to be encouraged through custom hire services.
		Alternate land use system	In initial stages of survival of plants, drip irrigation is to be provided for which Government support is needed.

6.	To provide consultancy services to the extension agencies for transfer of dryland technology	Dissemination of technology	The improved dryland technology was disseminated to the extension agencies by various methods like participation of scientists in T & V bi-monthly meetings, joint diagnostic field visits and training programmes

21. **List of contributors in Operational Research Project since 1984 to 2017**

S.No.	Name of the Scientist	Period
1	Sri.A.Rama Rao	01.04.1984 to 31.03.1985
2	Dr.V.Ramanjaneyulu	19.04.1984 to 30.06.1990
3	Sri M. Mallikarjuna Reddy	01.04.1985 to 30.04.1987
4	Sri B.C. Katama Reddy	01.06.1986 to 30.06.1999
5	Sri D. Virupaksha Goud	27.06.1990 to 31.07.1995
6	Sri K. Pundari Kakshudu	19.07.1989 to 31.12.1990
7	Dr. K. Bhargavi	23.08.1995 to 18.11.2016
8	Dr. M. Madhavi	08.04.1996 to 31.07.1999 and 10.05.2000 to 2001
9	Dr. Y. Padmalatha	23.07.1999 to 18.10.2011
10	Dr. K. Jayaprada	Mar 2002 to Jan 2003
11	Dr. G. Narayana Swamy	03.09.2007 to 21.6.2015
12	Smt. C. Prathyusha	21.02.2014 to 1.6.2015
13.	Sri. Malliswara Reddy	22.6.2015 to 14.7.2017
14.	Dr. C. Radha Kumari	19.11.2016 to 31.3.2018
15.	Sri. K.V.S. Sudheer	24.8.2017 to 31.3.2018
16.	Sri. Arun Kumar	26.8.2017 to 31.3.2018

22. **Photos**

<table>
<tr><th colspan="2">Yerracheruvu model watershed (1984-1993), Ananthapuramu dt.</th></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Farmers meeting in Krishnamreddypalli</td><td>Improved seed drill</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Dr. B. Sreenivas, Chief Scientist interaction with department officials in kandukur village</td><td>ORP scientists interaction with farmers in in Krishnamreddypalli village</td></tr>
</table>

Pennar - Manirevu national watershed (1994 – 2001)	
	
Natural pebble mulching in fields	**Castor + groundnut intercropping system**
	
Groudnut + pigeonpea in 7:1 ratio	**Groundnut + pigeonpea + mixed pulses**

Narasapuram national watershed (2002 to 2006)

Scientist conducting Survey in ORP village

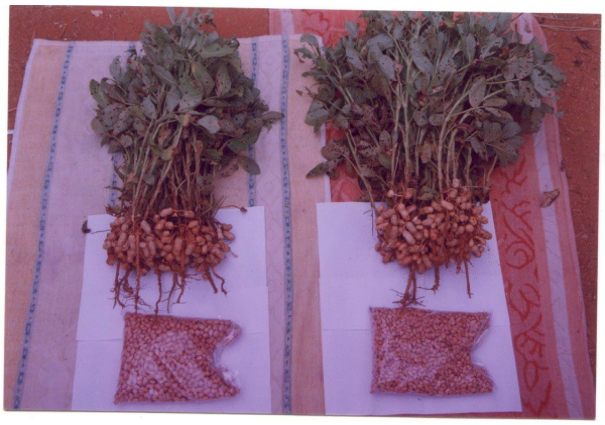
Farm Pond lined with cuddapah slabs

Dr. Ravindrachari visit in Thanda Village

Visit to Groundnut variety Vemana in farmers fields

Visit to tamarind planted field

Ramlambs in tamarind plantation

	
Interaction meeting with farmers in Thanda Village	**Castor as alternate crop**
	
Jowar as alternate crop	**Interaction with farmers**
	
Yield with Small seed vs Bold seed	**Small seed vs Bold seed**

	
Eenati Gorru (Sowing	**Ananta Groundnut planter**
	
ANGRAU Asha guntaka for harvesting	**Tractor drawn intercultivation**

K. Agraharam watershed (2007 to 2009)	
	
Interaction with sceintist from CRIDA and other allied Departments	**Training programmes conducted at K. Agraharam watershed**
	
Groundnut variety K-6	**Groundnut intercropping with redgram at 15:1 and 11:1ratios**
	
Farmers practice of sowing groundnut Vs Sowing with Tractor drawn mechanical seed drill	
Girigetla micro watershed (2010 to 2015)	

