ANNUAL REPORT 2015-'16





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Acharya N.G. Ranga Agricultural University Guntur, Andhra Pradesh, India



Release of souvenir on "Future Technologies Indian Cotton in the Next Decade" by Hon'ble Vice-Chancellor, Dr. A. Padma Raju in National Symposium from 17.12.2015 to 19.12.2015 at Guntur





46th Annual Convocation of ANGRAU held at Agricultural College, Bapatla on 9th September 2015





47th Annual Convocation of ANGRAU held at Rajamahendravaram on 4th January, 2016

Fifty-Second Annual Report 2015-'16



Acharya N.G. Ranga Agricultural University Guntur-522 509, Andhra Pradesh, India Compiled by Planning and Monitoring Cell

Director

Principal Scientists	:	Dr. P. Rajeswara Reddy
		Dr. D.Lokanadha Reddy
		Dr. N. Venugopalarao

:

Dr. E. Narayana

First Page : Foundation Stone for new Agricultural University was laid at Lam, Guntur by Shri Radha Mohan Singh, the Hon'ble Union Minister for Agriculture, Govt. of India in the august presence of the Hon'ble Union Ministers, Hon'ble Chief Minister, and Ministers of State on 16th November, 2015.

Printed at

ACHARYA N.G. RANGA AGRICULTURAL UNIVERSITY Guntur-522 034, Andhra Pradesh, India

Dr. V. Damodara Naidu

Vice-Chancellor



Acharya N.G. Ranga Agricultural University

Guntur-522 034, Andhra Pradesh, India



FOREWORD

It is with an immense pleasure that I release the 52nd Annual Report of ANGRAU for the period June 2015 to May 2016. Indeed, this period has witnessed significant progress in all spheres of our University's mandate in research, teaching and extension. Since this period happens to be prior to my assuming Office as Vice Chancellor, this annual report will enable me recognize the thrust areas to act up on during the next year. On the academic front, about 1094 students were graduated from Agriculture, Agricultural Engineering and Technology and in Diploma courses have passed out and the students on roll were 4415. The library facilities were also strengthened during this period under report with approximately 2000 books, 486 reports and 232 theses and dissertations have been added to the stock. I am also happy to inform that during this period, we have started Advanced Post Graduate Centre (APGC) at Guntur w.e.f. August 2015, progressed in laying foundation stone for new Agricultural University on 16 November 2015. Noteworthy among other events are inaugurations of Apex and Referral Laboratory for soil, plant, water, and fertilizer; and Pesticide residue laboratory during 2015.

On the research front, varietal release is indeed our main stay with seven varieties based on our breeding efforts in crops like rice (Sridruthi); redgram (Amaravathi); bengalgram (Dheera & Nandyala tellasanaga); cotton (Srirama); tobacco (Nandyala Pogaku-1); sugarcane (Simhadri & Revathi); blackgram (Tulasi). Besides, we have developed ecologically safe approaches for combating various biotic & abiotic stresses, Integrated Farming System models, and progressed well in research on biotechnology and nanotechnology. I appreciate the efforts of our scientific personnel in presenting research at various national and international fora.

Our farmers' outreach system as usual is robust and effective during this period under report. About 68 farm technologies were evaluated in 579 locations by our DAATTCs and KVKs in farmers' fields. The Extension team have organized 718 training programmes including 252 skill teachings, 151 field days besides Kisan Melas in different zones of AP. Certain new initiatives like National Initiative on Climate Resilient Agriculture (NICRA), Farm Science Clubs, Tribal Youth Network, Kisan Mobile Advisories and Integrated Agromet Advisory Services were taken up during this year. Our students progressed well during curricular, co-curricular and extra-curricular activities. I have no hesitations in congratulating the Student Placement Cell for its remarkable functioning. In fact, around 134 students being placed in various public and private sectors during this year. I appreciate the students' efforts that were successful on getting qualified to JRFs, SRFs, NET examinations at National Level conducted by ICAR, and for their active involvement in NSS activities. We are also keen in giving our students a chance for international exposure through our student exchange programmes and MOUs with foreign universities.

I heartily congratulate the team on their strenuous efforts in coming up with such a wonderful compilation of 52nd Annual Report of ANGRAU. Indeed, these reports are reflecting the academic year's progress in research, academic and extension fronts and also act as guide for coming years' thrust areas for excellence.

(V.DAMODARA NAIDU)

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SUMMARY

Acharya NG Ranga Agricultural University (ANGRAU) was established in the year 1964 as the sole Agricultural University for the State of Andhra Pradesh. Consequent to bifurcation of Andhra Pradesh into Telangana State and Residuary State of Andhra Pradesh on 02.06.2014, the ANGRAU, an Institute of national importance is now in operation in the 13 districts of residuary state of Andhra Pradesh. The University is entrusted with the responsibility of imparting quality education, research and extension in the fields of Agriculture, Agricultural Engineering & Technology and Home Science.

The University is executing its functions through its FIVE Agricultural Colleges, ONE Advanced Post Graduate Centre, ONE Institute of Agri-Business Management, TWO Agricultural Engineering Colleges, TWO Food Science and Technology Colleges, ONE Home Science College, SEVENTEEN Polytechnics, of which fourteen Agriculture, one Seed Technology and two Agricultural Engineering, THIRTY SIX Research stations including SIX Regional Agricultural Research Stations (RARS), THIRTEEN District Agricultural Advisory and Transfer of Technology Centres (DAATTCs), TWELVE Krishi Vigyan Kendras (KVKs) and ONE Farmers' Call Centre (FCC), located throughout Andhra Pradesh.

The activities of the University taken up from June 2015 to May 2016 have been summarized and placed below.

Administration

His Excellency, the Governor of Andhra Pradesh is the Chancellor of the University. The Board of Management (BoM) with 21 Members is the governing body of the University with Vice-Chancellor as the Chairman. The BoM assembled six times during the year and took decisions on various issues and aspects. The Vice-Chancellor acts as the Chief Executive Officer of the University with the assistance of SIX Deans (Agriculture, Agricultural Engineering & Technology, Home Science, Post Graduate Studies, and Student Affairs), TWO Directors viz. Director of Research and Director of Extension and one each of Registrar, Comptroller, Estate Officer, University Librarian and Controller of Examinations.

Teaching

- During the academic year 2015-'16, a total of 1473 students were admitted in different courses of the University. Of them, 806 were admitted in Undergraduate courses, 145 in Masters, 57 in Doctoral programmes and 465 in Diploma courses.
- The total number of students on rolls was 4415 comprising 1903 boys and 2512 girls.
- A total number of 1094 students, of which 388 (179 boys and 209 girls) in Agriculture; 192 (95 boys and 97 girls) in Agricultural Engineering and Technology; 424 (199 boys and 225 girls) in Diploma courses have passed out.
- Ms. D.R. Pravallika from Agricultural College, Rajamahendravaram represented ANGRAU in Kabadi, Discus throw and Shot-put events in the 16thAll India Inter Agricultural University meet held from 22nd to 26th February, 2016 at Coimbatore (TNAU), Tamil Nadu.
- Ms. Alluri Anjani from Agricultural College, Rajamahendravaram attended the International Youth Festival cum Seminar organized by Shri Ram Chandra Mission during 23rd to 27th April 2016 at Kanha Shanti Vanam Ashram, Chegur village, Mahaboobnagar, Telangana.
- The NSS volunteers of all colleges actively participated in NSS activities such as tree plantation, soil sample collection, socioeconomic survey, laying of roads, sanitation programmes, awareness programmes,



rodent control, Parthenium eradication in public places and clean & green programme etc.

- NSS special camps of about 10 days duration were organized by all the Colleges and Polytechnics for the students of final year Undergraduate and Diploma programmes.
- The students' counseling and placement cells functioned in all the Colleges and Polytechnics of the University and acted as liaison between the colleges and the public & private sector organizations / institutes that are in need of graduates/diploma holders. During the year, a total of 134 students got placements in different public and private organizations.
- The ANGRAU library system comprises10 libraries apart from the University Central Library located at the Head-Quarters in Lam, Guntur. All the libraries together continued to receive over 503 Indian and 58 foreign periodicals in agriculture and allied sciences. In addition, 1,989 books, 232 dissertations and 486 reports have been added during the year.

Research

- During the year 2015, seven new crop varieties / hybrids viz., "Sridruthi (MTU 1121)" in rice; "Amaravathi (LRG 52)" in redgram; "Dheera (NBeG 47)" in bengalgram, "Srirama (NDLH-1938)" in cotton, "Nandyala Pogaku-1 (NBD 119)" in tobacco; "Simhadri (2003 A255) and Revathi (2000 A 255)" in sugarcane were released by the State Varietal Release Committee. Further, two varieties namely "Tulasi (LBG 787)" in blackgram and "Nandyala Tella Sanaga (NBeG 119)" in bengalgram were released by Central Varietal Release Committee.
- The genotypes "MTU 1140, MTU 1156 and NDLR 7" of **rice**; "TBG 104" of **blackgram**, "NBeG 49" of **bengalgram**,

"K 1535" of **groundnut**, "NDSH 1012" of **sunflower** and ABH-1 of **pearl millet** have completed minikit testing and are ready for release.

- In mesta, two entries, "AHS-216 and AHS-230" are identified for release in the Workshop of Jute and Allied Fibres held on 3rd and 4th at BCKV, Kalyani, West Bengal.
- Groundnut genotype, "K 1719" which had significantly out-yielded the best check variety, "ICGV 00350" proposed for identification in the name of "Kadiri Chithravathi" for zone IIIb (Andhra Pradesh, Telangana, & Tamil Nadu) for rabi- summer season.
- In rice, 22 genotypes were under minikit testing during 2015-'16.
- In North Coastal zone, significantly highest paddy yield was recorded with machine transplanting (6.25 t/ha), followed by SRI method (5.75 t/ha) and Drum seeder method (5.72 t/ha).
- Studies on Development of organic farming package for rice during Kharif, 2015 revealed among different organic farming treatments, application of 100% N on equivalent basis through FYM, VC, Neem cake + organic practices for weed and pest control recorded highest grain yield of 3071 kg/ha followed by 100% N through FYM, VC, Neem cake + Bio-fertilizers grain yield of 2963 kg/ha. whereas application of recommended 100% NPK Micronutrients recorded higher grain yield of 3995 kg/ha followed by 50% rec. NPK through inorganic and 50% N through FYM (3209 kg/ha). In Rabi, 2015-16, highest grain yield of 5460 kg/ha was recorded with application of 100% rec. NPK +Micronutrients followed by 50% rec. NPK through inorganic and 50% N through FYM(5079 kg/ha). Among different organic farming treatments, application of 50% N



as FYM +Bio-fertilizer for N+RP+PSB recorded highest grain yield of 3429 kg/ha followed by different organic sources each equivalent to 1/3 of rec. N (FYM + VC + Neem cake) grain yield of 3302 kg/ha. Straw yield also followed the similar trend.

- Out of six botanicals, Neemazal @ 1000 ml/ha was found effective against rice stem borer with 5.0 % dead hearts over 15.67 % damage in control.
- Three years (2013-'14 to 2015-'16) study on maize based cropping system for HAT Zone indicated that higher benefit cost ratio with Chickpea (2.07) and Rajmash (2.04) crops with maize equivalent yields of 6054 and 6558 kg/ha followed by groundnut and niger.
- Field release of *Trichogramma chilonis* @ 75,000 or 1,00,000 parasitoids/ha from 15 days after seedling emergence, thrice at weekly intervals was effective in reducing maize stem borer (*Chilo partellus*) damage besides contributing significantly to higher cob yield (89,020 cobs/ha).
- Pearl millet variety, ABV 04 ranked first across the Zone B (Maharastra, Tamil Nadu, Karnataka and Andhra Pradesh states) in coordinated trials during *kharif* 2015.
- Finger millet culture, PPR 1012 having yield potential of 32-35 Q/ha with tolerance to three types of blast disease has completed second year of minikit testing.
- Among different weedicides tested in finger millet during Kharif and rabi 2015-16 preemergence application of pendimethalin @ 0.5 kg a.i./ha along with one hand weeding at 20 days after planting realized highest C:B ratio (2.12).
- Studies on drought mitigation in redgram indicated that the maximum grain yield (1956 kg/ha) was recorded with application of

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Pusa hydrogel @ 2.5 kg/ha + mulching with organic residues @ 5 t/ha.

- The blackgram culture, GBG-1 was in second year of minikit testing. It matures in 70-75 days, seeds are medium bold, shiny black in colour, resistant to MYMV with yield potential of 18-20 Q/ha.
- Blackgram culture, "GBG-12" was in first year of the minikit testing. It matures in 75-80 days, seeds are medium bold, shiny black in colour, resistant to MYMV and with yield potential of 20-22 Q/ha.
- The blackgram entries *viz.*, IPU-10-26, TU-13 and VBG-11-031 recorded zero per cent incidence of YMV and were found promising, while the check entries PU-31 and LBG-623 recorded zero and 30 % YMV incidence respectively.
- Developed DNA based screening method (agro-inoculation) for resistance to two species of begomoviruses associated with yellow mosaic disease of blackgram at seedling stage.
- Greengram culture, "GGG-1" completed first year of minikit testing. It is an extra early variety with a duration of 55-60 days, having bold and shiny seed with yield potential of 17-18 Q/ha and suitable for preceding paddy and *rabi* seasons.
- In greengram, application of pendimethalin 30EC+imazethapyr 2EC (Vallore32) @ 0.75/1.0 kg/ha(light/heavy soils) as preemergence weedicide followed by manual weeding at 25-30 DAS recorded the highest weed control efficiency (87.8%) followed by single application of Vallore 32 (83.5%).
- In rice fallow greengram, significantly lower incidence of flea beetle was found with diafenthiuron (50% WP) @ 1 g/L while significantly lower leaf miner incidence was observed with imidacloprid (17.8% SL) @ 0.4 ml/L.



- In bengalgram, high yielding Kabuli line, NBeG 399 and high yielding desi line, NBeG 147 were evaluated in minikit programme during 2015-'16 and were found promising.
- In chickpea, hand weeding at 20 and 40 DAS (1726 kg/ha) recorded highest grain yield of 1726kg/ha followed by topramezone @ 25 g a.i./ha at 20 DAS(1670 kg/ha), acefluorfen sodium + clodinafoppropargyl @ 160+80 g a.i./ha at 20 DAS (1660 kg/ha), acefluorfen sodium + clodinafoppropargyl @ 120+60 g a.i./ha at 20 DAS (1571 kg/ha), topramezone @ 15 g a.i./ha at 20 DAS (1475 kg/ha) and atrazine as post emergence @ 250 g a.i./ ha at 20 DAS (1455 kg/ha).
- Groundnut genotype, "TCGS 1073", a water-use efficient culture with high yield potential has completed third year of minikit testing. Over three years, it recorded a mean pod yield of 1882 kg/ha in *kharif* and 2474 kg/ha in *rabi*.
- Groundnut genotype, TCGS 1157, a shortstatured culture maturing in 110-115 days with fresh seed dormancy has completed 2nd year of minikit testing and recorded 5% to 20% higher yield over checks at different locations.
- In groundnut, irrespective of varieties, the moisture stress imposed at 70-90 DAS (pod filling to maturity) caused 82.5 per cent yield reduction, followed by 35.2 and 20.8 per cent yield reduction due to moisture stress imposed at 50-70 DAS (pegging to pod formation) and 30-50 DAS (flowering to pegging)respectively.
- In groundnut based cropping system, among contingent crops sown during August II FN of 2015, clusterbean (Vegetable) and cowpea have recorded higher pod yields (16,368 kg/ha and 4,967 kg/ha respectively) and net returns (Rs. 2,45,520 and Rs.

1,49,010 respectively). Similarly for September 1st fortnight, cowpea (green pod) and field bean have recorded higher pod yields (4,260 kg/ha and 5,117 kg/ha respectively) and net returns (Rs. 1,27,800 and Rs. 1,07,457 respectively).

- Soil application of chlorantraniliprole @ 10 kg/ha (3.61%) was found to be effective for management of root grub in groundnut followed by seed treatment with imidacloprid 600 @ 2 ml + 2 ml water per kg seed (4.31%).
- Groundnut storage in modified atmosphere with CO_2 revealed that CO_2 concentration of 20% and above was fatal to bruchid *Carycdon serratus* even after 6 months while 10% CO_2 controlled the pest up to 3 months only.
- Seed treatment with nano particles of zinc oxide @ 200 ppm and 400 ppm were found best in reduction of symptom severity of peanut stem necrosis disease without any phytotoxicity.
- Three years of experimentation on groundnut concluded that treating the seed with tebuconazole 2 DS @ 1.5 g/kg seed + furrow application of *T. viride* @ 4 kg enriched in 250 kg FYM/ha + broadcasting *T. viride* @ 4 kg enriched in 250 kg FYM/ ha at 40 DAS + two sprays of tebuconazole 25.9 EC. @ 1ml/L at 60 and 75 DAS significantly reduced soil borne (dry root rot, stem rot) and foliar (ELS, LLS and rust) diseases and recorded significantly higher pod yields.
- Sunflower hybrid, NDSH 1012, having high yield potential (20-25 q/ha) and high oil content (40-41%) was in 3rd year minikit testing during 2015-'16.
- Seed treatment with *Pseudomonas fluorescens* @ 10 g/kg seed followed by spray of propiconazole @ 0.1% at 45 DAS and *P. fluorescens* @ 1% at 60 DAS sowing



was best in reducing the *Alternaria* leaf blight severity by 45.87% over control and recording higher yields.

- In a rice fallow castor, seed treatment with sulphuric acid @ 0.1% recorded highest germination (89%), whereas application of pendimithalin @ 1.0 kg a.i./ha + paraquat
 @ 0.6 kg a.i./ha as pre-emergence weedicide followed by Quizalofop ethyl @ 50 g a.i./ha + chloromuron @ 8 g/ha at 25 DAS recorded lower weed growth and higher seed yields.
- Defoliation by Drop ultra 540sc @250 ml/ ha at 80% boll opening stage and ethrel @ 1500 ppm/ha at 70% boll opening stage recorded higher yield of 1604 kg/ha and 1581 kg/ha, respectively in "Sivanandi" variety of cotton.
- The insecticides such as flonicamid 50 % WG @ 75 g a.i./ha, buprofezin 25 % SC @ 2500 g a.i./ha and diafenthiuron 50 % WP @ 300 g a.i./ha were found effective against jassids when compared to neem oil and biofungal agents.
- The commonly used insecticides on cotton such as flonicamid, diafenthiuron, imidacloprid and fipronil are compatible with fungicides such as mancozeb, COC and also with foliar nutrients.
- Seed treatment fungicides *viz.*, streptocycline, thiram, carbendazim, mancozeb, streptocycline, trifloxystrobin and penflufen, were compatible with imidacloprid treated *Bt* cotton seed.
- In mesta, application of pretilachlor 50% EC
 @ 900 ml/ ha within two days after sowing
 + one hand weeding at 15 DAS recorded
 100% weed control, maximum plant basal
 diameter (2.06 cm) and fibre yield (24.4 q/
 ha), which resulted in highest gross returns
 (RS.62203/ha), net returns (Rs. 49003/ha)
 and B:C ratio (3.71).

- Harvesting of early maturing sugarcane genotypes at 10 months (71.8 t/ha) or 11 months (72.7 t/ha) registered higher cane yields whereas delay in harvesting at 10 months age to 13 months age drastically reduced the cane yields upto 11.2 t/ha.
- Under saline conditions, sugarcane entries CO 99004, 83V15, 2005T52 and 2010 T 172 showed less % reduction in cane weight, while entries CO 99004, 2010 T 58, 2010 T 161 showed less % reduction in sucrose % and CCS.
- In sugarcane, white grub damage was low (1.47%) when *Metarhizium anisopliae* @ 5 kg/ha in 250 kg FYM was applied to soil followed by application of *Heterorhabditis indica* @ 20 kg/ha in 150 kg moist sand two times (2.17%) while plant damage due to white grub was high in untreated control (48.04%).
- Application of both entomopathogenic fungi *i.e.*, *Metarhizium anisopliae* and *Beauveria bassiana* and entomopathogenic nematode, *Heterorhabditis indica* twice are effective in reduction of bud damage in sugarcane due to termites and recorded significantly high germination (59.62%, 58.15% and 54.75%), low bud damage (40.38%, 41.85% and 45.63%), low seedling mortality (12.04%, 8.54% and11.72%) and high yields (71.71 t/ha, 71.85 t/ha and 64.21 t/ha) respectively.
- In bidi tobacco, the cured leaf yield was on par in both ridge planting method(1138 kg/ ha) and flatbed method of planting (1101 kg/ha). Among spacings, 60 cm x 75 cm spacing recorded significantly higher cured leaf yield (1356 kg/ha) compared to 75 cm x 50 cm (1184 kg/ha) and 75 cm x 75 cm (1046 kg/ha).
- In tobacco, the cured leaf yield was significantly higher with foliar application of KNO₃twice at 45 and 60 DAT (1463 kg/ha) whereas foliar spray of ammonium

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sulphate and urea with sulphate of potash did not influence the yield.

- The results of Integrated Farming Systems module showed that, introduction of Vanaraja backyard poultry, vegetables in kitchen garden mode and mineral mixture feed to the cattle increased the income of marginal farmers to the tune of 41-43% over Rs 7894 base level income per month.
- Adoption of reclamation technologies in abandoned aqua ponds of Gokarnamatam and Adavuladeevi villages resulted in 17-33% increase in the yields of rice compared to control. Adoption of reclamation technology for two years resulted in improvement in soil pH (8.30-8.82 changed to 7.3-8.0) and Sodium Absorption Ratio (17.8-48.2 changed to 16.2-30.4).
- To alleviate the effects of salinity on rice, among different sources of Silica, application of potassium silicate recorded significantly higher grain yield (15.03 g/plant) when compared to all other silica sources. However the lowest yield was recorded in no silica treatment (10.90 g/plant). The highest grain yield (16.77 g/plant) was obtained in treatment combination of potassium silicate at 2 dS m⁻¹ salinity.
- Capsicum, Clusterbean and Palak are found economically viable up to 3.15, 4.25 and 4.50 dS m⁻¹ irrigation water salinity in open field cultivation. The order of salinity tolerance was found to be Clusterbean > Capsicum > Palak.
- Evaporation losses from the farm ponds are effectively minimized by using bamboo mat or spray with *stearyl* alcoholor silicon oil.
- Developed five row weeder, fertilizer and pesticide applicators suitable to attach to 17.5 HP transplanter power unit.
- The groundnut + redgram planter was designed and developed for sowing groundnut and redgram in 8:1 ratio.

- Lab model of Accelerated Ageing Chamber was designed and fabricated during 2015-'16.
- In accelerated ageing process of rice, in order to achieve ageing levels of 6 months, 12 months, 15 months and 18 months, the treatment corresponding to 50°C for 2h, 50°C for 6h, 50°C for 8h and 50°C for 8h of pulsed incubation periods (2h ON and 2h OFF) respectively were found better for paddy of both BPT 5204 and MTU 7029 varieties.
- Studies on rice varieties up to 10 months of storage revealed a decrease in protein and phenol content and an increase in amylose content. In all the five tested varieties, the physical parameters viz., grain length, width, volume expansion and cooking time were decreased upon storage. Highest antioxidant activity was recorded in MTU 7029.
- In tomato, Vitamin-C content and total phenol content decreased upon storage and the rate of decrease was more in tomatoes stored at room temperature compared to those stored at refrigerated conditions.
- Microbial load and insect infestation were significantly less in paddy seed stored in GrainPro Grainsafe IITM (GS II) capsule compared to the seed stored in gunny bags. Germination (93%) and milling quality (55.8%) were also found better in seed stored in hermetic bag than that stored in gunny bags (82% and 47.6% respectively).
- Bruchid damage was effectively controlled by mixing pepper powder @ 0.4% or treatment with Piperin in Nuwood <u>block @</u> <u>3.0%</u> (w/v) to greengram and mixing pepper powder @ 0.1% to groundnut.
- Design and fabrication of mechanized system for production of edible paper films for production of paper sweet was completed.



- Mechanized planting of sugarcane using budchip planter and sugarcane cutter planter was done in comparison with conventional planting. There was savings in labour cost, seed cost and time by 52, 75 and 58% respectively with budchip planter and 51%, 69% and 58% for sugarcane cutter planter compared to conventional planting.
- For North Coastal Zone, the cost of cultivation per hectare was worked out for crops such as sugarcane (Irrigated- plant crop Rs 1,91,288, ratoon crop Rs 1,36,100), rice (Rs 91,065), maize (Rs 1,00,452), groundnut (Rs 59,110), ragi (Rs 63,050), redgram (Rs 29,750), Rice fallow Blackgram (Rs 13,738), Rice fallow Greengram (Rs 14875), sesame (Rs 22,000) and mesta (Rs 71,320).
- At Lam, the per quintal cost of production of cotton, sugarcane, bengalgram, chillies, redgram and turmeric was Rs 4701, Rs 2562, Rs 4140, Rs 6923, Rs 4582 and Rs 6997 respectively and farmers realized -0.21, -0.19, 0.27, 0.59, 0.60 and 0.17 as Return on rupee of investment respectively.
- Overall, by application of bio-fertilizers, the chemical fertilizers could be saved by 50% with an extra benefit of 13.6% grain yield increase over 100% RDF in pigeonpea crop under deficit soil moisture conditions in Alfisol soil. And among formulations liquid bio-fertilizers of *Rhizobium* + PSB with 50% RDF gave 22% higher grain yields (1775.8. kg/ha) over powder bio-fertilizers + 50% RDF treatment (1526.9 kg/ha).
- A total of 185.6 metric tons of powder biofertilizer formulations and 26.0 metric tons of liquid bio-fertilizer formulations to a worth of Rs 151.8 lakhs were produced and supplied to the farming community of Andhra Pradesh during the year 2015-16.
- A quantity of 11,926 quintals of Breeder seed and 14,430 quintals of Foundation seed

in field crops has been produced during the year 2015-16 to meet the indents of Government of India, State Government, NGOs and Seed industry and supplied.

Extension

- During the year 2015-'16, the Farmers Call Centre received a total of 7028 calls from different districts of Andhra Pradesh. The calls comprised of 1328 calls on Crop production, 935 calls on Crop protection, 3003 calls on Horticulture and 1762 calls related to Agriculture department.
- During 2015-'16, a total of 68 technologies were assessed in 579 locations by the District Agricultural Advisory and Transfer of Technology Centres (DAATTCs) and *Krishi Vigyan Kendras* (KVKs) in farmers' field conditions.
- The DAATT Centers and KVKs undertook a total of 2093 diagnostic visits comprising of 651 visits undertaken by the Scientists of DAATT Centres and ESs, 650 by KVKs, while 792 visits were conducted jointly by the Scientists of DAATTCs, KVKs, Research Stations and officers of the state Department of Agriculture.
- The DAATTCs and the KVKs organized 718 training programmes covering 25148 farmers and farm women, 198 training programmes to 9043 Extension personnel and 65 training programmesto 3654 personnel of NGOs, Banks and others.
- A total of 252 skill teachings were imparted by KVKs and DAATTCs to 4814 farmers and rural youth.
- The scientists of DAATTCs and KVKs had altogether conducted 902 group discussions on topics like green manure crops before rice, weed management in direct sown rice, zero tillage in maize, management of YMV in pulses, production technology for summer pulses, IPM in groundnut,



management of *Botrytis* grey mold in castor, good agricultural practices in cotton, budchip method of planting in sugarcane, seed production at farmers level, *kharif* contingency plan, management practices in vegetable crops, plant protection in mango, Nutritional gardening, Techniques in Vannamei culture, feed management in carp culture, management of acid and alkaline soils, agriculture farm machinery, importance of drudgery reducing implements etc.

- A total of 151 field days were conducted to highlight varieties of rice (MTU 1061, NDLR 47), sugarcane, groundnut (Dharani, TCGS 1073), redgram, blackgram (LBG 752), MSRI in rice, sunflower, drum seeder technology in rice, zero tillage cultivation in maize, soil test based fertilizer application in paddy, management of foliar diseases in cotton, liquid bio-fertilizers in rice and captive rearing of fish etc.
- *Kisan Melas* were organised during the period under report by Regional Agricultural Research Stations, Anakapalle, Chintapalli, Maruteru, Tirupati and Nandyal. A large number of farmers participated and got benefited in these *Kisan Melas*.
- South Zone Agri-Expo 2015 was organized from 19th to 21st December, 2015 at Regional Agricultural Research Station, Lam, Guntur with a theme on 'Small Farmers Friendly Agricultural Technologies'.
- Under Diploma in Agriculture Extension Services for Input Dealers (DAESI) programmeat three Krishi Vigyan Kendras viz., Nellore, Banavasi and Reddipalli a total of 120 input dealers got benefited during the year 2015-'16.
- Under distance education, presented programmes twice a week, Tuesday and Friday in Annadata Velugubaata programme of ETV. Identified topics & resource persons for phone-in-live programme in

different TV channels: 51 programmes in Pasidipantalu of Doordarshan and 14 programmes in Annapurna programme of TV-5.

- The agricultural almanac *Vyvasaya Panchangam* 2016-17, besides other informative publications, were brought out by the Extension Department.
- The scientists of the DAATTCs and the KVKs along with other scientists of the Research stations actively participated in T&V Meetings, Polam Pilusthondi, AMC Level Interaction Meetings, Rytukosam Chandranna Yatralu, Janmabhumi – Maa Uuru programme, Pradhan Mantri Fasal Bima Yojana scheme, Awareness on Protection of Plant Varieties & Farmers Rights Act2001 etc., and interacted with the farmers and suggested solutions for their problems.
- Developed a smart phone application on groundnut in an Android platform with visual illustrations for the benefit of the farmers. The application contains seed to seed package of practices including varieties, insect pests and diseases, value addition, farm mechanization etc. The application is offline in Telugu language with a total of 120 screens.
- In addition to existing popular extension methods such as Flag Method and Developing Farmer Master Trainers, etc., new initiatives such as National Initiative on Climate Resilient Agriculture (NICRA), Farm Science Clubs, Tribal Youth Network, Kisan Mobile Advisories and Integrated Agromet Advisory Services etc., have been taken during the current period.

Research Publications

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• The research and extension activities carried out by the students and the faculty were published in various national and international journals, accounting to a total of 273 number by the teaching faculty, 268 number by the



research scientists and 17 number by the extension specialists, besides 29 number under chapters and books, during the report period.

Awards

- Dr. M. Girija Rani, Scientist (G & PB), APRRI & RARS, Maruteru was conferred with ANGRAU-Young Scientist Award, 2012 in the 46th Annual Convocation held at Agricultural College, Bapatla on 9th September, 2015.
- Dr. Lakshmi Jagarlamudi, Associate Dean, College of Home Science, Guntur was bestowed with State Best Teacher Award by Govt. of Andhra Pradesh on the occasion of Teachers day celebrations held on 5th September, 2015 at Visakhapatnam.
- Dr. K. Gurava Reddy, Scientist (Ag. Extn.), RARS, Lam received Meritorious Extension Scientist 2012 award on the occasion of 46th Convocation of ANGRAU on 9th September 2015 at Agricultural College, Bapatla.
- Dr. S. Krishnam Raju, Principal Scientist (Pl. Path.), APRRI & RARS, Maruteru received Sri Veerapaneni Narasimham Memorial Gold Medal in the 46th Annual Convocation of ANGRAU on 9th September 2015.
- Dr. BNVSR Ravi Kumar, Scientist (G & PB), APRRI & RARS, Maruteru received Meritorious Research Scientist Award for the year 2012 at 46th Annual Convocation held at Agricultural College, Bapatla on 9-9-2015.
- Dr. K.V. Naga Madhuri, Senior Scientist (SS & AC), RARS, Tirupati was conferred with KCP Endowment Prize for Best Scientist in Sugarcane during 46th Annual Convocation of ANGRAU at Bapatla on 9.9.2015.
- Dr. R.P. Vasanthi, Principal Scientist (G & PB), RARS, Tirupati received Sri Neelakantapuram Kaverappa Gold Medal

on 9th September, 2015 in the 46th Annual Convocation held at Bapatla.

- Dr. G. Ravi Babu, Associate Professor, College of Agricultural Engineering, Bapatla received Meritorious Scientist Award and Dr. B. Hari Babu, Assistant Professor, College of Agricultural Engineering, Bapatla received Meritorious Teacher Award in the faculty of Agricultural Engineering and Technology for the year 2012 during 46th Convocation on 9th September 2015 held at Agricultural College, Bapatla.
- Dr. V. Jayalakshmi, Principal Scientist (G & PB), RARS, Nandyal received Nagaraja Rao Gold Medal for Best Research Worker in Pulses in September, 2015.
- Dr. E. Narayana, Associate Director of Research, RARS, Lam, ANGRAU, Dr. M. Subba Rao, Principal Scientist (Millets) & Head, ARS, Perumallapalle, Dr. Ch. Mukunda Rao, Principal Scientist (Pl. Physiol.), RARS, Anakapalle and Dr. P. Jamuna, Principal Scientist (SS & AC), RARS, Anakapalle received Dr. I.V. Subba Rao Rythu Nestham Purshkaram award for the year 2015 on 23.10.2015 in Scientists category.
- AICRP on PHET, Bapatla and Anakapalle were awarded with the "Chaudhary Devi Lal Outstanding All India Coordinated Research Project Award" for the year, 2015 by ICAR.
- Dr. T.S.S.K. Patro, Senior Scientist (Pl. Path.) & Head, ARS, Vizianagaram received Innovative Scientist of the Year Award-2015 during International conference on Innovative approaches in applied sciences and technologies held at Faculty of Science Kasetsart University, Bangkok, Thailand in February 1-5, 2016.
- Dr. P.V. Ramana Rao, Scientist (G & PB), APRRI & RARS, Maruteru received ANGRAU-Young Scientist Award for the

ANGRAU

year 2013 in the 47th Annual Convocation at Rajahmundry on 4-1-2016.

- Dr. T. Usha Rani, Senior Scientist (SS & AC), APRRI & RARS, Maruteru and Dr. M. Suresh, Scientist (Pl. Path.), RARS, Anakapalle received Meritorious Research Scientist award during 47th Annual Convocation held at Rajahmundry on 4-1-2016.
- Dr. K. Vijay Krishna Kumar, Senior Scientist (Pl. Path.), RARS, Anakapalle was conferred with Veerapaneni Narsimhulu Gold Medal for Best Research in Plant Pathology for the year 2013 at the 47th Annual Convocation of ANGRAU at Rajahmundry on 04.01.2016.
- Dr. T. Madhumathi, Professor (Ento.), Agricultural College, Bapatla, Dr. G. Mohan Naidu, Associate Professor (Stats & Maths), SV Agricultural College, Tirupati, Dr. D. Subramanyam, Associate Professor (Agron.), SV Agricultural College, Tirupati, Dr. P.V. Satya Gopal, Associate Professor (Ag. Extn.), SV Agricultural College, Tirupati, Dr. P. Kishore Varma, Scientist (Pl. Path.), RARS, Anakapalle and Dr. A. Sambaiah, Scientist (SWE-1), Saline Water Scheme, Bapatla were bestowed with Meritorious Teacher Award for the year 2013 at the 47th Annual Convocation of ANGRAU held at Rajahmundry on 04.01.2016.
- Dr. M. Sreekanth, Scientist (Ento.), RARS, Lam was conferred with Dr. B. Nagaraja Rao Memorial Gold Medal for best research work in pulses for the year 2013 during the 47th convocation held at Rajahmundry on 4.1.2016.
- Dr. P.V.R.M. Reddy, Scientist (SS & AC), RARS, Tirupati received Meritorious Extension Scientist Award from ANGRAU on the occasion of 47th Annual Convocation held on 4th January, 2016, at Rajahmundry.

- KVK, Kadapa received Mahindra AGRI TECH SAMMAN AWARD at New Delhi on 3rd March, 2016 from Shri Radha Mohan Singh, Hon'ble Union Minister for Agriculture, Government of India as it was adjudged as Best KVK in India for their efforts in promoting the entrepreneurship and creating additional employment opportunities.
- Dr. T.V. Satyanarayana, Registrar, ANGRAU was conferred with FAO Award on 4th March, 2016 for his excellent contribution in the field of natural resources management, enhancing water availability and land productivity through the use of efficient on-farm irrigation and drainage water management technologies.
- Dr. Prabhu Prasadini, Director of International Programmes, ANGRAU and Dr. Jagarlamudi Lakshmi, Associate Dean, College of Home Science, Guntur were honored with the "Lifetime Achievement Award" of VIWA 2016 on the eve of International Women's Day on the 8th of March, 2016.
- Dr. T. Neeraja, Dean of Home Science, ANGRAU, Guntur was conferred with "Best Paper" Award for the paper entitled "Musculoskeletal disorders among unskilled women workers in construction work" presented in PCS Health Care Congress held at Budapest, Hungary on 16th and 17th April 2016.
- Dr. R. Ankaiah, Associate Dean, Agricultural College, Naira, Dr. P.V. Satyanarayana, Director & ADR, APRRI & RARS, Maruteru and Dr. T. Pratima, Senior Scientist (Agromet), RARS, Tirupati were conferred with Ugadi Puraskaram for the year 2016 on the eve of Ugadi at Vijayawada.
- Dr. R. Saradajayalakshmi Devi, Professor (Pl. Path.) and Dr. K. Hariprasad Reddy, Professor (G & PB), SV Agricultural



College, Tirupati were conferred with the State level Best Teacher Award.

 Dr. TNVKV Prasad, Senior Scientist (SS & AC), RARS, Tirupati received Dr. A.V. Krishnaiah Memorial Gold Medal Award for the Best Agricultural Researcher for the year 2013.