	
Social and Resource Mapping	**Group discussion**
	
General topography of Girigetla village	**Sub-soil (upto 45 cm) covered with small stones**
	
Farmers method of groundnut sowing	**Groundnut sowing with tractor drawn Ananta planter**

	
Groundnut sowing with bullock drawn Ananta planter	**Groundnut intercultivator**
	
Groundnut harvesting with digger, shaker cum windrower	**Groundnut threshing with wet pod thresher**

Vajralavanka watershed (2015 to 2017)

In-situ moisture conservation through chisel plough

Groundnut with soil test based fertilizer application

Setaria sowing with Ananta bullock drawn seed drill

Pearlmillet + pigeonpea (5:1)

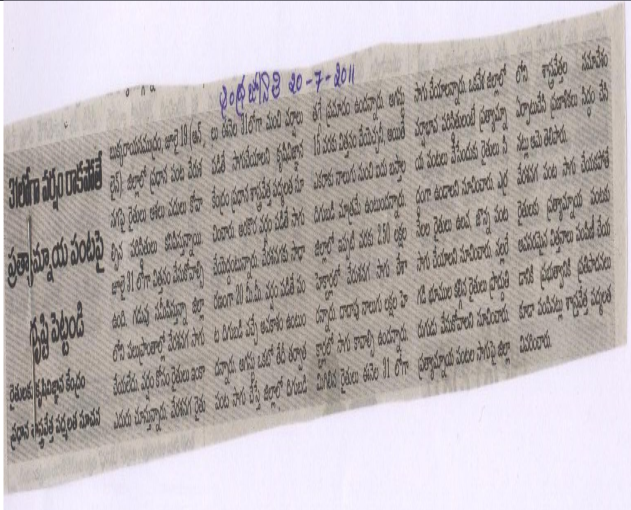
INM in groundnut

STBF in groundnut

Groundnut variety Dharani

Groundnut variety K -6

23. **Press Clippings**



4 ఆదివారం 21 ఆగస్టు 2011 | కర్నూలు

భారతదేశంలో అమినేబాద్ అగ్రగామిగా నిలవాలి

నిక్రా ప్రాజెక్టు కో ఆర్డినేటర్ పీకే మిశ్ర

మెట్ట వ్యవసాయంలో అధిక దిగుబడి సాధించి భారతదేశంలోనే అమినేబాద్ గ్రామాన్ని అగ్రగామిగా నిలపాలని జాతీయ వాతావరణ అనుకూల వ్యవసాయ పరిశోధన పథకం ప్రాజెక్టు కో-ఆర్డినేటర్, వ్యవసాయ శాస్త్రవేత్త డాక్టర్ పీకే మిశ్ర అన్నారు. శనివారం తుగ్గలి మండలం అమినేబాద్‌లో అఖిలభారత సమన్వయ మెట్ట పరిశోధన పథకం ద్వారా జరిగే ఆపరేషనల్ రిసర్చ్ ప్రాజెక్టును ప్రారంభించారు. ఈ సందర్భంగా ఆ పథకం ప్రధాన శాస్త్రవేత్త, ప్రాజెక్టు ఇన్‌చార్జి డాక్టర్ పద్మలత అధ్యక్షతన రైతుల బహిరంగ సభను ఏర్పాటు చేశారు. ఈ సందర్భంగా నిక్రా ప్రాజెక్టు కో-ఆర్డినేటర్ మిశ్ర మాట్లాడారు. ఏడీఏ గురుమూర్తి, ఏవో మునెమ్మ, ఏఈవో చంద్రశేఖర్, వ్యవసాయ శాస్త్రవేత్తలు శశిధర్, రవినాథ్‌రెడ్డి, సాగర్, కృష్ణమూర్తి, సరలమ్మ, భార్గవి, ఉద్యాన శాస్త్రవేత్త నారాయణరెడ్డి, సహదేవరెడ్డి, రైతులు పాల్గొన్నారు. - ఆన్‌లైన్, తుగ్గలి

ఎరువుల పరికరాన్ని పరిశీలిస్తున్న వ్యవసాయ శాస్త్రవేత్తల బృందం

ఆంధ్రజ్యోతి

ఆధునిక వ్యవసాయంతో అధిక దిగుబడి

అమినాబాద్(తుగ్గలి), న్యూస్‌లైన్ : ఆధునిక వ్యవసాయ పద్ధతుల ద్వారా అధిక దిగుబడులు సాధించవచ్చని జాతీయ వాతావరణ అనుకూల వ్యవసాయ పరిశోధన పథకం(విక్రా) ప్రాజెక్టు కోఆర్డినేటర్ డాక్టర్ మిత్ర తెలిపారు. మండల పరిధిలోని అమినాబాద్ గ్రామంలో ఆపరేషనల్ రిసెర్చ్ ప్రాజెక్టు ఆధ్వర్యంలో రైతులకు శనివారం సాయంత్రం అవగాహన కల్పించారు. ఈ సందర్భంగా ఆయన మాట్లాడుతూ రైతుల భాగస్వామ్యంతో మెట్టవ్యవసాయంలో పరిశోధన చేస్తున్నామన్నారు. నూతన పథకాన్ని ఒకటి, రెండు గ్రామాల్లో ప్రాజెక్టుగా అమలు చేసి విజయవంతమైతే మరిన్ని గ్రామాల్లో ఏర్పాటుచేస్తామన్నారు. దేశంలో వంద కృషి విజ్ఞాన కేంద్రాలు, 23 అఖిలభారతీయ మెట్టవ్యవసాయ స్థానాలున్నాయన్నారు. ఈ ప్రాజెక్టుల ద్వారా రైతులకు యాంత్రీకరణ నూతన పద్ధతుల ద్వారా సాగుపద్దతులపై శాస్త్రవేత్తలు సూచనలు అందిస్తున్నారని చెప్పారు. పొలాల్లో నీటి కుంటలు ఏర్పాటు చేసుకుని బెట్టసమయంలో ఆ నీటిని స్ప్రింకర్ల ద్వారా పంటలకు అందించి దిగుబడులు తీసుకోవచ్చు అన్నారు. అనంతరం గ్రామంలో ప్రాజెక్టు ఆధ్వర్యంలో ఏర్పాటు చేసిన నూతన యంత్రాలను ఆయన పరిశీలించారు. ఈ కార్యక్రమంలో శాస్త్రవేత్తలు గిరిధర్ కృష్ణ, రవీంద్రానాథ్‌రెడ్డి పద్మలత, సరళమ్మ, నారాయణస్వామి, లక్ష్మిరెడ్డి, భార్గవి విజయసాయిరెడ్డి, గ్రామస్తులు పాల్గొన్నారు.

మాట్లాడుతున్న విక్రా ప్రాజెక్టు కో ఆర్డినేటర్ డాక్టర్ మిత్ర

అమినాబాద్

అగ్రగామిగా నిలవాలి

మెట్ట సేద్యానికి పెద్దపీట

అమీనాబాద్(తుగ్గలి): మెట్ట సేద్యాన్ని లాభదాయకంగా చేయడానికి చర్యలు తీసుకొంటున్నట్లు కేంద్రీయ మెట్ట వ్యవసాయ పరిశోధనా సంస్థ సమన్వయకర్త పి.కె. మిశ్రా చెప్పారు. శనివారం అమీనాబాద్ గ్రామంలో జాతీయ వాతావరణ అనుకూలవ్యవసాయ పథకాన్ని ప్రారంభించిన అనంతరం జరిగిన సమావేశంలో మాట్లాడారు. మెట్ట వ్యవసాయం ఎన్నో సమస్యలతో కూడినదని, శాస్త్రవేత్తలు రైతులతో కలసి పరిశోధనలు చేసి మెట్ట సేద్యం లాభదాయకంగా చేయాలని నిర్ణయించామన్నారు. అందులో భాగంగా గ్రామాలను దత్తత తీసుకొని పరిశోధనలు చేస్తున్నట్లు పేర్కొన్నారు. మంచి ఫలితాలు వస్తే అన్ని గ్రామాలలో ఈ పథకాన్ని అమలు చేయడానికి కేంద్ర, రాష్ట్ర ప్రభుత్వాల దృష్టికి తీసుకెళతామన్నారు. కార్యక్రమంలో ప్రధాన శాస్త్రవేత్తలు గిరిధర్ కృష్ణ, రవీంద్రనాథరెడ్డిపద్మలత, బనవాసి, యాగంటి పల్లి కృషి విజ్ఞాన కేంద్రం శాస్త్రవేత్తలు, స్థానిక వ్యవసాయ అధికారులు గురుమూర్తి, మునెమ్మ తదితరులు పాల్గొన్నారు.