Other events

- Advanced Post Graduate Centre was started by the University at RARS, Lam and the classes commenced on 1st August, 2015.
- The 46th Annual Convocation was held on the 9th September, 2015 at Agricultural College, Bapatla. Dr. Harsh Kumar Bhanwala, Chairman, National Bank for Agriculture and Rural Development (NABARD), Mumbai was the Chief Guestcum-Orator. He has been conferred with Honorary Degree of Doctor of Philosophy (*Honoris causa*).
- Dr. T.V. Satyanarayana, Dean of Agricultural Engineering & Technology and Registrar, ANGRAU laid Foundation stone for Dairy Engineering Laboratory under ICAR S&D Grants at College of Agricultural Engineering, Madakasira on 31st October, 2015.
- Shri Radha Mohan Singh, Hon'ble Union Minister for Agriculture, Govt. of India laid Foundation Stone for new Agricultural University at Lam, Guntur in the august presence of the Hon'ble Union Ministers, Hon'ble Chief Minister, Ministers of State, Vice-Chancellor, University Officers and the staff of ANGRAU on the 16th of November, 2015.
- The 40th VC's Convention was held at Fortune Select Grand Ridge, Tirupati on 2nd and 3rd December, 2015. Indian Agricultural Universities Association (IAUA) came up with a set of recommendations. Integrated farming system involving animals and horticulture should be encouraged to replace

monocropping. This should be coupled with awareness about the usage of fertilizers and importance of soil health cards, so as to meet the sustainability of farming.

- Apex and referral laboratory for soil, plant, water and fertilizer as well as pesticide residue laboratory were inaugurated by Dr.
 A. Padma Raju, Vice Chancellor, ANGRAU on 4.12.2015 at RARS, Tirupati.
- The 47th Annual Convocation was held on the 4th January, 2016 at Sri Venkateswara Anam Kala Kendram, Rajahmundry, East Godavari dist. Shri Siraj Hussain, IAS, Hon'ble Secretary, Ministry of Agriculture, Govt. of India, Department of Agriculture, Cooperation & Farmers Welfare, Krishi Bhawan, New Delhi was the Chief Guestcum-Orator. He has been conferred with Honorary Degree of Doctor of Philosophy (*Honoris causa*).
- Shri Prathipati Pulla Rao, Hon'ble Minister for Agriculture, Govt. of A.P. laid foundation for Faculty Building at Lam, Guntur in the august presence of MPs, MLAs, Vice Chancellor and staff of ANGRAU on the 10th of February, 2016.
- "Aalambana" a family guidance and counseling centre established by the department of human development and family studies at College of Home Science, Guntur was inaugurated by Dr. A. Padma Raju, Hon'ble Vice Chancellor, ANGRAU on 10th February 2016 to help people of different age groups to solve their problems by themselves through counseling.
- Dr. D.V.Subba Rao, Professor (Economics), assumed the NABARD Chair Professor in the University on 2nd April, 2016.
- AGRI-CARNIVAL, with the theme of bioapproaches in pest and disease management in agriculture was organized at Agricultural College, Naira on 4th May, 2016.

- ANGRAU
 - University has organized 23 training programmes and 7 workshops and conferences during the reporting period.

MOUs

- IGKV, Raipur and ANGRAU entered into a Memorandum of Understanding on 22nd August, 2015 for collaboration of PG and Ph.D. Students of IGKV Raipur for thesis research work at ANGRAU and *vice versa*.
- PJTS Agricultural University, Telangana entered into a Memorandum of Understanding on 20th April, 2016 to guide PG students in Farm Machinery & Power.
- UMK, Malaysia had an MoU with the ANGRAU on 25th April, 2016 especially related to research collaborations, joint academic and mobility programs.
- MOU's were signed with M/S Chakravarthy Agro Foods Private Limited, Tirupati; M/s KVL Bio Products Pvt., Secunderabad and M/s Jayalakshmi Agro Industries, Butchayyapeta mandal, Visakhapatnam district towards transfer of design and machinery details of mechanized jaggery granulator for the production of granular jaggery.

Visitors

- Stephen Cherry, FSP, Canada visited ARS, Peddapuram on 12th October ,2015 to observe research activities.
- Dr. Gordon Smith, Professor and Head and Prof. B. Subrmanyam, Grain Science and Industry Department, Kansas State University, USA accompanied by Dr. S. Raghuvardhan Reddy, Former Vice-Chancellor, ANGRAU visited the University on 5th December, 2015 and reviewed the collaborative research projects.

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- Dr. Rami A. Reddy, Professor of Agribusiness Programme along with students from Agri-business division, University of Wisconsin – Platteville, Wisconsin, USA visited ANGRAU on 2nd January, 2016as Part of the course entitled "Agriculture and food market in India" and discussed about the possibility of Memorandum of Understanding (MOU) for student as well as faculty exchange programme between ANGRAU and University of Wisconsin – Platteville.
- Dr. Sajid Alavi, Professor, Department of Grain Science & Industry, Kansas State University, USA visited ANGRAU on 12th January, 2016 to have an agreement to give practical training to students as well as staff members of ANGRAU on grain storage and food processing.
- Mr. G.K.D. Kalyan Chakravarthy, Senior Researcher & Business Coordinator, Agroparks and Metropolitan Food Clusters, Wageningen University and Research Centre, Wageningen visited the University on 1st April, 2016 to discuss the India Water Initiative project wherein few of our students can be involved in a short-term collaborative programme/course on climate smart advanced irrigation systems.

Foreign Tours for Participation in Seminars / Conferences / Workshops

• Seventeen faculty members from the three Faculties of Agriculture, Agricultural Engineering & Technology and Home Science participated in the overseas Conferences / Workshops / Seminars held in various foreign countries like Poland, Germany, China, Philippines, USA, Serbia, Thailand, Australia, Hungary and Brazil etc.

Annual Report 2015-2016



I. INTRODUCTION

Acharya N G Ranga Agricultural University (ANGRAU) was established on the 12th of June 1964 in the name of Andhra Pradesh Agricultural University (APAU) under the APAU Act 1963. Later on the 7th of November 1996 it was renamed as Acharya NG Ranga Agricultural University in honour and memory of the noted Parliamentarian and Kisan Leader, Sri Gogineni Ranga Nayukulu (popularly known as N G Ranga). Consequent to bifurcation of Andhra Pradesh State into two states of residual Andhra Pradesh and Telangana on the 2nd of June 2014, the ANGRAU has been bifurcated 'on order to serve basis' into the Acharya N G Ranga Agricultural University for the State of the Residual Andhra Pradesh and Professor Jayasankar Telangana State Agricultural University for the State of Telangana. The University is entrusted with the responsibility of generating and grooming the personnel for the agricultural services (Education), formulating and pursuing research activities in agriculture science (Research) and transferring the fruits of research and development to farmers and other stake holders (Extension).

The University is governed by the Board of Management comprising 21 members with Vice-Chancellor as its Chairperson. The Vice-Chancellor is assisted by University Officers viz., Faculty Deans, Dean of PG Studies, Dean of Student Affairs, Director of Experimental Stations, Director of Extension, Registrar, Controller of Examinations, Comptroller, University Librarian and Estate Officer in the day to day University administration. The academic matters are looked after by the Academic Council and Faculty Boards under the guidance of Vice-Chancellor. The Research and Extension Programmes are formulated by the Research and Extension Advisory Council (REAC) under the Chairmanship of the Vice-Chancellor.

The ANGRAU has three faculties namely Agriculture, Agricultural Engineering and Technology and Home Science with UG, PG and Doctoral Programmes. The University carries out its teaching mandate through 12 constituent colleges. The University also offers two year Diploma in Agriculture and Seed Technology programmes in the local vernacular Telugu language and three year diploma in Agricultural Engineering in English to train grass root level technical workers. So far a total of 37,943 students, comprising 28,065 graduates and 9,878 postgraduates have taken their degrees from the University.

The University carries out its research programmes through 36 Research Stations including six Regional Agricultural Research Stations spread over the entire State of Andhra Pradesh. With the basic motto of 'making agriculture profitable and sustainable', the University has released 403 improved varieties / hybrids of different crops; a few of them are first of their kind not only in India but also in the world, over the years and tailored matching agrotechniques resulted in three-fold increase in agricultural production of the State.

Evolved over the last five decades, the University had introduced few programmes like introduction of Rural Agricultural Work Experience Programme (RAWEP) during undergraduate course and introduction of 2-year Agriculture/ Seed Technology and 3-year Agricultural Engineering diploma courses for development of skilled manpower; and establishment of District Agricultural Advisory and Transfer of Technology Centre (DAATTC – *Eruvaka Kendra*) in every district of Andhra Pradesh for the first time in the country, which altogether led to bag the Best Institution Award twice from the ICAR.

Today, in the residual Andhra Pradesh, the University has 13 DAATTCs located one each in the 13 districts of the State and 12 *Krishi Vigyan Kendras* (KVKs) in the service of farmers of the State. The Farmers Call Centre located in Guntur facilitates farmers, a direct access to crop experts to get their farm problems solved over phone.

At this glorious backdrop of the University, this 52nd Annual Report of the ANGRAU showcases activities and significant achievements of the University in the fields of education, research and extension during the period from June 2015 to May 2016.



II. UNIVERSITY ADMINISTRATION

The Hon'ble Governor of Andhra Pradesh, Sri E Srinivasan Lakshmi Narasimhan is the Chancellor of the University. Next to the Chancellor, Vice-Chancellor acts as the Academic Head and Chief Executive of the University.

The organogram of the University is presented in Fig.1.

The University is governed by the following bodies:

- (i) Board of Management
- (ii) Academic Council and the Faculty Boards
- (iii) Research and Extension Advisory Council

A. AUTHORITIES OF THE UNIVERSITY

1. Board of Management

The Board of Management (BoM) is the

apex body of the University and makes policy decisions. The Vice-Chancellor is the Chairman of the Board of Management. The BoM comprises of representatives from State Legislature / Parliament (4), the Agro-industry (2) and the State Chamber of *Panchayat Raj* (1) as well as the Agricultural Scientific Community (1). Besides these, one representative from the Indian Council of Agricultural Research, three Members of the Academic Council of the University, Secretaries to Government from the *Panchayat Raj* and Finance Departments, Directors of State Departments of Agriculture and Animal Husbandry and Progressive Agriculturists (4), are also the members of the BoM of the ANGRAU

Members of Board of Management during 267th meeting of Board of Management

Chairman	Dr A Padma Raju
Members	
Four Ex-Officio Members	Sri K S Jawahar Reddy, I A S Principal Secretary to Government, Panchayat Raj Department
	Sri K Dhanunjay Reddy, I A S Director of Agriculture
	Dr P D Kondal Rao Director of Animal Husbandry
	Smt. K Sunitha, I A S Secretary to Government, Financial Department
Other Members	
ICAR Nominee	Vacant
Distinguished Agricultural Scientist	Dr E A Siddiq Ex-National Professor, IIRR, Hyderabad



Three Persons from Academic Council	Dr R Sarada Jaya Lakshmi Devi Professor, S V Agricultural College, Tirupati
	Vacant
	Vacant
Four Persons from Progressive Agriculturists, of whom one shall be a woman	Sri N Chandrababu
	Sri C Reddepa Reddy
	Sri Malkud Narayana Rao
	Smt. B Mamatha
Two Persons from among Agro-industrialists and other Entrepreneurs, including Self-Employed Graduates	Sri M Vidyanatha Reddy
	Sri K Nagabhushanam
Secretary	Dr T V Satyanarayana Registrar

Members of Board of Management during 268th meeting of Board of Management

Chairman	D A Padma Raju
Members <i>Four Ex-Officio Members</i>	Sri K S Jawahar Reddy, I A S Principal Secretary to Government, Panchayat Raj Department
	Sri K Dhanunjay Reddy, I A S Director of Agriculture
	Dr P D Kondal Rao Director of Animal Husbandry
	Smt. K Sunitha, I A S Secretary to Government, Financial Department



Other Members	
ICAR Nominee	Dr D Rama Rao Director, NAARM
Distinguished Agricultural Scientist	Dr E A Siddiq Ex-National Professor, IIRR, Hyderabad
Three Persons from Academic Council	Dr R Sarada Jaya Lakshmi Devi Professor, S V Agricultural College, Tirupati
	Vacant
	Vacant
Four Persons from Progressive Agriculturists, of whom one shallbe a woman	Sri N Chandrababu
	Sri C Reddepa Reddy
	Sri Malkud Narayana Rao
	Smt. B Mamatha
Two Persons from among Agro- industrialists and other Entrepreneurs	Sri M Vidyanath Reddy
including Self-Employed Graduates	Sri K Nagabushanam
Secretary	Dr T V Satyanarayana Registrar

Members of Board of Management during 269th to 271st meetings of Board of Management

Chairman	Sri T Vijay Kumar, I A S Special Chief Secretary to Govt. & Vice-Chancellor
Members	
Four Ex-Officio Members	Sri K S Jawahar Reddy, I A S Principal Secretary to Government, Panchayat Raj Department
	Sri K Dhanunjay Reddy, I A S Director of Agriculture
	Dr G Somasekharam Director of Animal Husbandry
	Smt. K Sunitha, I A S Secretary to Government, Financial Department



Other Members	
ICAR Nominee	Dr D Rama Rao Director, NAARM
Secretary	Dr T V Satyanarayana Registrar

Members of Board of Management during 272nd meeting of Board of Management

Chairman	Sri T Vijay Kumar, I A S Special Chief Secretary to Govt. & Vice-Chancellor	
Members		
Four Ex-Officio Members	Sri K S Jawahar Reddy, I A S Principal Secretary to Government, Panchayat Raj Department	
	Sri K Dhananjaya Reddy, I A S Director of Agriculture	
	Dr G Somasekharam, M.V.Sc, Director of Animal Husbandry	
	Smt. K Sunitha, I A S Secretary to Government, Financial Department	
Other Members		
ICAR Nominee	Dr D Rama Rao Director, NAARM	
Distinguished Agricultural Scientist	Dr V Damodara Naidu Professor (Retd.), ANGRAU	
Three Persons from Academic Council	Prof. G V Nageswara Rao Professor (Plant Pathology), Agricultural College, Rajamahendravaram	
	Dr S R Koteswara Rao Professor & Head, Dept. of Entomology S.V. Agricultural College, Tirupati	
	Prof. I Bhavani Devi Professor & Special Officer, Institute of Agri. Business Management S.V. Agricultural College, Tirupati	

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Four Persons from Members of Legislative Assembly / Parliament	Sri Kinjarapu Rammohan Naidu Hon'ble Member of Parliament (Loksabha)		
	Sri K S Jawahar Hon'ble Member of Legislative Assembly, Govt. of Andhra Pradesh		
	Sri B C Janardhan Reddy Hon'ble Member of Legislative Assembly, Govt. of Andhra Pradesh		
	Smt. Meesala Geetha Hon'ble Member of Legislative Assembly, Govt. of Andhra Pradesh		
Four Persons from Progressive Agriculturists, of whom one shallbe a woman	Sri Mekala Lakshmi Narayana		
	Smt. Alluri Vijaya		
	Sri Chapara Ganapathi Rao		
	Sri T V Muralinatha Reddy		
One Person from among the Members of the State Chamber of Panchayat Raj	Sri P Rajasekhar ZPTC, Mummidivaram, G. Vemavaram(V), Polavaram (M), East Godavari District		
Two Persons from among Agro- industrialists and other Entrepreneurs, includingSelf-Employed Graduates	Vacant		
Secretary	Prof. T V Satyanarayana Registrar		

E.A. Engg (Tirupati) Tirupatią. Estate Officer Dy, EX. Engineer (Bapatla) Bapatla - | |.am- | Anakapalle- | University Librarian Asst. Librarians Bapatla Tirupati Naira Mahanandi Dy.Comptroller Comptroller Asst. Comptroller (Audit. Accounts. Claims. Budget. Colleges. RAR5s) Examinations Addl. Controllers of Controller of Evaminations Wardens. Physical Directors, RMOs Secretary (Tech.) to Vice-Chancellor Public Relations Officer Dean of Student Affairs DAATTCs (13) KVKs (12) Al&CC and Univ Press (1) Farmers Call Ð Centre Asst.Dir. of Extn. Extension Extension Asst. Director of Research Dy Directors Director of Dy. Directors of સ Research Assoc Director of Research (H.Q.) (1) Regl.Agril. Res. Station RARS ARS No. Hy. Lam 9 Anakopalle Chintapalli Manuteru A0 Tirupati Nandyal Experimental Director of Stations Assoc. Directors of Ť RARSs (6) Research POLYTECHNICS Seed Tech. Agril Engg (1) (2) Univ: Heads of Department A.05. Dy. Directors & Asst. Deans.Special Officers & Directors (iii) Home science (iv) Postgraduate Studies (i) Agriculture(ii) Agril. Eng. & Tech. Coordinator, Assoc. FACULTY DEANS Principals Agri (14) ©OLLEGES © Enge CFST Home Science (2) (2) (1) Registrar (OP) & Registrar (V&L Assistant Assistant (isi) Deputy Registrar (NTE) Asst. Regist far (NTE) Deputy Registrar Dy. Director & Asst. Director Ē Registrar Regist 아 문 Asst. TE) 5. Sec. Registrar Regist linit Acad

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Dy. Directors & Asst. Directors

Planning & Monitoring Director

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> Director International Programmes

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BOARD OF MANAGEMENT

VICE-CHANCELLOR

CHANCELLOR

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Personal Secretary (AR) to Vice-Chancellor

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Fig. 1: ORGANOGRAM OF THE UNIVERSITY

ANGRAU

2. Officers of the University

The list of University Officers for the period under report is given below.

University Officers					
Vice-Chancellor	Dr A Padma Raju (Up to 12.02.2016)				
	Sri T Vijay Kumar (13.02.2016 onwards)				
Registrar	Dr T V Satyanarayana				
Comptroller	Sri K L Raju				
Dean of Agriculture	Dr T Ramesh Babu				
Dean of Agril. Engg. & Technology	Dr T V Satyanarayana (Up to 08.11.2015)				
	Dr D Bhaskara Rao (09.11.2015 onwards)				
Dean of Home Science	Dr R Veeraraghavaiah (Up to 08.11.2015)				
	Dr T Neeraja (09.11.2015 onwards)				
Dean of Postgraduate Studies	Dr T Ramesh Babu (Up to 21.12.2015)				
	Dr R Veeraraghavaiah (22.12.2015 onwards)				
Director of Experimental Stations	Dr K Raja Reddy (Up to 21.12.2015)				
	Dr N V Naidu (22.12.2015 onwards)				
Director of Extension	Dr K Raja Reddy (From 01.06.2015 to 08.11.2015)				

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Dr N V Naidu (From 09.11.2015 to 21.12.2015)



	Dr K Raja Reddy (22.11.2015 onwards)	
Dean of Student Affairs	Dr R Veeraraghavaiah (Up to 22.12.2015)	
	Dr D Bhaskara Rao (23.12.2015 onwards)	
University Librarian	Sri K L Raju (Up to 21.12.2015)	
	Dr R Sarada Jayalakshmi Devi (22.12.2015 onwards)	
Estate Officer	Sri K L Raju (Up to 17.11.2015)	
	Smt N Madhavi Sukanya (18.11.2015 onwards)	

3. Academic Council

The Academic Council is vested with the powers to implement and monitor all the academic programmes. The Vice-Chancellor is the Chairperson of the Council, which has Deans of Faculties, Directors of Experimental Stations and Extension, University Heads of Departments and Professors as its members. In addition, the Council also has ten academicians representing different faculties nominated by the Vice-Chancellor and two representatives of the Board of Management.

Members of the Academic Council

Chairman	Dr A Padma Raju and Sri T Vijay Kumar, I A S
Ex-Officio Secretary	Registrar Dr T V Satyanarayana
Members	Vide Annexure I

4. Research and Extension Advisory Council

The *Research and Extension Advisory Council* (*REAC*), headed by Vice-Chancellor with Director of Extension, Director of Experimental Stations, Associate Directors of Research of the six Agro-climatic Zones, three each from Innovative Farmers' Network, Agri-business Consortium, representatives from KVKs (Operated by NGOs) and Special Invitees representing the different regions of the State and

two Eminent Scientists of Agriculture as members (Annexure II), reviews the functioning of centres in the state.

B. MEETINGS OF THE AUTHORITIES OF THE UNIVERSITY

1. Board of Management

The Board of Management of the ANGRAU met 6 times during the year under report. The dates and venues of the meetings are given below.

ANGRAU					
	S. No.	No. of the Board Meeting	Date	Venue	
	1	267 th	09.09.2015	Agricultural College, Bapatla	
	2	268 th	22.09.2015	Andhra University, Visakhapatnam	
	3	269 th	04.01.2016	La Haspin Hotel, Rajamahendravaram	
	4	270 th	12.02.2016	Rajendranagar, Hyderabad	
	5	271 st	07.04.2016	Chambers of Special Chief Secretary to Government, Government of Andhra Pradesh & Vice-Chancellor, ANGRAU at 'J' Block, A.P. Secretariat, Hyderabad	
	6	272 nd	21.05.2016	Lam, Guntur	

2. Academic Council

The Academic Council normally meets once in six months. The 95th meeting of Academic Council was held on the 11th September 2015 at Agricultural College, Bapatla.

The 96th meeting of Academic Council was held on the 06th of January, 2016 at Agricultural College, Rajamahendravaram.

The 97th meeting of Academic Council was held on the 25th of May, 2016 at Institution of Engineers (India), Governorpet, Vijayawada.

3. Research and Extension Advisory Council (REAC)

The 45th REAC Meeting was held on the 20th January, 2016 at Regional Agricultural Research Station, Tirupati.

C. FACULTY STRENGTH

The cadre-wise strength of teaching staff of the ANGRAU is shown in Table 1, while details of faculty working in various Colleges, Agricultural Research Stations and other Extension Centres including Administration are given in Annexure III.

S. No.	Item	Professor		Associate Professor		Assistant Professor		Total	
		S	IP	S	IP	S	IP	S	IP
1.	Teaching	28	13	87	41	263	159	378	213
2.	Research	22	30	85	70	218	143	325	243
3.	Extension	5	12	10	7	111	53	126	72
4.	Administration	5	8	3	4	6	6	14	18
	Total	60	63	185	122	598	361	843	546

Table 1: Faculty Strength in the ANGRAU during 2015-16

S - Sanctioned IP - In Position

Note: In-position includes faculty under Career Advancement Scheme also.



III. TEACHING

A. EDUCATION

1. Teaching Institutes

The Acharya N G Ranga Agricultural University offers both undergraduate and postgraduate programmes including doctoral programmes in the faculties of Agriculture, Agricultural Engineering & Technology and Home Science. The University has five Agricultural Colleges, one Advance Post Graduate Centre, one Institute of Agri-Business Management, fourteen Agricultural Polytechnics and one Seed Technology Polytechnic under the Faculty of Agriculture, two Colleges of Agricultural Engineering, two Colleges of Food Science & Technology and two Agricultural Engineering Polytechnics under the Faculty of Agricultural Engineering & Technology and one College of Home Science under the Faculty of Home Science.

The organogram of teaching institutes in the University is depicted in Fig.2. The list of Colleges and Polytechnics with their location, year of establishment and courses offered is given in Table 2.

S. No.	Teaching Institute with Location	Year of Establishment	Name of the Associate Dean / Principal	Courses Offered
(1)	(2)	(3)	(4)	(5)
Facul	ty of Agriculture			
1.	Agricultural College Bapatla - 522 101 Guntur Dist.	1945	Dr P R K Prasad	B.Sc. (Ag.), M.Sc.(Ag.) and Ph.D. (Ag.).
2	S V Agricultural College Tirupati - 517 502 Chittoor Dist.	1961	Dr N P Eswara Reddy (Up to 20.04.16) Dr V Rajarajeswari (21.04.16 onwards)	B.Sc. (Ag.), M.A.B.M., M.Sc. (Ag.) and Ph.D. (Ag.).
3	Agricultural College Mahanandi- 518 502 Kurnool Dist.	1991	Dr B Ravindranatha Reddy (Up to 20.04.2016) Dr D Balaguravaiah (27.04.2016 onwards)	B.Sc. (Ag.) and M.Sc. (Ag.)
4	Agricultural Collège Naira - 532 185 Srikakulam Dist.	1989	Dr G Jogi Naidu (Upto 18.07.2015) Dr R Ankaiah (19.07.2015 onwards)	B.Sc. (Ag.) and M.Sc. (Ag.)
5.	Agricultural College Rajamahendravaram - 533 103, East Godavari Dist.	2008	Dr K V Seetharamaiah (Up to 20.04.2016) Dr P Jayarami Reddy (28.04.2016 onwards)	B.Sc. (Ag.)
6.	Advanced Post-Graduate Centre, Lam, Guntur - 522034, Guntur Dist.	2015	Dr K L Narasimha Rao	M.Sc. (Ag.) Ph.D. (Ag.)
7.	Institute of Agri. Business Management, S.V. Agricultural College, Tirupati - 517 502, Chittoor Dist.	2015	Dr I Bhavani Devi	MBA (ABM)

Table 2. Teaching Institutes of the University





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S. No.	Teaching Institute with Location	Year of Esta <u>blishment</u>	Name of the Associate Dean / Principal	Courses Offered			
(1)	(2)	(3)	(4)	(5)			
Agriculture Polytechnics							
1.	Agricultural Polytechnic Regional Agricultural Research Station Maruteru – 534 122 West Godavari Dist.	1999	Dr P V Satyanarayana	Diploma in Agriculture			
2.	Agricultural Polytechnic Regional Agricultural Research StationAnakapalle – 531001,Visakhapatnam Dt.	1999	Dr. N. Venugopala Rao	Diploma in Agriculture			
3.	Agricultural Polytechnic Podalakur– 524345 SPS Nellore Dist.	2005	Dr O Venkateswarlu (Up to 01.12.2015) Dr D Kodanda Rami Reddy (02.12.2015 onwards)	Diploma in Agriculture			
4	Agricultural Polytechnic Reddipalli–515001 Anantapuramu	2005	Dr S Vasundhara	Diploma in Agriculture			
5.	Agricultural Polytechnic Utukur – 516 003 YSR Dist.	2005	Dr G Karuna Sagar	Diploma in Agriculture			
6.	Agricultural Polytechnic Garikapadu – 521175 Krishna Dist.	2007	Dr B Venkateswarlu	Diploma in Agriculture			
7.	Agricultural Polytechnic Madakasira – 515 301 Anantapuramu Dist.	2007	Dr B Narendra	Diploma in Agriculture			
8	Agricultural Polytechnic Regional Agricultural Research Station, Chintapalle-531 111 Visakhapatnam Dist.	2011	Dr B Padmodaya (Up to06.02.2016) Dr G Jogi Naidu (06.02.2016 onwards)	Diploma in Agriculture			
9	Agricultural Polytechnic Regional Agricultural Research Station, Tirupati – 517 502 Chittoor Dist.	2011	Dr T Giridhara Krishna (Up to 30.01.2016) Dr TCM Naidu (31.01.2016 onwards)	Diploma in Agriculture			
10.	Agricultural Polytechnic Regional Agricultural Research Station, Nandyal – 518 502, Kurnool Dist.	2011	Dr Y Padmalatha (Up to 02.02.2016) Dr B Gopal Reddy (03.02.2016 onwards)	Diploma in Agriculture			

S. No.	Teaching Institute with Location	Year of Establishment	Name of the Associate Dean / Principal	Courses Offered
(1)	(2)	(3)	(4)	(5)
11.	Agricultural Polytechnic Somasila, SPS Nellore Dt.	2012	Dr O Venkateswarlu (Up to 01.12.2015) Dr D Kodanda Rami Reddy (02.12.2015 onwards)	Diploma in Agriculture
12.	Agricultural Polytechnic Kalikiri - 517234 Chittoor Dist.	2012	Sri A Subramanyam	Diploma in Agriculture
13.	Agricultural Polytechnic Rampachodavaram Rajahmundry –533 103 East Godavari Dist.	2013	Dr K V Seetharamaiah (Up to 20.04.2016) Dr P Jayarami Reddy (28.04.2016 onwards)	Diploma in Agriculture
14	Agricultural Polytechnic (Seed Technology) & Agricultural Polytechnic Jangameswarapuram, Gurajala-522415, Guntur Dist.	2011 2015	Dr R Ankaiah (Up to17-07-2015) Dr SBS Narasimha Rao (8-7-2015 to12-8-2015) Dr K Chandrasekhar (13-8-2015 to 11-2-2016) Dr N Sambasiva Rao (12-02-2016 onwards)	Diploma in Seed Technology & Diploma in Agriculture
Fac	ulty of Agricultural Engin	eering & Tech	nology	
1.	College of Agricultural Engineering Bapatla - 522 101 Guntur Dist.	1990	Dr ChVV Satyanarayana (Upto 12.06.2014) Dr M Raghu Babu (13.06.2014 onwards)	B.Tech. (Ag. Engg.), M.Tech. (Ag. Engg.) Ph.D. (Ag. Engg.)
2.	College of Agricultural Engineering Madakasira - 515 301 Anantapuram Dist.	2008	Dr MV Ramana (Up to 21.04.2016) Dr C Ramana (02.05.2016 onwards)	B.Tech. (Ag.Engg.)
3.	College of Food Science & Technology Bapatla - 522 101 Guntur Dist.	2003	Dr BVS Prasad	B.Tech. (Food Technology)
4.	College of Food Science & Technology Pulivendula - 516 390 YSR Dist.	2008	Dr B John Wesley (Up to15.12.2015) Dr. S. Kaleemullah (16.12.2015 onwards)	B.Tech. (Food Technology)
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S. No. (1)	Teaching Institute with Location (2)	Year of Establishment (3)	Name of the Associate Dean / Principal (4)	Courses Offered (5)
Agric	ultural Engineering Poly	technics		
1.	Polytechnic of Agricultural Engineering Kalikiri Chittoor Dist.	2013	Sri A Subramanyam	Diploma in Engineering
2.	Polytechnic of Agricultural Engineering Anakapalle Vishakapatnam Dist.	2013	Dr N Venugopala Rao	Diploma in Engineering
Facul	ty of Home Science			
1.	College of Home Science Guntur	2013	Dr J Lakshmi (Up to 10.04.2016) Dr L Uma Devi (11.04.2016 onwards)	B.H.Sc.

2. Admission Strength and Out-turn of Students

During the academic year 2015-'16, a total of 1473 students were admitted in the University. Out of them, 806 in undergraduate courses, 145 in Masters, 57 in Doctoral programmes and 465 in diploma courses were admitted. Student enrolment by courses and year-wise is given in Annexure IV and students strength in various colleges of the ANGRAU is shown in Annexure V.

A total number of 1,164 students were admitted in to the Faculty of Agriculture, comprising of 582 in undergraduate courses, 173 in postgraduate programmes and 409 in diploma programmes. The Faculty of Agricultural Engineering & Technology comprised of 178 undergraduate students, 29 postgraduate students and 56 diploma programme students, with the total student strength of 263. Under Home Science faculty, a total of 46 students were admitted in undergraduate programme.

A total number of 4,415 students were on rolls of the University in different Undergraduate, Postgraduate, Doctoral and Diploma programmes. Out of them, 1,903 were boys and 2,512 were girls. The information pertaining to the number of students admitted, students enrolled and students out-turn during the year is given in Table 3.



Table 3.	Admission Strength, Student	s on Rolls a	ind Out-tu	irn of S	students u	ınder Var	ious Prog	rammes	during tl	he Year	2015-16	
Degree	Faculty & Course	Intake	Stude	nts Adm	itted	Stuc	dents on R	olls	Stude	ents Out-	turn	
			F			F	č	Ē	F	5		

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		Capacity	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Faculty of	^e Agriculture										
nG	B.Sc. (Ag.)	009	268	314	582	945	1236	2181	140	167	307
PG	M.Sc. (Ag.)	156	49	72	121	91	127	218	18	25	43
	M.A.B.M.	43	3	ю	S	6	8	17	5	5	10
	Total (PG)	199	51	75	126	100	135	235	23	30	53
Doctorate	Ph.D. (Ag.)	57	20	27	47	56	58	114	16	12	28
Sub Total ((Agriculture)	856	339	416	755	1101	1429	2530	179	209	388
Faculty of	^e Agricultural Engineering & Te	chnology									
NG	B. Tech. (Ag. Engg.)	96	52	37	89	226	188	414	59	42	101
	B. Tech. (Food Sci. & Tech.)	69	38	51	89	130	195	325	28	47	75
	Total (UG)	165	90	88	178	356	383	739	87	89	176
PG	M. Tech. (Ag. Engg.)	17	12	7	19	16	×	24	8	8	16
Doctorate	Ph.D. (Ag. Engg. & Tech.)	8	3	7	10	13	8	21	0	0	0

Sub Total (Agril. Engg. & Tech.)

Domoo	Poundary & Common	Intake									
aarbar	r acuity & Course	Capacity	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Faculty of Home	Science										
nG	B. H. Sc.	38	0	46	46	0	107	107	0	90	06
Diploma	Diploma in Agriculture	435	144	245	389	333	468	801	161	189	350
	Diploma in Seed Technology	25	10	10	20	19	21	40	11	6	20
	Diploma in Ag. Engg.	60	20	36	56	65	88	153	27	27	54
Total (Diploma)		520	174	291	465	417	577	994	199	225	424
Total (U.G.)		803	358	448	806	1301	1726	3027	227	346	573
Total (P.G.)		216	63	82	145	116	143	259	31	38	69
Total (Ph.D.)		65	23	34	57	69	99	135	16	12	28
Grand Total		1604	618	855	1473	1903	2512	4415	473	621	1094
Note: 1. ICAR an	d other States – 25% of seats in	M. Sc. T	hrough	All India	Entranc	e Exami	nation co	inducted h	by ICAR		

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2. Foreigners / ICAR Employees – 10% of seats in M. Sc. / Ph. D. Courses





Fig. 3: Faculty-wise students on rolls



Fig. 4: Faculty-wise Students Passed

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A total number of 670 students comprising of 388 in Agriculture and 192 in Agricultural Engineering and Technology faculties have passed out of the portals of the University. In

ANGRAU

addition, 424 diploma holders also have passed out of the portals during the year.

In the Faculty of Agriculture, 307 undergraduates and 81 postgraduates including 53



at master level and 28 at doctoral level have passed. In addition, 350 students obtained their diploma in Agriculture and 20 students got diploma in Seed Technology. One hundred and seventy six undergraduate, 16 postgraduate and 54 diploma students passed out in the Faculty of Agricultural Engineering and Technology.



Fig. 5: Programme-wise Students on Rolls



Fig. 6: Programme-wise Students Passed

3. Academic Excellence

ANGRAU

Forty Six students of different colleges of ANGRAU qualified in ICAR- JRF/ SRF and

GATE Examinations conducted in 2016 and secured ranks as detailed below

S.	Name			No. of ra	anks secured	
No.	of the College	ICAR- JRF	ICAR- SRF	GATE	Others	TOTAL
1.	College of Agril. Engineering, Bapatla	-	-	12	2 (1 One time merit cum means; 1 Student Ship)	14
2.	College of Agril. Engineering, Madakasira	-	-	5	-	5
3.	College of Food Sci. and Technology, Bapatla	-	-	8	-	8
4.	College of Food Sci. and Technology, Pulivendula	7		2	-	9
5.	Agricultural College, Naira	10	-	-	-	10
	Total	17	-	27	2	46

4. Academic Initiatives

(i). B.Sc. (Ag.) - Rural Agricultural Work Experience Programme (RAWEP)

As a part of the regular curriculum, the final year B.Sc. (Ag.) students were placed in rural areas for one semester during kharif season, where each student was attached to one host farmer for practical learning with regard to crop production, crop protection, rural economics and also the dynamics of rural society.

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Diagnostic Field Visits in Brinjal







Method demonstration conducted by RAWEP students to the farmers



Root feeding technique

(ii). B.Sc. (Ag.) - Agricultural Experiential Learning Programme (AELP)

As a part of the regular curriculum, the final year B.Sc. (Ag.) students, after the completion of RAWEP were placed in different areas of entrepreneurship, for one semester, wherein each student was attached to any one of the experiential learning units.







AELP Activities



(iii). B.Tech. (Ag. Engg.) - In-plant Training

The final year students of B.Tech. (Ag. Engg.), Bapatla and Madakasira campuses were sent to different firms for practical learning.

(iv). B. Tech. (Food Sci. & Tech.) - In-Plant Training

The students of B. Tech. (Food Science & Technology) underwent In-plant Training at different Food Processing Companies all over India.

(v). B. H. Sc. - Rural Home Science Work Experience Programme (RHWEP)

Each student of the final year B. H. Sc. of College of Home Science, Guntur was attached to 6-8 households to teach rural women, youth and children in the identified areas of Home Science.

(vi). B.H. Sc. - Experiential Learning Programme (ELP)

In Home Science, the Departments of Foods and Nutrition, Apparel and Textiles and Resource Management and Consumer Sciences have provided in-depth managerial and entrepreneurial skills to the students in the production, marketing and management through Experiential Learning Program in the areas viz., Extrusion Technology, Production of Health Foods, Preserved Fruit and Vegetable Products, Apparel Production Management, etc.

The details of number of students, who attended the RAWEP / In-Plant Trainings/ RHWE programmes during the year are given in Table 4.

Name of the College and Degree Programme	No. of Students Attended	No. of Villages / Plants	No. of Farmers
Faculty of Agriculture			
Agricultural College, Bapatla	170	-	170
S.V. Agricultural College, Tirupati	132	-	132
Agricultural College, Mahanandi	66	9	66
Agricultural College, Naira	73	15	73
Agricultural College, Rajahmundry	50	8	50
Faculty of Agricultural Engineering & Technology			
College of Agricultural Engineering, Bapatla	60	12	-
College of Agricultural Engineering, Madakasira	35	-	-
College of Food Science & Technology, Bapatla	66	-	-
College of Food Science & Technology, Pulivendula	28	-	-

Table 4. Details of RAWE / In-Plant Training / RHWE Programmes

5.

Scholarships and Stipends

The students of Acharya N G Ranga Agri. University were provided with large number of scholarships, fellowships and stipends sponsored by various agencies. The details are given in Table 5.

S. No.	Name of the Scholarship	No. of Students Awarded	Amount in Rs. per Year
1	2	3	4
1	National Merit/ Talent Scholarship	97	11,12,000
2	Govt. of India Post-Matric Scholarship to Scheduled Castes	257	32,29,903
3	Govt. of India Post-Matric Scholarship to Scheduled Tribes	34	4,65,347
4	Govt. of India Post-Inter Merit Scholarship (Dist. Level) to SCs and STs	58	3,47,651
5	Post Matric Scholarship to BC	115	31, 65,985
6	Post Matric Scholarship to EBC	139	19,84,994
7	Minority Post Matric Scholarship	31	5,79,922
8	State Scholarship to Denoted Tribes	42	4,70,449
9	State Scholarship to Listed Backward Class	571	50,50,308
10	State Scholarship to Economically Poor Persons.	201	8,73,310
11	Stipend to P.G. Students	170	1,00,70,000
12	Stipend to U.G. Students from Other States	10	8,40,000
13	Stipend to Agril. Officers studying M.Sc. (Ag.) Course		
14	Stipend to VEOs studying B.Sc. (Ag.) Course		
15	Stipend to VDOs studying B.Sc. (Ag.) Course		
16	Dress and Book Allowance	549	1,09,800
17	Others, if any	5	3,77,900
18	State Post-Matric Scholarship to BC-E	5	47,764

Table 5. Details of Scholarships and Stipends

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S. No.	Name of the Scholarship	No. of Students Awarded	Amount in Rs. per Year
19	Inspire Fellowship for Ph.D. Students	3	4, 10,000
20	Rajiv Gandhi Fellowship for Ph.D. Students		
21	Stipend to Ph.D. Students	20	21,70,000
22	State scholarship to scheduled castes	34	3,67,200
23	State scholarship to scheduled tribes		
24	ICAR-JRF Scholarship	3	3,29,040

6. Students' Hostels

The hostel facilities available in the Colleges and the number of students accommodated in different hostels in all the campuses of the University are given in Table 6.

S.	Campus		No. (Hoste	of els	No. Acco	of Stud ommoda	ents ated
110.		Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Facult	y of Agriculture						
1.	S.V. Agricultural College, Tirupati	3	4	7	263	373	636
2.	Agricultural College, Bapatla	4	4	8	371	527	898
3.	Agricultural College, Mahanandi	3	3	6	88	107	195
4.	Agricultural College, Naira	2	1	3	120	168	288
5.	Agricultural Polytechnic, Madakasira	1	1	2	17	29	46
6.	Agricultural Polytechnic, Utukur	1	1	2	16	30	46
7.	Agricultural Polytechnic, Podalakur	1	1	2	14	24	38
8.	Agricultural Polytechnic, Reddipalli	1	1	2	15	37	52
9.	Agricultural Polytechnic, Anakapalle.	1	1	2	18	28	46
10.	Agricultural Polytechnic, Chintapalli	2	2	4	21	20	41
11.	Agricultural Polytechnic, Garikapadu	3	1	4	28	42	70
12.	Agricultural Polytechnic, Maruteru	1	1	2	39	64	103
13.	Agricultural Polytechnic, Nandyal	1	1	2	19	23	42

Table 6. Campus-wise Hostel Accommodation



S.	Campus		No. of Hostels	5	No. o Acco	of Stud mmoda	ents ated
110.	*	Boys	Girls	Total	Boys	Girls	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Facu	lty of Agriculture						
14.	Agricultural Polytechnic, Somasila	1	1	2	21	24	45
15.	Agricultural Polytechnic, Kalikiri	1	1	2	35	48	83
16.	Agricultural Polytechnic, Tirupati	Acc Ho Agricu	ommod stels of ltural C Tirupati	ated in SV college,	25	26	51
17.	Agricultural Polytechnic, Guntur	2	3	5	26	35	61
18.	Agricultural Polytechnic (Seed Technology) & Agricultural Polytechnic, Jangamaheshwarapuram						
19.	Polytechnic of Agricultural Engineering, Kalikiri	2	1	3	33	39	72
20.	Agricultural Engineering Polytechnic, Anakapalle	Tem Farr acco RAI	nporarily ners Gu ommoda RS, Ana	/ boys w est Hou ated in v kapalle	vere acco se and g acant sta	ommoda irls were iff quart	ted in e ers of
Facu	llty of Agricultural Engineering & Tech	nology					
20.	College of Agricultural Engineering, Bapatla	1	1	2	141	95	236
21.	College of Agricultural Engineering, Madakasira	Tem Agr	porarily i. Polyte	accom ch and I	modated Horti. Po	l in Host lytech.	els of
22.	College of Food Science & Technology, Bapatla	1	1	2	53	96	149
23.	College of Food Science & Technology, Pulivendula	1	1	2	45	61	106
Facu	lty of Home Science						
24.	College of Home Science, Guntur	Ont	empora	ry priva	te accom	modati	on



B. RESEARCH PROJECTS OPERATED IN THE COLLEGES

The details of Research Projects operated at the Colleges during the year are given below.

1. S.V. Agricultural College, Tirupati

- a. ICAR project on "Diagnosis and Management of Leaf Spot Diseases of Field and Horticultural Crops"
- b. ICAR project "ICT utilization in agricultural education GAP analysis
- c. ICAR project on "Assessment of present status and future prospects of basic sciences research in agricultural education".

2. Agricultural College, Bapatla

 a. DST project of "Web enabled and weather based decision support system for forewarning & management of YSB & BPH of rice in A.P".

3. College of Home Science, Guntur

- Department of Agriculture, Government of Andhra Pradesh sponsored project on "Standardization of value added millet products"
- b. Project on "Functioning of consumer clubs: An elevation for future direction" funded by Ministry of Consumer Affairs, Food and Public Distribution, Government of India.
- c. National safety council, Mumbai Project on "Prevalence and incidence carpet tunnel syndrome in workers engaged in packaging activities of small scale industries".
- d. Sarva Siksha Abhiyan/ Rajiv Vidya Mission, Department of Education, Andhra Pradesh project on "Impact of Nutrition and Health programmes on enrollment and retention at elementary level"

4. College of Agricultural Engineering, Bapatla

- a. ICAR project on "Gaps in Agricultural Engineering education to the Industry and Farmers needs".
- b. ICAR project on "Spatio-Temporal explicit water foot print modeling for hydrological sustainability and enhanced water productivity in coastal Andhra Pradesh".
- DST project on 'Hydrological modeling of Kolleru lake catchment area using GIS and RS'

C. STUDENTS' RESEARCH

1. Agricultural College, Bapatla

a. Department of Agricultural Economics

An economic analysis of redgram and redgram based cropping systems in Prakasam district of Andhra Pradesh reveals that both the family labour income, farm investment income, gross income, net income and return per rupee expenditure were more in redgram + greengram cropping system, followed by redgram + castor cropping system while the sole redgram recorded the least, indicating the profitability of intercropping over the sole crop.

Impact assessment of Mahatma Gandhi National Rural Employment Guarantee (MGNREG) Act on supply, demand and wages of agricultural labour in Guntur district of Andhra Pradesh indicated that the number of person days employed under the MGNREGA during *kharif* and *rabi* was increased. The employment generation was also improved. Easier works for women and aged workers was one of the best practices followed under MGNREGA. The nonparticipation of farmers in the program was because of their busy work schedule, as revealed by 66 per cent of the farmers. The implementation of MGNREGA has increased the labour scarcity and thereby labour wages and the cost of cultivation.

ANGRAU

In an analysis of price behaviour of turmeric in Guntur district of Andhra Pradesh, the market arrivals were highest in the year 2014 and lowest during the year 2002, while the prices were recorded highest during 2011 and lowest during 2004. The month-wise seasonal analysis revealed that the highest arrivals were recorded during the months of June and May, while the lowest were recorded during November and February. The highest price index was found in December and January, while the lowest was recorded in April and July. The cyclical variations in market arrivals showed one cycle from 2004-2010. The turmeric arrivals showed a negative impact on price of turmeric. The export competitiveness of turmeric was high.

b. Department of Agronomy

Sowing of rice fallow sorghum at a planting density of 2.22 lakh plants ha⁻¹ was found optimum with a linear response up to 150 kg N ha⁻¹ during *rabi* under zero-till conditions and resulted in higher returns per rupee invested.

Performance of baby corn as influenced by plant densities and levels of nitrogen revealed that higher cob and grain yields were obtained with the application of $240 \text{ kg N} \text{ ha}^{-1}$ but it was on par with 180 kg N ha.

During *rabi*, maize sowing with higher plant density of 1,00,000 plants ha⁻¹ with the application of 300 kg N ha⁻¹ + 0.5 % ZnSo₄ as foliar spray at tasseling recorded the highest gross returns, net returns and BC ratio.

Sowing of gum guar cultivar RGC-1003 during second fortnight of November had realized higher yield, quality and high returns per rupee invested under Bapatla conditions.

The two years study on the response of aerobic rice- zero tillage maize cropping system

to subsurface drip fertigation concluded that the benefit of fertigation at 175% EPan with 180 kg N ha⁻¹ to rice and 100% EPan with 240 kg N ha⁻¹ to maize crops resulted in increasing the productivity and profitability of aerobic rice-zero tillage maize cropping systems.

c. Department of Crop Physiology

Evaluation of Maize (Zea mays L.) hybrids for tolerance to water logging revealed that water logging for six days in general reduced overall plant growth, delays Anthesis-Silking Interval and reduced maize kernel yield to a considerable extent. However, there is inherent tolerance ability in some maize hybrids. Among the maize hybrids tested, the hybrid Lakshmi-2277 recorded higher yield attributes and maintained higher cob and kernel yield under water logging conditions. It also maintained high growth attributes i.e., dry matter accumulation and its partitioning and leaf area; and water logging tolerance traits such as lesser ASI and more number of nodes bearing adventitious roots, better ROS scavenging system in terms of greater activity of SOD; and physiological traits such as higher RWC, total chlorophyll and SPAD chlorophyll meter readings which showed restoration of photosynthetic machinery after recovery. These results revealed that Lakshmi-2277 followed by Bharati-99 and SY-280 are suitable to excess moisture stress

Dust pollution on blackgram (*Phaseolus mungo* L.) significantly decreased the growth and yield. Plants treated with cement dust @ 150 g/m² significantly decreased the morphological parameters like plant height, number of branches, number of leaves and leaf area followed by stone crusher and lime dust. Total dry matter decreased by 1.27 folds with this treatment compared to control. Stomatal aperture, transpiration rate and total chlorophyll content in blackgram leaves were found very low with cement dust @ 150 g/m² followed by stone





crusher and lime dusts, where as nitrate reductase activity and ascorbic acid content in leaves were increased. The seed yield of blackgram was decreased by 76% with cement dust @ 150 g/ m^2 over control, followed by stone crusher and lime dusts.

d. Department of Plant Pathology

Sixteen blackgram genotypes were screened against Mungbean yellow mosaic disease under field conditions with LBG-623 as susceptible check. As the crop advanced in growth, none of the genotypes escaped the disease and the disease progressed significantly till the harvest. Nine genotypes viz., DKU-87, KPU 12-133, DKU-102, UG-281, KPU-21, KPU-6, KPU-29, KPU 12-1731 and PU 12-11 showed resistant reaction whereas LBG-752 was moderately resistant while other remaining six genotypes (KPU-1, KPU-22, KPU-9, OBG-32, Co5 and LBG-623) were susceptible to MYMV. Resistant genotypes had purple petiole colouration or purple splash, thicker leaves, more amount of epicuticular wax, high Trichome density and low stomatal frequency compared to susceptible or highly susceptible genotypes.

In rice, the symptom expression varied among the genotypes screened for false smut. The smut balls of NLR- 34449, RNR-15048 and MTU-1010 were dark green in colour, smut balls were initially yellow, later they transformed into dark green in MTU-1121 and NP-9381, infected grains showed black colour powdery mass in some of the genotypes like NLR-3041, WGL-283, JGL-384, JGL-19621, MTU-1081, JGL-20171 and JGL-11470 and yellow colour smut balls were observed in genotypes of MTU-1071, MTU-1061, MTU-4870and MTU-1075. Plant height and boot leaf length could be useful traits and could be considered as indicative of false smut proneness in rice genotypes. Application of fungicides at booting, 50% flowering and 100% flowering stages was found to have no effect on the incidence. Propiconazole 0.1%, carbendazim 0.1% and copper oxychloride 0.2% were found to significantly reduce false smut incidence, chaffiness and grain discolouration.

S.V. Agricultural College, Tirupati

a. Department of Agricultural Economics

Horizontal and vertical integration of major oil seed markets in India was studied for three major oil seed crops viz., groundnut, sunflower and castor. With respect to horizontal integration, Kurnool and Yemmiganur markets came to short run equilibrium within 8 hours and 4 hours respectively. Among sunflower markets Kurnool and Ranebennur markets converged to short run equilibrium price within 5 hours and 4 hours. Granger causality test indicated that Gondal groundnut market, Ranebennur sunflower market and Patan castor market were the lead markets.

With respect to vertical integration among the daily price series of pod oil and cake for 3 selected crops revealed that in the case of groundnut, two pod markets (Kurnool and Yemmiganur) were integrated with the oils and cakes in Bombay market. According to the results of FMEA, Pareto analysis and Ishikawa diagram for risk analysis in supply chain of oilseeds, out of 33 identified sources of risk analysis in supply chain of oil seeds, a total of 18 risks were identified as the high potential critical risks at the supply chain stages of input, production, post harvest and marketing and the disruptive range of all critical risks between the risk priority number (Minimum 48-Maximum 125).

A study on Influence of Futures Market on Price behavior of turmeric in India was undertaken on the marketing practices of turmeric farmers, price forecasts, extent of market integration among turmeric, price volatility and export



competitiveness. The analysis of marketing costs and margins revealed that producer received relatively higher share in consumer's rupee in Channel III over Channel I and Channel II in the case of dried turmeric where as in the case of turmeric converted into powder the producer share in consumer rupee was higher in channel V. The producers of turmeric realized 60.71 and 50.56 per cent of consumer's rupee in channel III and V. The results of ARIMA model for turmeric indicated the per quintal prices from January to March 2015 would be ranging from Rs 5446 to Rs 5496 in Kadapa market. Rs 5350 and Rs 5399 in Duggirala market, Rs 5916 to Rs 5972 in Nizamabad market, Rs 7253 to Rs 7330 in Sangli market and Rs 6532 to Rs 6581 in Erode market.

In a study on Economic Analysis of Rice Based Cropping Systems in Nellore District of Andhra Pradesh, major Rice based cropping systems identified in the study area were cropping system-I (Paddy and Cotton), cropping system -II (Paddy-Paddy-Greengram) and cropping system-III (Paddy-Paddy-Groundnut). It was observed that the returns per rupee of expenditure in all the cropping systems were ranged from 1.51 to 1.60. Higher returns per rupee of expenditure in cropping system-III i.e., 1.60 followed by cropping system-I (1.59) and cropping system-II (1.51).

Socio-economic and environmental Impact Assessment of tobacco cultivation in Nellore and Prakasam Districts of Andhra Pradesh shows that the value of farm assets of tobacco farmers was greater than that of non-tobacco farmers. At a glance, 96.65 percent of the farmers were satisfied with all the services provided by the ITC-ILTD company in all aspects *viz.*, required information, timely availability, full information, professionalism and staff attitude. At farm level, per hectare cost of reducing carbon dioxide emitted from cured leaves of FCV tobacco was Rs 3,949.08 in Andhra Pradesh level, with a total production of 213.93 million kg of cured leaf, accounting for Rs 56.26 crores. FCV tobacco was more profitable as it earned more net returns and the next best alternate crop was bengalgram in unirrigated conditions and paddy in irrigated conditions.

A study on price behaviour of important pulses in major pulse markets of Andhra Pradesh indicates that there was an increasing trend in the prices of bengalgram, blackgram, greengram and redgram in all the selected markets. The annual increase in prices of bengalgram was found to be highest in Koilakuntla market (Rs 15.32/q)) whereas lowest in Kurnool market (Rs 12.28/q). In respect of blackgram annual increase in prices was highest in Ponnur market (Rs 23.2 /q), whereas it was lowest in Tenali market (Rs 22.13/ q). In the case of greengram the annual increase in prices was lowest in Suryapeta market (Rs 22.86/q), whereas it was highest in Thandur market (Rs 25.31/q) and in case of redgram annual increase in prices was highest in Thandur market (Rs 20.01/q), whereas it was lowest in Kurnool market (Rs 14.36/q). Blackgram prices in Tenali market were more volatile with a value equal to 1.02 as indicated by the sum of Alpha and Beta values.

Economic Analysis of production and marketing of ginger in Wayanad District of Kerala State revealed that the per hectare cost of cultivation of ginger in the study area was Rs 4,54,991.62, Rs 4,94,501.03 and Rs 4,81,957.23 on small, large and pooled farms respectively and thus exhibiting direct relationship with the size of the farm. The break-even output per hectare in the cultivation of ginger was 41.28, 39.04 and 40.44 quintals on small, large and pooled farms respectively. The actual output obtained by the farmers exceeded the break-even



output. The results of allocative efficiency highlighted that the MVP/MFC ratios were more than unity for seeds, fertilizers and manures on small farms, and seeds and plant protection chemicals on pooled farms. However, the negative ratio of MVP/MFC for fertilizers on large farms and less than one ratio of the same for manures on large and pooled farms indicated that the factor was used at higher levels than necessary in ginger production.

b. Department of Agronomy

Application of 240 kg N/ha and 40 kg S/ha was found to be more advantageous with higher yield, monitory returns and quality of protein in maize.

In finger millet, transplanting of 15 days old seedlings at 20 cm x 20 cm with single seedling per hill resulted in the maximum grain yield with highest monetary returns in Southern Agroclimatic zone of the AP.

Evaluation of baby corn based intercropping systems under varying crop geometry revealed that raising of baby corn at optimum crop geometry of 60 cm x 15 cm with cultivating leafy amaranthus as intercrop produced the maximum baby corn yield, green fodder yield along with higher leaf yield of amaranthus which inturn increased the overall productivity of the system.

Pre-emergence application of oxyfluorfen 75 g/ha followed by quizalofop 50 g/ha applied at 20 DAS resulted in broadspectrum weed control with higher seed yield and net returns.

Scheduling of irrigation by drip at 0.9 IW/ CPE ratio along with 240 kg N ha⁻¹ was proved to be suitable combination for maximizing the yields of maize with higher water use efficiency during rabi in sandy loam soils of Tirupati.

Under agronomic fortification of fodder maize with zinc, maximum growth parameters and green fodder yield of fodder maize were recorded with recommended dose of fertilizers, soil aplication of 50 kg Zn SO₄ and foliar nutritiion of Zn SO₄ @ 0.2 % at 30 and 45 DAS.

The productivity and quality of redgram were significantly increased with application of RDF (20-50-0 kg N, P_2O_5 and K_2O ha⁻¹) along with foliar application of 1% KNO₃ + 0.2% ZnSO₄ at flower bud initiation stage and at pod formation stage. The same nutritional management strategy also realized maximum economic returns apart from enhanced quality of seed in terms of higher concentration of zinc and protein.

Studies on optimization of the date of sowing and phosphorus management for seed dhaincha showed that first fortnight of November sown crop with application of 45 kg P_2O_5 ha⁻¹ resulted in increased seed yield with maximum gross and net returns as well as returns per rupee of expenditure during *rabi* in the Southern Agro Climatic Zone of Andhra Pradesh.

In pearl millet, pre-emergence application of atrazine @ 750 g *a.i.* ha⁻¹ supplemented with hand weeding at 30 DAS resulted in effective control of all categories of weeds with increased grain yield and maximum net returns. However, it was comparable with hand weeding twice at 20 and 40 DAS.

c. Department of Genetics & Plant Breeding

Among 48 genotypes of clusterbean evaluated for 16 quantitative traits, the genotype GA2G-0503 recorded the maximum per se performance for seed yield per plant followed by MG-903 and GAUG-101. These 48 genotypes were grouped into 12 clusters based on Mahalanobis D² analysis. Greater genetic divergence was found between clusters IX and XI, while the minimum inter-cluster distance was found between II and cluster III. Selection of parents for crossing from divergent clusters may result in heterotic expression for yield and quality traits. Pod yield per plant and shelling percentage were the important yield component traits having direct influence on improvement of seed yield per plant and could be given importance during selection for improving seed yield potential of genotypes.

Forty four genotypes of groundnut were evaluated under organic and conventional fertilizer management separately. Based on mean performance, the genotypes TCGS-1330, TCGS-1343, TCGS-1349, TCGS-1381, TPT-1, Narayani, TCGS-1328, ICGV 06420, ICGV 03042, TCGS-1073, Bheema, TCGS-1157-A, TCGS-1333 and TCGS-1157 were found to be good for yield as well as for quality traits under organic and conventional fertilizer managements. Path analysis revealed high positive direct effects of pod yield per plant and shelling percentage. Hence selection would be more effective through these traits to improve kernel yield under both the environments. Oil content displayed a significant negative association with kernel yield per plant though other characters had significant positive association. Hence judicious selection programme might be formulated by repeated internating to break the negative correlation between oil content and kernel yield

Four mungbean genotypes viz., MGG 347, MGG 351, LGG 460 and LGG 528 were identified as the best for improvement of yield and drought tolerance traits based on per se performance and *gca* effects. The crosses viz., MGG 347 × MGG 351, MGG 351 × LGG 460 and LGG 460 × LGG 528 were identified as best specific cross combinations as these exhibited significantly high *sca* effects for seed yield per plant along with one or a few drought related traits in desirable direction. The Generation mean analysis of these crosses indicated the cross MGG 347 × MGG 351 as the most promising for seed yield, yield attributes and drought related traits based

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on mean performance. Majority of the traits were found to be under the influence of duplicate type of epistasis for which one or two cycles of recurrent selection followed by pedigree breeding would be effective to modify the genetic architecture of mungbean for attaining higher yield with drought tolerance..

Genetic evaluation of 50 genotypes of groundnut revealed that the genotypes viz., MLTG(SB)-3, MLTG(SB)-6, MLTG(VB)-11 and MLTG(VB)-2 showed high mean performance for pod yield and its component traits. The Mahalanobis Divergence analysis (D²) grouped the 50 genotypes into five clusters. Character associations indicated highly significant positive association of kernel yield per plant with pod yield per plant. Path coefficient analysis revealed that kernel yield per plant exerted the highest positive direct effect on pod yield per plant. It was also revealed that number of primary branches per plant, number of sound mature kernels per plant and leaf nitrogen (%) content at 60 DAS contributed indirectly to pod yield per plant through kernel yield per plant.

d. Department of Crop Physiology

Among the ten gum guar genotypes, the genotypes RGG-13-4 and RGG-12-3 showed higher morpho-physiological traits along with higher seed yield and its attributes. Genotypes RGC-936, RGC-936-1, GA2G-0503, RGC-1003 and RGG-12-3 recorded superior gum viscosity (>4000 milli pascals per second) and GAUG-4703-1 and GA2G-0503 recorded higher gum content (> 30%), whereas RGG-13-4 and GAUG-841 recorded poor gum content of less than 25 per cent. Based on morphophysiological traits, seed yield and its quality, RGG-12-3 was superior in southern climatic zone followed by RGC-936-1, GAUG-4703-1 and GA2G-0503. Seed yield recorded positive correlations with dry matter and leaf area index



and a weak negative correlation with gum content.

In sugarcane, morpho-physiological and growth attributes were affected by different chemical treatments. Different growth attributes viz., germination percentage, coefficient of velocity of germination and seedling vigour index; morphological attributes viz., shoot length, root length, total dry matter, number of leaves, number of tillers, leaf area index, crop growth rate and biochemical parameters viz., acid invertase, reducing sugars, proteins and non reducing sugars were found to be highest in treatments with water soaking and CaC12+CEPA. Spread of germination was more in variety 2003T121 compared to variety 2003V46.

In rice, Poly Ethylene Glycol (PEG) induced moisture stress could be used as effective method for screening of genotypes suitable for dry direct sowing. Genotypes which exhibited high seedling vigour in laboratory reflected the same in field in terms of performance. Among several biochemical markers, starch content and alpha amylase could be trusted for selection of early vigour genotypes. Cultivars with early vigour along with other positive yield traits like number of productive tillers, number of panicles, number of grains per panicle and test weight could be selected for dry direct sowing condition of rice under aerobic cultivation.

e. Department of Soil Science and Agricultural Chemistry

Seven typical pedons representing major land forms in semi-arid ecosystem of Chillakur mandal of SPSR Nellore district, Andhra Pradesh indicated low CaCO₃ status. The soils were low to medium in available nitrogen and phosphorus, low to high in available potassium and high in available sulphur. However, soils were deficient in DTPA extractable zinc and sufficient in Diethylene-triamine Penta acetic acid (DTPA) extractable copper, iron (except pedon 7) and manganese. As per Soil Taxonomy, pedons 1, 3, 4 and 7 were grouped under Entisol due to absence of sub-surface diagnostic horizon and classified as Typic Ustorthents (Pedons 1, 3 and 4) and Typic Ustipsamment (pedon 7). Pedons 2, 5 and 6 were placed under Inceptisol due to presence of cambic (Bw) sub-surface diagnostic horizon and classified as Typic Haplustepts. All the soils of the study fall under agricultural land with land capability sub-classes, namely *IIIs* (Pedons 5 and 6), IIIws (Pedon 2), IVs (Pedon 7) and IVse (Pedons 1, 3 and 4).

Seven typical pedons representing major land forms in semi-arid ecosystem of Pakala mandal of Chittoor district. Andhra Pradesh indicated that soils were low in available nitrogen, medium to high in available phosphorus, low to high in available potassium and deficient to sufficient in available sulphur. Deficient in DTPA-extractable Fe, deficient to sufficient in DTPA-extractable Zn and Mn and sufficient in DTPA-extractable Cu. Pedons 1, 2 and 6 were grouped under Entisols due to absence of sub-surface diagnostic horizon and classified as Typic Ustorthents and Typic Ustifluvent whereas pedons 3, 4, 5, and 7 were placed under Inceptisols due to presence of cambic (Bw) sub-surface diagnostic horizon and classified as Typic Haplustepts . All the soils of the study area fall under agricultural land with land capability classes ranging from III to IV. Further, the lands have limitations of slope (s) erosion (e) and wetness (w). On the basis of major soil constraints, suitable land use plan for Pakala mandal was suggested for their sustainable management.

A long-term field experiment under rainfed groundnut mono-cropping system at Regional Agricultural Research Station, Tirupati revealed that the experiment field was slightly acidic category, non saline, low in organic carbon and free CaCO₃ contents. The available nitrogen content was low, medium in phosphorus and medium to high in potassium. The micronutrients status of the experimental field was above critical levels. Phosphorus fractions like Al-P, Fe-P, Occluded-P, Ca-P, total-P and available-P decreased with crop growth from sowing to harvest stage. The decrease of Al-P was 15.17 to 29.90 per cent. Fe-P decreased in the range of 4.35 to 25.25 per cent, Ca-P content decreased from 7.99 to 44.13 per cent. However, the changes in the total-P were small in the different treatments under study.

The survey to study the nutrients status of groundnut growing areas in eastern mandals of Chittoor district of Andhra Pradesh revealed that the texture of the soils varied from sandy loam to sandy clay loam, neutral to slightly alkaline in reaction, non-saline, low to medium in organic carbon and available N and medium to high in available P and K. Available Ca, Mg, S, Fe, Mn, Zn and Cu were found to be above critical limits in all the soils. Simple correlation studies revealed that available N, S, Fe, Mn, Cu and Zn were positively and significantly correlated with clay content and organic carbon. However, available P, K, Ca and Mg were negatively and significantly correlated with clay content.

Long--term effect of manure and fertilizers on soil physical properties and yield of groundnut under rainfed mono cropping system indicated that the physical properties viz., bulk density, porosity, maximum water holding capacity and structural indices *viz.*, mean weight diameter, geometric mean diameter and per cent water stable aggregates (>0.25 mm) were improved due to the application of 5 t ha⁻¹ of FYM once in three years for the last 34 years. The hydraulic conductivity and infiltration rate of FYM treated plots were reduced due to improvement of the physical environment of the soil. The treatmental combinations *viz.*, NPK + gypsum + ZnSO₄, NPK+ lime, NPK + gypsum and NPK were also

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improved the physical environment of the soil compared to the control. The plots which received single nutrients i.e., N or P or K alone were inferior as compared to the combined application of nutrients. The study clearly indicated that FYM and treatmental combinations *viz.*, NPK + lime, NPK + gypsum + ZnSO₄, NPK + gypsum would be better for the improvement of health of the soil and yield of the groundnut crop on sustainable basis.

f. Department of Entomology

The 15 combinations of five insecticides viz., flubendiamide, rynaxypyr, cartap hydrochloride, buprofezin and profenophos and three fungicides viz., tricyclazole, hexaconazole and propiconazole were found physically compatible. No detrimental effects of insecticides, fungicides and their combinations were observed on most occurring predators like spiders and coccinellid beetles. Herbicide, cyhalofop-Butyl in combination with more effective treatmental combinations of insecticides viz., flubendiamide, rynaxypyr with all three fungicides revealed that they were highly compatible with no phytotoxic effects.

Among the six tested hosts, Aphis preferred craccivora cowpea> groundnut>greengram>blackgram>sunflower> cotton in that order. Longest oviposition period, fecundity and adult longevity was observed in aphid reared on cowpea (188.40±28.87 h; 52.00±10.92; 231.60±40.41 h). Highest aphid nymphal mortality was noticed in cotton and sunflower (100%) and lowest in cowpea (0%). Trichome densities of different host plants were positively correlated with adult longevity, fecundity and total life span and were significantly positively correlated with percentage nymphal mortality of Aphids. When Aphids reared on different host plants were fed to lady beetle Cheilomenes sexmaculata, total larval duration was longest on Groundnut reared aphids followed by blackgram>greengram>sunflower>cowpea>



cotton.

Seasonal incidence of Gelechiidae insect pests revealed that groundnut leaf miner showed positive correlation with RH-1 RH-II, Mean RH and SS hours and leaf bud borer showed positive correlation with RH-I, RH-II, Mean RH and W.V. The genotypes ASK -2013-1, K-1563 and TCGS-894 were found to be highly resistant to leaf bud borer and TCGS-894 and TCGS-1097 were highly resistant towards leaf miner.

Cigarette beetle, *Lasioderma serricorne* (Fabricius) when reared on four varieties of dry turmeric, showed longest developmental period when reared on Kasturi and least developmental period was observed on Duggirala and Tekurpet giving Kasturi the status of least preferred variety and Duggirala and Tekurpet, the status of most preferred varieties for its growth and development.

g. Department of Plant Pathology

Ten isolates of *Sarocladium oryzae pathogen* causing sheath rot in rice were obtained from Nellore and Chittoor districts and their morphological characters *in vitro* were studied. Management of the pathogen using fungicides, plant extracts and bio control agents was studied *in vitro* and the effective treatments were used for testing under field conditions.

Seven endophytic *Trichoderma* spp., seven rhizosphere *Trichoderma* spp., six isolates of *Pseudomonas fluorescens* and eight isolates of endophytic bacteria were isolated, screened for their biocontrol potential against groundnut stem rot pathogen, *Sclerotium rolfsii in vitro* and the selected potential isolates were further assessed *in vivo* in pot culture against groundnut stem rot.

Nine *Trichoderma* isolates were obtained from 27 rhizosphere samples collected from groundnut, redgram and tomato and their efficacy was tested by dual culture studies against major soil borne plant pathogens *viz.*, *Sclerotium rolfisii*, *Aspergillus niger*, *Rhizoctonia solani*, *Macrophomina phaseolina*, *Fusarium oxysporum*. Molecular characterization for all isolates by PCR- RAPD was carried out using 15 primers from OPA and OPM series, of which 9 primers gave reproducible and scorable band with high percentage of polymorphism.

Master of Agri Business Management (MABM)

Study on organizational structure of Farmer Producer Organizations (FPOs) for Effective value chain analysis - a case analysis of Telangana and Karnataka revealed that by prompt supply of inputs and coordination among the members on back end and collecting larger volumes of produce on front end need to be strengthened to significantly increase agricultural income and welfare among small and marginal farmers.

A study on buying behavior of farmers for Indofil products in Krishna district of Andhra Pradesh showed that dealers were playing a major role in influencing farmers buying behavior. Non provision of safety measures by companies for pesticides was the most unfelt needs of the farmers in the study area.

Study on market competitiveness and financial patterns of Farmer Producer Organizations (FPOs) in Telangana and Karnataka revealed that FPOs can increase the marketing efficiency by reducing the marketing costs and marketing margins. As FPOs are facing liquidity crunch there is a greater role to be played by credit institutions in improving their solvency position.

Analysis of food safety standards followed by street food vendors, retailers, and household women in Tirupati of Chittoor district indicated that difference exists among them for food safety standards and hence there is a need to create

awareness among individuals to ensure that food is safe. The five keys to food safety – maintain cleanliness, separate raw and cooked food, cook thoroughly, keep food at correct temperature and use safe water and raw materials need to the promoted.

A study on procurement of milk by Balaji Dairy in Chittoor district of Andhra Pradesh indicated that the most favorable factors influencing the supply of milk by farmers are consideration of fat and SNF content, regular payment of price, provision of loans, inputs provided, veterinary services, milk testing equipment, quality standards for milk, individual billing and dairy services provided. Unfavorable factors include non existence of fodder banks, lack of scholarship facility and absence of resource centre for improvement of skills by farmers.

The financial analysis of Sri Venkateswara Co-operative Sugars Ltd., Gajulamandyam, Renigunta from 2009 to 2015 revealed that the increase in share capital and reserves of the factory was negligible and both long term and short term borrowings of the factory have been increasing since 2009. The firm was recording annual losses since 2009. Poor liquidity ratio is due to more payables and poor receivables. Inventory was lying ideal for more time and financial risk of the firm showed an increasing trend. The sales revenue generated by the company was highly fluctuating. The factory was incurring losses over the study period and the operating expenses of the company were also kept on the higher side.

A study on farmers attitude towards the purchase of Indofil products in Guntur district of Andhra Pradesh indicated that since BPH and Blast are the major yield reducing causes in paddy of this area, the farmers attitude towards use of indofil products was mainly influenced by dealers and effective promotional campaigns.

2. Agricultural College, Naira

a. Department of Agronomy

Sequential application of pendimethalin @ 0.75 kg a.i. ha⁻¹ at 3-5 DAS followed by metsulfuron methy1 + chlorimuron ethy1 @ 4 kg a.i. ha⁻¹ at 20-25 DAS was found to be the most effective weed control practice to achieve broad spectrum weed control and to realize higher grain yield as well as economic returns from *kharif* sown semidry rice in North Coastal Zone of Andhra Pradesh

On sandy clay loam soils of North Coastal Zone of Andhra Pradesh, application of 90 kg K ha⁻¹ in three equal splits at basal + peak tillering + panicle initiation + foliar application of 1.0% KNO₃ once at flowering to rice is found sufficient for realizing higher productivity and monitory returns without deteriorating soil fertility status.

Orthosulfamuron @ 100 g a.i. ha⁻¹ as preemergence sand mix application + Orthosulfamuron @ 100 g a.i. ha⁻¹ as post emergence at 20-25 DAP registered highest productive tillers (232 m⁻²), grain yield (5489 kg ha⁻¹) and benefit cost ratio (1.21). With respect to weed parameters, sequential application of Orthosulfamuron as pre and post emergence recorded the highest Weed Index (0.71), Weed Control Efficiency at harvest (85.76) and Weed Management Index (1.01) and hence was found to be effective for management of weeds under mechanized SRI in North Coastal Zone of Andhra Pradesh.

Zero-till maize can be grown profitably with maximum gross returns. Net returns and B:C ratio by application of 180 kg N ha⁻¹ and supplemented with micronutrient mixture as foliar application.

3. Agricultural College, Mahanandi

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a. Department of Genetics and Plant Breeding Department

In the studies on stability for yield and physiological traits of rice, the genotypes RNR



11718, MTU PS8-7-1-1 and MTU 11371-44-1-1 were identified as stable, widely adaptable and promising for cultivation during early, normal and late *kharif* seasons, while BPT 2671 was found to be suitable and promising for normal *kharif* season of the Scarce Rainfall Zone of Andhra Pradesh State. Filled grains per panicle and 1000-seed weight were identified as effective selection criteria for yield improvement in rice.

The 50 drought tolerant groundnut genotypes studied for genetic diversity were grouped into nine clusters and no relation was noticed between geographical and genetic diversity. Genotypes K 1725, K 1719, K 1717, K 1718 and K 1848 were identified as potential genotypes for kernel yield per plant and majority of other characters studied in drought tolerant groundnut. 100 kernel weight, pod and haulm yields per plant were identified as effective selection criteria for improvement of kernel yield in drought tolerant groundnut.

4. College of Agricultural Engineering, Bapatla

a. Department of Soil and Water Engineering

The saline water irrigation to Okra, Abelmoschus esculentu L. leads to the reduction in yield of 7.4 %, 42% and 61.7 % for the irrigation water salinity of 2 dSm-1, 4 dSm-1 and 6 dSm-1 respectively as compared to fresh water (0.42 dSm-1). The highest yield was recorded when irrigated with fresh water at 100 % of CWR as 6.35 t ha-1 and the lowest yield was recorded with saline water of 6 dSm-1 at 60 % of CWR as 2.08 tha-1. The significant increase in yield of 17.4 % was observed under drip system as compared to the control treatment irrigated by conventional irrigation practice. The emission uniformity and water use efficiency were increasingly reduced as salinity of irrigation water increased.