యంత్ర పరికరాలను పరిశీలిస్తున్న మిశ్రా తదితరులు

ఈనాడు ఆగస్టు 21

తక్కువ పెట్టుబడులతో అధిక దిగుబడులు

గిరిగెట్ల(తుగ్గలి), న్యూస్‌లైన్: ఆధునిక పద్ధతులతో యంత్రాలను వినియోగించి తక్కువ పెట్టుబడులతో అధిక దిగుబడులు సాధించవచ్చని అనంతపురం జిల్లా రెడ్డిపల్లి కృషి విజ్ఞాన కేంద్రం వ్యవసాయ శాస్త్రవేత్త డాక్టర్ మంజుభార్గవి తెలిపారు.గిరిగెట్లకు చెందిన బసవరాజు పొలంలో వేరుశనగ కాయలు వేరు చేసే యంత్రం గురించి రైతులకు వివరించారు. ఈ యంత్రం ₹1.80లక్షలు ఉందని, గంటకు ₹400 బాడుగ చెల్లించి ఉపయోగించుకోవచ్చన్నారు. గంటకు 10 నుంచి 20 బస్తాల వేరుశనగ కాయలలను వేరుచేస్తుందన్నారు. కృషి విజ్ఞాన కేంద్రం నిక్రా ప్రాజెక్టు ఆధ్వర్యంలో అమినాబాద్, గిరిగెట్ల గ్రామాలను దత్తత తీసుకుని యాంత్రీకరణ పద్ధతి ద్వారా వ్యవసాయం ఎలా చేయాలో రైతులను ప్రోత్సహిస్తున్నామన్నారు.

వేరుశనగ నూర్పిడిని పరిశీలిస్తున్న మంజుభార్గవి

యర్రగుంట్లపల్లె (ప్యాపిలి), న్యూస్‌టుడే: వ్యవసాయంలో రైతులు తగిన జాగ్రత్తలు, వ్యవసాయాధికారుల, శాస్త్రవేత్తల సలహాలు సూచనలు తీసుకుంటే నష్టాల నుంచి గట్టెక్కి మంచి దిగుబడులను సాధించే అవకాశం ఉంటుందని ఆచార్య ఎన్‌జీ రంగా వ్యవసాయ విశ్వవిద్యాలయం అనంతపురం వ్యవసాయ పరిశోధనా శాస్త్రవేత్తలు జాన్సన్, రాధాకుమారి, సుధీర్, అరుణ్‌కుమార్ అన్నారు. శాస్త్రవేత్తల బృందం మండలంలోని యర్రగుంట్లపల్లి గ్రామంలో కంది పంటను సోమవారం పరిశీలించింది. ఈ సందర్భంగా వారు మాట్లాడుతూ ప్రస్తుతం కంది పూత దశ నుంచి కాయ దశలో ఉందని, కందికి మారుకా పురుగు (గూడు కట్టే పురుగు), శనగ పురుగు ఆశిస్తుందని, దీనిని ప్రారంభ దశలోనే నివారించుకోవాలని సూచించారు. పురుగు ఆశించిన పంటకు రైతులు 5 మి.లీటర్ల వేపనూనెను లీటరు నీటికి కలిపి పిచికారీ చేయాలన్నారు. పూత రాలుతున్నట్టయితే థైమిథోయేట్ 2 మి.లీటర్ల లీటరు నీటికి పిచికారీ చేయాలని చెప్పారు. పిందె దశలో ఉంటే క్లోరోపైరిఫాస్ 2.5 మి.లీటర్ల లీటరు నీటికి కలిపి పిచికారీ చేయడం వల్ల శనగపచ్చ పురుగును అరికట్టవచ్చన్నారు. పురుగుమందులు సాయంత్రం వేళల్లో మాత్రమే పిచికారీ చేయాలని, తగిన జాగ్రత్తలు తీసుకోవాలని సూచించారు. ఈ కార్యక్రమంలో రైతులు పాల్గొన్నారు.