Evaluation of low cost micro controller used in automated drip irrigation system revealed that in sweet corn crop the yield response was observed to be the best in soil moisture sensor based irrigation with each row lateral spacing as 7.93 t ha-1. Water applied for sweet corn through drip irrigation system using soil moisture sensor was found to be 332 mm instead of 520 mm in flood method (36 % water saving). Water use efficiency for sweet corn was highest in single row drip method with 23.88 kg/ha-mm followed by paired row drip and flood method as 19.51 and 14.29 kg/ha-mm respectively. In watermelon, the yield was best in paired row drip method as 2.5 t/ha water applied through drip irrigation system using soil moisture sensor was 222 mm instead of 380 mm in flood method (41 % water saving). Water use efficiency for watermelon was highest in paired row drip method as 11.26 kg/ha-mm followed by single row drip and flood method as 9.45 and 5.26 kg/ha-mm respectively. The total cost of the microcontroller based soil moisture sensor was Rs. 3755 as compared to the Rs 1 lakh worth commercially available automated system.



Microcontroller based soil moisture sensor

ANGRAU



Soil moisture aluminum probes

Studies on mole drainage technology along with open and subsurface drainage (SSD) systems in waterlogged black soils with two varieties of sugarcane CO7805 and 2000V46 revealed that 2000V46 variety gave higher yields compared to the other one. Among all drainage systems mole drainage system with 2000V46 gave higher yield of 64 t/ha followed by open drainage system. The yields under subsurface drainage plot were found not satisfactory because of less pumpage from the collection sump by the field staff in view of operational constraints connected with adjoining paddy growers. The benefit cost ratio was worked out to be 1.3 for the mole drainage system.



Inserting the observation pipe into drainage plots performance



Hydraulic and functional

Studies on rice productivity under modified SRI in the fields of Chittoor district revealed higher water use efficiency (5.69 kg/ha-mm) in mechanized paddy crop compared to conventional method i.e., (2.31 kg/ha-mm) and concluded that higher yield (15.78%), high water use efficiency (57%) and reduced water consumption (49.48%) were possible through machine transplanted rice production system. The total labour requirements for mechanised and conventional paddy production were 26 man days and 85 man days per hectare respectively. On an average, the yield advantage of 4.75 quintals per hectare was observed in mechanized compared to conventional paddy. The by-products from the mechanised and conventional fields were 2.5 and 2 tonnes respectively. Mechanised paddy farmers were able to secure a net income of Rs.1.81/- per every rupee of expenditure. While, the convectional paddy farmers realized Rs 1.42/-.

Mutukula watershed receives rainfall in almost all the months. Watershed receives 402.3 mm rain fall during *kharif* season, 93.6 mm in *rabi* season and 104.3 mm rainfall in *zaid* season. Seasonal average runoff was highest in *kharif* season with 21.2 mm throughout the watershed followed by *rabi* with 8.0 mm and *Zaid* with 4.1 mm. The Chaturvedi relationship indicated that recharge to ground water commences at p=15

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inches, it gave highest recharge of 165.5 mm from mean annual rainfall of 898.7 mm in the year of 1997; the Kumar and Seethapathi relationship indicated that recharge to ground water commences at p=15.28 inches, it gave highest recharge of 149.2 mm from mean annual rainfall of 898.7 mm in the year 1997; and the modified Chaturvedi relationship indicated that recharge to ground water commences at p=14 inches, it gave highest recharge of 154.0 mm from mean annual rainfall of 898.7 mm in the year of 1997. The entire Mutukula watershed has the total area of 5100 ha. In this watershed there were 26,793 livestock's of which sheep population accounts for (11,924). This was followed by poultry (5955), ox (675), buffalos (2755), cows (520), he-buffalos (119), goats (4570) and piggery (275) The extent of migration was reduced in all the four sub watersheds.

a. Department of Farm Machinery and Power

The results of the study on Energy utilization pattern in dryland production systems of cotton and maize mechanization revealed that the highest energy utilization for crop production was observed in medium size farm holdings and lowest in case of small size farm holdings for both the crops, due to more use of power sources and inputs. Machinery energy ratio and mechanization index values were lowest in case of small farmers in all the clusters, which indicates that small farmers face difficulty in use of machinery for crop production due to financial constraints. This causes stagnation in crop productivity. The cotton – CHC groups utilized more tractor hours (800 h/annum) than maize CHC groups as well as normal cluster farmers.

A prototype FYM pulverizer cum spreader was developed and evaluated under field condition



with the best optimized variables derived from the experimental trials. The bulk density, clod size distribution and application rate was observed as 0.512 g cm⁻³ & 0.521 g cm⁻³, 75.99 % & 64.45 % and 5.9 t ha⁻¹ & 12.5 t ha⁻¹ at half and full shutter opening area respectively. The cost of operation of FYM pulverizer cum spreader works out to be Rs 620 per acre when the machine is used for dry FYM pulverizing cum spreading operation. There was a saving of Rs 504 per acre over traditional method of spreading.

Developed a seed planter with battery drive and evaluated its performance with ground wheel drive for direct sowing of paddy. L3S2D1 setting was selected for the seed planter as it was providing recommended seed rate with minimum damage. Effective field capacities were 0.301 ha h^{-1} and 0.299 ha h^{-1} and the fuel consumption of tractor for sowing of seed were 1.87 and 0.891 h^{-1} respectively for seed planter with battery drive and ground wheel drive. Seed miss index was zero in both cases. Spacing between seed to seed



was 23.2 cm and 25.1 cm and the seed germination was 97% and 96% for planter with battery drive and ground wheel drive respectively. Cost of operation for developed planter, local seed drill and manual transplanting was Rs 950, 1440 and Rs 2665 respectively. Finally, it could be concluded that the seed planter with battery drive with L3S2D1 setting is suitable for direct sowing of paddy.

The effective field capacity of the newly de-



veloped multi crop precision planter was found to be 0.081 ha h-1, 0.152 ha h-1 and 0.059 ha h-1 while the field efficiency was found to be 77.33 %, 81.06 % and 78.66 % for Bengalgram, redgram and paddy respectively. The depth of sowing was found to be 0.0410 m, 0.0362 m and 0.0355 m and the seed to seed spacing was found to be 0.2820 m, 0.2742 m and 0.2664 m for Bengalgram, redgram and paddy respectively. The cost of planter was found to be Rs 4500 with an operating cost of Rs 41.34 per hour. The cost of operation was found to be Rs 474.99, Rs 271.60 and Rs 700.29 per ha for Bengalgram, redgram and paddy respectively and was less with planter compared to manual sowing in all the crops.

In sugarcane ratoon management, the



effective field capacity of the disc off barrier, Ratoon manager, Mini rotoweeder, Ridger, Mini plough, Conventional plough and Harvester were 0.18, 0.45, 0.31, 0.04, 0.088, 0.02, 0.34 ha h⁻¹ respectively, with a fuel consumption of 0.013, 0.0152, 0.018, 0.015, 0.0125, 0.020 m³ha⁻¹ respectively. Ratoon management with stubble shaving, disc off barring followed by intercultivation by tractor and mechanical harvesting resulted in high yield parameters and was found economical with a benefit cost ratio of 2.14 followed by Improved method of running with stubble shaver + intercultivation by tractor + manual harvesting with a benefit cost ratio of 2.08.

c. Department of Agricultural Processing and Food Engineering

Effect of different heat shrinkable films like Polyolefin 15 μ and Cryovac 9 μ on physicochemical attributes of two varieties of bananas namely *Chakkerkeli* and Dwarf Cavendish was studied until quality deterioration was observed. Of all the treatments, hands wrapped with polyolefin 15 μ retained higher values for most of the physico- chemical properties studied under ambient storage conditions. Using polyolefin 15 μ , the shelf life of dwarf Cavendish and *Chakkerkeli* hands was enhanced to 18 days and 14 days respectively under ambient storage conditions



 $(72\% \text{ RH}, 33^{\circ}\text{C})$, while the shelf life of unwrapped fruits was 10 days and 7 days respectively. Polyolefin 15 μ hand wrapped fruits of both the varieties retained higher scores of 8.51 for various organoleptic attributes under ambient storage conditions.

In the study to establish the process technology for sugarcane juice processing and storage, based on overall physico-chemical, microbiological and sensory data, it could be concluded that thermal treatment and flocculant added, microfiltered, pasteurized treatments are better in that order, the former being the best. The study suggests that membrane filtration in combination with thermal treatment results in good quality bottled sugarcane juice.

Study on Ready-to-eat orange segments by modified atmosphere packaging under refrigerated storage to improve the shelf life revealed that storage of citric acid treated, LDPE packed orange segments under a gas composition of 5% $O_2 + 10\% CO_2 + 85\% N_2$ at 5°C was the best method as it enhanced the shelf life to 25 days while it was only 4 days in control.

The study on the storage period of bitter gourd powder by optimizing the concentrations of carrier agent, inlet air temperatures and feed flow rates concluded that on 45^{th} day of storage period the quality of bitter gourd powder was good at 8% maltodextrin, 130° C inlet air temperature and 15 ml/min feed flow rate. The overall acceptance rating of Ready to serve beverage prepared from 2 g powder +10% sugar + 50 ml lemon juice + 2 g salt was the highest. The total cost of operation for the preparation of spay dried bitter gourd powder was Rs. 96.4/ 12.35 g and for the preparation of bitter gourd RTS beverage was Rs. 24.32 per liter.

Cleaner cum Pearler Machine for Finger

millet was developed and tested for its pearling efficiency, percentage of broken grain at speeds 1400, 900, 500, 300 rpm; moisture contents 10, 13, 16 % (w.b) and at feed rates 90, 120, 150 kg/h for two passes. The optimum value of pearling efficiency was 80.1 %, 4.3 % of broken grain at 10% w.b moisture content, 900 rpm at 150 kg/h feed rate (II pass). The pearling efficiency decreased with increase in moisture content and increased with the increase of cylinder speed and feed rate. The percentage of broken grain decreased with the increase in moisture content and feed rate and increased with increase in cylinder speed. The highest percentage of broken grain was found to be 9.5 % at 10 % w.b moisture content, 1400 rpm at 90kg/h (II pass). The operating cost of the machine per kg was Rs 0.326/-.

The milling and cooking quality characteristics of Radio Frequency dried paddy (var. NLR 33892) were studied as affected by the drying bed thickness (2.00, 3.00 and 4.00 cm). Among all the grain bed thickness investigated, the 2 cm thick bed yielded better results in terms of less broken and more head rice when compared to 3 and 4 cm thick beds dried under RFD.

D. STUDENTS'ACTIVITIES

1. National Cadet Corps (NCC)

Many of the ANGRAU students got B and C certificates in NCC during the year.

On June 21st, 2015, a total of 34 NCC cadets of Agricultural College, Bapatla have participated in the International Yoga Day celebrations held at Guntur and received the appreciation certificates from Commander, NCC Unit, Tenali.

The NCC Camps attended by the students during the year are shown in the Table 7.

Name of the College	Camp	Venue	Date	No. of Cadets Attended
S. V. Agricultural College, Tirupati	Combined Annual Training Camp -XIII	Gurukul Complex, NCC Nagar,	01-02-2016 to 12-02-2016	32
Agricultural College, Bapatla	Weapon Training Camp	Tirupati NCC Nagar, Tirupati	21-02-2016 to 6-02-2016	13
	Combined Annual Training Camp -VII	Ongole	19-03-2016 to 28-03-2016	19
Agricultural College, Bapatla	Zonal NCC Shooting Coaching Capsules Camp	Kendriya Vidyalaya, Ongole	13-05-2016 to 22-05-2016	07

Table 7. NCC Camps attended by the students



Agricultural College, Bapatla, 26th JANUARY 2015 Republic Day

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2. NSS Activities

The NSS volunteers of various colleges actively participated in NSS Camps during the year. The NSS activities included planting of ornamental and tree plants, sanitation programmes, awareness programmes on Health & Hygiene and AIDS, blood donation programmes, vaccination to animals, rodent control, Parthenium eradication in public places and Clean & Green programmes, etc.

The NSS special camps of about ten days duration were organized for the students of all the final year undergraduate and diploma programmes. The details of the NSS special camps attended by the students during the year 2015-16 are shown in Table 8.



Name of the	Camp	Venue	Duration of Special Camp		No of Students	
College	Cump	, ende	From	То	Attended	
Faculty of Agricult	ure					
S.V. Agricultural College, Tirupati	Special Camp	Kuppambadur(V), Ramachandrapuram (M)	07.01.16	13.01.16	133	
Agricultural College, Bapatla	Special Camp	Naduru(V), Ponnur(M), Guntur Dist.	07.01.16	13.01.16	169	
Agricultural College, Naira	Special Camp	Kistappapeta(V). Srikakulam Rural Mandal	17.11.15	23.11.15	100	
Agricultural College, Mahanandi	Special Camp	Thimmapuram	04.11.15	10.11.15	66	
Agricultural College, Rajahmundry	Special Camp	Pushkar Ghat, Rajamahendravaram	14.07.15	20.07.15	50	
Faculty of Agricultural Engineering & Technology						
College of Agril. Engg., Bapatla	Special Camp	Marubroluvari Palem	26.2.16	03.3.16	78	
College of Agril. Engg., Madakasira	Special Camp	Amidalagondi	28.03.16	04.04.16	113	
College of Food Science & Tech., Bapatla	Special Camp	Dundivaripalem	25.02.16	02.03.16	48	
Faculty of Home Science						
College of Home Science, Guntur	Special Camp	Gorlavanipalem(V)	14.03.16	20.03.16	40	

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Table 8. NSS Camps Attended by the Students



The students of different Colleges of the University actively participated and worked in the programmes like tree plantation, rodent control, soil sample collection / socio-economic survey, laying of roads, identification of pests and diseases and their control, and diet survey for the social awareness etc.



Planting of saplings by Dr. PRK Prasad, Associate Dean, Agril. College, Bapatla in the School Premises at Nanduru Village



Veterinary Camp and distribution of vet medicines to the farmers at Nanduru





Health Camps

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3. Sports, Games, Cultural and other Activities

Ms. D.R. Pravallika from Agricultural College, Rajamahendravaram represented ANGRAU in Kabadi, Discus throw and Shotput event in the 16th All India Inter Agricultural University meet held on 22nd to 26th February, 2016 at Coimbattore (TNAU), Tamilnadu.

Ms. Alluri Anjani, from Agricultural College, Rajamahendravaram attended the International Youth Festival cum Seminar organized by Shri Ram Chandra Mission during 23rd to 27th April 2016 at Kanha Shanti Vanam Ashram, Chegur village, Mahboobnagar, Telengana.

Six students selected from Agricultural College, Mahanandi participated in the 16th ICAR All India Inter Agricultural Universities Sports & Games meet held at Tamilnadu Agricultural University, Coimbatore from 22nd to 26th February, 2016.

Two students belonging to College of Agricultural Engineering, Madakasira participated



in Inter University Sports Meet at TNAU, Coimbatore during February-2016

Students of College of Agricultural Engineering, Bapatla bagged a total of 21 prizes in the three phases of Intercollegiate games & sports. Ch. Avanish Jahnavi was selected and participated in Volley Ball at 16th All India Inter Agricultural University sports and games meet held at TNAU, Coimbatore from 21st to 28th January 2016

Students of SV Agricultural College, Tirupati won altogether 12 prizes in the three phases of Intercollegiate games & sports. Four Students represented the College in the 16th All India Inter Agricultural University sports and games meet 2015-16 from 22nd to 26th February, 2016 at Tamilnadu Agricultural University, Coimbatore.





Sports Activities in ANGRAU



ness Programme





International Yoga Day



Exhibition



Swachh Bharat



Blood Donation Camps

ANGRAU

Cultural and other Activities of students

4. Students' Counseling and Placement Cells

The Students' Counseling and Placement Cells are functioning in all the Colleges and Polytechnics of the University. They are acting as liaison between the University Colleges and the public & private sector organizations / institutes that are in need of graduates/diploma holders.

During the year, the campus interviews were held by several organizations and a total of 134 students got placed in different public and private organizations. The list of firms in which the students got placement is shown in Table 9.

Name of the Organization	Name of the Post	Number of students placed			
S.V. Agricultural College Tirupati					
ITC Limited	Post Graduate Agricultural Trainee	1			
Coramandal Fertilizers (Murugappa's group)	Marketing Development Officer	1			
Dupont	Marketing Co-ordinator	1			
JK Agri Genetics Ltd	Assistant manager	1			
Axis Bank	Assistant manager	1			
МАНҮСО	Marketing Development Officer	1			
Agricultural College, Bapatla					
Nagarjuna Fertilizers and Chemicals Limited	Marketing Executive	6			
Alliance One India Ltd.	Sales Executive	3			
Godfray & Phillips Company	Sales Executive	6			
Coromandel Ltd.	Marketing Officer	5			
Agricultural College, Rajahmundry					
Department of Agriculture	MPEO	12			
Agriculture Polytechnic	Teaching Assistant	2			
Agro based Industries	Sales Executive	3			
Civil Supplies	Technical Assistant	3			
Agricultural College, Mahanandi					
Department of Agriculture	Agri. Extension Officer	4			

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Table 9. Student Placements during 2015-16



Name of the Organization	Name of the Post	Number of students placed			
Department of Agriculture	MPEO	11			
Syngenta Ltd.	Seed Officer	1			
Agri. Polytechnics	Teaching Assistant	5			
College of Agricultural Engineering, Madakasira					
EPC (A Mahindra Group Company)		3			
ITC		1			
Pydah Polytechinic of Ag. Engg, Kakinada		5			
College of Food Science & Technology, Bapa	tla				
M/s Dukes, Hyderabad.	Trainee	5			
Heritage, Hyderabad	Trainee	1			
Hector Beverages, Mysore	Trainee	4			
Gokul(Heritage), Chittoor	Trainee	1			
Sangam Dairy, Vadlamudi	Trainee	1			
Ongole Dairy, Ongole	Trainee	2			
Pepsico Ltd, Sangareddy, Medak	Trainee	1			
SA Rawther Pvt Ltd, Hindupur, Ananthapur	Trainee	2			
Priya Foods, Poranki, Vijayawada	Trainee	1			
Inbisco Ltd, Hyderabad	Trainee	4			
Greenways Agro Foods, Chellapalli	Trainee	1			
College of Food Science & Technology, Pulivendula					
Prakasm Dairy	Production manager	2			
ITC - Guntur	Production manager	1			
College of Agricultural Engineering, Bapatla					
Sonalika International Tractors	Field officer-Trainee	6			
Jain Irrigation Systems PVT Ltd.	MI Engineers	18			
Department of Horticulture - AP	Project Officers	6			
Beri Udyog PVT Ltd.	Field Officers	2			



5. Equipment Purchased by Different Colleges during the Year 2015-16

The details of equipment purchased by different colleges which costs more than Rupees One lakh per item are furnished in Table 10.

S. No.	Institution	Equipment	Cost (Rs.)
1	College of Agricultural	Hydrus 3D Professional software Automatic PC Compatible Solvent	4,91,400
	Bapatla	Extraction System	1,87,336
2	CFST,	Environmental Chamber	1,99,975
3	Bapatla	Solar Water Heater	1,28,127
4	CFST, Pulivendula	Tensile strength tester	1,97,925
5	Agricultural College, Mahanandi	Yuvaraj Tractor	7,81,600
6		Solar fencing around F. No. 40 and 41	1,14,532
7	S.V. Agricultural College, Tirupati	John Deere 45 HP tractor with 32 blade Rotavator	6,99,678
8		6000 L capacity water tanker	1,00,000

Table 10.Major Equipment Purchased during the Year in different Colleges
Costing more than Rs. 1.00 lakh per item

E. UNIVERSITY LIBRARY

1. ANGRAU LIBRARY SYSTEM AND MANAGEMENT

The ANGRAU Library System is having 10 Libraries in its fold apart from the University Library located at the Head-Quarter in Lam, Guntur. The main motto of the Libraries is to accomplish its task of reaching to wider user community, comprising of teachers, scientists, extension specialists and students. All the ANGRAU libraries hold rich collection in Agriculture and allied sciences which comprises of Books, Periodicals, Back-Volumes and Reports etc. Apart from print resources the e-Resources are being made available through online.

The ANGRAU Libraries function under the overall supervision of the University Librarian. The Regional Libraries and the College Libraries are run by the Assistant Professors (LIS) under the administrative control of the Associate Deans in their respective Colleges.

After provisional bifurcation of the ANGRAU, Library system consists of the following centers.

University Library :

Lam, Guntur

Regional Libraries :

1. Agricultural College, Bapatla

2. S.V. Agricultural College, Tirupati

College Libraries :

- 1. College of Agricultural Engineering, Bapatla
- 2. College of Food Science & Technology, Bapatla
- 3. Agricultural College, Naira
- 4. Agricultural College, Mahanandi
- 5. Agricultural College, Rajahmundry



- College of Food Science & Technology, Pulivendula
- 7. College of Agricultural Engineering, Madakasira
- 8. College of Home Science, Guntur

Every Polytechnic College is provided with library facilities for the benefit of the students and teachers. These libraries are maintained by Officer-in-charge, Library.

2. COMPONENTS OF LIBRARY

Books and Periodicals

All the libraries together continued to receive over 503 Indian and 58 Foreign Periodicals in agriculture and allied sciences. In addition, 1,989 books and about 232 dissertations and 486 reports have been added during the year. All the libraries have a separate reference book collection viz., dictionaries, encyclopedias, almanacs, etc.

Book Bank Scheme

The ANGRAU libraries are providing important books under special Book Bank Scheme for the benefit of SC, ST and BC students. Special text-book collection has been built up at each campus. All the libraries have procured good number of titles and increased the collection for the benefit of the students.

Competitive Examination Cell

A separate competitive examination cell has been established at all the ANGRAU campuses for the benefit of those students who are appearing for various competitive examinations for the better placement position and higher studies. This section provides the useful material required for the aspirants of ICAR Examinations, ASRB, ARS, ICAR-JRF/NET, UPSC, APPSC, GMAT, TOEFL, Bank Exams and all other competitive exams.

Visitors

During this period, a total of 91,705 number of visitors utilized the library services in all the

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campuses of the ANGRAU Libraries. The regular membership of the libraries including teachers and students was 2,195.

3. LIBRARY SERVICES

Reprographic Services

The photocopying facilities available in all the campuses have been put to maximum use and nearly 2,03,201 copies were provided to the library users during the year. It is also generated an income of Rs.3,34,329 from all the ANGRAU libraries.

Digital Library Service

The digital library infrastructure facilities viz., interactive digital board, computers with the latest configuration, internet facility, etc., are fully strengthened in existing libraries as well as established digital libraries in new Colleges to utilize the electronic information i.e. CeRA, CAB abstracts with full text journals, Krishiprabha, Krishi Kosh, Indiastat, CRC, Netbase e-Books, CAB e-Books, Elsevier e-Books, etc. for the improvement of academic and research programmes. All the ANGRAU libraries are equipped with sufficient number of computers with latest configuration and U.P.S. facility, printers, touch screen computers etc. to access the e-Resources and also to browse the Internet. The Internet facility is available in all the campuses of the ANGRAU libraries.

4. RESOURCES / ONLINE RESOURCES

The ANGRAU Central Library has subscribed e-Resources / Online Resources to provide the latest information to the teachers, scientists, extension specialists and students, etc., to meet their research and educational information needs.

• Consortium for e-Resources in Agriculture (CeRA): The ICAR has provided consortium online e-Resources service called CeRA (Consortium for e-Resources in Agriculture) under NAIP project from 2008 onwards. It is providing access to


nearly 3568 journals in agriculture and allied disciplines. The user ID and Passwords have been circulated to all the colleges of the University, Research Stations and also to all the patrons of the University to utilize the e-Resources effectively.

- CAB Online Version: provides abstract and full text data from 1990 to present with CD back up for the year 2014. Online CAB abstracting services data is very useful in formulating technical programmes, research projects, writing Ph.D. and M.Sc. theses, etc.
- Indiastat Statistical Database: Indiastat.com is an authentic storehouse for socio-economic statistics about India. It provides statistical data, current happenings with a statistical approach and articles from scholars on subjects of social and economic importance, etc.
- CMIE Commodities Database: Commodities database is the most comprehensive and reliable source of Indian Commodity Prices, Market intelligence, crop forecasts and time-series data for agricultural commodities. India Harvest Database has been replaced with commodities database with additional resources.
- e-Books Taylor and Francis: The ANGRAU Central Library has purchased more than 210 CRC Net Base e-Books on agriculture and allied sciences, which can be accessed through I.P. and on User ID and Password basis. The e-Books are very much useful to the teachers, scientists, extension specialists and students to browse the important content on agricultural and allied sciences.
- e-Books CABI: The ANRAU Central Library has purchased 810 CABI e-Books on perpetual basis and on DVD, which has unlimited access from the year 2000 and

provided access to all the ANGRAU Colleges via I.P. range and on User ID and Password basis. The user ID and Password are circulated to all the Colleges and Research Stations in the University. e-Books are useful for the teachers, scientists and students to browse important agricultural content by sitting anywhere, anytime and these will improve the quality of research and save lot of precious time of the students, teachers and researchers.

- Elisevier e-Books / e-Books on SciVerse Science Direct: Elisevier e-Books / e-Books on SciVerse Science Direct provide the comprehensive and reliable content that researchers need, the accessibility and searchability that researchers want, which alone cannot be available in print sources. All the ANGRAU Colleges can access via I.P. range and on User ID and Password basis.
- J-Gate Agriculture and Biological Sciences: It has also provides access to Online e-Journals Portal called J-Gate Agriculture and Biological Sciences under CeRA for the year 2015-16 (which covers data from 2001 to 2016).
- Agricat: Agricat is the Union Catalogue of the holdings of 12 major libraries of the ICAR Institutes and SAUs. It has been created with the partnership of OCLC WorldCat. The ANGRAU Central Library is also a member library in AgriCat / WorldCat and contributed nearly 35,000 bibliographical records.
- Krishi Kosh: Krishi Kosh is an Institutional Repository under National Agricultural Research System (NARS). The repository of knowledge in agriculture and allied sciences, having collection of old and valuable books, records and various documents spread all over the country in different libraries of Research Institutions and State Agricultural Universities (SAUs).

 Table 11. Library facilities and services for the year 2015-2016

ŚŻ	Name of the Library	8	ooks	The	Ses	Perio Subscr	odicals ibed	Memb	ership	Books Issued	No. of Visitors	No. of Internet	No.Of Xerox	Income Genera-
		Number		Number				Number				Users	Copies	tion
		added	Total	Added	Total	Indian	Foreign	Added	Total				Exposed	(Rs .)
		during the Vear		during the year				during the year						
-	Docional Libuar													
_:	regional Liorary, Bapatla	269	58,202	52	1809	86	20	170	294	4787	21518	967	25000	41,190
5	Regional Library,													
	Tirupati	400	21479	132	3949	128	30	247	748	3891	32051	5398	103012	1,79,932
З.	Agricultural College	164	12103	8	244	172	ı	75	420	1406	3742	4919	44953	43,770
	Library, Naira													
4.	Agricultural College	218	11546	10	29	54	ı	71	71	5450	8050	650	21511	16,444
	Library, Mahanandi													
5.	Agricultural Engineering	134	10275	17	53	12	8	92	92	6904	9573	235	7520	12,288
	College Library, Bapatla													
6.	College of Food Science	173	8093	6	73	33	ı	52	261	6545	1555	110	4205	34,905
	& Technology Library,													
	Bapatla													
7.	Agricultural College,	450	3976	ı	I	I	I	60	205	1700	2241	I	I	1
	Rajahmundry													
×.	College of Food Science	131	2330	i.	1	8	1	20	176	1560	8940	6800	2000	5,800
	& Technology, Pulivendula													
9.	Agricultural Engineering	50	4226	4	12	10	ı	ı	173	1340	2670	1	1	1
	College, Madakasira													
10.	College of Home Science,	I	700	ı.	T	T	I	1	25	155	1365	1	I	1
	Guntur													
	TOTAL	1989	1.32.930	232	6.169	503	80	787	2.195	33.738	91,705	19.079	2.03.201	3.34.329
				1			>							





F. INTERNATIONAL PROGRAMMES

The ANGRAU established a centre to facilitate International Programmes under the control of the Director of International Programmes in 2005. The Centre serves as an internal and external liaison for the University, providing a source of assistance to faculty, administrators and students and enhancing their ability to pursue and develop international activities and initiatives. The ANGRAU promotes the process of actively partnering with the International Universities and Organizations to effectively utilize and apply the University's knowledge, resources and expertise to mutually address the needs and problems facing global society today. During the period under report, the Centre took up the following activities.

• Identified collaborative research projects with the institutes abroad

• Stimulated the faculty and students to apply for various International Fellowships

• Coordinated the participation of Faculty in overseas programmes

• Coordinated the visits of foreign delegations

The details of participation of ANGRAU faculty in various overseas programmes and the visits of foreign delegations to the University during the period under report are given in detail in Table 12a and 12b.



PARTICIPATION OF FACULTY IN OVERSEAS PROGRAMMES

S. No.	Name of the Faculty	Training Programme / Workshop/ Conference attended	Period	Place
1	Dr. M. Suresh Kumar Coordinator, DAATTC, Amadalavalasa, Srikakulam	Presented a paper on "A Study on the Digitization of supply chains in Agriculture, An Indian Experience" at EFITA-2015	28 th June to 2 nd July, 2015	Poznam, Poland
2	Dr. M. Reddi Kumar Senior Scientist (Plant Pathology), Institute of Frontier Technology, RARS, Tirupati.	XVIII International Plant Protection Congress (IPCC-2015)	24 th to 27 th August, 2015	Berlin, Germany
3	Dr. K. Raja Reddy Director of Research, Admn. Office, ANGRAU	Participated in Agricultural and Horticultural Study Tour	7 th to 15 th September, 2015	China
4	Dr. B.N.V.S.R. Ravi Kumar Scientist (G&PB), APRRI & RARS, Maruteru	Short course on Molecular Breeding	28 th Sept. to 9 th Oct, 2015	IRRI, Los Bonos, Philippines
5	Dr. V. Lakshmi Narayana Reddy, Scientist (Br), RARS, Tirupati	Participated in 2 nd Global Food Security Conference	11 th to14 th October, 2015	Cornell University, New York, USA
6	Dr. E. Narayana Associate Director of Research, RARS, Lam, Guntur	Presented a research paper in III World Biodiversity Congress	26 th to 29 th Oct., 2015	Mokragora, Serbia MRF and
7	Dr. V. Rajarajeswari Professor & Head, Department of Crop Physiology, S.V.Ag. College, Tirupati	Participated in Multidisciplinary Academics Conference 2015 organized by MRF and UNESCO.	2 nd to 6 th November, 2015	UNESCO in Thailand
8	Dr. N.V. Naidu Professor & University Head, S.V.Ag. College, Tirupati	Participated in Multidisciplinary Academics Conference 2015 organized by MRF and UNESCO.	2 nd to 6 th November, 2015	UNESCO in Thailand
9	Dr. N. Srinivasa Rao Scientist, APRRI & RARS, Maruteru	Attended a training at IRRI	2 nd to13 th November, 2015	IRRI, Philippines
10	Dr. R. Sarada Jayalakshmi Professor &Head, Dept. of Pl. Pathology, S.V.Ag. College, Tirupati	Participated in AAGB Conference	5 th to 7 th November, 2015	Brisbane, Australia
11	Dr. K. Raja Reddy Director of Research, Admn. Office, ANGRAU	Participated & presented a research paper in the 8th International Conference of the Peanut Research Community	5 th to7 th November, 2015	Brisbane, Australia



S. No.	Name of the Faculty	Training Programme / Workshop/ Conference attended	Period	Place
12	Dr. K.S.S. Naik Principal Scientist & Head, ARS, Kadiri	Presented a research paper on "Advances in Arachis through Genomics & Biotechnology" in 8th International Conference of the Peanut Research Community.	5 th to 7 th November, 2015	Brisbane, Australia
13	Dr. V.S. Gangadhara Rao Principal Scientist (G&PB) & Head, ARS, Yelamanchili	 i) Attended the 8th International Conference on Advances in AAGB Conference ii) Tropical agriculture conference 	5 th to 7 th November, 2015 16 th to 18 th November, 2015	Brisbane, Australia Brisbane, Australia
14 15	Dr. M. Rajasri Senior Scientist, KVK, Garikapadu Dr. T.S.S.K. Patro Senior Scientist and Head, ARS, Vizianagaram	Participated in International Conference on Innovative approaches in Applied Sciences and Technologies (iCiAsT - 2016)	1 st to 5 th February, 2016	Kesetsart University, Bangkok, Thailand
16	Dr. N. Chamundeswari Scientist (Plant Breeding), RARS, Maruteru	Genome wide association mapping analysis of MAGIC population	7 th to 15 th March, 2016	IRRI, Philippines
17	Dr. T. Neeraja Dean of Home Science, ANGRAU	Participated and presented a paper in PCS-HCC-2016 in Budapest.	16 th to 17 th April, 2016	Budapest, Hungary
18 19	Dr. K. Raja Reddy Director of Extension, ANGRAU Dr. E. Narayana Director, Planning & Monitoring, ANGRAU.	Participated in 3 - City Study Agri - Tour to China coinciding with 17th Shouguang International Vegetable Sci- tech Fair, Shanghai - Shouguang - Beijing.	20 th to 26 th April, 2016	China
20	Dr. V. Chenga Reddy Principal Scientist (Cotton), RARS, Lam, Guntur	World Conference on Cotton	2 nd to 6 th May 2016	Goiania, Goias, Brazil

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Table 12 b. VISIT OF FOREIGN DELEGATIONS TO ANGRAU

S. No.	Name	Purpose	Date
1.	Mr Ropate Ligairi - Fiji Permanent Secretary of Agriculture (Team Leader); Ms Miliakere Nowaikula - Director Research, Ministry of Agriculture; Mr Epili Dugucagi - Principal Agriculture Officer, Ministry of Agriculture; Dr Ravi	Interacted with the Vice- Chancellor and the University Officers and evinced keen interest in the teaching, research and extension activities of the university.	13 th August, 2015
	Joshi - Consultant, Ministry of Agriculture and Mr Sageasi Waikere - Charge de Affaires, Fiji High commission, New Delhi		
2.	Dr. Gordon Smith, Professor & amp; Head and Prof. B. Subrmanyam, Grain Science and Industry Department, Kansas State University USA accompanied by Dr. S. Raghu- vardhan Reddy, Former Vice- Chancellor, ANGRAU	To review the collaborative research projects.	5 th December, 2015
3.	Dr. Rami A. Reddy, Professor of Agribusiness Programme along with students from Agri-business division, University of Wisconsin - Platteville, Wisconsin, USA	 Students of Wisconsin visited ANGRAU as Part of the course entitled "Agriculture and food market in India". Discussed about the courses offered in both the Universities i.e., ANGRAU and University of Wisconsin-Platteville in Agribusiness Programme. To look into possibility of Memorandum of Understanding (MOU) for student as well as faculty exchange programme between ANGRAU and University of Wisconsin - Platteville. 	2 nd January, 2016
4.	Dr. Sajid Alavi, Professor, Department of Grain Science & Industry, Kansas State University, USA	To have an agreement with ANGRAU to give practical training to students as well as staff members of ANGRAU on grain storage and food processing	12 th January, 2016
5.	Mr. G.K.D. Kalyan Chakravarthy, Senior Researcher & Business Coordinator, Agroparks and Metropolitan Food Clusters, Wageningen University and Research Centre, Wageningen	To discuss the India Water Initiative project wherein few of our students can be involved in a short-term collaborative programme/course on climate smart advanced irrigation systems	1 st April, 2016



MoUs

S. No.	Name	Purpose	Date
1.	IGKV, Raipur	Collaboration for PG and Ph.D. Students of IGKV Raipur for thesis research work at ANGRAU and vice versa	22 nd August, 2015
2.	PJTS Agricultural University, Telangana	To guide PG students in Farm Machinery & Power	20 th April, 2016
3.	UMK, Malaysia	MoU especially related to research collaborations, joint academic and mobility programs.	25 th April, 2016

IV. RESEARCH

Of the three major functional components of the University, research is by far the largest component of the University's functions in terms of manpower engaged and funds utilized through several projects including ICAR and other agencies viz., National Agricultural Innovation Project (NAIP), Department of Biotechnology (DBT), Department of Science & Technology (DST) and *Rashtriya Krishi Vikas Yojana* (RKVY) etc.

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The University continued its research efforts in Agriculture, Agricultural Engineering & Technology, Home Science and allied fields with the renewed vigour and commitment for improving the production and economic status of the farmers of the Andhra Pradesh State in particular and contributing for food security of India in general.

The research activities of the University in the faculties of Agriculture and Agricultural Engineering & Technology are being carried out at 36 Research Stations including six Regional Agricultural Research Stations spread over the entire state of Andhra Pradesh.

The organogram of research in the University is depicted in Fig. 7. The Agro-climatic zone-wise list of research stations of the University and their functions, the List of ICAR Coordinated research projects and the List of projects under *Rashtriya Krishi Vikas Yojana* are given in Annexures VI, VII and VIII, respectively.

The research activities of the University mainly focus on crop improvement, crop production, crop protection, climate resilient agriculture, post harvest management and farm mechanization aspects for adoption by the farming community for overall increase in agricultural production and reducing cost of cultivation besides solving location specific problems. Research is also carried out in basic sciences, which is supportive to applied research. On-farm research is conducted for evaluation and refinement of newly developed technologies under farmers' field conditions.

SEASONAL CONDITIONS AND CROP PERFORMANCE

Seasonal conditions in the State during the year 2015-16 were satisfactory. The state received an average total rainfall of 912 mm as against the normal rainfall of 966 mm, recording a deficit rainfall of only 5.6 per cent. During South - West Monsoon an average rainfall of 522.4 mm was received in the State as against the normal rainfall of 556 mm, recording a deficit rainfall of 6.0 per cent. During North- East Monsoon period, an average rainfall of 287.1 mm was received as against the normal rainfall of 296 mm, recording a deficit rainfall of 4.0 per cent.

During the year 2015-16, rice crop was grown in an area of 21.61 lakh ha (13.99 lakh ha in *Kharif* and 7.62 lakh ha in *rabi*) and the crop recorded 61% higher production (50.75 lakh tons) and 67% higher productivity (6660 kg/ha) during *rabi* compared to normal. Even though, there was a decrease of 2.55 lakh ha in total rice area, increase in *rabi* productivity has resulted in higher rice production in the state (112.33 lakh tons).