కంది పంటను పరిశీలిస్తున్న వ్యవసాయ శాస్త్రవేత్తలు

15 వరకు వేరుసెనగ విత్తుకు అవకాశం

ఎర్రగుంట్లపల్లె (ప్యాపిలి), న్యూస్‌టుడే : రబీలో వేరుసెనగ విత్తుకు డిసెంబరు 15 వరకు సమయం ఉందని ఆచార్య ఎన్‌జీ రంగా విశ్వవిద్యాలయం (అనంతపురం) చెందిన ముఖ్య శాస్త్రవేత్త డా.బి.రవీంద్రనాథ్‌రెడ్డి అన్నారు. మంగళవారం మండలంలోని ఎర్రగుంట్ల పల్లెలో రైతులకు పలు సూచనలు చేశారు. నీటి పారుదల కింద వేరుసెనగ విత్తుకొనే రైతులు వరుసల మధ్య 22.5 సెం.మీటర్లు, మొక్కల మధ్య పది సెంటీ మీటర్ల దూరాన్ని పాటించాలని సూచించారు. ఇందుకోసం అనంత విత్తు పరికరాన్ని ఉపయోగించడంతో సరైన క్రమంలో విత్తనం పడుతుందని, ఇందుకయ్యే ఖర్చు తక్కువే ఉందన్నారు. ముందుగా విత్తనశుద్ధి తప్పనిసరిగా చేయాలని, అధిక దిగుబడులకు కే6 రకం లేదా ధరణి, కదిరి, హరితాంధ్ర, అనంత రకాలను ఎంపిక చేసుకోవాలన్నారు. అంతకుముందు అపరేషన్ రీసర్చ్ ప్రాజెక్ట్ కింద సాగు చేసిన కంది పంటను పరిశీలించారు. పురుగులను, తెగుళ్లను పరిశీలించి తీసుకోవాల్సిన జాగ్రత్తలను వివరించారు. శాస్త్రవేత్తలు డా.రాధాకుమారి, డా.సునీల్, డా.అరుణ్‌కుమార్, డా.కిశోర్ పాల్గొన్నారు.

విత్తన గొర్రు పనితీరును పరిశీలిస్తున్న శాస్త్రవేత్తలు

అప్రమత్తతతో అధిక దిగుబడి

కంది పంటను పరిశీలిస్తున్న శాస్త్రవేత్తలు

వన్నేదొడ్డి (గుత్తి గ్రామీణం), న్యూస్‌టుడే: రైతులు విభిన్న ఆలోచనలతో వేసిన పంటలను అప్రమత్తంగా కాపాడుకుంటే అధిక దిగుబడి సాధించవచ్చని ప్రధాన శాస్త్రవేత్త జాన్సన్ పేర్కొన్నారు. మండలంలోని వన్నేదొడ్డి గ్రామంలో సోమవారం వ్యవసాయ పరిశోధన స్థానం, అనంతపురం ఆచార్య ఎన్.జి రంగ వ్యవసాయ విశ్వవిద్యాలయం నుంచి వచ్చిన శాస్త్రవేత్తలు వన్నేదొడ్డి గ్రామంలో పలు పంటలను పరిశీలించారు. గ్రామంలో రైతులకు పంటల సాగుపై అవగాహన కల్పించారు. శాస్త్రవేత్తలు రాధాకుమారి, సుధీర్, అరుణ్ కుమార్ మాట్లాడుతూ ప్రస్తుతం కంది పంట పూత నుంచి కాయ దశలో ఉందని, కంది పంటలో మారుకా పురుగు, శనగపచ్చ పురుగు ఆశించిందన్నారు. అందువల్ల రైతులు వేప నూనె 5మి.లీ లీటరు నీటిని కలిపి పిచికారి చేయాలని అన్నారు. కార్యక్రమంలో రైతులు తదితరులు పాల్గొన్నారు.

తక్కువ పెట్టుబడులతో అధిక దిగుబడులు

గిరిగెట్ల(తుగ్గలి), న్యూస్‌లైన్: ఆధునిక పద్ధతులతో యంత్రాలను వినియోగించి తక్కువ పెట్టుబడులతో అధిక దిగుబడులు సాధించవచ్చని అనంతపురం జిల్లా రెడ్డిపల్లి కృషి విజ్ఞాన కేంద్రం వ్యవసాయ శాస్త్రవేత్త డాక్టర్ మంజుభార్గవి తెలిపారు.గిరిగెట్లకు చెందిన బసవరాజు పొలంలో వేరుశనగ కాయలు వేరు చేసే యంత్రం గురించి రైతులకు వివరించారు. ఈ యంత్రం ₹1.80లక్షలు ఉందని, గంటకు ₹400 బాడుగ చెల్లించి ఉపయోగించుకోవచ్చన్నారు. గంటకు 10 నుంచి 20 బస్తాల వేరుశనగ కాయలలను వేరుచేస్తుందన్నారు. కృషి విజ్ఞాన కేంద్రం నిఖా ప్రాజెక్టు ఆధ్వర్యంలో అమినాబాద్, గిరిగెట్ల గ్రామాలను దత్తత తీసుకుని యాంత్రీకరణ పద్ధతి ద్వారా వ్యవసాయం ఎలా చేయాలో రైతులను ప్రోత్సహిస్తున్నామన్నారు.

వేరుశనగ నూర్పిడిని పరిశీలిస్తున్న మంజుభార్గవి

ప్రత్యామ్నాయ పంటల సాగుపై దృష్టి సారించాలి

పంటను పరిశీలిస్తున్న డాక్టర్ పద్మలత

అమినాబాద్(తుగ్గలి), న్యూస్‌లైన్ : మరో పది రోజుల్లో వర్షాలు కురవకపోతే రైతులు ప్రత్యామ్నాయ పంటల సాగు చేసుకునేందుకు సమాయత్తం కావాలని అనంతపురం జిల్లా రెడ్డిపల్లి కృషి విజ్ఞాన కేంద్రం వ్యవసాయశాస్త్రవేత్త డాక్టర్ పద్మలత సూచించారు. మండల పరిధిలోని అమినాబాద్ సమీపంలోని వేరుశనగ, ఆముదం పొలాలను శనివారం పరిశీలించారు. ఒకటి, రెండు పంటలపై ఆధారపడకుండా నాలుగైదు రకాల పంటలు సాగు చేసుకుంటే ఏదో ఒక పంట ఆదుకుంటుందన్నారు. ప్రత్యామ్నాయ పంటలుగా జొన్న, పెసర, ఉలవలు సాగు చేసుకోవచ్చు అని, విత్తన ఖర్చు, పెట్టుబడులు కూడా తక్కువగా ఉంటాయని తెలిపారు. అంతేకాక క్వింటాల్‌కు నికర ఆదాయం ₹1500 నుంచి ₹2వేల దాకా ఉంటుందన్నారు. అన్నింటి కన్నా ఉలవ సాగు ఎంతో మేలని సూచించారు. పంట దిగుబడులు రాలేదని రైతులు ఆత్మస్థైర్యం కోల్పోవద్దన్నారు.

List of Contributors

Chief Scientists

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Dr.V.Muna Swamy	2011-2012
Dr..A.Pratap Kumar Reddy	2012-2013
Dr.B.Sahadeva Reddy	2013-2016
Dr.B.Ravindranatha Reddy	2016-2018
Dr. R. Veeraraghavaiah	2018-2019

Agronomists

Dr.A.Yogeswara Rao	1984-1985
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Dr.M.Murali Rao	1996-1998
Dr.B.Sahadeva Reddy	2007-2013
Dr.C.Radha Kumari	2013 - 2017
Dr. A. Malliswara Reddy	2017- till date

Soil Physists

Dr.G.I.Lazarus	1983-1991
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Dr.M.Vijaya Sankar Babu	2010-till date

Plant Breeders

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Dr. P. V. Padmavathi	2015-2016
Dr. P. Srivalli	2017-2018