Redgram, an important *Kharif* pulse crop was grown in an area of 2.20 lakh ha and produced 1.32 lakh tons. During *rabi*, Bengalgram, Blackgram and Greengram were grown in 4.71, 4.12 and 1.6 lakh ha, respectively. The total pulse production during the year 2015-16 was 12.29 lakh tons.

Groundnut crop was sown in an area of 7.75 lakh ha. Good rainfall received during August and September months in major groundnut growing areas has resulted in better yield (876 kg/ha in *Kharif* and 2190 kg/ha in *rabi*) and a total production of 8.01 lakh tons.

Cotton, an important commercial crop of the state was sown in an area of 6.66 lakh ha and produced 18.18 lakh bales of lint.

The area, production and productivity of important crops in Andhra Pradesh during the year 2015-16 are given in Table 13 and Fig. 8 & Fig. 9.



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Сгор	Area	('000 ł	na)	Product	tion ('00	0 tonnes)	Product	ivity (k	kg ha ⁻¹)
	Khairf	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi	Total
1 Paddy	13.99	7.62	21.61	61.58	50.75	112.33	4402	6660	5198
2 Jowar	0.44	1.30	1.74	0.49	3.09	3.58	1110	2369	2049
3 Bajra	0.33	0.04	0.37	0.59	0.06	0.65	1767	1793	1769
4 Maize	0.75	1.58	2.33	2.76	11.36	14.12	3682	7204	6068
5 Ragi	0.27	0.05	0.32	0.25	0.09	0.34	955	1876	1090
6 Other Millets	0.47	0.04	0.51	0.44	0.04	0.48	933	1087	945
7 Bengalgram	0.00	4.71	4.71	0.00	5.00	5.00	0	1061	1061
8 Redgram	2.15	0.05	2.20	1.29	0.03	1.32	597	695	599
9 Greengram	0.52	1.60	2.12	0.18	1.19	1.37	353	744	648
10 Blackgram	0.44	4.12	4.56	0.31	3.80	4.11	703	923	902
11 Horsegram	0.35	0.23	0.58	0.11	0.11	0.22	299	506	380
12 Other pulses	0.15	0.19	0.34	0.12	0.16	0.28	813	832	824
13 Groundnut	6.82	0.93	7.75	5.98	2.03	8.01	876	2190	1033
14 Sesamum	0.28	0.25	0.53	0.05	0.09	0.14	183	364	268
15 Sunflower	0.07	0.20	0.27	0.05	0.18	0.23	786	913	881
17 Safflower	0.00	0.00	0.00	0.00	0.00	0.00	0	699	699
18 Niger	0.00	0.07	0.07	0.00	0.03	0.03	0	386	386
19 Soybean	0.01	0.00	0.01	0.02	0.00	0.02	1476	1619	1476
20 Castor	0.49	0.02	0.51	0.28	0.01	0.29	564	687	568
21 Other Oil seeds	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
22 Rape & Mustard	0.00	0.01	0.01	0.00	0.01	0.01	704	536	537
23 Cotton (*)	6.63	0.03	6.66	18.11	0.07	18.18	465	334	464
24 Mesta (#)	0.05	0.00	0.05	0.44	0.00	0.44	1491	1678	1492
25 Chillies	1.32	0.24	1.56	5.16	1.02	6.18	3921	4190	3963
26 Sugarcane	1.22	0.00	1.22	93.53	0.00	93.53	76862	0	76862
27 Turmeric	0.17	0.00	0.17	1.21	0.00	1.21	7117	6748	7117
28 Tobacco	0.02	0.96	0.98	0.05	2.14	2.19	2500	2239	2245
29 Onion	0.34	0.07	0.41	5.73	1.23	6.96	16926	16613	16870
30 Coriander	0.00	0.25	0.25	0.00	0.10	0.10	361	410	410

Table. 13: Area, Production and Productivity of Major crops in
Andhra Pradesh during 2015-'16

(*) Cotton production in lakh bales of 170 kg of lint.

(#) Mesta production in lakh bales of 180 kg.

Source: Directorate of Economics & Statistics, Government of Andhra Pradesh.

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A. AGRICULTURE

Crop Varieties/ Hybrids released

During the year 2015, seven new crop varieties, one each in Rice, Redgram, Bengalgram, Cotton, Tobacco and two varieties in Sugarcane were released at state level. Two varieties one each in Blackgram and Bengalgram were released at National level during 2015.

Crop Varieties/ Hybrids released during 2015 at State level

Rice



Variety	: Sridruthi (MTU 1121)
Parentage	: BPT 5204/MTU BB8-24-1
Duration	: 125-130 days
Season	: Rabi
Reaction to pests	5,
diseases and	
abiotic stresses	: Resistant to Leaf Blast and
	BPH
Average Yield	: 6.0 t/ha
Potential Yield	: 7.5-8.0 t/ha
Salient features	: High yielding and non-
	lodging. It has two weeks
	seed dormancy and low
	grain shattering habit. Semi
	tall with moderate tillering

ability.

Redgram



: Amaravathi (LRG 52)
: LRG 41 X ICP 8863
(Maruthi)
: 155-160 days
: kharif & rabi
S,
otic
: Moderately Resistant to
wilt and tolerant to
Helicoverpa pod borer and
escapes terminal moisture
stress.
: 15.0 q/ha
: 20 – 25 q/ha.
: High yielding and early in
maturity (15- 20 days)
compared to LRG 41. Tender
Pods are maroon in colour.
Suitable for light soils.
Escapes terminal moisture
stress. Seeds are brown in
colour and medium in bold.
Plants have drooping
tendency at full blooming

and pod formation stage.



Bengalgram



Variety	:	Dheera (NBeG 47)
Parentage	:	ICCV 2 X PDG 84-16
Duration (days)	:	90-105
Season	:	Rabi

Reaction to pests,

diseases and abiotic

stresses

: Resistant to wilt, Moderately tolerant to pod borer.

Average Yield Potential yield : 20 – 22 q/ha

- : 16.0 (q/ha)
- Salient features : NBeG 47 is a semi erect genotype with tall growing habit. Bearing confined to the top of the plant. Pod bearing nodes are above 28-32 cm from the soil. Suitable for mechanical harvesting.

Cotton



Variety	: Srirama (NDLH-1938)
Parentage	: NDLH – 1797X NDLH - 1325
Duration	: 160 days
Reaction to pests	5,
diseases and abio	otic
stresses	: Tolerant to sucking pests
	(jassids, whiteflies and
	thrips).
Average Yield	: 21.0 q/ha
Salient features	: High yielding hybrid with
	better fibre quality. Plant
	habit is lanky, stem hairy and
	dust green. The petal colour
	cream with creamy pollen.
	Bolls are medium to big in

size with oval shape.

Sugarcane



Variety	: Simhadri (2003 A255)
Parentage	: Co 8371 X CoT 8201
Duration	: Early (10 months)
Reaction to pest	5,
diseases and abi	otic
stresses	Resistant to red rot &
	moderately tolerant to whip
	smut and early shoot borer.
Cane yield	: 135.00 t/ha
Juice Sucrose	: 18.50%
CCS yield	: 17.00 t/ha
Jaggery yield	: 15.50 t/ha
Salient features	: Good ratooner with higher
	jaggery recovery. Resistant
	to red rot and moderately
	tolerant to whip smut and
	early shoot borer.

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Sugarcane



Variety Parentage Duration

: Revathi (2000 A 255) : Co 85002 Poly Cross

: Mid late (11 months)

Reaction to pests, diseases and abiotic

stresses : Resistant to red rot, moderately tolerant to whip smut. Tolerant to water logging situations.

Cane Yield	: 135.00 t/ha
Juice Sucrose	: 18.50%
CCS yield	: 17.00 t/ha
Jaggery yield	: 16.00 t/ha

Salient features : Suitable for water logging conditions. Performs well under all agroclimatic conditions and soils. Good jaggery variety. Resistant to red rot, moderately tolerant to whip smut.

Tobacco



Variety : Nandyala Pogaku-1 (NBD 119) Parentage : Nipani 126 (Bidi tobacco) X Viram (Chewing tobacco)

Duration : 160 – 170 days Season : *Rabi* Reaction to pests, diseases and abiotic stresses : Less incidence of black shank, Tobacco Mosaic Virus, Tobacco leaf Curl Virus and Orobanche under field conditions. Cured leaf yield : 16.25 q/ha Salient features : Possesses 0.54 to 5.55% nicotin, 2.17 to 4.28% reducing sugars and 0.99 to 2.50% Chlorides. This variety has high productive potential and good leaf quality.

Crop Varieties Released during 2015 at National Level

Blackgram



Variety	: Tulasi (LBG 787)
Parentage	: LBG 685 X IPU 981
Duration days	: 75 – 80
Season	: Kharif, Rabi and Summer
Reaction to pest	s, diseases and
abiotic stresses	: Resistant to Yellow Mosaic
	Virus
Average Yield	: 18 – 20 q/ha

Salient features : Resistant to yellow mosaic virus. Photo insensitive suitable for all seasons (*Kharif, rabi* and summer). Medium duration (75-80 days) with erect plant type. Shining black seed medium in size. Main-stem bearing habit (2-3 extra pods at the base of axil on the main stem in addition to the normal cluster). Dark green foliage, leaflets lanceolate to oval in shape. Pods are sparsely hairy. Suitable for rice-fallows after *kharif* paddy (*rabi*) and after *rabi* paddy (summer). Released at National Level for South zone for *rabi* cultivation.

Bengalgram



Variety	: Nandyala Tella Sanaga					
	(NBeG 119)					
Parentage	: (ICCV 98502 X ICCV 98004)					
	X ICCV 92311					
Duration	: 90 – 95 days					
Season	: Rabi					
Average Yield	: 18.0 q/ha					
Potential Yield	: 20 – 25 q/ha					
Salient features	: A bold seeded kabuli variety					

(100 seed weight of 38 - 40g) with beige colour attractive seeds with a protein content of 19.25%. Suitable for cultivation in South Zone comprising of Andhra Pradesh, Karnataka and Tamilnadu under rainfed conditions as well as with one or two protective irrigation. A better alternative to KAK2.

Cultures which have completed minikit testing and ready for release RICE







Variety : MTU 1140 : MTU 5249xPLA 8572 Parentage Duration : 140-145 days Season : Kharif Reaction to pests, diseases and abiotic stresses BPH

: Moderately resistant to brown spot, resistant to

Average Yield : 6.0 t/ha

Salient features : Suitable for *Kharif* in flood prone areas of Krishna, Godavari and North Coastal Zones of Andhra Pradesh. Tolerates 10 days flash floods (75% Plant survival).Suitable for stagnant flooding (30-35cm) and for direct seeded conditions. It possesses two weeks anaerobic germination (80%) plant survival).Medium slender grain with good cooking quality. It is a non lodging variety with strong culm suitable for machine harvesting.

RICE







Variety	: MTU 1156				
Parentage	: MTU 1010xMTU 1081				
Duration	: 115-120 days				
Season	: Rabi				
Reaction to pest	ts,				
diseases and ab	iotic				
stresses	: Resistant to leaf blast and				
	BPH				
Average Yield	: 7.5 t/ha				

Salient features : Non-lodging, fertilizer responsive upto 180 kg N/ha. Strong culm with more culm diameter and culm strength. Two weeks seed dormancy. Resistant to blast and BPH. Low shattering of grains (<2%).Suitable for direct seeded conditions. Long Slender translucent grain with good cooking quality.

RICE



Variety	: NDLR 7				
Parentage	: BPT3291x CR 157-212.				
Duration	: Kharif(140days) and				
	Rabi (135 days)				
Season	: Suitable for both <i>Kharif</i> and				
	Rabi.				
Reaction to pests	2				
diseases and abio	tic				
stresses	: Tolerant to moisture Stress.				
	Highly tolerant to leaf folder,				
	brown plant hopper and				
	tolerant to blast.				
Average Yield	: 7.5 t/ha				
Salient features	: Non lodging and responsive to				
fertilizers. Cooking quality, taste and keeping					
quality are as that	at of BPT 5204. Fetches higher				
1					

market price. Non shattering variety. Suitable for cultivation in Rayalaseema, Guntur and Prakasam districts of Andhra Pradesh and Mahaboobnagar district of Telangana and Bellary, Rayachur and Gangavathi districts of Karnataka.

Black gram



Variety	: TBG 104				
Parentage	: PU 19 X LBG 623				
Duration	: 75 – 80 days				
Season	: Suitable for all seasons				
Reaction to pest	5,				
diseases and					
abiotic stresses	: Resistant to Yellow Mosaic				
	Virus				
Average Yield	: 17 – 18 q/ha				
Salient features	: Seeds are shining black and				
	medium size. Photo				
	insensitive and suitable for				
	all seasons. Resistant to YMV.				

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Bengal gram



Variety : NBeG 49 Parentage : Annegriri x ICC 4958 Duration : 90 – 105 days Season : *Rabi* Reaction to pests, diseases and abiotic stress : Tolerant to Fusarium wilt Average Yield : 20 – 25 q/ha

Salient features : High yielding desi bengalgram variety with attractive seeds. Fetches premium price in the market on account of its attractive seeds. A better alternative to JG 11 in Andhra Pradesh. Suitable for all chickpea growing districts of Andhra Pradesh. Semi spreading plant type and medium in height. Seeds are medium bold, angular, brown in colour with rough testa and uniform in size.

Groundnut



Variety	: K 1535
Parentage	: Kadiri 6 X NCAC 2242
Duration	: 115 – 120 days
Season	: Kharif
Reaction to pests	, diseases and
abiotic stress	: Tolerant to PSND, Tolerant to
	thrips, jassids and leaf spot.
Average Yield	: 16 – 17 q/ha
Salient features:	

Possesses 50% oil content with good kernel characters (smooth rose testa). Tolerant to PSND with the preferred kernel characters of Kadiri 6.

Sunflower



NDSH 1012



Variety	: NDSH 1012
Parentage	: NDCMS 30A X R 843
Duration	: 90 – 95 days
Season	: Kharif rabi and summer
Reaction to pests	, diseases and abiotic
stress : Moderate	ely resistant to downy mildew
Average Yield	: 20 – 25 q/ha
Salient features:	

It is an early maturing, high yielding, high oil content (40-41%) hybrid suitable for growing in all seasons. A better alternative to KBSH 44, DRSH 1, SB 275 and other popular private hybrids in Andhra Pradesh. It has flat and medium size head with ovoid elongate seeds with a test weight of 4 to 5 grams.





In Mesta two entries viz., AHS-216 and AHS-230 have been identified for release in the workshop of Jute and Allied Fibres.

In groundnut, genotype K 1719 which significantly out-yielded the best check variety ICGV 00350 was proposed for identification in the name of Kadiri Chithravathi for zone IIIb (Andhra Pradesh, Telangana, & Tamilnadu) for rabi- summer season.

The research activities taken up at different locations during the year2015-16 are presented crop-wise and discipline-wise hereunder.

Variety	: ABH-1 (Ananthapuramu
	Bajra
	Hybrid-1)
Parentage	: ICMA 96444 X ARL - 1
Duration	: 85-90 days
Season	: kharif and rabi seasons
Reaction to pes	ts, diseases and
abiotic stress	: Tolerant to downy mildew
	Moderately tolerant to
	drought
Average Yield	: rainfed - 15 to 25 q/ha
	Irrigated - 30 to 35q/ha
a 1.	

Salient features:

It is a medium duration, dual purpose, medium tall (140-170 cm), non-lodgin and high yielding hybrid. Panicles semi compact and conical in shape. Grain round, smooth, medium bold with light ash / gray colour.

1. Cereals and Millets

1.1 Rice

Research on rice was carried out at Maruteru, Bapatla, Ragolu, Machilipatnam, Nellore, Utukur, Chintapalle and Nandyal research stations, covering all agro-climatic zones of Andhra Pradesh with the APRRI & RARS, Maruteru as the lead centre.

Crop Improvement

Promising Rice cultures under minikit testing during 2015-16

S.No.	Research Station	Culture (s)	Duration (days)	Characters
1	APRRI & RARS, Maruteru	MTU 1166 3 rd year in <i>kharif</i>	150	 two weeks dormancy medium slender high yielding with resistance to BLB and BPH excellent cooking quality
2		MTU 1187 1 st year in <i>Rabi</i>	120-125	 7.5 tha yield potential resistance to blast and moderately resistant to BPH. long slender grains resistance to blast and moderately resistant suitable for both raw rice and export.

S.No.	Research Station	Culture (s)	Duration (days)	Characters
3		MTU 1184 1 st	145-150 year	• Tolerant to flash floods for 10 days at tillering stage and suitable for stagnant flooding (20-50 cm) with Elongation ability Possessing 2 weeks seed dormancy.
4		MTU 1194 1st year	145-150	Moderately resistant to BPH. Higher yielding potential than the local popular variety MTU 7029.
5		MTU 1224 1 st year of testing	130-135 (kharif) 125 (rabi)	Non lodging with two weeks dormancy and low shattering.translucent with high head rice recovery (65%) and good cooking quality. Moderately resistant to BPH.High yielding potential than the local popular variety BPT 5204.
6		MTU 1226 1 st year of testing	145-150	Non lodging with two weeks dormancy and low shattering.Grains are bold with high test weight (27.5 grams).Straw glumed similar to Prabhat (MTU 3626).Good grain quality suitable for export to Kerala and Tamilnadu as an alternative to MTU 3626 for <i>kharif</i> .Moderately tolerant to BPH and BLB.
7		MTU 1229 1 st year of testing	150-155	Non lodging. Dark green foliage with semi erect plant similar to Swarna. Translucent with high head rice recovery (67%). Moderately resistant to BPH and BLB. Higher yielding potential than the local popular variety MTU 7029.
8	ARS, Nellore	NLR 40065	120-125	Suitable for early <i>kharif</i> with thermo tolerance.
9		NLR 40058	120-125	Suitable for early <i>kharif</i> with thermo tolerance.
10		NLR 33671	120-125	 Tolerant to blast and BPH Medium slender grain Non-lodging with purple pigmentation. Very good cooking quality.
11		NLR 3042	120-125	 Suitable for <i>Rabi</i> and Early <i>kharif</i> seasons Tolerant to blast with medium hold grain
12		NLR 3083	135	 Tolerant to blast and BPH with medium slender grain Non-lodging and good cooking quality
13		NLR 20084	150-155	 Suitable for <i>kharif</i> season and can be sown up to October ending. Tolerant to blast, non-lodging, slightly photo sensitive, molagolukulu (Dark Gloom, MS) grain with very good cooking quality. Suitable for direct seeding and organic farming



S.No.	Research Station	Culture (s)	Duration (days)	Characters
14		NLR 20104	150-155	 Suitable for <i>kharif</i> season and can be sown up to October ending Tolerant to blast, non-lodging, slightly photo sensitive, medium slender (Straw glume, fine grain) with good cooking quality Suitable for direct seeding and organic farming.
15		NLR 3513	140 days	Very dwarf, non lodging,Tolerant to BPH & BlastCoarse grain
16		NLR 40011 st year	140-145	Fine grain with blast and BPH toleranceCompact tillering, strong culm, non lodging,straw glumeGood cooking quality Low input variety
17		NLR 3217 1 st year	120-125	Compact tillering, dense panicle, semi dwarf, non-lodging, straw glume with fine grain qualityMultiple resistance to leaf and neck blast, sheath blight, sheath rot, brown spot and RTDSuitable for r <i>abi</i> and early <i>kharif</i> seasons.
18		NLR 40054 1 ^s year	^t 125-130	Aromatic rice culture with gall midge, blast and thermo tolerance. Medium slender grain with strong aroma. Suitable for early <i>kharif</i> and <i>rabi</i> sowings.
19	RRU, Bapatla	BPT 2571 days	135-140	High yielding rice culture with blast and BPH resistance Compact tillering, semi-dwarf with straw glume. Medium slender grain similar to BPT 5204 grain type with good cooking quality
20		BPT 2615 days	120-125	Tolerant to blast, BPH, non-lodging, medium slender (Straw glume, fine grain) with good cooking quality. Suitable for late <i>Kharif</i> and <i>rabi</i> season.
21		BPT 2595 1 st year	145-150 days	Suitable for late <i>kharif</i> with medium slender grain, good cooking quality traits and high anti-oxidant activity.
22		BPT 2660 1 st year	140-145 days	Suitable for late <i>kharif</i> season with medium slender grain and good cooking quality traits.





NLR 40054 Short duration culture with aromatic fine grain, blast and gall midge tolerance



NLR 3513 Long duration (140 days), dwarf, non-loding, tolerance to BPH, blast, medium bold grain with high yield potential

APRRI & RARS, Maruteru

kharif

In Advanced Varietal Trial-1 (Medium), three entries PR -14104 (5851 kg/ha), PR -14101 (5760 kg/ha) and HKR 09-189 (5048 kg/ha) recorded superior yield than the best check MTU 1001 (5045 kg/ha).

In Multi Location Trial-Early- wet direct seeding- late sown conditions, out of 36 entries, MTU 1121 recorded highest grain yield of 4475 kg/ha followed by PR 124 (4315 kg/ha), DRR Dhan 44 (IET 22081) (4255 kg/ha) and Varalu (4190 kg/ha).



In AVT-1 semi deep water trial, out of 11 entries tested, the entries MTU 1140 (4300 kg/ ha) and CR 3607-12-1-2-1-1 (4137 kg/ha) performed better than local check MTU 1064 (2617 kg/ha).



In NSDWSN, entries CR 3900-135-8-5-4 (4039 kg/ha) and CR3060-2-1-12-2 (3907 kg/ha) recorded higher grain yield than local check PLA1100 (3236 kg/ha).

In hybrid rice- HRT (MS) Trial, the hybrid PR 14111 (5767 kg/ha) recorded highest yield followed by PR 14109 (5579 kg/ha) and MR 8666 (5110 kg/ha) in comparison with national check variety BPT 5204 (4468 kg/ha).

In Advanced Yield Trial – Late, among the eighteen entries evaluated, MTU 2035-12-2-4-1 (6935 kg/ha), MTU 2086-9-1-1-2 (6302 kg/ha) and MTU 2197-12-1 (6126 kg/ha) were the top three significantly out yielding entries compared to the best check, MTU 1061 (4274



kg/ha).

In MLT-Late, entries MTU PS 257-1-1-1 (5587 kg/ha), MTU 2035-18-1-2-7 (5576 kg/ha) and MTU 2111-13-1-2 (5565 kg/ha) were the top three yielders compared to the best check MTU 1061 (4531 kg/ha).

In AYT (M), the entry MTU 2404-25-1 (6383 kg/ha) recorded highest yield followed by RM 152-35-2-1-1 (6145 kg/ha) and MTU 2284-103-1-9 (5836 kg/ha) in comparison with the check MTU 1075 (5275 kg/ha).

In MLT (M), entries BPT 2601 (6375 kg/ ha), RM 147-8-5-1-1 (6176 kg/ha) and MTU II 369-72-4-1-1-1 (5982 kg/ha) recorded higher grain yields in comparison with the local check MTU 1075 (5306 kg/ha).

Among nineteen entries in AYT-Early, the entry MTU 2347-45-1-1 recorded highest grain yield of 7380 kg/ha followed by 2274-1-3-1 (6944 kg/ha) and RM 7-61-3-1 (6794 kg/ha) and significantly out yielded the local check MTU 1121 (5874 kg/ha).

In AYT SDW, entries MTU2244-128-18 (4167 Kg/ha), MTU 2142-9-2-1 (4060 kg/ha) and MTU 2145-6-2-1 (3832 kg/ha) gave higher yield than local check PLA 1100 (2991 kg/ha).

In Multilocation Trial-Direct seeded-Late (MLT-DS-L), out of 22 entries, the entry RM 102-10-3-2-1 recorded highest grain yield of 6835 kg/ha followed by DSM 327 (6710 kg/ha) and RM 136-32-2-1-1 (6270kg/ha)while the best check MTU 1061 recorded 5680 kg/ha. Similarly, in Multi Location Trial-Direct seeded-Medium (MLT-DS-M), the entry RM 152-54-3-1-1 recorded highest yield of 6810 kg/ha followed by RM 154-26-5 (6670 kg/ha) and RM 135-51-1 (6170 kg/ha).

Among 32 entries tested in Advanced Yield

Trial- Direct Seeded -Medium and late (AYT-DS-M&L) trial, the entry RM 102-10-3-21 recorded highest grain yield of 6790 kg/ha followed by RM 152-54-3-21 and RM 67-55-2-1-1 with 6505 and 6450 kg/ha, respectively. Similarly, in Advanced Yield Trial- Direct Seeded-Early and Mid early (AYT-DS-E&ME) trial, among the 30 entries, the entries RM 57-41-1-1-1 (6110 kg/ha), MTU II 15-2-1-2-1-1-1 (5980 kg/ha) and RM 168-16-3-1-1 (5960 kg/ ha) recorded significantly superior yields than MTU 1121 (5650 kg/ha).

Rabi 2015-'16

In AYT-Early, among 24 entries, the entry 2274-74-2-2-1 recorded highest grain yield of 7854 kg/ha followed by MTU 2274-74-2-2-1 (7688 kg/ha) and RM 7-61-3-1 (7456 kg/ha) while the best local check MTU 1121 recorded 6609 kg/ha. And in MLT-Early, the entry MTU II 369-33-1-1 recorded highest grain yield of 7679 kg/ha followed by MTU 1213 (7497 kg/ ha) and MTU 2229-26-2-1-1 (7376 kg/ha) while the best local check MTU 1121 yielded 6615 kg/ha.

In AYT (M), the entry MTU 2404-52-3 (5993 kg/ha) recorded highest yield followed by MTU 2404-25-1 (5637 kg/ha) and RM 138-80-3-1-1-1 (5512 kg/ha) in comparison with the check MTU 1001 (5440 kg/ha).

Out of 12 entries tested under AYT-DS-Medium, the entry RM 152-54-3-1-1 recorded highest grain yield of 7478 kg/ha followed by RM 155-122-1-1-1, RM 88-95-1-1-1 and RM 57-30-1-1-1 with 7364 and 7245 and 7215 kg/ha respectively, while the check MTU 1121 recorded 6540 kg/ha, while in AYT-DS-Early, the entry RM 141-134-3- 1-1 recorded highest grain yield of 7248 kg/ha followed by RM 136-48-3-1-1 (7210 kg/ha) and RM 136-33-1-2-1 (7124 kg/ ha) while the checks MTU 1121 and MTU 1010 recorded 6654 and 5845 kg/ha respectively.

In MLT-DS- Medium trial, the entry RM 138-5-2 recorded highest grain yield of 7625 kg/ ha followed by RM 141-134-4-1-1 and RM 152-54-3-1-1 with 7325 and 7475 kg/ha, respectively over the best check entry MTU 1121 (6555 kg/ha) and in MLT-DS- Late, the entry RM 102-10-3-2-1 (7515 kg/ha) followed by RM 67-60-1-1-1 (7450 kg/ha) and RM 71-42-1-1-1 (7350 kg/ha) recorded higher grain yield than the check MTU 7029 (5960 kg/ha).

Among 35 entries tested under Green Super Rice- Rainfed- low land, the entries IRRI123 (162g/m²), MTU 1010 (140g/m²) and HHZ 14-SAL19-Y1 (134 g/m²) gave higher yield under stagnant flooding condition.

In International Rice Blast Nursery (IRBN-2015) during *Kharif*, under normal protected conditions the entry IR 11A479 recorded highest grain yield of 7560 kg/ha followed by IR 11A501 (7410 kg/ha) and IR 10F221 (7260 kg/ha).

Rice Research Unit, Bapatla

Rice Research Unit, Bapatla maintained one hundred and eighty seven germplasm lines collected from various research stations and data was recorded for seven entries on 50 characters.

In AYT- Late, seven entries *viz.*, BPT 2773 (7459 kg/ha), BPT 2774 (7409 kg/ha), BPT 2776 (7381 kg/ha), BPT 2644 (6342 kg/ha) BPT 2673 (6237 kg/ha,) BPT 2782 (7287 kg/ha), BPT 2743 (7241kg/ha), BPT 2750 (7193kg/ha) and BPT 2766 (6902 kg/ha) recorded significant yield superiority over checks BPT 2270 (6123 kg/ha) and BPT 5204 (4879kg/ha).

Among entries tested in AYT-Medium, BPT 2703 (7360 kg/ha), BPT 2741 (7237 kg/ha), BPT 2769 (7029 kg/ha), BPT 2717 (6932 kg/ha) and BPT 2704 (6845 kg/ha) recorded significantly superior yield over MTU 1001

(5858kg/ha).

The entries BPT 2658 (7124 kg/ha), BPT 2660 (7069 kg/ha) and BPT 2595 (6949 kg/ha) were the top three significantly superior yielders over the best check MTU 7029 (4859 kg/ha) in MLT- Late and the entries RM 71-35-2-1-1 (7984kg/ha) followed by RM 168-16-3-1-1 (7622kg/ha) and MTU2067-9-1-1-2 (7518 kg/ha), recorded significantly superior grain yield than the best check MTU1001 (5437 kg/ha) in MLT-medium,

Among 19 entries tested in Initial Hybrid Rice Trial – Medium slender (IHRT - MS), the entry MR-8666 (6945 kg/ha) followed by SPH-1003 (6875 kg/ha), PR14109 (6646 kg/ha), SPH-5400 (6319 kg/ha) and DRRH-3 (6181 kg/ha) recorded significant yield advantage over the local check BPT 5204 (4938 kg/ha).

Under dry direct sowing, entries BPT 2743(6544 kg/ha), BPT 2671 (6417kg/ha), JGL 11727 (6270 kg/ha), NLR 20017 (6504 kg/ha), BPT 2571 (6134 kg/ha), JGL 3844 (6215 kg/ha), NLR 3041 (6158kg/ha), BPT 2595 (6297kg/ha), BPT 2605 (6130kg/ha) and MTU 1001 (6076kg/ha) recorded significant yield superiority over the check BPT 5204 (4919 kg/ha).

Under nutritional and bio-chemical quality analysis of 25 rice genotypes, the Iron content ranged from 7.0 ppm (BPT 2595) to 10.7 ppm (BPT 2741) in brown rice and from 1.1ppm (NLR 145) to 5.2 ppm (BPT 2295) in polished rice. Likewise, Zinc content ranged from 11.2 ppm (BPT 2675) to 22.3 ppm (NLR 34449) in brown rice and in polished rice it ranged from 7.8 ppm (NLR 145) to 18.7 ppm (JGL 1798). Protein content ranged from 5.87% (JGL 1798) to 8.17% (BPT 2644) while Starch content ranged from 48.52% (BPT 2595) to 49.19% (NLR 34449). For antioxidant activity, the genotype BPT 2595



(16.666 μ g/ml) followed by BPT 4358(15.193 μ g/ml), BPT 2675(14.369 μ g/ml) and BPT 2743(13.985 μ g/ml) recorded higher values when compared with BPT 5204 (6.949 μ g/ml).

Agricultural Research Station, Machilipatnam

Entry MCM 103, a semi dwarf, non-lodging, saline tolerant, having dormancy for 3 weeks and medium slender grain with 140-145 days duration (*kharif*) and high yield potential of 6.5 t/ha completed first year minikit testing during *kharif* 2015.

In Multilocation Trial- Early, the culture MCM 101 recorded 809 kg/ha of grain yield and ranked No. 1 followed by MTU 1216 with 781 kg/ha and NLR 3391(743 kg/ha), while in the MLT- Medium, the culture BPT 2677 recorded 2028 kg/ha of grain yield and ranked No. 1 followed by MCM 100 1925 kg/ha of grain yield.

In Coastal Saline Tolerant Variety Trial-Initial Variety Trial (IVT 1 - CSTVT), out of 64 test entries, the culture 4044 recorded highest grain yield of 2375 kg/ha followed by 4019 with 2312 kg/ha and the culture 4061 with 2271 kg/ ha of grain yield while the check MTU 1061 yielded 1792 kg/ha.

Regional Agricultural Research Station, Nandyal

In early duration multi location trial, among 17 entries, only one entry, E 461 recorded significantly superior yield of 5405 kg/ha over the check, MTU 1010 (4749 kg/ha). In MLT-Medium and MLT- Late none of the test entries were significantly superior over the respective common checks.

In Observational Yield Trial (Medium) out of the 13 entries 7 entries i.e., K15M06 (6913 kg/ha), K15M11 (6497 kg/ha), K15M07 (6460 kg/ha), K15M13 (6029 kg/ha), K15M09 (5977 kg/ha), K15M05 (5925 kg/ha) and K15M01 (5925 kg/ha) performed better by recording significantly superior yields over check, BPT 5204 (5821 kg/ha).

Entries K15L04 (7640 kg/ha) and K15L05 (7484 kg/ha) recorded significantly superior yields over the check, BPT 5204 (6393 kg/ha) among the thirteen entries evaluated in Observational Yield Trial (Late).

Agricultural Research Station, Jangamaheswarapuram

In Multilocation yield trial (kharif), entry E-454 (5917 kg/ha) over MTU 1010 (5072 kg/ ha) in early group, M-515 (7361 kg/ha) against MTU 1001(5611 kg/ha) in medium duration group and L-517 (7500 kg/ha) over MTU 7029 (6028 kg/ha) in late duration recorded highest grain yields.

Agricultural Research Station, Nellore

One hundred and thirty four new germplasm accessions (49 lines under IRBPHN, 69 lines under IRBBN and 16 lines under IRHTN) were added this year to already available 250 germplasm accessions.

In AICRIP trials Seven cultures belonging to ARS, Nellore viz., NLR 3242 in IVT-E transplanted, NLR 3241 in AVT-1-IM, NLR 3302 in IVT-1M, NLR 4001 in IVT-L, NLR 3238 in AVT-1 Bio-fortification, NLR 3337 and NLR 3350 in IVT-1M were found promising and were advanced to next level of testing.

In Advanced Variety Trial-Late, out of 15 entries, five entries were found significantly superior over the best check NLR 33892 (3979 kg/ ha). The top three high yielding entries were NLR 3433 (5084 kg/ha), NLR 3432 (4853 kg/ha) and NLR 3418 (4704 kg/ha) respectively.

In Multilocation Varietal Trial (Early), among 15 entries evaluated, only one entry, E465



(MTU PS-2-11-1-1) recorded significantly superior yield of 6467 kg/ha over the best check NLR 34449 (5546 kg/ha).

In Multilocation Varietal Trial (Medium), out of 26 entries evaluated, only one entry M 515 (MTU 11-369-72-4-1-1) recorded significantly superior yield (6488 kg/ha) over the best check MTU 1001(5486 kg/ha).

In International Rice Bacterial Blight Nursery (IRBBN), the culture IR10N305 recorded highest grain yield of 45.3 grams per plant followed by IR82492-7-2-3-3 (39 g/pl) and IRBB10 (36.8 g/pl). Similarly in International Rice Brown Plant Hopper Nursery (IRBPHN), entry IR09N127 recorded highest grain yield of 42.4 g/pl followed by Sinna Sivappu (41.5 g/pl) and TN1 (39.2 g/pl) and in International Heat Tolerance Nursery (IRHTN), the entry IR11C22 (44.3 g/Pl) recorded highest grain yield followed by IR1C208 (32.8 g/pl) and IR10C172 (28.4 g/pl).

Agricultural Research Station, Utukur

Among seventeen entries tested in Advanced yield trial, three entries namely UTR51 (7404 kg/ ha), UTR41 (7267 kg/ha) and UTR06 (7183 kg/ ha) recorded significantly higher grain yields against the check NDLR 8 (5858 kg/ha).

Agricultural Research Station, Ragolu

During *kharif* in Multi-location Yield Trials, the entries MTU 2127-48-1-1-1 (8361 kg/ha), MTU 20601-1-1-1 (8120 kg/ha) and MTU 2127-35-1-1-1 (7685 kg/ha)over the local check RGL 11414 (5315 kg/ha) in late group, BPT 2601 (9083 kg/ha), MTU 11-369-72-4-1-1-1 (8972 kg/ha) and MTU 2067-9-1-1-2 (8458 kg/ha) over the check MTU 1001 (7204 kg/ha) under medium duration group and MTU 1214 (8757 kg/ha), MTU PS 2-11-1-1 (8420 kg/ha) and MTU 2231-18-1-3 (8099 kg/ha), over the check RGL 1880 (5984 kg/ha) in early group were found to be significantly superior and top grain yielders.

During *kharif* in Multi-location Yield Trial (Direct sown Medium), among the 30 entries, the enties DSM 10 (7107 kg/ha), DSM 7 (6747 kg/ ha), DSM 13 (6147 kg/ha), DSM 8 (6093 kg/ ha), DSM 25 (6067 kg/ha) and DSM 18 (6053 kg/ha) were found to be significantly superior compared to other entries.

In Advanced Variety Trial-1 (Irrigated Medium), the entry HRI 174 (HC) (7541 kg/ha) compared to other entries and the local check RGL 11414 (6996 kg/ha) and in Advanced Variety Trial-2 (Irrigated Medium), the entries HKR 09-104 (7185 kg/ha) and MEPH-114 (Hybrid) (7089 kg/ha) compared to other entries and the local check RGL 2538 (6850 kg/ha) were found to be superior in terms of yield.

Crop Production

Agricultural Research Station, Reddipalli

Weed management practices on growth and yield of direct seeded rice indicated that hand weeding at 20 and 40 DAS recorded maximum grain yield of 4762 kg/ha followed by post-emergence application of pendimethalin at 35 DAS (4659 kg/ha). Among the rice hybrids tested, PAC 837 recorded significantly higher yield compared to PA6444.

Regional Agricultural Research Station, Tirupati

For the first time, Core-shell structured phosphorous nanoparticles were synthesized using Stevia leaf extract (10%) and rock-phosphate (Jordan). The prepared 'P' nanoparticles were characterized and found to be highly stable. These 'P' nanoparticles showed significant positive effects on germination, root growth, shoot growth, chlorophyll content and protein content of rice seedlings.