Agriculture Engineers

Er.V.Ramalingam	1982-1985
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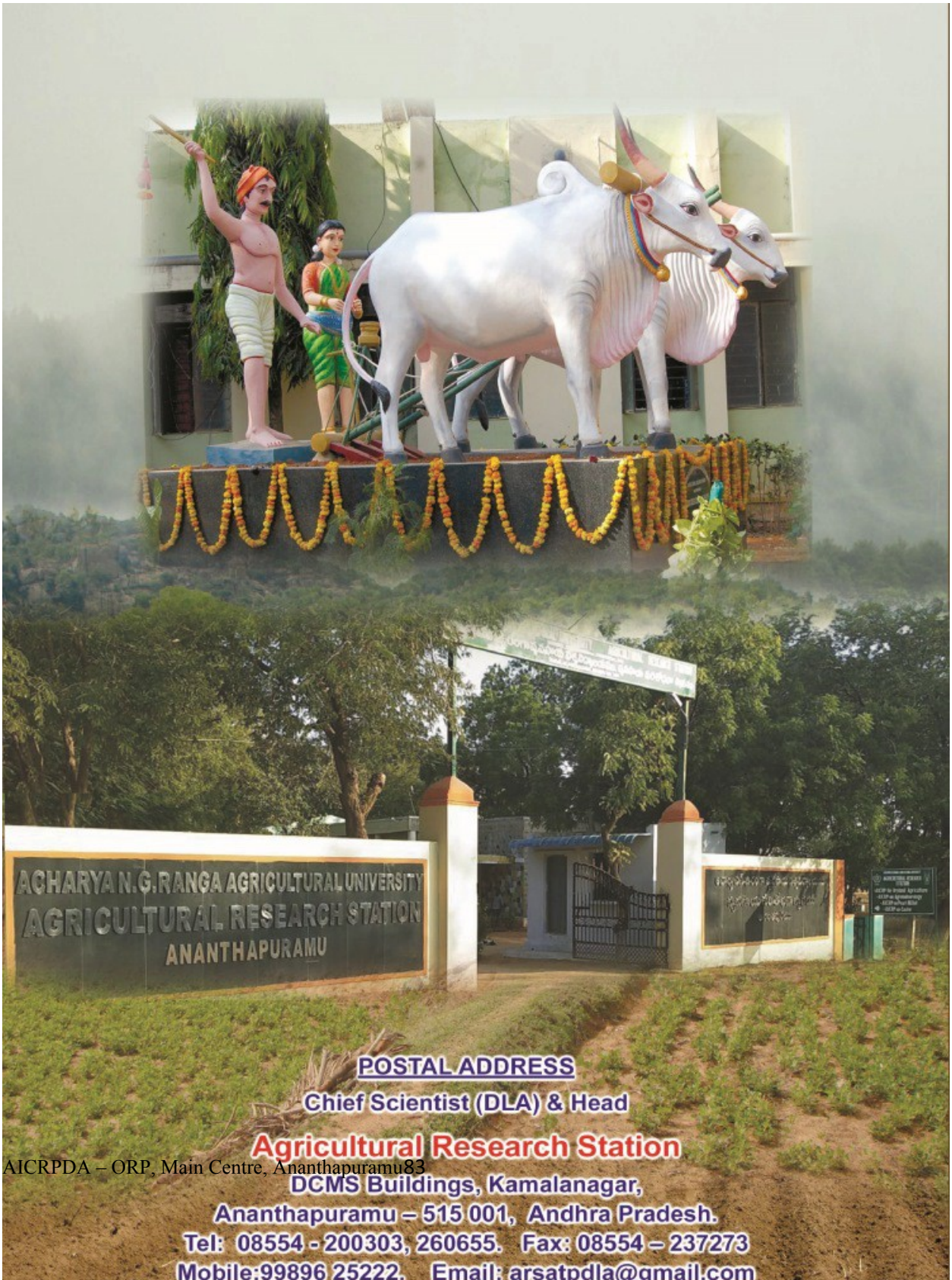
Er.G.Aravinda Reddy	1996-1998
Dr.B.John Wesley	1998-2005
Er.G.Murali Krishna	2005-2009
Dr. Madhusudhana Reddy	2013-2017
Dr. N. Kishore	2017- till date

ABBREVATIONS

ANGRAU	:	Acharya N.G.Ranga Agricultural University	IWMP	:	Integrated Water management programme
CRIDA	:	Central Research Institute for Dryland Agriculture	NREGS	:	National Rural employment Guarantee Scheme
AICRPDA	:	All India Coordinated Research Project on Dryland Agriculture	MoRD	:	Ministry of Rural Development
ORP	:	Operational Research Project	M	:	Mandal
Cm	:	Centimeter	V	:	Village
ha	:	Hector	Dt.	:	District
ha^{-1}	:	Per hector	SAU	:	State agricultural university
%	:	percentage	KVK	:	Krishi Vigyan Kendra
Rs	:	Rupees	PBND	:	Peanut Bud Necrosis disease
Kg	:	Kilogram	ZREAC	:	Zonal Research and Extension Advisory Council
OC	:	Organic Carbon	DLCC	:	District Level Coordination Committee
N	:	Nitrogen	ATMA	:	Agricultural Technology Management Agency
P,P2O5	:	Phosphorus	NGO	:	NonGovernment Organization
K,K2O	:	Potassium	T&V	:	Training and Visit
DAP	:	Di-Ammonium Phosphate	SHG	:	Self Help Group
RWM	:	Rainwater management	AICPMIP	:	All India Coordinated Project on Pearl millet Improvement
CS	:	Cropping System	AICRPAM	:	All India Coordinated Project on Agro meteorology
NM	:	Nutrient management	SWC	:	Soil and Water Conservation
IV	:	Improved Varieties	WTC	:	Water Technology Centre
PVS	:	Participatory varietal Selection	NRM	:	Natural Resource Management
EM	:	Energy Management	RKVY	:	Rastriya Krishi Vikas Yojana
ALU	:	Alternate Land Use	NREGS	:	National Rural employment Guarantee Scheme
FP	:	Farmers Practice	MoRD	:	Ministry of Rural Development
IP	:	Improved Practice	M	:	Mandal
BCR	:	Benefit Cost Ratio	V	:	Village
STBF	:	Soil Test Based fertilizer Application	Dt.	:	District
CBD	:	Complete Block demonstration	SAU	:	State agricultural university
COC	:	Cost Of Cultivation	KVK	:	Krishi Vigyan Kendra
SOC	:	Soil Organic Carbon	PBND	:	Peanut Bud Necrosis disease
SN	:	Soil Nitrogen	PSND	:	Peanut Stem Necrosis disease
SK	:	Soil Potassium	DAATTC	:	District Agricultural Advisory and Transfer of Technology centre
IWMP	:	Integrated Water management programme	SAC	:	Scientific Advisory Committee