Regional Agricultural Research Station, Anakapalle

In rice – maize system, dhaincha as preceding crop to rice produced the highest crop residue on fresh weight basis (29.39 t/ha) followed by sunhemp (20.89 t/ha) and both of them improved the grain yield of the succeeding crop of rice (7366 and 6646 kg/ha respectively) than all other pre *kharif* crops.

In-situ green manuring of cowpea and incorporation resulted in production of highest biomass (19.67 t/ha), panicles/m²(590), panicle weight (2.58 g), grain and straw yield (6703 kg/ ha and 11628 kg/ha) of paddy.

In North Coastal Zone, significantly highest grain yield was recorded with machine transplanting (6.25 t/ha) followed by SRI method (5.75 t/ ha) and drum seeder method (5.72 t/ha) with 150 % RDN+ 100 % RDPK and foliar spray of potassium nitrate at 10 days after panicle initiation and panicle emergence.

Regional Agricultural Research Station, Chintapalle

Among seven varieties tested, MTU 1010 has recorded significantly higher yields (65.7 q/ ha) followed by Tellahamsa (52.6 q/ha), WGL 283(52.5 q/ha) and RNR 2458 (52.4 q/ha). Non significant differences in yields were recorded among three different sowing dates.

APRRI & RARS, Maruteru

Studies on Permanent plot experiment on integrated nutrient supply system in rice-rice crop sequence during *kharif* revealed that highest grain yield of 4861kg/ha was obtained with application of 75% recommended NPK through inorganic fertilizers + 25 % N through FYM followed by 75% recommended NPK through inorganic fertilizers + 25 % N through paddy straw (4649 kg/ha). During *rabi*, highest grain yield of 6185 kg/ha was recorded with 100% recommended NPK through fertilizers which was 50% recommended NPK + 50% N through paddy straw treatment during *Kharif* season.

Studies on Development of organic farming package for rice during *kharif* revealed that application of 100% recommended NPK + Micronutrients recorded higher grain yield of 3995 kg/ ha followed by 50% RDNPK through inorganic and 50% N through FYM (3209 kg/ha). During *rabi*, highest grain yield of 5460 kg/ha was recorded with application of 100% RDNPK + Micronutrients followed by 50% RDNPK through inorganic and 50% N through FYM (5079 kg/ ha).

In the identification of need based cropping systems for different agro ecosystems during *Kharif*, MTU 1075 recorded highest yield of 5120 kg/ha compared to MTU 1112. Maize and sorghum after *kharif* rice cropping system performed well among Rice - ID crops.

Among three AVT-SDW (Semi Deep Water) cultures tested, maximum grain yield was recorded with IET - 23017 (2.48 t/ha) followed by IET - 2305241 (2.11 t/ha) compared to standard checks.

Of the three AVT ASG (Aromatic Short Grain) cultures tested, maximum grain yield was recorded by IET-23879 (6.83 t/ha) followed by MTU 1064 (6.66 t/ha) compared to other entries. All entries were found suitable for 100% RDN application.

During *kharif* highest grain and straw yields were recorded with RDF + Silicate Tabs SiO2 @ 2.5 kg/ha at 25 DAT and 50 DAT (4850 kg/ ha & 6339 kg/ha) followed by RDF + Vigore application @ 625 g/ha as basal application + Spray @ 1.25 g/l at PI stage (4762 kg/ha and 6285 kg/ha respectively) compared to other treatments.

ANGRAU

Studies on long term soil fertility management in low land rice soils of Godavari delta under rice-rice cropping system revealed that the highest mean grain yield was recorded with 100% NPK + Zn +S + FYM @ 5 t/ha both in *kharif* (5400 kg/ha) and *rabi* (5700 kg/ha) and was significantly superior over the control.

For yield maximization of rice through Site Specific Nutrient Management, application of fertilizers based on the nutria expert i.e. 118-27-51 recorded highest grain yield of 5.43 t/ha followed by RDF (90-60-60) 4.53 t/ha during *kharif* while in *rabi*, highest grain yield was recorded with RDF (180-90-60) i.e. 6.87 t/ha.

Crop residue management under machine harvested rice fields during *Kharif* revealed that application of SSP @ 125 kg + 25 kg Urea per hectare at first puddling recorded maximum grain yield 5.86 t/ha which was on par with the *in-situ* incorporation of straw @ 5 t/ha along with application of cellulolytic microorganisms (EM1 culture) @ 1 kg/ton of trash (5.76 t/ha), while in *rabi, in-situ* incorporation + SSP application @ 125 kg/ha at first puddling recorded maximum grain yield of 7.62 t/ha.

MTU 7029 recorded relatively higher grain yield (5817 kg/ha) in organic farming compared to inorganic treatment (5150 kg/ha) during *kharif* but in *rabi*, highest grain yield was obtained with inorganic treatment (7.70 t/ha) while organic treatment gave a grain yield of 5.86 t/ha.

Zinc uptake of grain in MTU-1001 was high in both *kharif* and *rabi* with Soil application of $ZnSO_4$ @ 50 kg/ha which was on par with the Soil application of $ZnSO_4$ @ 37.5 kg/ha along with foliar spray of $ZnSO_4$ at 14 DAT. The grain and straw yield was highest with the Soil application of $ZnSO_4$ @ 50 kg/ha along with the foliar spray of $ZnSO_4$ at 14 and 30 DAT.

Based on heat tolerance indices, entries DRRH-106, DRRH-107, IET 24075, Somali, IET23979 and IET 24082 could be selected as relatively heat tolerant genotypes. The grain yield recorded under elevated temperature showed strong association with GMP, YI, MP and HIS and these indices are useful in screening for high temperature tolerance.

Under induced stress, application of Silicon solubilizer Imidazole to the soil increased productivity of rice in hybrids and varieties. It improved the silicon solubilization and uptake of silicon by rice plants. The grain yield was increased by 12.5 % by Imidazole soil application and 9.2 % by foliar spray of Siloxol.

Screening for dormancy during kharif indicated that the duration of dormancy ranged from 1week (BPT 2688) to 7 weeks (MTU 1001). Five MLT-(E) cultures (NLR 3364, NLR 5707-22-2-1, NLR 3304, MTU 2274-3-2-2 and MTU 1211), 7 MLT-(M) cultures (NLR 3405, NLR 3296, NLR 5763-36-1-1, BPT 2601, MTU 2067-9-1-1-2, MCM 104, and NLR 5785-12-2-1) and 14 MLT (L) cultures (RGL 7014, BPT 2675, MTU 2195-201-1-3, NLR 3379, MTU 335-19-1-1-1, MTU 2111-13-1-2, NLR 3385, BPT 2595, NLR 3380, BPT 2658, NLR 5785-12-2-1, NLR 3390, BPT 2661 and MTU 2195-105-1-5) were identified as having better dormancy characters, which are having less than 5% and 10% germination at maturity and 5 days after maturity respectively and they can be preferred to grow in wet season of coastal region of A.P.

Agricultural Research Station, Nellore

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During early *kharif* (2015), highest grain yield was recorded with test variety NLR 40024

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(7762 kg/ha) and was on par with NLR 3242(7738 kg/ha). Among nitrogen levels, 160 kg N/ha was found to be optimum for early *kharif*.

During *rabi* (2015), highest grain yield was recorded with NLR 3217 at 200 kg N/ha (6571 kg/ha) which was on par with NLR 34449 at 200 kg N/ha (6247 kg/ha).

Organic cultivation recorded lower yields both in early *kharif* (11%) and *rabi* (31.5%) seasons compared to inorganic cultivation.

In early *kharif*, lowest % of seedling root damage was recorded with application of rice husk ash and rice husk (@ 10 kg/cent (Basal application) while spraying of Jeevamrutham, Panchagavya, Humic acid (at 7 days before pulling of rice nursery) and gypsum @ 8 kg/cent (as basal) recorded lesser damage to nursery roots while pulling of rice nursery.

Agricultural Research Station, Ragolu

During *kharif*, variety Swarna recorded a grain yield of 6446 kg/ha under organic farming practices as against 6699 kg/ha with inorganic practices. Both the treatments were at par in grain yield. Regardless of the source, supply of 120 kg N/ha recorded significantly higher grain yield over 80 kg N/ha.

Among different crop establishment methods, MSRI recorded highest grain yield (7159 kg/ha), followed by semidry rice (6835 kg/ha). However, semi dry rice recorded higher net benefit ratio (1.74) followed by drum seeder (1.36).

Under dry direct sown cultivation (semi dry method), hybrids Arise 6444, VS 312 and varieties RGL 2538 and RGL 11414 found superior in suppression of weeds and recording higher weed control efficiency and consequently higher grain yields compared to other cultures. In semi dry rice (*kharif*), post emergence application of Bis-pyribac sodium @ 25 g a.i./ ha at 20 DAS followed by Ethoxysulfuron @ 20 g a.i./ha + Fenoxaprop P Ethyl with safenor (Rice star) @ 625 ml/ha at 40 DAS effectively controlled weeds (80.9%) and resulted into higher grain yield (6578 kg/ha) and BC ratio (1.91).

Crop Protection

Insect Pest Management

Rice Research Unit, Bapatla

Out of 105 entries screened, 4 entries i.e. BPT 2405, KALANAMAK, NBR 16 and JGL 18047 showed low Leaf folder damage (below1%), while BPT 2405, BPT 3291, KALANAMAK and NBR 8 recorded low BPH population (ranging between 30-50/10 hills). In case of BPH most of the entries scored '1 & 3' while for leaf folder damage except 5 entries all the entries scored '1'.

APRRI & RARS, Maruteru

Rice cultures *viz.*, BPT 2612,2671, 2673, 2678, 2743, CB 05 022, CB 12 132, CB 12 186, MTU II 335-19-1-1-1, MTU 20601-1-1-1-1, MTU PS 8-7-1-1 recorded ZERO score and found to have high field resistance against mixed population of plant hoppers (BPH & WBPH).

Entries NSN 1-86, NSN 1-359 from National Screening Nursery-1(NSN-1), NSN 2-68 from NSN-2 and RP 5588-B-B-B-B-32, RP BIO 5478-166 M, RP BIO 5478-176 M and RP BIO 5478-196 M from Multiple Resistance Screening Trial were found to be highly resistant to mixed population of plant hoppers.

Screening of 153 rice entries for gall midge resistance revealed that 85 entries were highly resistant by recording Zero % damaged plants.

During 2015-16, two new rodenticides

namely Flocoumafen and Difenacoum were tested against *B. bengalensis* under laboratory conditions. The study revealed that the rodents were dead in the mean time and 100% mortality was achieved. The mean mortality time taken by flocoumafen and difenacoum are 3.82 and 4.38 days respectively which are on par with the bromadiolone 0.005% (6.86 days).

Under rodent management technologies in storage conditions, among the bait additives tested in multi-choice test, dry fish powder and dry prawn powder recorded high per cent consumption by the test rodents. All the additives improved the bait intake over the loose bromadiolone 0.005% bait. Dry fish powder additive bait has resulted in highest population reduction of 77.7% among the treatments as it has highest bait acceptance over the other treatments.

In irrigated paddy the rodent catches were highly encouraging in Trap Barrier System (TBS). TBS gave > 90% protection to the rice tillers against field rodents. The halo protection of TBS on surrounding crop is significant.

Bait consumption by rodents was more in cement + Flour added with traces of oil over the cement + Flour bait material. In both the cases all the animals were died with bloated abdomen. The mean time mortality was relatively low with 5.26 days and 6.24 days in the treatments. Cement + flour feeding has caused the abdomen bloat and air bubbles in liver and constriction and shrinkage in intestine. Animal died with difficulty due to corrosion to internal organs and intestine blockage caused by cement feeding.

Agricultural Research Station, Nellore

Studies on insecticide resistance in field population of rice leaf folder, *Cnaphalocrocis medinalis* revealed that, Chlorpyriphos concentration/dose required to cause 50% mortality in

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leaf folder was 2.5 ml/l, for Cartap hydrocloride 1.06 g/l, for Flubendiamide 0.112 ml/l, for Chlorantraniliprol 0.191 ml/l and for Acephate 1.051 g/l.

Insecticide resistance study in field population of brown plant hopper, *Nilaparvatha lugens* revealed that, Brown plant hopper population collected from Kotturu, Nellore District was 5.46 fold resistant for imidacloprid followed by 1.95 fold resistant for buprofezin and 1.29 fold resistant for acephate and 1.26 fold for monocrotophos.

Zinc and chelated zinc were physically compatible with all insecticides tested. However phytotoxic symptoms were observed in rice in the treatments with spinosad, flubendiamide, chloripyriphos and profenophos.

Out of six botanicals, neemazal @ 1000 ml/ha was found to be effective against stem borer with 5.00 % dead hearts which was at par with nimbicidine (5.33 %), neembaan (6.33 %) and multineem (7.00 %) where as in control 15.67 % damage was recorded. Highest grain yield (36.76 q/ha) was recorded in neemazal treatment.

Agricultural Research Station, Ragolu

Out of 273 entries tested for gallmidge reaction in *kharif*, 96 entries were found to be resistant with nil incidence.

In Gallmidge Population Monitoring (GMPM) trial, high level of virulence was observed in Purple (87.9%) followed by W1263 (12.1%) where as Aganni and RP 2068-18-3-5 recorded nil damage.

In multiple resistance screening trial, 8 entries showed resistance to gallmidge with nil incidence, whereas the entries CR 1898-32-69-CN12-2 and CR 2711-149 showed relative resistance to stem borer at reproductive stage with scale 1.



DPX-RAB 55 @ 237.5 ml/ha was highly effective on stem borer (15.37% white ears) while Flubemdamide 240% + Thiocloprid 240% @ 250 ml/ha was very effective on leaf folder incidence in rice (5.32% leaf damage). Highest yield of 6.91 t/ha was recorded in the treatment with DPX-RAB 55 @ 237.5 ml/ha.

Among botanical insecticides for gallmidge control, multineem @ 2500 ml/ha (5.0 ml/l) was efficient with nil incidence, followed by neemazal @ 1000 ml/ha (2.0 ml/l).

Higher natural enemy activity (6.8-6.9/m²), lower leaf folder incidence (1.77% dl), lower gallmidge (0.98%SS) and lower stem borer at pre-harvest stage (5.1%WE) were found in organic plots compared to inorganic plots. Yields were non significant and the difference was only 5%, but cost benefit ratio was higher with inorganic cultivation compared to organic cultivation.

Disease Management

APRRI & RARS, Maruteru

For leaf blast resistance, out of 354 entries screened during *rabi* under NSN 1, 21 entries viz., BRR 2031, PAU 3075-35-1, VG 09006, CR Sugandh Dhan 907, RP 4926-341- 128-101-31-13, XRA 27934 (Hybrid), CN 2015-5-4, IR 64 (NC), HRI 180 (Hybrid), Pusa 1718-14-2-150, Pusa Basmati 1121 (RP), CR 2593-1-1-1-1, RCPR 8, NPH 912 (hybrid), DRRH 102 (hybrid), IR 83421-6-B-3-3-1-1, UPR 2805-14-1-2, OR 2487-9, NP 7061, Shahbhagidhan and CR 3624-1 scored resistant score of 0 under Standard Evaluation System (SES). Under NSN 2, four entries, i.e. AD 13125, ARB 14, CR 3947-9- 25-3-2 and TRG 2015-15 recorded score of 0 under SES.

Screening for neck blast resistance (*rabi*): Out of 354 entries screened under NSN 1, one entry i.e., Pusa 1884-9-12-14 recorded <5% incidence under Standard Evaluation System (SES). Out of 715 entries screened under NSN 2, nine entries i.e., CR 3862-29-15-7, GNV 05-01, CR 3952-2-3-1-1-1, SKL-03-6-19-25-40-25-2, R 1659-450-1-231-1, CSR 10, CR 3561-3-2-1-1-1, KAU CUL 27-2 and CIARI Dhan-4 recorded 0 score. Under NHSN, two entries *i.e.*, GK -5030 and IRH -104 recorded 0 score.

Screening for sheath blight resistance (*kharif*): Out of 354 entries screened under NSN 1, two entries (CR 3605-4-2-1-1-1 and CR 2789-9-2); out of 715 entries under NSN-2, two entries (CR 3898-113-4-2-1 and Ketekejoha) recorded score 3. Similarly, one entry RP 2015DN 130 from DSN recorded resistant score 3.

Out of 1251 entries screened for sheath rot resistance during *kharif* as many as 943 were completely free from sheath rot incidence.

Screening for bacterial leaf blight resistance (*kharif*): Out of 1382 entries screened, entries RP 5898-54-21-9-4-2-2 and CR 3948-2-1-2-2-1 recorded score 3.

Among the new fungicides tested, ICF-110 (tricyclazole 45% + hexaconazole 10% WG) was found effective against sheath blight of rice during *kharif* and against leaf blast and neck blast diseases during *rabi*.

Under Integrated Disease Management of sheath blight (*kharif*), moderately resistant variety (MTU 1061) with recommended dose of nitrogen application and need based spraying with hexaconazole 5% EC @ 2.0 ml/l recorded significantly low sheath blight incidence (10.75%) and severity (11.36%).

Parental polymorphism for stem rot resistance in rice in the cross between MTU-3626 (highly susceptible) and MTU-1064 (moderately resistant) was expressed by 23 out of 192 randomly selected SSR markers.

ANGRAU

Identification of blast resistance genes in rice genotypes: Presence of Pil blast resistance gene was detected in TN1, BPT 5204, Tetep, MTU 1002, MTU 1003, MTU 1004, MTU 1005, NLR 34449, C101 LAC, RIL 10, A57 and Raminad STR 3 through SSR marker with primer RM224 (146 bp); Presence of PiKh blast resistance gene was detected in MTU 1001, BETICHICON, TETEP, Swarna, MTU 1102, MTU 1003, MTU 1004, NLR 34449, IR 64, C104PKT, O. minuta and A57 through SSR marker with primer RM206 (145 bp); Attempts to detect the presence of Pi2 blast resistance gene were made with SSR primer RM 527. An amplified fragment at 180 bp was detected in Jasmine 85, MTU 1001, MTU 1156, TETEP, MTU 1002, MTU 1004, MTU 1005, IR 64 and Raminad STR 3.

Agricultural Research Station, Nellore

A total of 871 rice entries were screened against sheath rot, neck blast and bacterial leaf blight diseases, among which two cultures were resistant and 621 cultures were moderately resistant to sheath rot; five cultures were resistant and 512 cultures were moderately resistant to neck blast; eight cultures were resistant and 117 cultures were moderately resistant to bacterial leaf blight.

Out of 936 rice entries screened against leaf blast disease, 29 entries were resistant and 160 entries were moderately resistant.

Among the biocontrol treatments, sheath blight and leaf blast were most significantly reduced due to three and four sprays respectively of *Pseudomonas fluorescens* while, sheath rot was most significantly reduced due to four sprays of *P.fluorescens* enriched with 1% milk powder. With regard to neck blast incidence the treatmental effects were not significant.

Among the ten fungicides tested against post flowering diseases in rice, kasugamycin 3L, tryfloxystrobin 25%+ tebuconazole 50% WG and kasugamycin 3L + propiconazole 25 EC significantly reduced the sheath rot disease incidence. Stem rot was most significantly reduced by tryfloxystrobin 25%+ tebuconazole 50% WG, isoprothiolane 40 EC + tebuconazole 25.9% EC and kasugamycin 3L + tebuconazole 25.9% EC treatments. There was singnificant reduction in grain discolouration due to all the fungicidal treatments over the control treatment.

Based on the leaf blast reaction on the international differentials it was found that ID-14 race of blast pathogen is prevalent at ARS, Nellore.

1.2 Maize

Crop Production

Regional Agricultural Research Station, Chintapalle

In a three years (2013-14 to 2015-16) study on maize based cropping system for HAT Zone, higher benefit cost ratio was observed with chickpea (2.07) and rajmash (2.04) crops with maize equivalent yields of 6054 and 6558 kg/ha followed by groundnut and niger crops.

Regional Agricultural Research Station, Lam

In rice fallow maize, the highest C: B ratio of 2.13 was recorded with atrazine @ 1.0 kg/ha + paraquat @ 0.60 kg/ha as PE followed by topramezone @ 0.025 kg/ha at 25-30 DAS (seed yield-10400 kg/ha) followed by atrazine @ 1.0 kg/ha + paraquat @ 0.60 kg/ha as PE followed by tembotrione @ 0.100 kg/ha at 25-30 DAS with 2.11 (seed yield-10135kg/ha).

Crop protection



Insect Pest Management

Regional Agricultural Research Station, Lam

Whorl application of granular insecticides like chlorantraniliprole 0.4 G @ 10 kg/ha and fipronil 0.3 G @ 12.5 kg/ha at 22 DAS was found to be effective against pink stem borer in rice fallow maize. In control plot, highest incidence of 25.68% deadhearts was recorded while in all other treatments the per cent deadheart incidence was low and ranged from 5 to 8 per cent only.

Out of 67 maize inbreds evaluated during *rabi* 2015-16, PDM1450, 1458, 1461, 1462, 1469, 1472, 1473, 1495 and 1498 recorded low % deadhearts of 8.33, 7.89, 8.33, 5.88, 9.09, 5.71, 5.4, 5.88, 6.25 and 6.25 respectively. PDM 1439 recorded highest % deadheart of 70.58.

Nylon net fencing and circular wire fencing prevented the wild boar damage as they recorded only 1.5% and 0.7% plant damage respectively over 100% plant damage in control plot as well as in a treatment where in four rows of castor was grown around the maize.

Regional Agricultural Research Station, Anakapalle

Field release of *Trichogramma chilonis* @ 75,000 or 1,00,000 parasitoids per ha from 15 days after seedling emergence, three times at weekly interval was found effective in reducing maize stem borer, *Chilo partellus* damage and recorded significantly higher cob yields (89,020/ ha) compared to field release of *T. chilonis* @75,000 per ha from 25 days after seedling emergence three times at weekly interval (79,320/ ha).

Evaluation of NBAII entomopathogenic strains against maize stem borer, *Chilo partellus* on rabi Maize showed that stem borer damage was significantly low in all the NBAIR entomopathogenic strains *i.e.*, Bb -7 (0.57 %

DH), Bb -5a (0.87 % DH), Bb -19 (0.94 % DH), Bb 23 (1.29 %DH), Bb 14 (1.34% DH) and Ma 35 (1.49% DH) as compared to untreated control (8.53 %DH). Cob yields recorded significantly higher in Bb 19 (87,440/ha) and Bb45 (80,780/ha) as compared to other strains and cob yield was low in untreated control (72,670/ha).

Disease Management

Regional Agricultural Research Station, Lam

Out of 12 maize hybrids tested, 8 hybrids viz., IR 9126, IR 9133, IR 9140, IR 9144, IR9149, IR 9190, DKC 81012 and pioneer 30 V 92 were found resistant to stalk rot disease caused by *Fusarium verticelloides*. In case of stalk rot disease caused by *Macrophomina phaseolina*, 6 hybrids viz., IR 9126, IR 9133, IR 9140, IR 9145, IR 9190 and HISHEEL had shown resistant reaction.

1.3 Sorghum

Crop Improvement

Regional Agricultural Research Station, Nandyal

Genotypes GP3403, GP2608, GP2615 and GP 2626 were observed to be thermo-tolerant with no reduction in shoot and root growth among the 24 genotypes screened using the TIR technique.

AICRP on Sorghum, Bapatla

In Advanced Hybrid Trial – (Grain Sorghum), out of 15 entries tested, the entry SPH 1777 (4983 kg/ha) numerically out yielded the best check CSH 30 (4556 kg/ha) in grain yield during *kharif*.

During *rabi* 2015-16 a total of 142 germplasm lines collected *viz.*, 98 lines from IIMR, 20 from ICRISAT, 24 from RARS, Nandyal were maintained and out of which one



hundred and twenty two lines were evaluated for seven traits.

Crop Production

Regional Agricultural Research Station, Tirupati

Single cut fodder Jowar variety, MP Chari recorded significantly highest green fodder yield of 9.5 t/ha followed by CSV 21 F (8.1 t/ha) and PC 615 (7.6 t/ha). Highest drymatter yield was recorded with CSV 21 F (4.9 t/ha) which was comparable with MP Chari (4.5 t/ha). The Quality parameters like crude protein and fibre were highest with PC 615 variety and significantly higher than other varieties. There was no significant influence of different levels of RDF on yield and quality parameters, except crude protein.

Among multi cut fodder varieties, Pant Chari recorded highest green fodder yield of 31.7 t/ha followed by CoFS-29 (29.7 t/ha) during first cut and in second cut CoFS-29 recorded highest green fodder yield of 21.4 t/ha followed by Pant Chari (19.9 t/ha) and were significantly higher than SSG59-3 (1st cut:26.6 t/ha; 2nd cut:18.3 t/ha). Application of 150 N kg/harecorded significantly higher total drymatter yield over higher and lower levels of N, but on par with 125 kg/ha N application.

In sorghum, application of Nano ZnO@100 ppm significantly increased cane yield, green fodder yield and juice volume over other treatments (calcium oxide and magnesium oxide particles). However, higher percent of brix (18%) and sucrose% was recorded with the treatment which received combination of all nanoscale materials used in the study. Further, addition of nanoscale materials in the process of fermentation proved to be effective and enhanced the bioethanol production.

Insect Pest Management

Regional Agricultural Research Station, Lam

Among 73 sorghum germplasm entries, PEC 8, EP 59, EP 70, EP 95, EP 104, EP 106, EP 107, EP 112, EP116 and IS 29872 were found promising against sorghum shootfly as they recorded less than 10 per cent deadhearts and PEC 2 was found promising against stem borer.

1.4 Pearl Millet (Bajra)

Crop Improvement

Agricultural Research Station, Ananthapuramu

One new pearl millet population / variety (ABV 04) was evaluated in coordinated trials during *kharif* 2015 and it ranked first across the Zone B and promoted to 3rd year testing in coordinated trials.

Crop Production

Regional Agricultural Research Station, Lam

In pearl millet, atrazine (a) 0.75 kg/ha, pendimethalin (a) 1.0 kg/ha and alachlor (a) 1.0 kg/ha as pre emergence recorded a grain yield of 13.75 q/ha, 12.50 q/ha and 12.50 q/ha, respectively compared to 7.50 q/ha recorded in weedy check. Among the post emergence herbicides metsulfuron 0.0015 kg/ha + chlorimuron 0.0015 kg/ha at 20 DAS recorded a grain yield of 18.75 q/ha followed by 2, 4-D Na salt (a) 0.80 kg/ha at 20 DAS with 17.50 q/ha.

Regional Agricultural Research Station, Tirupati

Standardization of NPK recommendations for yield maximization in Bajra showed that 120-30-40 resulted in maximum grain yields (11 t/ha) as compared to 60:30:20 (8.2 t/ha).

1.5 Finger Millet (Ragi)

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Crop Protection



Crop Improvement

Regional Agricultural Research Station, Nandyal

In Co-ordinated advanced varietal trial (early and medium duration group) VL 376 (3264 kg/ha) and VL 379 (2581 kg/ha) recorded the highest grain yield against check variety Champavathi (1528 kg/ha).

Agricultural Research Station, Perumallapalle

Ragi culture PPR 2885 was proposed for release in 2015.

Culture PPR 1012 having yield potential of 32-35 q/ha with tolerance to all the three types of blast completed second year of minikit testing during *kharif* and *rabi* 2015-16.

Among ten entries tested in multilocation trial (*kharif*), only one entry VR 1066 (46.02 q/ha) recorded significantly higher grain yield over the best check Vakula (40.54 q/ha).

Among ten entries tested in multilocation trial (*rabi*), only one entry, PPR 1027 (52.67 q/ha) recorded significantly higher grain yield over the best check Vakula (49.16 q/ha).

Agricultural Research Station, Vizianagaram

In Finger millet Advanced Varietal Trial-I & II (AVT-I & II) - among 11 entries tested against local check UM (32.37 q/ha), GPU 45 recorded highest grain yield of 40.50 q/ha followed by VL 376 (39.73 q/ha) and VR 936 (39.58 q/ha).

In Advanced Varietal Trial III (AVT-III)entry VR 990 recorded highest grain yield of 36.21 q/ha followed by DHFMV 10-2-1 (35.44 q/ha) and GPU 67 (34.77 q/ha) against local check VR 762 (31.25 q/ha).

In Multi Location Yield Trial (MLT) - among 12 entries tested against local check VR (W) 936 (36.55 q/ha), VR 900 recorded highest grain yield of 38.99 q/ha followed by MLT 10 (37.90 q/ha) and MLT 9 (36.60 q/ha).

Agricultural Research Station, Peddapuram

Genotype PR 10-45 which recorded higher yields in addition to lodging tolerance under coordinated trials was given for third year minikit testing in Andhra Pradesh.

Three cultures *viz.*, PR 10-22, PR 10-34 and PR 10-35 were nominated for state level multi location testing during *kharif* 2015.

In AVT station trial, entry PR 10-35 (27.80 q/ha) recorded significantly superior yield compared to better check PR 10-45 (25.60 q/ha).

Crop Production

Regional Agricultural Research Station, Lam

In finger millet pendimethalin (*a*) 1.0 kg/ha, atrazine (*a*) 0.75 kg/ha and oxadiargyl (*a*) 0.060 kg/ha as PE recorded a grain yield of 7.50 q/ha, 6.50 q/ha and 6.25 q/ha, respectively compared to 5.00 q/ha recorded in weedy check. Among the post emergence herbicides metsulfuron 0.0015 kg/ha + chlorimuron 0.0015 kg/ha at 20 DAS recorded a grain yield of 10.63 q/ha followed by 2, 4-D Na salt (*a*) 0.80 kg/ha at 20 DAS with 9.38 q/ha.

Regional Agricultural Research Station, Anakapalle

In direct sown ragi under rainfed conditions, pre emergence application of bensulfuran methyl + pretilachlor @ 5.0 kg/ha on 2nd day after sowing gave a seed yield of 933 kg/ha. Among post emergence weedicides, spraying of 2, 4-D amine @ 1.0 litre/ha (976 kg/ha) at 20-25 days after sowing was proved effective over other weedicides which recorded higher WCE of 82.5% and grain yield of 976 kg/ha.

Transplanted white ragi recorded significantly



highest grain yield (1372 kg/ha) compared to broadcasting and transplanting in puddle soil. Among the nitrogen levels, the highest grain yield was recorded with 60 kg N/ha (1154 kg/ha).

Agricultural Research Station, Perumallapalle

Among different weedicides tested in finger millet during *Kharif* and *rabi*, pre-emergence application of Pendimethalin @ 0.5 kg a.i./ha along with one hand weeding at 20 days after planting realized highest C:B (2.12) followed by post emergence application of 2,4 D sodium salt @ 0.8 kg a.i./ha at 20 DAP (1.92 C:B Ratio).

Under *kharif* rain fed conditions in sandy loam soils the grain yield was significantly influenced by both the varieties and fertilizer levels. Among five Pre released finger millet varieties GPU 92 recorded higher grain yield at 50% RDF while PPR 1040 and VL 376 gave higher grain yield at 125 % RDF.

Agricultural Research Station, Reddipalli

In finger millet, recommended dose of fertilizers recorded maximum seed yield of 4314 kg/ ha which was on par with the yield recorded with recommended dose of water soluble fertilizers through fertigation (3750 kg/ha). Maximum net returns were recorded with recommended dose of fertilizers only.

Agricultural Research Station, Vizianagaram

Highest straw and grain yields of finger millet were obtained with the application of 200% RD N+100% RD P&K+25% RD Zn, S & B + FYM @ 5 t/ha (38.6 q/ha grain yield). However it was on par with the treatment in which fertilizers were applied based on STCR equation for 40 q/ha (37.6 q/ha).

Long term experiment on completely organic and inorganic plots indicated that grain and straw

yields of organic plot (26.48 and 68.91 q/ha) were significantly lower than inorganic plot (32.84 and 81.47 kg/ha) where as the soil fertility status evidenced an improvement with higher organic carbon percentage (0.45%) and available macro and micronutrients.

Finger millet + Bhendi (8:2) intercropping system recorded highest Finger millet equivalent yield (6759 kg/ha) and it was closely followed by treatments Finger millet + Clusterbean (8:2), Finger millet + Fieldbean (8:2) and Finger millet + Pigeonpea (8:2). Highest B:C ratio was observed with Finger millet + Pigeonpea (3.52).

Crop Protection

Disease Management

Agricultural Research Station, Perumallapalle

In multilocation trial on blast, the entries BR 36 and VR-1066 showed less incidence of neck blast (2.25% and 3.64%) and finger blast (9.52% and 14.0%) in both *kharif* and *rabi*.

Agricultural Research Station, Vizianagaram

Entry SCN-6 showed lowest incidence of neck blast, finger blast and sheath blight; GPU-92 and DHFMV -10-2-1 recorded lowest incidence of neck blast and finger blast; VL- 379 and VR 1076 recorded lowest incidence of sheath blight.

In Finger Millet Blast Variability Nursery (FMBVN), out of 13 entries tested along with check Uduru millgae, the entry GE-4449 recorded lowest incidence of neck blast (8.0%), finger blast (8.7%) and sheath blight (13.5%) as compared to check Uduru millgae with neck blast (69.7%), finger blast (65.0%) and sheath blight (50.7%) respectively.

1.6 Foxtail Millet (Korra)

Crop Improvement



Regional Agricultural Research Station, Nandyal

In Station Foxtail millet Advanced Varietal Trial, SiA 3163, SiA 3159 and SiA 3223 recorded higher grain yields of 4588, 4365 and 4159 kg/ha, respectively as against SiA 3156 (2857 kg/ha).

Suryanandi followed by SiA 3156 recorded higher grain yield of 3207 and 2999 kg/ha, respectively among the varieties screened for drought tolerance.

Agricultural Research Station, Vizianagaram

Study of Foxtail millet Advanced Varietal Trail (FAVT) indicated that the entry DHFTMV 2-5 recorded highest grain yield of 27.25 q/ha followed by VFMC 336 (27.12 q/ha) and SiA 3205 (26.65 q/ha) where as the check SiA 326 recorded 16.07 q/ha grain yield.

Crop Production

Agricultural Research Station, Utukur

In a study on response of korra varieties to nitrogen levels, the variety Suryanandi recorded higher seed yield of 1037 kg/ha followed by SiA 3156 (967 kg/ha) while Srilakshmi registered the lowest seed yield of 817 kg/ha. Among nitrogen levels, application of 40 kg N/ha registered higher seed yield of 9999 kg/ha.

Regional Agricultural Research Station, Nandyal

Application of zinc in the form of zinc sulphate had no effect on grain or straw yield but its application either through soil or foliar spray increased the zinc content in the grain.

Among different *kharif* crops evaluated in delayed monsoon conditions, redgram stood first with higher foxtail millet equivalent yield (11,610 kg/ha) with higher net returns (Rs.114323/ha) and B: C ratio (4.57).

Significantly higher grain yield of foxtail millet was recorded when irrigation was given at 3 stages *viz.*, 20-25, 40-45 and 60-65 DAS. However, irrigation at 20-25 days after sowing was found to be very crucial for getting higher yields because grain yields were reduced drastically when irrigation was not provided at 20-25 DAS compared to other dates.

In integrated approach for enhancing seed yield and quality in foxtail millet, direct sowing recorded significantly higher field emergence (91%), plant height (41.96 cm), chlorophyll reading (24.6) and early flowering (37 days) compared to transplanting.

Crop Protection

Disease Management

Regional Agricultural Research Station, Nandyal

From Foxtail millet Advanced Varietal Trial (FAVT), the entries FAVT-5, 6, 7, 8 and FAVT-10 were identified as resistant to blast; ISc 1204 and RFM 29 were identified as immune to downy mildew disease.

Agricultural Research Station, Vizianagaram

In FAVT, the entry SiA 3179 recorded lowest incidence of sheath blight (14.9%) as compared to the local check I Se 1575 (75.8%).

1.7 Little Millet (Sama)

Crop Improvement

Agricultural Research Station, Perumallapalle

Forty seven germplasm lines of Little millet were maintained and characterized during 2015-16.

In Little millet Advanced Varietal Trial, among fourteen entries tested, the entry DHLtMV 14-1 (28.20 q/ha) was the top yielder followed by BL 41-3 (24.32 q/ha) and BL 150 (20.69 q/ha) which recorded significantly higher grain yields over the best check OLM 203 (15.34 q/ha).

Agricultural Research Station, Vizianagaram

In Little millet Advanced Varietal Trial (LAVT) among 14 entries tested, GPUL 2 recorded highest grain yield of 17.33 q/ha followed by TNPSu 167 (17.06 q/ha) and KOPLM 53 (14.81 q/ha) while the local check OLM 203 yielded 11.22 q/ha.

Crop Production

Agricultural Research Station, Vizianagaram

Long term experiment indicated that grain and straw yields of organic plot (5.01 and 58.55 q/ha) were significantly lower than inorganic plot (6.70 and 69.55q/ha) where as the soil fertility status evidenced an improvement with higher organic carbon percentage (0.49%) and available macro and micronutrients.

1.8 Banyard millet (Ooda)

Crop Improvement

Agricultural Research Station, Vizianagaram

Barnyard millet Advanced Varietal Trial (BAVT) revealed that the entry KOPBM 11 recorded highest grain yield of 52.65 q/ha followed by DHBMV 23-3 (44.25 q/ha) against local check VL 172 (27.65 q/ha).

1.9 Proso millet

Crop Improvement

Regional Agricultural Research Station, Nandyal

In Co-ordinated Advanced Varietal Trial, the entries TNPM 230 (2569 kg/ha), GPUP 24 & DHP 2181 (2523 kg/ha each) recorded numerically higher yields while the best check GPUP 21 recorded 2431kg/ha.

2. Pulses

2.1 Redgram

Crop Improvement

Regional Agricultural Research Station, Lam

Among twenty four Lam genotypes screened for wilt and SMD at ICRISAT screening nursery, the entries LRG 158, LRG 137-2 and LRG 52 were resistant to SMD and LRG 133-33, LRG 134, LRG 135-1, LRG 135-2 and LRG 136 were resistant to wilt disease.

In MLT among 12 entries tested, LRG 91 (2316 kg/ha) recorded significantly superior yield over the check variety Maruthi (1968 kg/ha).

In AICRP- IVT (medium), among 23 entries tested, entries *viz.*, GRG 2013 (2405 kg/ha), 319(2353 kg/ha), 310 (2226 kg/ha), 326 (2064 kg/ha) and 302(2000 kg/ha) recorded higher yields.

In AVT, among 10 entries tested, entry Co 6 recorded highest yield of 2414 kg/ha followed by entries, LRG 151 (2331 kg/ha) and GJP 1304 (2059 kg/ha).

Agricultural Research Station, Darsi

In MLT, out of 12 entries, highest yield was recorded by LRG-151 (1790 kg/ ha) followed by TRG-59 (1750 kg/ ha).

Regional Agricultural Research Station, Tirupati

In AVT (ANGRAU) for wilt resistance, among the nine lines evaluated, TRG-87, TRG-83 and TRG-86 gave higher seed yield of 1975, 1966 and 1950 kg per hectare respectively in 180-190 days. The check LRG-41 recorded 590 kg/ha in 190 days duration and affected by wilt up to 75%.

Under AICRP - IVT (medium early), six entries significantly out yielded the check ICP-


8863 and highest seed yield of 858 kg/ha was recorded by R-216 followed by R-213 (841kg/ ha) and R-212 (818kg/ha) whereas ICPI-8863 gave a seed yield of 499 kg/ha. Entries R-216, R-213 and R-212 showed recouping nature even in excess rainfall conditions with extended duration by 20-30 days.

Crop Production

Agricultural Research Station, Anantapuramu

Groundnut + redgram intercropping system recorded higher groundnut equivalent yield of 1041 kg/ha, net returns of Rs.31280/ha and B:C ratio of 1.48 followed by groundnut + castor intercropping system with groundnut equivalent yield of 975 kg/ha, net returns (Rs.28292/ha) and B:C ratio (1.34).

Among moisture conservation practices, conservation furrow + mulching recorded the highest seed yield (610 kg/ha), net returns (Rs.36754/ha) and B:C ratio (3.05).

Regional Agricultural Research Station, Tirupati

In redgram, significantly highest seed yield of 1731 kg/ha was recorded with application of Potassium (K₂O) @ 60 kg/ha and among the Zinc treatments, basal application of ZnSO₄ @ 25 kg/ha (or) foliar sprays at 120 DAS @ 2 gm/l recorded highest seed yield of 1661 kg/ ha when compared with control (1178 kg/ha).

Regional Agricultural Research Station, Lam

The maximum grain yield (1798 kg/ha) of pigeonpea was recorded in INM+IWM+IPM which was on par with IWM+IPM (1587 kg/ha). All the ICM treatments recorded significantly higher yields over control.

Studies on drought mitigation indicated that the maximum grain yield (1956 kg/ha) was recorded with application of Pusa hydrogel @ 2.5 kg/ha + Mulching with organic residues @ 5 t/ha which was at par with application of FYM @ 5 t/ha+ Pusa hydrogel @ 2.5 kg/ha + 2% KH₂PO₄ spray at flowering + 2% KNO₃ at pod development stage (1766 kg/ha) and significantly higher over control (1032 kg/ha).

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Lam

Among 33 germplasm lines screened, the pod damage due to *Helicoverpa armigera*, *Maruca vitrata* and *Melanagromyza obtusa* was low in ICPL 20058 (3.4 %), ICP 11299 (8.9%) and ICPHaRL – 4978-8 (18.9%), respectively.

Regional Agricultural Research Station, Tirupati

In management of podfly, treatments with Novaluron (4.32%), monocrotophos + dichlorvos (4.49%) and Monocrotophos (4.43%) recorded lowest pod damage as against highest damage in untreated control (14.27%).

Agricultural Research Station, Utukur

Studies on population dynamics of pod feeding insect pests of pigeonpea in LRG-41, TRG-59 and TRG-87 varieties indicated high incidence of *Helicoverpa* during first week of January (1st Standard week) in TRG-87 (4.26) followed by TRG-59 (4.12). Similarly, *Maruca* spotted pod borer incidence was high during second week of January (2nd Standard week) in LRG-41 (26.52 larvae per plant) followed by TRG-59 (20.64), while pod fly maggots and pupae were high during fourth week of January (4th standard week) in TRG-87 followed by TRG-49.

Agricultural Research Station, Darsi

ANGRAU

During *kharif* 2015, insecticide protected plot of pigeonpea with sunhemp as trap crop recorded lower larval incidence of *Maruca* (0.20 larva/plant) and highest yields (994 kg/ha) followed by insecticide protected plot without trap crop (0.31 larva/plant; 848 kg/ha grain yield) while pigeonpea alone (without trap crop and unprotected) recorded highest incidence of larvae (1.19 larvae/plant) and significantly lowest seed yield (257 kg/ha).

Disease Management

Regional Agricultural Research Station, Tirupati

Screened 50SSR markers and identified ASSR 366 marker linked to wilt resistance in pigeonpea and validated this marker using set of resistant and susceptible lines.

Screened 91 pigeonpea genotypes received from AICRP under sick plot with LRG-41 as check and identified the following genotypes as resistant for wilt : Bhahar, RVSA-07-10, GRG177, KA13-5,BSMR853, BRG1, IPA15-F, KPL43, ASHA, MA16, BAUP09-27, MAL-44, BRG3, ICPL87119, BRG15-1, TRG59, AKTM10-12, WRG140, CRG9701, DA15-1, MAL43, WPP1,NTL-30,WRG-90, BRG-15-3, DA-15-2, and WRP-1.

2.2 Blackgram

Crop Improvement

Regional Agricultural Research Station, Lam

During *rabi* in station AYT, the entry LBG 823 recorded highest seed yield of 880 kg/ha with YMV resistance followed by the best check LBG 752 (845 kg/ha) and in MLT the entries LBG 808 recorded highest seed yield of 868 kg/ha followed by LBG 806 (815 kg/ha), GBG 1 (812 kg/ha) compared to the best check LBG 752 (785 kg/ha).

The entry LBG 806 recorded highest seed yield of 829 kg/ha followed by LBG 888 (820 kg/ha), GBG 1 (805kg/ha) compared to the best check LBG 752 (701 kg/ ha) in performance of YMV resistant lines trial during *rabi* season.

Following germplasm lines were identified as source of resistance to different stresses: *Yellow Mosaic Virus* - PU 31, Pant U-19, TU 94-2, LBG 752, PDU 3, P 205, P1051, P 1075, IPU 2-43, TBG 104, LBG 787 and GBG 1; *Powdery mildew* - LBG 17; *Sympodial bearing* - LBG 400, LBG 697, WBG 26 and LBG 726; *Main stem bearing* - CKM, LBG 613, LBG 685, LBG 676 and LBG 787; *Wilt* -BM, LBG 611, LBG 402, LBG 648, LBG 22, LBG 685, LBG 645, LBG 708, LBG 752 and LBG 787; *Leaf curl virus* - IPU 981, IPU 982 and TU 94-2.

Agricultural Research Station, Ghantasala

The blackgram culture GBG-1 was in second year of minikit testing. It matures in 70-75 days, seeds are medium bold, shiny black in colour, resistant to MYMV with yield potential of 18-20 q/ha.

Culture GBG-12 was in first year of the minikit testing. It matures in 75-80 days, seeds are medium bold, shiny black in colour, resistant to MYMV with yield potential of 20-22 q/ha.

In Advanced Varietal Trial, entry GBG-47 recorded highest yield of 1913 kg/ha followed by GBG-21 (1828 kg/ha) and GBG-29 (1775 kg/ha).

In Blackgram multilocation Trial, LBG 796 recorded highest yield of 1881kg/ha followed by LBG 794 of 1874 kg/ha and LBG 811 of 1813 (kg/ha).

A total of 160 blackgram germplasm lines were maintained.

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Regional Agricultural Research Station, Tirupati

Under AICRP (MULLaRP) programme in Urdbean advanced varietal trial, among 8 cultures studied, RU15-1 (1462 kg/ha) gave significantly higher seed yield over best check PBG-1 (1396 kg/ha). In Initial Varietal Trial among 15 urdbean cultures studied, RU15-18 (1910 kg/ha) and RU15-17 (1889 kg/ha) gave higher seed yields over best check LBG-752 (1317 kg/ha).

Genotypic variability among blackgram genotypes for YMV tolerance revealed that leaf thickness showed no significant difference among resistant and susceptible genotypes whereas SCMR showed more variation among resistant and susceptible genotypes. Among the genotypes, AVT-RU-15-2 (47.2) recorded highest SCMR followed by AVT-RU-15-3 (46.0). However, the genotypes AVT-RU-15-3, MLT-BG-6 and MLT-BG-8 recorded significantly higher values for leaf hairiness. Maximum total leaf phenols were recorded in AVT-RU-15-6 and MLT-BG-3 compared to other tolerant genotypes.

Crop Production

Regional Agricultural Research Station, Lam

Among all the weed management practices, two manual weedings at 20 and 40 DAS recorded the highest grain yield (891 kg/ha) which was on par with application of Iris @1.0 l/ha at 25-30 DAS (808 kg/ha) and PE application of vallore 32 followed by hand weeding at 30 DAS (798 kg/ha).

All the foliar nutrition treatments recorded higher grain yields over control, but among them the highest grain yield (698 kg/ha) was recorded with application of salicylic acid @ 75 ppm at flowering initiation and 7 days after 1st spray.

Severe phytotoxicity was noticed with foliar application of nano phosphorus at different concentrations (20ppm, 40ppm and 60ppm) at pod development stage and hence, recorded significant reduction in grain yield. The maximum grain yield was recorded with soil application of phosphorus (649 kg/ha) which was significantly superior over control (548 kg/ha).

Analysis of 18 blackgram varieties for high water use efficiency during *rabi* under receding soil moisture conditions indicated that chlorophyll a, b and total chlorophyll were ranged from 0.25 to 0.50, 0.08 to 0.92 and 0.33 to 1.44 mg/g fresh weight respectively. The Spad Chlorophyll Meter Reading (SCMR) ranged from 21.4 to 51.2 and canopy temperature ranged from 27.1°C to 31.1°C. Maximum seed yield (973 kg/ha) was recorded in KU12-35 where as minimum seed yield (590 kg/ha) was recorded in KU12-55.

Application of RDF + Foliar spray of nano ZnO (*a*) 2g/15 litres at 25 and 40 DAS recorded the highest grain yield (17.6 q/ha), plant height, and no.of pods per plant. But the highest Zn content in grain was recorded in treatment of RDF + Foliar spray of ZnSO₄(*a*) 2g/l at 40 DAS.

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Lam

The blackgram entries *viz.*, IPU-10-26, TU-13 and VBG-11-031 recorded zero per cent incidence of YMV and were found promising while Check entries PU-31 and LBG-623 recorded zero and 30 per cent YMV incidence respectively.

Disease Management

Regional Agricultural Research Station, Lam

Based on natural field screening for three years the genotypes P 716, P 12-80, P 12-87, P 12-30, P 12-72, P 12-78, BG 1, BG 2, BG 3, P 512, P 20, P 109, P 110, P 105, SSUP 15-51,



SSUP 15-74, SSUP 15-52, SSUP 15-73, SSUP 15-53, SSUP 15-55, SSUP 15-68, LBG 808, LBG 806 and LBG 794 were identified as MYMV resistant.

Regional Agricultural Research Station, Tirupati

Among 6 CEDG series SSR markers (CEDG 180, 268, 245, 198, 44 and 139) and one SCAR marker used in validation for YMV resistance, SSR markers CEDG 44 & 268 and SCAR marker gave better results when tested using known genotypes for YMV reaction.

Developed DNA based screening method (agroinoculation) for resistance to two species of begomoviruses associated with yellow mosaic disease of blackgram at seedling stage.

Agricultural Research Station, Utukur

For management of foliar diseases in blackgram Carbendazim @ 0.15 % was found effective in reducing the incidence of powdery mildew disease with PDI of 38.33% and recording highest seed yield of 780 kg/ha followed by Propineb @ 0.10% (43.33%) with seed yield of 720 kg/ha. During the experimental period, there was no incidence of other foliar fungal diseases like leaf spot and rust.

2.3 Greengram

Crop Improvement

Regional Agricultural Research Station, Lam

During *rabi*, the entry LGG-574 recorded highest seed yield of 2041 kg/ha followed by PM 113 (1856 kg/ha), PM115 (1856 kg/ha) and PM 112 (1701 kg/ha) compared to the best check LGG 460 (862 kg/ha) in YMV resistant greengram trial.

The following lines were identified as source of resistance to different stresses: *Yellow Mosaic Virus* - LGG 407, ML 267, PDM 54, WGG 37, UPM 79-5-4, LGG 460, PM 115, PM 112, PM110, PM 103, LGG 574, IPM 2-14 and WGG 42; *Powdery mildew* - JRUM 1, TARM 22, and TM 96-2; *Angular black leaf spot* - PIMS 3, PIMS 4 and LGG 407; *Drought* - D12/295, RMG 275and PDM 54; *Resistant to sucking pest* - JRUM 1 and LGG 460; *Preharvest sprouting* - LGG 450.

Agricultural Research Station, Ghantasala

Greengram culture GGG-1 completed first year of minikit testing. It is an extra early variety with a duration of 55-60 days, having bold and shiny seed with yield potential of 17-18 q/ha and suitable for preceding paddy and *rabi* seasons.



The entry RM15-3 recorded seed yield of 1680 kg/ha followed by RM 15-2 of 1416 kg/ha in advanced varietal trial during *rabi*.

Agricultural Research Station, Podalakur

Among the eight entries tested in multi location trial, LGG 574 recorded the highest seed yield of 870 kg/ha followed by LGG 578 with 580 kg/ha while the check, LGG 460 recorded seed yield of 170 kg/ha.

Agricultural Research Station, Darsi

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In multi location testing, out of the nine cultivars, TM 96-2 recorded highest grain yield



(2324 kg/ha) followed by GGG-1 (2319 kg/ha).

Regional Agricultural Research Station, Tirupati

Under AICRP (MULLaRP) programme in Mungbean advanced varietal trial, among 7 cultures studied, RM15-5 (1239 kg/ha) and RM15-1 (1178 kg/ha) gave higher seed yields over the best check LGG460 (932 kg/ha). In initial varietal trial, among 11 cultures studied, RM15-10 (1640 kg/ha) and RM15-11 (1136 kg/ha) gave higher seed yields over the best check LGG460 (932 kg/ha).

Crop Production

Regional Agricultural Research Station, Lam

Application of Pendimethalin 30EC+ Imazethapyr 2EC (Vallore32) @ 0.75/1.0 kg/ha as pre-emergence weedicide followed by manual weeding at 25-30 DAS recorded the highest WCE (87.8%) and was closely followed by Vallore32 alone (83.5%).

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Lam

Diafenthiuron 50% WP @ 312.5 g a.i./ha was found effective against whiteflies on greengram by recording 76.7% reduction in whitefly population and 48% increase in yield (11.8 q/ha) over control (6.13 q/ha).

Profenophos 50% EC @ 500 g a.i./ha was found effective against leaf miners. It recorded 46.8% reduction in leaf mines and 92% (9.10 q/ ha) increase in yield over control (4.75 q/ha).

Agricultural Research Station, Darsi

Azadirachtin @ 10000 ppm was found to be superior over all other treatments by recording highest mean percent reduction in foliage damage due to flea beetles (67.4%) and it was on par with triazophos (61.6%), acephate (57.3%), thiamethoxam (55.7%) and profenophos (49.2%).

Disease Management

Regional Agricultural Research Station, Lam

Based on natural field screening for three years, the genotypes PM 14-19, PM 14-1, PM 14-3, PM 14-5, PM 14-11, PM 14-9, PM 14-16, PM 14-13, PM 14-17, PM 14-12, PM 14-2, GG 1, GG 4, GSMP 15-47, GSMP 15-04, GSMP 15-46, GSMP 15-05, GSMP 15-07, GSMP 15-42, GSMP 15-09, GSMP 15-10, LGG 577, LGG 578 were identified as MYMV resistant.

2.4 Bengalgram

Crop Improvement

Regional Agricultural Research Station, Lam

In multi-location trial on kabuli genotypes, entry NBeG 179 recorded significantly higher grain yield of 1561 kg/ha followed by VIHAR (1550 kg/ha) and KAK 2 (1249 kg/ha) while the entry NBeG 780 recorded significantly higher grain yield of 2576 kg/ha followed by NBeG 507 (2497kg/ha) in multilocation trial on desi genotypes.

In ICVT desi genotypes, the entry ICCV15117, recorded significantly higher grain yield of 2132 kg/ha followed by ICCV15115 (2066 kg/ha), and ICCV15107 (2062 kg/ha) compared to local check JG 11 (2078 kg/ha) and in ICVT Kabuli genotypes, the entry ICCV15309 recorded significantly higher grain yield of 1229 kg/ha compared to local check LBeG 7 (1054kg/ha).

Regional Agricultural Research Station, Nandyal

High yielding kabuli line NBeG 399 and high yielding desi line NBeG 147 were evaluated in

Minikit programme during 2015-16 and found promising.

ANGRAU

Pooled performance of desi entries in Advanced yield trials during 2014-15 and 2015-16 indicated the superiority of NBeG 785 (1940 kg/ha) with an advantage of 13.5% over the check NBeG 3 (1710 kg/ha). Other two desi entries *viz.*, NBeG 779 (1931 kg/ha) and NBeG 776 (1913 kg/ha) recorded 12.9%, and 11.9% superiority over NBeG 3.

Pooled performance of kabuli entries in advanced yield trials during 2014-15 and 2015-16 indicated the superiority of NBeG 529 (1722 kg/ha) with a yield advantage of 11.6% over the best check Vihar (1543 kg/ha).

In MLT kabuli, entry NBeG 510 (1649 kg/ ha) though on par with best check Vihar (1621 kg/ha) in yield it is a large seeded kabuli with 100 seed weight of 45.7g as against 32.3g in Vihar.

Crop Production

Regional Agricultural Research Station, Lam

The 12 chickpea genotypes tested for adaptation to drought under rainfed ecosystem indicated significant differences among genotypes for different physiological characters. Seedling vigour ranged from 2.33 to 4.33, plant height ranged from 30.13 cm to 37.33 cm, no. of pods ranged from 37.46 to 75.16, seed weight ranged from 23.12 g to 49.42 g in chickpea genotypes. Maximum seed yield was recorded in BG14 (20.21 q/ha) followed by BG16 (19.86 q/ha) and the lowest was recorded in BG 8 (11.12 q/ha).

Application of weedicides topramezone @ 15 or 25 g a.i./ha, acefluorfen sodium + clodinafop propargyl @ 120+60 or 160+80 g a.i./ha and atrazine as POE @ 250 g a.i./ha at 20 DAS were comparable with hand weeding at 20 and 40 DAS. The highest net returns (Rs 39,600) and benefit cost ratio (1.48) were observed with Acefluorfen sodium + Clodinafop propargyl @ 160+80 g a.i./ha at 20 DAS.

Agricultural Research Station, Darsi

Soil application of hydrophilic polymer @ 15 kg/ha+FYM @ 5 t/ha recorded higher yields (1949 kg/ha) followed by soil application of hydrophilic polymer @ 10 kg/ha+FYM @ 5 t/ ha(1928 kg/ha).

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Nandyal

NBeG 440 recorded the lowest leaf damage (11.8%) among one hundred and seventy five chickpea entries screened against beet army worm, *Spodoptera exigua*.

Neem oil @ 5 ml/l, Rynaxypyr 0.2 ml/l and novaluron 1 ml/l were found effective in reduction of incidence of *Spodoptera exigua* over control by recording 93.3, 86.9 and 84.1% reduction over control. The yield loss due to *S. exigua* was estimated to be 9.52 percent in bengalgram.

Disease Management

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Regional Agricultural Research Station, Lam

Surveys indicated that dry root rot and wilt diseases appeared to be of economic concern during reproductive stage of chickpea.

Integration of seed treatment and soil application with *Pseudomonas and Trichoderma* resulted in maximum reduction of wilt disease incidence in chickpea.

Regional Agricultural Research Station, Nandyal

The entries P-1706, P-1615, P-1754, P1657, P-1766 and P-1767 were found free from incidence of *Fusarium* wilt out of 177 entries screened in wilt sick plot.



NBeG-3 and NBeG-452 exhibited resistant reaction to dry root rot among the 17 advanced lines tested.

2.5 Cowpea

Crop Improvement

Regional Agricultural Research Station, Tirupati

In advanced varietal trial, among the 16 lines tested, CP-2 ranked first with seed yield of 1560 kg/ha followed by CP-3 (1470 kg/ha) while the check GC-3 recorded 1191 kg/ha in 80-85 days.

Agricultural Research Station, Anantapuramu

In advanced varietal trial, the entry CP-15 recorded highest seed yield of 1074 kg/ha followed by CP-1 (919 kg/ha) and CP-2 (844 kg/ha).

Crop Production

Regional Agricultural Research Station, Tirupati

During *kharif*, fodder cowpea variety Co-8 recorded significantly highest green fodder yield of 18.9 t/ha followed by APFC10-1(16.1 t/ha). Application of P_2O_5 (a) 40 kg/ha recorded significantly higher dry matter yield compared to other levels. While, during *rabi* significantly highest green fodder yield of 29.2 t/ha was recorded with Co-8 variety, which was comparable with APFC 10-1(27.8 t/ha). Application of different levels of P_2O_5 did not influence the green fodder yield of cowpea varieties.

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Tirupati

Among the AVT cultures (Cow-pea), the incidence of spotted pod borer (*Maruca vitrata*)

ranged from 2.0% (AVT-1-CP-9) to 8.5% (AVT-1-CP-12). In case of pod sucking bugs, the lowest damage was 5.63 per cent in AVT-1-CP-1 as against 42 per cent in AVT-1-CP-12.

2.6 Horsegram

Crop Improvement

Agricultural Research Station, Anantapuramu

Among 12 entries of AVT-I + IVT evaluated, the entry HG-2 recorded highest seed yield of 1544 kg/ha followed by HG- 13 (1431 kg/ha).

Crop Production

Agricultural Research Station, Anantapuramu

Horsegram sown early during the first fortnight of August recorded maximum seed and bhusa yield and any further delay in sowings resulted in decreased yields. ATPHG-11 recorded highest yield compared to the other tested varieties when it was sown early during the 1st fortnight of August. CRHG-4 recorded highest yield under delayed sowings.

2.7 Clusterbean

Crop Improvement

Agricultural Research Station, Anantapuramu

In Guar Initial Varietal Trial (*Kharif*) 2015, a total of 16 guar gum entries were evaluated for seed yield. The entry GR-8 recorded highest seed yield of 704 kg/ha followed by GR-6 (677 kg/ ha) and GR-3 (631 kg/ha).

One hundred Guar germplasm lines were tested for different morphological characters during *Kharif*. The accession 1C 116703 recorded highest seed yield per plant (8.7 g/plant) followed by 1C 116692 (8.5 g/plant) and 1C 116682 (8.4g/plant).

ANGRAU

Among the seven pre released clusterbean genotypes the genotype GG-1 recorded highest seed yield of 837 kg/ha followed by PB-80 (827 kg/ha) and RGC-1017 (824 kg/ha).

Among the 18 station level entries tested, the entry IC 113481 recorded highest seed yield of 621 kg/ha followed by IC 40996 and GG-1 with a seed yield of 587 kg/ha and 583 kg/ha respectively.

Crop Production

Regional Agricultural Research Station, Lam

Different rhizobium cultures to clusterbean showed non significant differences. However, the rhizobium culture no.6 produced higher plant height, more no. of branches and grain yield (1336 kg/ha) followed by culture no.2 when compared to other strains tried during *rabi* 2015-16.

In INM treating rhizobium culture with different N levels did not give significantly added advantage while 60 kg N recorded significantly higher grain yield (1823kg/ha) when compared to 20 kg N/ha (1406 kg/ha) and it was at par with 40 kg N/ha (1749 kg/ha).

2.8 Rajmash

Crop Production

Regional Agricultural Research Station, Chintapalle

Among weed management practices, application of pendimethalin @ 0.75 kg/ha + hand weeding at 30 DAS recorded highest weed control efficiency (73.9% & 61.0%), and yield attributes followed by sequential application of pendimethalin @ 0.75 kg/ha + imazythapyr @ 63 g a.i./ha and alachlor + imazythapyr @ 63 g a.i./ha respectively. Highest benefit cost ratio (1.87) was recorded with application of pendimethalin @ 0.75 kg/ha + imazythapyr @ 63 g a.i./ha.

3. Oilseeds

3.1 Groundnut

Crop Improvement

Regional Agricultural Research Station, Tirupati

A total of about 944 germplasm accessions were maintained during *kharif* 2015. The germplasm collection included 770 Spanish bunch, 140 Virginia bunch, 16 Virginia runner and 18 were Valencia types.

Genotype TCGS 1073, a water-use efficient with high yield potential has completed third year of minikit testing. In early *kharif* situation, over three seasons, it recorded a mean pod yield of 1882 kg/ha with an increase of 11% and 27% over Narayani and Kadiri-6. In *rabi* season it recorded mean pod yield of 2474 kg/ha with an advantage of 28 % over Narayani and 49 % over Kadiri-6. Mean 100- sound kernel weight (over four years) was 56 g in TCGS 1073 while it was 44 g in Narayani, 42 g in Kadiri-6 and 41 g in Abhaya.

Groundnut genotype TCGS 1157, a shortstatured culture maturing in 110-115 days with fresh seed dormancy has completed II year of minikit testing. During *kharif* 2015, it recorded 9%, 5% and 20% higher yield over kadiri.6, TAG.24 and Kadiri.6, respectively in Chittoor, Nellore and Kadapa districts respectively.

In advanced varietal trial- I year, out of 25 genotypes tested, 11 genotypes recorded significantly higher pod yield over Abhaya (2274 kg/ ha). Among these, the top four genotypes were TCGS 1653 (3810 kg/ha), TCGS 1696 (3393 kg/ha), TCGS 1666 (2927 kg/ha) and TCGS 1681 (2841 kg/ha).

In multi-location trial (SB), out of 13 geno-

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types, 8 genotypes recorded significantly higher pod yield over best check Narayani (1748 kg/ ha). Among these, the top three genotypes were MLTG (SB)-2015-7 (2878 kg/ha), MLTG (SB)-2015-1(2374 kg/ha) and MLTG (SB)-2015-10 (2291 kg/ha).

In advanced varietal trial (Early), out of 16 genotypes, two genotypes *viz.*, TCGS 1609 (2683 kg/ha) and TCGS 1622 (2520 kg/ha) during early *kharif* season and only one genotype, TCGS 1653 (3001 kg/ha) during *rabi* recorded significantly higher pod yield over the best check variety, Dharani (*kharif*: 2194 kg/ha; *rabi*: 1966 kg/ha).

In advanced varietal trial II (Bold seeded), among the test entries, selection from Dharani × ICGV 05163 (2999 kg/ha; 2100 kg/ha) and MLTG 2015-4 (2888 kg/ha; 2042 kg/ha) recorded significantly higher pod yield and kernel yield respectively over the best bold-seeded check variety, Bheema (2080 kg/h pod yield; 1426 kg/ha kernel yield).

In AICRP- advanced varietal trial (SB), seven out of eight genotypes, registered significantly higher pod yield over Dharani (1860 kg/ ha). Among these, the top three genotypes were ASK-2015-5 (2915 kg/ha), ASK-2015-7 (2671 kg/ha) and ASK-2015-6 (2571 kg/ha) that were superior by 57%, 44% and 38% respectively over Dharani (1860 kg/ha).

The SSR marker GM625 was screened in all 331 genotypes and the results revealed that some of the advanced breeding lines still retained heterozygosity for this position. A total of 487 SSR markers were screened between parental lines. The position of these markers was identified by blast seachinsilico. Among 331 lines and 2 checks evaluated for water use efficiency and root traits, SCMR values ranged from 30.3 to 52.2; SLA Values ranged from 44.5 cm² to 390.0 cm²/g; root length ranged from 9 cm to 90 cm; shoot length ranged from 9 cm to 48 cm and root shoot ratio ranged from 1:04-1:56.

In advanced varietal trial only one genotype, AIS-2016-4 recorded significantly higher pod yield of 3431 kg/ha over the local check variety, Dharani (2688 kg/ha).

Out of 354 SSR markers, 40 were found polymorphic viz., TC7A02, GM2120, IPAHM689, TC2D02, IPAHM207, IPAHM23, AH282, IPAHM283, PMC468, RN02F12, RN09C02, RN09C08, GA163, gi370, IPAHM308, IPAHM33, IPAHM377, IPAHM407, IPAHM534, IPAHM556, PM024, IPAHM701, IPAHM589, AH191, AH269, AH330, S076, PM014, PM208, RN7F03, GM672, TC11B04, SEQ 706, SEQ5D11, GM694, GM698, EM152, SEQ8H01, TC11804 and GA110 between Kadiri 6 and Dharani. These markers can be successfully employed for genotyping the whole germplasm for drought and can be used to accumulate desirable genes into a single or a few genotypes by marker assisted selection to ultimately arrive at a high yielding drought tolerant genotype.

Agricultural Research Station, Kadiri

In groundnut, genotype K 1719 which significantly out-yielded the best check variety ICGV 00350 was proposed for identification in the name of Kadiri Chithravathi for zone IIIb (Andhra Pradesh, Telangana, & Tamilnadu) for rabi- summer season.

In Advanced Varietal Trial (*kharif*-2015), three groundnut genotypes, K2270 (2519 kg/ha), K2267 (2352 kg/ha) and K2209 (1926 kg/ha) significantly out yielded the check variety Kadiri 9 (1525 kg/ha). The percent increase in pod yield ranged from 26 to 65%.

In AICRP-G trials, during rabi-summer sea-



son 2014-'15, one spanish genotype K1609 with >10% kernel yield over best check was promoted to AVT in Zone IIIa (Karnataka & Maharashtra). Similarly three genotypes K1609 (2068 kg/ha), K1621 (1951 kg/ha) and K1604 (1904 kg/ha) which were found significantly superior over the best check for kernel yield were promoted to AVT in Zone IIIb (Andhra Pradesh, Telangana, & Tamilnadu).

Agricultural Research Station, Anantapuramu

The entries K 1801 (2208 kg/ha) followed by K 1809 (2139 kg/ha) and K 1535 (2042 kg/ ha) which recorded highest pod yield were identified as most suitable drought resistant groundnut varieties for severely drought affected areas of Anantapuramu.

Agricultural Research Station, Peddapuram

In Multilocation Trial (SB), the entries MLTG (SB)-04 (29.5 q/ha) and MLT (SB)-07 (26.7 q/ha) were found promising out of twelve entries tested.

In Multilocation Trial (VG), the entries MLTG (VG)-01 (33.1 q/ha) and MLTG (VG)-09 (32.9 q/ha) were found promising out of 10 entries tested.

Agricultural Research Station, Utukur

Multi location trial in groundnut with Virginia cultures indicated that the entry MLTG (VG) 2015-7 was the top performer with a pod yield of 2837 kg/ha and kernel yield of 1512 kg/ha followed by MLTG (VG) 2015-5 with 2356 kg/ ha pod yield and 1481 kg/ha kernel yield. However the entry MLTG (VG)2015-9 has shown on par kernel yield (1476 kg/ha) with MLTG (VG) 2015-5.

Multi location trial with Spanish bunch group indicated that the entries MLTG (SB) 2015-4,

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MLTG (SB) 2015-1 and MLTG (SB) 2015-13 recorded significantly higher pod yields of 2245 kg/ha, 2405 kg/ha and 2247 kg/ha with a shelling percentage of 60, 56 and 58% respectively. However, MLTG (SB) 2015-3 and Dharani have recorded highest shelling percent of 71 and 70 respectively.

Agricultural Research Station, Yelamanchili

In MLT (SB), out of 13 entries tested, the entries MLTG-13 (1835 kg/ha), MLTG-4 (1348 kg/ha), MLTG –5 (1287 kg/ha) and MLTG -7 (1170 kg/ha) were found promising and significantly superior to the check Dharani (724 kg/ha).

Out of 10 entries tested in MLT(VG), the entries MLTG-5 (1289 kg/ha), MLTG-7 (1234 kg/ha) and MLTG-3 (1168 kg/ha) were significantly superior in pod yield over the check Dharani (621 kg/ha).

Agricultural Research Station, Amadalavalasa

In Multilocation Trial of Groundnut (SB), among 13 entries tested, seven entries performed better than general mean (2128 kg/ha) and the entry MLTG (SB) 2015-13 recorded maximum pod yield of 3750 kg/ha. Similarly in Multilocation Trial of Groundnut (VB), among the nine entries tested, six entries were better than general mean (2862 kg/ha) and the entry MLTG (VB) 2015-3 recorded highest pod yield of 3469 kg/ha.

Agricultural Research Station, Vizianagaram

In MLT (SB) the entry MLT (SB)-7 recorded highest yield of 31.2 q/ha followed by MLT (SB)-10 (28.5 q/ha) and MLT (SB)-1 (27.1 q/ha).

In MLT (VB), the entry MLT (VB)-8 recorded highest yield of 30.5 q/ha followed by MLT (VB)-7 (27.4 q/ha) and MLT (VB)-3 (25.9 q/ha) against the local check ICGV-86325

ANGRAU

(25.71 q/ha).

Crop Production

Agricultural Research Station, Kadiri

Among two post emergence herbicides in groundnut, imazethapyr significantly reduced both narrow and broad leaf weeds compared to quizalofop ethyl and there by enhanced pod yield significantly. Lowest weed density, weed dry matter, highest weed control efficiency and weed index among tank mix treatments was with pendimethalin @1.5 kg a.i./ha (PE) + imazethpyr @ 75 g a.i./ha at 20- 30 DAS and resulted in highest pod yield, haulm yield.

Under rainfed conditions, application of FYM @ 5 t/ha + 100% P + DGRC2 resulted in significantly higher pod (1354 kg/ha) and haulm yield (2089 kg/ha) but found on par with FYM @ 5 t/ha + 100% P and FYM @5 t/ha + 100% P + DGRC1. Higher gross, net returns and benefit cost ratio were also recorded with FYM @ 5 t/ha + 100% P + DGRC2.

Agricultural Research Station, Anantapuramu

Irrespective of varieties, moisture stress imposed at 70-90 DAS (pod filling to maturity) caused 82.5 per cent yield reduction followed by 35.2 and 20.8 per cent yield reduction due to moisture stress imposed at 50-70 DAS (pegging to pod formation) and 30-50 DAS (flowering to pegging) respectively.

Among contingent crops sown in the month of august, highest groundnut equivalent yield (GEY) of 697 kg/ha and net returns of Rs.19314/ ha were obtained with redgram crop followed by Bajra with GEY of 489 kg/ha and net returns of Rs.10530/ha. Highest B:C ratio of 1.60 was recorded for Redgram crop followed by korra (1.29). Study on native phosphorous solubilization and enhancement of nutrient use efficiency in core rainfed alfisols indicated that the treatment with half the recommended fertilizer (10:20:20 kg N, P_2O_5 , K_2O) along with consortia of PSB+PSF+AM fungi recorded highest yields (2314 kg/ha) and was closely followed by fertilizer application based on soil test values along with consortia of PSB+PSF+AM Fungi (2232 kg/ha). Control recorded the lowest pod yield (1485 kg/ha).

The analysis of the 334 soil samples for phosphorus and secondary nutrient status in groundnut growing soils of Anantapuramu district indicated that the available phosphorous content ranged from 35 kg/ha to 85 kg/ha and available potassium ranged from 161-391 kg/ha and organic carbon content ranged from 0.15% to 0.41%. The pH was in the range of 5.9 to 9.0 while EC ranged from 0.21 ds/m to 1.09 ds/m.

Application of polymer @ 20 kg/ha + FYM 5 t/ha to soil retained comparatively more soil moisture and also released it slowly and this was reflected in the increased pod yield of 2886 kg/ ha compared to all other treatments.

Studies on organic farming in groundnut revealed that sheep penning with organic pest management recorded higher pod yield of 2530 kg/ha and the lower yield of 1160 kg/ha was recorded in control (RDF with chemical pest management). Soil moisture during crop growth was comparatively better in the sheep penning as compared to all other treatments.

Studies on revisiting of fertilizer recommendations to groundnut crop in Andhra Pradesh revealed that for 12 q/ha targeted yield, application of 25-50-50 kg NPK/ha, Zn @ 31 kg/ha as $ZnSO_4$, S @ 625 kg/ha as Gypsum, B @ 12.5 kg/ha as Borax along with FYM addition @ 5 t/ha gave significantly higher yield of 26.30

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q/ha which was on par with the STBF based Fertilizer Application (24.56 q/ha), while the current RDF has given lowest pod yield of 19.60 q/ha.

Regional Agricultural Research Station, Tirupati

During *rabi*, foliar application of phenyl mercuric acetate (PMA) 0.002 % at 15 days after moisture stress to variety, "Dharani" recorded high drought adaptive traits (high RWC, high CSI) and high yield and yield attributes (high 100-kernel wt., high harvest index and high pod yields) and also recorded high total carbohydrates in kernels. Kaoline 2 % foliar treatment recorded high drought adaptive traits (high SCMR, low SLA, high proline) and high yield and yield attributes (high 100-kernel wt., and high pod yields).

Deep ploughing with subsoiler before sowing effectively mitigated drought during *kharif* in redgram and groundnut and significantly increased yields in groundnut (126%) and redgram (34%) compared to conventional tillage. Such an increase in yields due to subsoiling was correlated significantly with higher root length, total plant dry matter, shelling per cent and higher plant population.