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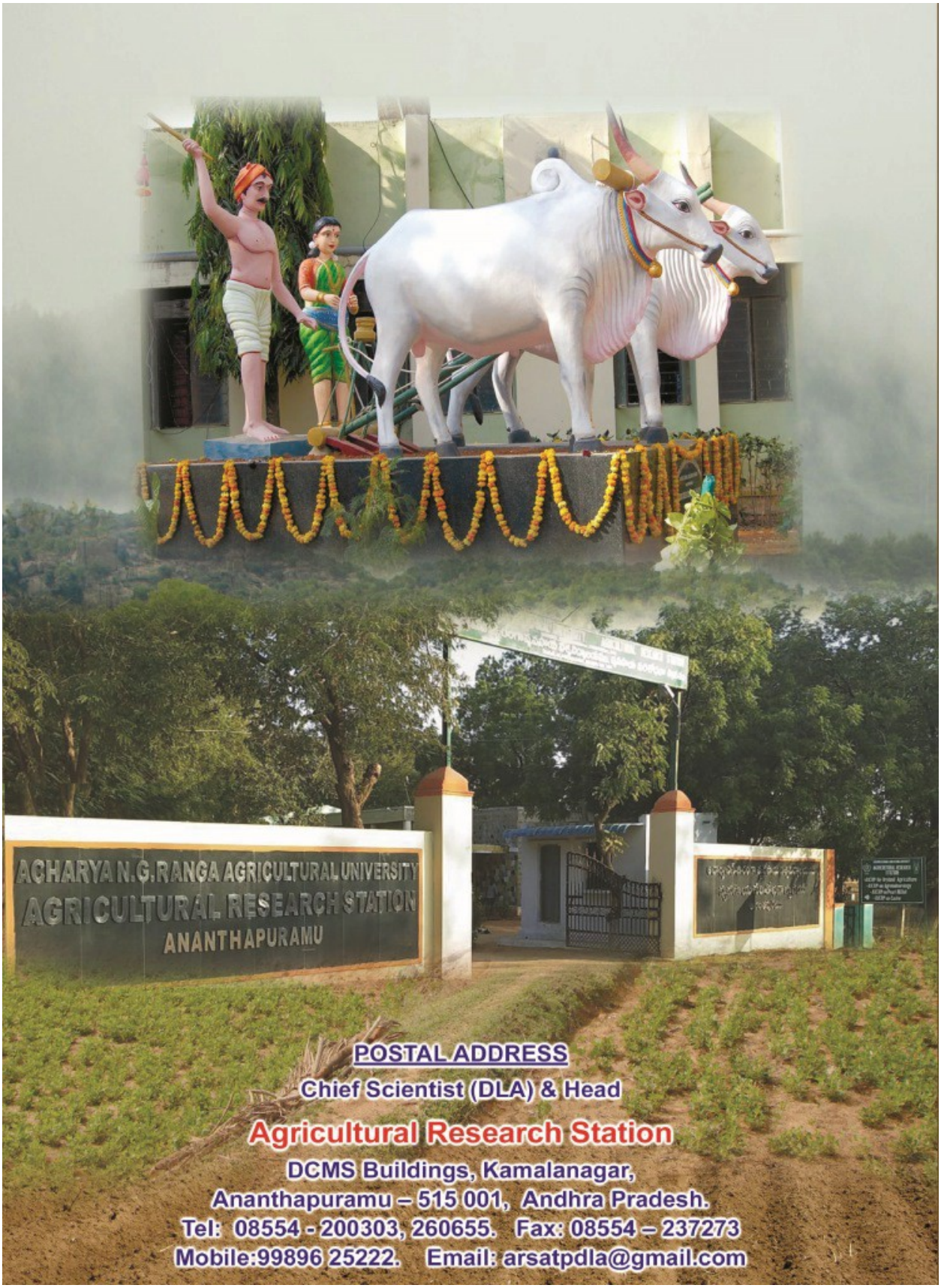

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