In enhancement of rain water productivity through supplemental irrigation to rainfed groundnut, in *kharif*, the pooled data (2013-14, 2014-15 and 2015-16) results revealed that significantly highest groundnut pod yield (1129 kg/ha) and groundnut pod equivalent yields (1504 kg/ha) were recorded when three irrigations of 10 mm were supplemented at flowering/pegging, pod development and pod maturity stages. Correspondingly, the highest net returns of Rs 42,674/ha was realized from groundnut/redgram in 7:1 system with three irrigations. The rainfed (control) cropping system gave the lowest net returns of Rs 13,888/ha. In groundnut based cropping system, among contingent crops sown during August II FN of 2015, Clusterbean (Vegetable) recorded pod yield of 16,368 kg/ha and gave the highest net returns of Rs.2,45,520 followed by Cowpea which recorded pod yield of 4,967 kg/ha and net returns of Rs.1,49,010. Similarly for September 1st fortnight, Cowpea recorded green pod yield of 4,260 kg/ha and gave the highest net returns of Rs.1,27,800 followed by Field bean which recorded pod yield of 5,117 kg/ha and net returns of Rs.1,07,457.

Pooled data (2013-14, 2014-15 and 2015-16) results of weed control in groundnut revealed that application of Imazethapyr @ 75 g a.i./ha as P.E. + Hand weeding at 25-30 DAS recorded significantly highest pod yield of groundnut *i.e.* 1719 kg/ha with lowest weed dry matter of 253 kg/ha. The lowest pod yield of 923 kg/ha was recorded with weedy check having highest weed dry matter of 3430 kg/ha.

When different organic sources were compared under organic farming, the highest pod yield of 2019 kg/ha was recorded with press mud cake application followed by RDF (1779 kg/ha).

Groundnut genotypes, TCGS 1186, 1275, 1273, 1342, 1330, 1387, 1416 and Abhaya were found to be efficient for Fe uptake even under calcareous soils as they have shown >12 ppm active Fe. These genotypes may be considered as tolerant to Fe chlorosis.

Groundnut genotypes *viz.*, Dharani, CO2 and TG3 were found to be efficient for Zn and genotypes Dharani, Gangapuri and GG4 were efficient for Fe based on the localization of Zn and Fe in kernels.

Among 25 groundnut genotypes screened for P and Fe efficiency, based on TP%: ICGV 00350, 02266, 07240, 87846, 13104 and GG20

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and based on P uptake: ICGV 00350, 02266, 06146, 91114, 13104, 13121, 12625, GG 20 and Dharani were found efficient for P. Geno-types, ICGV03057, 07240, 13200, 13206, 87846, 07222, 91114 and TAG 24 were found efficient for Fe.

When groundnut seeds were treated with different concentrations of nano ZnO, phytotoxic symptoms like stunted growth and curling of leaf were observed at concentrations beyond 800 ppm. However, when nano ZnO was applied through foliar spray no phytotoxic effects were recorded even up to 2000 ppm. Further, it was also observed that with the application of nano ZnO, PSND disease was controlled in groundnut.

Regional Agricultural Research Station, Chintapalle

Second fortnight of October was found to be the optimum sowing time for *rabi* groundnut in HAT zone to obtain higher yields (23.9 q/ha)followed by first fortnight of November (21.6 q/)ha) and among six varieties tested, Anantha recorded higher yields of 25.5 q/ha followed by "Harithandhra (24.3 q/ha)".

Crop Protection

Insect Pest Management

Agricultural Research Station, Kadiri

Among 50 stage-I genotypes screened, 18 genotypes *i.e.*, ISK-I-2015-1, 4, 7, 9, 10, 12, 13, 23, 24, 27, 31, 34 ; ASK-2015-3, 5 IVK-I-2015-14 and AVK-2015-2, 3 & 12 showed immune reaction to sucking pests and defoliators.

Out of 69 stage II genotypes, 15 genotypes ISK–2014-3, 9, 10, 11, 16, 29; ALSVT-14, 04, 06; IVK-14-3, 4, 8, 8; AVK-1-2014-4 and AVK-1-2014-7 were showed immune reaction against sucking pests and defoliators.

Seed treatment with imidacloprid 600 FS @ 2 ml/kg seed (1:2 ratio of chemical and water) or @1 ml/kg seed (1:3 ratio of chemical and water) were found to be significantly effective and at par in reducing thrips and jassid damage up to 40 days after sowing and also reduced the incidence of Peanut Stem Necrosis Disease (PSND) in groundnut.

Agricultural Research Station, Utukur

For management of root grub in groundnut, soil application of chlorantraniliprole @ 10 kg/ ha (3.61%) was found to be effective followed by seed treatment with imidacloprid 600 FS @ 2 ml + 2 ml water per kg seed (4.31%) and soil application with fipronil 5 SG @ 20 kg/ha (4.34%).

Agricultural Research Station, Darsi

In groundnut among the newer insecticides tested, Diapenthiuron 50% WP and Bifenthrin 10% EC against jassids and Fipronil 80% WG and Fipronil 5% SC against thrips were found effective.

Regional Agricultural Research Station, Tirupati

During 2015-16, 280 *Bacillus thuringiensis* isolates were extracted from soil samples of Chittoor, Kadapa and Nellore districts. Among the 30 Bt isolates tested for their efficacy against third instar larvae of *Spodoptera litura*, isolate 3 (60%), isolate 435 (56.67%) recorded more than 50 per cent mortality.

Among the new seed treatment chemicals studied for the control of sucking pests in early stage of groundnut, Imidacloprid 600FS @ 2 ml + 4 ml water /kg seed was found effective with least foliar damage.

Highest pod yield of 1779 kg/ha was recorded in IPM with chemical inputs followed by



1582 kg/ha in IPM with organic inputs and 1520 kg/ha in farmers' module. Analysis of soil from three different modules indicated that, there was slight increase in organic carbon content (0.72%), available N (163 kg/ha), P_2O_5 (167 kg/ha) and high K_2O (532 kg/ha) in case of organic inputs applied plot compared to inorganic and farmers practice.

Agricultural Research Station, Anantapuramu

Groundnut storage in modified atmosphere with CO_2 revealed that CO_2 concentration of 20% and above was fatal to *C. serratus* even after 6 months while 10% CO_2 controlled the pest up to 3 months only.

Increased efficiency of trapping of thrips was noticed when delta pheromone trap was integrated with yellow (4.26 thrips/plant) and blue (4.28 thrips/plant) sticky liners and resulted in decreased population of thrips/plant. However control recorded highest no of thrips/plant (13.61).

Disease Management

Agricultural Research Station, Kadiri

The antibiotic 2-4 DAPG a product of different isolates of the beneficial bacterium *Pseudomonas fluorescens* was tested in groundnut for its efficacy in disease incidence and yield. Among them, FP-86 recorded significantly higher pod yield (1315 kg/ha) over all other treatments. Incidence of dry root rot and Stem rot was also found lowest with FP-86.

Seed treatment with nano particles of zinc oxide @ 200 ppm and 400 ppm was found best against reduction of symptom severity of peanut stem necrosis disease without phytotoxicity on groundnut.

Among IVT II & AVT (Stage II) genotypes

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screened against major diseases of groundnut, ISK-I-2014-1, 8, 15 and 36 recorded least incidence of dry root rot consistently for two seasons (< 5.0 %) and ISK-I-2014-4 and 33; AVK-I-2014-1 against stem rot disease.

Three years of experimentation concluded that treating the seed with tebuconazole 2 DS @ 1.5 g/kg seed + furrow application of *T. viride* @ 4 kg enriched in 250 kg FYM/ha + broadcasting *T. Viride* @ 4 kg enriched in 250 kg FYM/ha at 40 DAS + two sprays of tebuconazole 25.9 EC. @ 1ml/l at 60 and 75 DAS significantly reduced soil borne (dry root rot, stem rot) and foliar (ELS, LLS and rust) diseases and recorded significantly higher pod yields.

Regional Agricultural Research Station, Tirupati

Among field resistant groundnut genotypes tested, SSR marker GM2301 primer gave 81% accuracy in identifying LLS resistant material and 76% accuracy in detecting rust resistant genotypes.

Among 50 genotypes screened for various diseases, TCGS-1157, 1375, 1387 & 1516 recorded zero percent incidence of dry root rot and peanut bud necrosis disease.

Agricultural Research Station, Vizianagaram

For management of soil borne diseases seed treatment with Tebuconazole @1.5 g per kg seed + furrow application of *Trichoderma viride* @ 4 kg enriched in 50 kg FYM/ ha found best and showed less than 20% of late leaf spot (LLS), less than 5% of rust and zero incidence of stem rot compared to the check where up to 80% of LLS, 60% of rust and 35.2% stem rot incidence was observed.

For management of major foliar diseases in groundnut among 7 different treatments tested,



spraying of tebuconazole 50% + trifloxystrobin 25% WG @ 1.32 g/l (0.035%) at 40 and 65 DAS showed lowest incidence (<5%) of late leaf spot with highest pod yield of 2055 kg/ha as compared to the check in which 1490 kg/ha yield was recorded.

3.2 Sunflower

Crop Improvement

Regional Agricultural Research Station, Nandyal

NDSH 1012, a high yielding (20-25 q/ha) and high oil content (40-41%) sunflower hybrid was in III year minikit testing during 2015-16.

Crop Production

Regional Agricultural Research Station, Nandyal

Five year study (2009-10 to 2014-15) on sunflower – chickpea cropping system revealed that significantly higher chickpea seed yield (1748 kg/ha) with high net returns of Rs.59,754 /ha and B:C ratio of 2.80 was recorded when it was fertilized with recommended NPK and its preceding sunflower with RDNPK supplemented with Sulphur + limiting nutrient (Zn), it was on par with treatments which received NPK + Boron nutrients to sunflower and recommended NPK to chickpea (1669 kg/ha; B:C ratio 2.60). However, recommended NPK to sunflower followed by chickpea crop recorded only 1412 kg/ha seed yield of chickpea with net returns of Rs.42,884/ and B: C ratio of 2.2.

Pre emergence application of pendimethalin (1.0 kg a.i./ha) followed by post emergence application of either fenoxoprop ethyl @ 37.5 g a.i./ha or quizalofop ethyl @ 37.5 g a.i./ha as direct spray on weeds at 15-20 DAS was observed as the best option for effective chemical weed management.

Agricultural Research Station, Utukur

Field validation of fertilizer requirement for targeted yield of sunflower revealed that sunflower targeted yield of 20 q/ha and 22 q/ha with chemical fertilizers; Sunflower Targeted yield of 20 q/ha and 22 q/ha with chemical fertilizers + VC 5 t/ha and general recommendation of fertilizers (RDF), recorded the seed yield of 20.65, 21.72, 21.06, 22.23 and 15.81 q/ha, respectively.

Disease Management

Regional Agricultural Research Station, Nandyal

Seed priming with carbendazim 2 g/kg + thiamethoxam 0.04 % + two sprays of propiconazole @ 0.1% + <u>azadirachtin @ 1.5</u> <u>ml/l</u> resulted in good control of all the three diseases *viz.*, necrosis, powdery mildew and *Alternaria* leaf spot with higher yield (1604 kg/ha) and higher benefit cost ratio (1.81).

Seed treatment with *Pseudomonas* fluorescens @ 10 g/kg seed followed by spray of propiconazole @ 0.1% at 45 DAS and *P.* fluorescens @1% at 60 DAS was best in reducing the *Alternaria* leaf blight severity by 45.87% over control and recorded higher yields.

3.3 Sesamum

Crop Improvement

Agricultural Research Station, Yelamanchili

Out of 100 germplasm lines tested, the lines VSP-6, 7 & 10, VZM-4 & 12, SKL-4, 14 & 19, TMV-3, RT-371, MT-10-25-3, PT-10 and IC-260760 were found promising, under sever incidence of *Macrophomina & phollody* diseases.

In Advanced Varietal Trial-I, the entries YLM -17 (1005 kg/ha), YLM-136 (1044 kg/ ha) and YLM-137 (1005 kg/ha) over check YLM-66 (868 kg/ha) and in Advanced Varietal



Trial-II, the entries YLM-141 (1084 kg/ha), YLM-142 (1182 kg/ha) and YLM 146 (1142 kg/ha) against check YLM-66 (907 kg/ha) were found significantly superior in respect of seed yield.

Crop Production

Regional Agricultural Research Station, Lam

Variety YLM 17 recorded highest grain yield (1375 kg/ha) followed by Sarada and significantly superior over other varieties. Further, RDF with 2% urea spray at capsule development recorded highest grain yield (1417 kg/ha) over other treatments while the interaction between varieties and nutrient management was found non significant.

Agricultural Research Station, Yelamanchili

Application of sulphur at 45 kg/ha through gypsum produced significantly higher plant height (94.1cm), branches/plant (4.97), capsules / plant (93.2) and seed yield (582.4 kg/ha) of sesame than 15 kg S/ha through gypsum or sulphur bentonite and control. Sulphur application at 45 and 30 kg/ha recorded higher net returns (Rs. 34037 and 32635 per ha respectively) and B: C ratio (2.44 and 2.36 respectively) than lower levels.

Studies on organic farming revealed that application of recommended dose of fertilizers 40:20:20 kg/ha NPK recorded higher yield (532 kg/ha), net returns (Rs. 29202/ha) & B:C ratio (2.18) followed by FYM (4 t/ha) + Neem cake (0.4 t/ha) which gave seed yield of 468 kg/ha, net return of Rs.22238/ha & B:C ratio of 1.46.

Crop Protection

Disease Management

Regional Agricultural Research Station, Anakapalle

Among the eight seed treatments against

seed and soil borne diseases, trifloxystrobin + tebuconazole seed treatment @ 1.5g/kg seed was found most effective with least (13.4%) PDI, compared to control. But all the bio agent seed treatments and chemical seed treatments were significantly on par.

3.4 Castor

Crop Improvement

Agricultural Research Station, Anantapuramu

In AVHT, the entry AVHT-1556 recorded highest seed yield of 1144 kg/ha followed by AVHT-1551 (923 kg/ha).

Crop Production

Regional Agricultural Research Station, Lam

In a rice fallow castor, Seed treatment with sulphuric acid @ 0.1% recorded highest germination per cent of 89 and application of Pendimithalin @ 1.0 kg a.i./ha + Paraquat @ 0.6 kg a.i./ha as pre-emergence weedicide followed by Quizalofop ethyl @ 50 g a.i./ha + chloromuron @ 8 g/ha at 25 DAS recorded lower weed growth and higher seed yield compared to other treatments

In IWM, highest kernel yield (3358 kg/ha), net returns (Rs 58,240) and benefit cost ratio (1.37) were observed with pre emergence application of pendimethalin @ 1.0 kg a.i./ha followed by chlorimuron ethyl @ 10 g a.i./ha as POE at 40 DAS.

4. Commercial Crops

4.1 Cotton

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Crop Improvement

Regional Agricultural Research Station, Lam

Five hundred American cotton germplasm lines (*G hirsutum* L.) and twenty seven Egyptian cotton germplasm lines (*G barbadense* L.) were



maintained during 2015-16 crop season.

In Br. 06 (a) NT trial the test entry LHDP 1 (3394 kg/ha) recorded significantly highest total seed cotton yield/ha (130+160 DAS) over local check L 604 (2772 kg/ha). The entries LHDP1 (1243 kg/ha), DSC 1501 (1181 kg/ha), DSC 1502 (1113 kg/ha), RS 2814 (1063 kg/ha), GSHV 171 (1063 kg/ha) and ANGC 1502 (1058 kg/ha) recorded significantly highest lint yield/ha (130+160 DAS) over local check CS (L 604) (865 kg/ha).

Out of twenty five crosses studied for identification of high yielding extra long staple cotton varieties/hybrids (*G. barbadense* L) tolerance to biotic and abiotic stresses with earliness during 2015-16, the crosses C 25 (2044 kg/ha), C 24 (1984 kg/ha), C 21 (1865 kg/ha), C 2 (1865 kg/ha), C 5 (1846 kg/ha) and C 12 (1826 kg/ha) recorded significantly superior seed cotton yield/ha over check DCH 32 (1449 kg/ ha). One cross LAHB 1 which was found promising during 2014-15 and 2015-16 trials was produced in bulk and proposed for AICCIP, Br 015(a) PHT trial during 2016-17.

During 2015 - 16 season, 50 lines of *G. hirsutum* were evaluated for yield and fibre properties. The entries HS 294 (164.70 g/plant), TSH0533-1 (154.35 g/plant), PBH 10 (154.2 g/plant), L 788 (150.1 g/plant), CCH 14-1 (138.4 g/plant), L 1008 ((137.6 g/plant), Sakthi Sultan (136.4 g/plant), GJHV 497 (134.9 g/plant) and GTHV 13/37 (134.1 g/plant) recorded significantly higher seed cotton yield than the check L604 (95.2 g/plant).

In Advanced Yield Trial among 10 entries tested, the entry L 1511 (2187 kg/ha) recorded highest seed cotton yield followed by L 1318 (2050 kg/ha) and L 1353 (2025 kg/ha) compared to checks L 604 (1394 kg/ha) and NDLH 1938 (1588 kg/ha). In multilocation trial, L 1231 (2253 kg/ha) recorded highest seed cotton yield followed by L 1384 (2150 kg/ha) and NDLH 2005-4 (2013 kg/ha) compared to checks L 604 (1487 kg/ha), NA 1325 (1560 kg/ha) and NDLH 1938 (1626 kg/ha).

Regional Agricultural Research Station, Nandyal

In Advanced Varietal Trial (hirsutum), NDLH-1906 recorded the highest yield of 1582 kg/ha followed by NDLH-2028-2 (1475 kg/ha) and NDLH -2005-4 (1411 kg/ha) compared to the check Siva Nandi (925 kg/ha).

In Advance Hybrid Trial, NDLHH-442 gave highest yield of 761 kg/ha followed by NDLHH-445 (728 kg/ha) and NDLHH-458 (649 kg/ha) compared to the check NDLHH-425 (362 kg/ha).

Genotypes P 2151 (1682 kg/ha) and ARBC 64 (1580 kg/ha) of hirsutums and RG-8 (1014 kg/ha) and GAM-191 (871 kg/ha) of arboreums recorded higher yields in high density planting system (HDPS).

Crop Production

Regional Agricultural Research Station, Lam

Highest seed cotton yield was recorded when drip irrigation was given at 0.6 Epan (3848 kg/ha) followed by drip irrigation at 0.8 Epan (3392 kg/ha). Application of 75% RDN & K through drip and RDN & K as soil application recorded similar yields.

Under organic cotton production, highest seed cotton yield of 1556 kg/ha and 1502 kg/ha was recorded with RD of nutrient through organic based P equivalent and RD of nutrient through organic based N equivalent respectively and was on par with broadcasting of sunhemp at 45 DAS interval, incorporated before flowering. ANGRAU

Cotton entries expressed significant variation for physiological, drought tolerance and yield parameters. The entries *viz.*, BS 39, SCS 1213, CNH 1110, AKH09-5, ARBH 1352, LRA 5166 and L770 recorded higher seed cotton yield under need based irrigated conditions. The entries *viz;* L 603, BS 39, AKH09-5, SCS 1213, CNH 1110, L 770 and RAH 806 recorded higher seed cotton yield under rainfed conditions and expressed more than two contributing characters of drought tolerance in addition to yield attributing characters.

Higher seed cotton yield was recorded with foliar spray of Godrej Double, a Homobrassinolide based plant growth regulator @ 500 ml per hectare at 40 DAS and 55 DAS. The yield improvement ranged from 10 to 15 percent.

Studies on rescheduling of fertilizers to *kharif* cotton indicated that application of 300:90:60 kg of N, P_2O_5 & K_2O /ha along with 5t of FYM/ha + 25% RD of S, B and Zn recorded the highest yield (42.47q/ha) while the lowest yield (25.77 q/ha) was recorded in farmers practice without FYM application.

Application of RDF *i.e.*, 150:60:40 kg of N, $P_2O_5 \& K_2O/ha$ along with liquid bio-fertilizers (LBFs) at sowing & 45 DAS + FYM @10 t/ ha resulted in the highest plant height, no. of sympodia and bolls per plant and Kapas yield (40.8 q/ha) and it was on par with 75% RDF + LBFs at sowing & 45 DAS + FYM @10 t/ha (kapas 35.5 q/ha). The lowest was recorded with RDF only (19.5 q/ha).

Regional Agricultural Research Station, Nandyal

In HDPS with compact cultures, significantly higher kapas yield (1065 kg/ ha) was recorded with spacing of 60 cm x 10 cm which was on par

with spacing of 45 cm x 10 cm (980 kg/ha). Application of Fertilizers at 125% RDF recorded highest kapas yield of 1015 kg/ha. Significantly lower kapas yield of 903 kg/ha was observed in 100 % RDF.

Defoliation by Drop ultra @ 250 ml/ha at 80% boll opening stage and ethrel @ 1500 ppm/ ha at 70% boll opening stage recorded higher yield of 1604 kg/ha and 1581 kg/ha, respectively in Sivanandi variety of cotton.

Agricultural Research Station, Utukur

Field validation of fertilizer requirement for targeted yield of cotton revealed that kapas targeted yield of 30 q/ha with RDF; kapas targeted yield of 30 q/ha with chemical fertilizers; kapas targeted yield of 30 q/ha with chemical fertilizers + VC 5 t/ha; Farmer's practice (180:150:60) recorded 12.51; 14.47, 14.80; and 13.51 q/ha of kapas respectively.

Crop Protection

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Insect Pest Management

Regional Agricultural Research Station, Lam

Under advanced screening, the entries GSHV 162, GISV 267, SCS 1062 and CCH 12-2 were found tolerant to jassids.

The insecticides such as flonicamid 50 % WG @ 75 g a.i./ha, buprofezin 25 % SC @ 2500 g a.i./ha and diafenthiuron 50 % WP @ 300 g a.i./ha were found effective against jassids when compared to neem oil and biofungal agents.

The commonly used insecticides on cotton such as flonicamid, diafenthiuron, imidacloprid and fipronil were compatible with fungicides such as mancozeb, COC and also with foliar nutrients.

Most of the commonly grown BG II hybrids were found moderately susceptible against jassids and a very few (US 4746, TULASI 234 BG II, SADANAND BG II, US 7067 BG II,



RCH 668 BG II, VIRAT BG II, RCH 665 BG II & VICH 313 BG II) were recorded the low incidence of jassids.

Regional Agricultural Research Station, Nandyal

Flonicamid (@ 75 and 100 g a.i./ha), diafenthiuron (300 g a.i./ha) and fipronil (50 g a.i./ha) were effective in managing the leaf hoppers.

Disease Management

Regional Agricultural Research Station, Lam

Progress of TSV disease incidence (%) was in the range of 0.81% to 12.97% in *Bt* cotton hybrids.

Entry L 799 was free from grey mildew and recorded resistant reaction to *Alternaria* leaf spot. Entries with resistant/moderately resistant reaction to *Alternaria* leaf spot, grey mildew and rust were 25D14, ARBB-1501, CCB-11a, ARBB-1502, ARBB 1401, ARBD 27, GSB-44 and ARBHB 1402.

Cotton entries, ARBB 1401, DB 1402, CCB 36, ARBB 1402 and DB 1302 showed resistant reaction to grey mildew during 2nd consecutive year.

Seed treatment fungicides *viz.*, streptocycline, thiram, carbendazim, mancozeb, streptocycline, trifloxystrobin and penflufen, were compatible with imidacloprid treated *Bt* cotton seed.

4.2 Mesta

Crop Improvement

Agricultural Research Station, Amadalavalasa

A total of 53 germplasm accessions of *Hibiscus sabdariffa* were maintained, studied and found that eight accessions exceeded fibre yield over the best check variety, AMV-5 (15.67

g/plant). The lines, AR-23, REX-4, AR-63 and R-203 were among the top fibre yielders.

The entries AHS-255 (32.53 q/ha) and JRHS-1 (31.66 q/ha) from Advanced Varietal Trial-I and AHS-249 (22.47 q/ha) from Advanced Varietal Trial-II of *Hibiscus sabdariffa* were found to be superior than check HS-4288.

The entry JRK-2013-1 (17.36 q/ha) in Advanced Varietal Trial-I and JRK-2011-4 (15.96 q/ha) in the Advanced Varietal Trial-II of *Hibiscus cannabinus* L. were found to be on par with the check varieties HC-583 and AMC-108 for fibre yield.

Crop Production

Agricultural Research Station, Amadalavalasa

Studies on integrated weed management in mesta revealed that, application of pretilichlor 50% EC @ 900 ml/ ha within two days after sowing + one hand weeding at 15 DAE recorded 100% weed control efficiency, maximum plant basal diameter (2.06 cm) and fibre yield (24.4 q/ ha) which resulted in highest gross returns (RS.62203/ha), net returns (Rs. 49003/ha) and B:C ratio (3.71).

Performance of roselle genotypes under different fertilizer management schedule indicated that variety AHS-230 recorded highest fiber yield of 27.66 q/ha with fertilizers @ 80:40:40 NPK kg/ha followed by AHS-233 (24.85 q/ha) while the best check variety AMV-5 recorded 21.46 q/ha.

In rainfed acidic soil condition, conjoint use of fertilizers and organic manure based on soil test-targeted yield equation, i.e., 150 % NPK on ST – TY + 25% lime requirement lime + 5 tonnes FYM/ha recorded highest fibre yield of mesta (16.52 q/ha) and improved the soil health also.



Micro pond retting was found most feasible and effective in terms of reducing retting time (about 10 days), cost of retting and fibre extraction (@ Rs. 6000/- per hectare) and improving fibre quality (shiny) and strength compared to conventional retting.

Crop Protection

Insect Pest Management

Agricultural Research Station, Amadalavalasa

Under field conditions, mesta entries AS-80-12 and AS-80-23 were completely free from incidence of aphids. Similarly R-96 and R-321 entries were free from leaf hoppers infestation. Entries AR-16, AR-20, ER-38, R-127, R-129 and R-321 against whiteflies, AR-128, AR-80-23, REX-6, ER-27, ER-38, R-77 and R-88 against semiloopers and R-191 and AS-80-9 against mealybugs were found to be tolerant with lowest infestation.

Disease Management

Agricultural Research Station, Amadalavalasa

In AVT-I, six varieties *viz.*, AHS-255, JRHS-1, HS-4288, JRHS-2, AHS-267 and AMV-5 were found moderately susceptible to foot and stem rot disease with incidence ranging from 9.8% to 23.2%. Among them, AHS-255 recorded lowest disease incidence of 9.8% with high fibre yield (32.53 q/ha). Similarly, all the six advanced varieties in AVT-II *viz.*, AHS-249, JRR-2012-1, AHS-254, AHS-238, HS-4288 and AMV-5 were found moderately susceptible to foot and stem rot disease with per cent disease incidence ranging from 14.4% to 23.5%. The entry AHS-249 recorded high fibre yield (22.47 q/ha) with least disease incidence (14.4%).

Metalaxyl MZ as seed dresser and foliar

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spray against *Phytophthora parasitica var. sabdariffae* in mesta resulted in less incidence of disease (8.85%) at the time of harvest with high fibre yield of 19.83 q/ha and proved superior in all the parameters *viz.*, plant height, basal diameter, plant population and green weight.

4.3 Sugarcane

Crop Improvement

Regional Agricultural Research Station, Anakapalle

One hundred and thirty five germplasm clones were maintained under field conditions. Single cane weight ranged from 0.60 kg (Co A 8401) to 1.46 kg (92 A 145); cane diameter ranged from 1.90 cm (Co A 71-1) to 3.20 cm (97 A 44); cane length ranged from 1.80 m (97 R 401) to 3.10 m (87 A 380) and HR brix per cent ranged from 16.00 (NCO 310) to 24.60 (Co 997).

In seedling nursery, from 2651.00 g of fluff a total of 10,397 seedlings were transplanted from 33 station crosses, 13 zonal crosses, 13 PCs and 56 GCs. Out of which 7314 seedlings survived in the main field with an average survival per cent of 70.35. Seven hundred and sixty genotypes were selected from seedling nursery.

In Main Yield Trial Early- Plant Crop-I, the clone 2011 A 262 recorded highest number of millable canes of 111.55 thousands/ha, cane yield of 114.58 t/ha, with a per cent juice sucrose of 19.69 and CCS yield of 16.18 t/ha when compared to the standard 2001 A 63, which recorded the cane yield of 110.50 t/ha, NMC 105.47 thousands/ha, percent juice sucrose of 17.91 and CCS yield of 14.06 t/ha.

In Main Yield Trial Early -Plant Crop-II, the clone 2010 A 229 recorded cane yield of 124.91 t/ha, NMC of 110.50 thousands /ha, percent juice sucrose of 17.34 and CCS yield of 15.42 t/ha



and significantly out yielded the best standard Co 6907, which recorded the cane yield of 107.47 t/ha, NMC of 101.47 thousands/ha, percent juice sucrose of 16.62 and CCS yield of 12.69 t/ha. The same clone 2010 A 229 also posses good quality parameters *viz.*, 19.53% of Brix, 88.77 % of purity and 12.37% CCS.

In Main Yield Trial Early -ratoon crop, the clone 2010 A 229 recorded maximum cane yield of 123.53 t/ha, NMC of 110.68 thousands/ha, percent juice sucrose of 19.31 and CCS yield of 17.11 t/ha when compared to the standard Co 6907 with cane yield of 106.77 t/ha, NMC of 104.17 thousands/ha, percent juice sucrose of 18.51 and CCS yield of 14.15 t/ha and significantly excelled the best check.

In Main Yield Trial Mid late-Plant Crop-I, the clone 2011 A 222 recorded high cane yield of 117.93 t/ha, NMC of 77.47 thousands/ha with percent juice sucrose of 20.28 and CCS yield of 16.95 t/ha followed by 2011A313 with cane yield of 102.41t/ha, NMC of 87.8 thousands/ha, sucrose of 20.24, CCS yield of 14.43t/ha when compared to the standard Co 7219, which recorded the cane yield of 78.77 t/ha, NMC 65.51 thousands/ha, percent juice sucrose of 18.85 and CCS yield of 10.12 t/ha.

In Main Yield Trial Mid late-Plant Crop-II, the clone 2010 A 273 recorded cane yield of 91.02 t/ha, NMC of 66.09 thousands /ha, percent juice sucrose of 18.17 and CCS yield of 11.31t/ ha when compared to the standard Co 7219 with cane yield of 73.66 t/ha, NMC of 64.6 thousands/ha, percent juice sucrose of 17.27 and CCS yield of 8.18 t/ha.

In Main Yield Trial Mid late - Ratoon, the clone 2010 A 273 recorded maximum cane yield of 80.23 t/ha, NMC of 66.65 thousands/ha, juice sucrose of 18.8 and CCS yield of 10.46 t/ha followed by 2010 A 154 with cane yield of 72.94 t/ha, NMC of 70.36 thousands/ha, percent juice sucrose of 19.30 and CCS yield of 9.76 t/ha when compared to the standard Co 7219 which recorded the cane yield of 58.69 t/ha, NMC of 62.91 thousands/ha, percent juice sucrose of 18.05 and CCS yield of 7.3 t/ha.

Twelve clones were tested under rainfed situation at M/S Etikoppaka Sugar Factory liaison Farm during 2015-16. The clones 2000A225 (98.55 thousands/ha) and 2004 A 55 (98.33 thousands/ha) recorded maximum number of millable canes when compared to best standard 87 A 298 (96.67 thousands/ha). The clones 2000 A 225 (94.22 t/ha and 12.39 t/ha) and 2005 A 128 (91.33 t/ha and 11.33 t/ha) recorded significantly higher cane and CCS yields when compared to best standard 87 A 298 (83.00t/ha and 10.87 t/ha) respectively at harvest.

Among the 20 genotypes studied for their suitability to energy production, the clone 2008 A 120 recorded highest NMC of 118.40 thousands/ha, 2006 A 288 and 2006 A 223 recorded highest fibre content of 14.70 %, 2009 A 302 recorded highest leaf area of 480.50 sq cm, while the clone 2009 A 107 recorded highest sucrose content of 20.84%, cane yield of 126.74 t/ha and CCS yield of 18.36 t/ha and the clone 2009 A 377 recorded highest biomass of 1350 gm per plant.

In Advanced Varietal Trial Early-Plant crop-I, the clone, 2006 A 223 recorded significantly higher cane, CCS yields and per cent juice sucrose (126.79 t/ha, 17.60 t/ha and 19.50 per cent) when compared to the best standard 87 A 298 (108.15 t/ha, 15.01 t/ha and 18.64 per cent).

In Advanced Varietal Trial (early)-Plant Crop-II, the clone 2005 A 128 (138.33 t/ha, 18.95 t/ha and 18.52 per cent) followed by 2000 A 240 (134.67 t/ha, 18.71 t/ha and 18.60 per cent) were found to be significantly superior over the best standard 87 A 298 (116.33 t/ha, 15.88 t/ha and 18.40 per cent) respectively.

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In Advanced Varietal Trial (early) - Ratoon Crop, entry 2005 A 128 (126.33 t/ha and 16.35 t/ha) followed by 2000 A 240 (123.33 t/ha and 16.20 t/ha) recorded significantly higher cane and CCS yields when compared to best standard 87 A 298 (102.63 t/ha and 12.85 t/ha) respectively. For per cent juice sucrose, the clone 2000 A 240 (18.72) was found to be on par with the best standard 87 A 298 (18.58). The clone 2000 A 240 recorded lower fibre per cent (14.40) while, the clone CoC 11336 recorded high fibre per cent (17.00).

Under rainfed situation, the clones, 2006 A 223 (112.33 t/ha, 17.52 t/ha) followed by 2000 A 225 (110.67 t/ha and 17.84 t/ha) and 2007 A 81 (108.09 t/ha and 16.23 t/ha) recorded higher cane and CCS yields when compared to standards 87 A 298 (92.67 t/ha and 13.44t/ha) and Co 7219 (96.33t/ha and 14.26t/ha) respectively.

Under limited irrigated conditions (early plating), among 12 sugarcane clones / varieties tested, the clones 2003 A 255 (56.59 t/ha), 2004 A 55 (55.21 t/ha), 2000 A 225 (57.12 t/ha), 2001 A 63 (57.98 t/ha), 2007 A 126 (57.12 t/ha), 2007 A 130 (57.81 t/ha), 2001 A 70 (55.38 t/ha) and 2007 A 81 (61.11 t/ha) performed well and these clones also recorded higher shoot population and millable canes at harvest, and high SPAD (SCMR), higher SOD values and leaf proline content at formative stage.

Among 15 sugarcane clones screened under rainfed conditions (June planting), the clones 2001 A 63 (76.18 t/ha), 2004 A 55 (70.63 t/ha), 2000 A 226 (74.21 t/ha), 2000 A 56 (68.1 t/ha), 2000 A 240 (74.8 t/ha), 2004 A 107 (74.12 t/ha), 2000 A 213 (72.02 t/ha) and 2006 A 223 (75.99 t/ha) performed well and recorded higher NMC, SPAD (SCMR) and SOD values which denotes drought tolerance efficiency under rainfed conditions.

Regional Agricultural Research Station, Tirupati

Screening of 6 promising sugarcane varieties for salinity tolerance indicated that high SCMR, low SLA, high CSI and high proline was recorded in 2010 T 172 compared to checks. The sugarcane genotype 2010 T 72 recorded highest cane yield both in control and salinity stress and showed 35 % reduction in yield under imposed salinity conditions compared to checks.

Genetic diversity within twenty released and pre released sugarcane cultivars was estimated with random amplified poly-morphic DNA (RAPD) fingerprinting using11 RAPD markers. A total of 77 markers were scored for 11 RAPD markers. The number of amplification products ranged from 5 (OPC5 and OPG8) to 11 (OPB5). OPG8 is monomorphic in all the 20 genotypes with 5 amplicons. Jaccard's similarity coefficients ranged from 0.485 to 0.919. The UPGMAbased phenogram consisted of two clusters; the first group consists of 11 varieties and the second one included the rest.

Agricultural Research Station, Perumallapalle

Sugarcane clone 2003 T 121 was proposed for release.

A total of 145 germplasm accessions were maintained. The new accessions of the station were characterized and pictures were documented.

In seedling nursery, fluff of 52 cross combinations was sown and 6268 seedlings were transplanted and out of them 5382 (85.9%) seedlings survived.

In the main yield trial (Early) plant crop-I, clone 2011 T 24 recorded highest significant cane yield (159.8 t/ha) and CCS (20.6 t/ha). Other clones which also recorded significant cane yield and CCS yield were 2011 T 94 (103.4 t/ha, 13.1 t/ha), 2011 T 161(111.7 t/ha, 12.9 t/ha) and 2011 T 62 (96.6 t/ha, 12.7 t/ha). The best check 2003 V 46 recorded 68.5 t/ha cane yield and 8.7 t/ha CCS yield.

In the main yield trial (Midlate) plant crop-I, the test clone 2011 T 104 recorded highest significant cane yield (138.6 t/ha) and CCS yield (17.0 t/ha). Other clones which also recorded significant cane yield and CCS yield were 2011 T 51 (107.8 t/ha, 13.3 t/ha) and 2011 T 70 (103.8 t/ha, 12.3 t/ha). The best check Co 86032 recorded 73.1 t/ha cane yield and 7.9 t/ha CCS yield.

In the advanced varietal trial (Early) plant crop-I, clone Co T 10367 recorded highest significant cane yield (157.4 t/ha) and CCS yield (19.6 t/ha). Other clones which also recorded significant cane yield and CCS yield were Co 10005 (118.9 t/ha, 15.8 t/ha) and Co 10026 (119.4 t/ha, 13.7 t/ha). The best check Co 85004 recorded 91.8 t/ha cane yield and 11.8 t/ha CCS yield.

In the advanced varietal trial (Early) plant crop-II, among the three clones evaluated, Co 09004 recorded significantly high cane yield (138.5 t/ha) and CCS yield (16.8 t/ha) against the best check Co 85004 (108.5 t/ha, 12.1 t/ha).

Agricultural Research Station, Vuyyuru

One hundred and fifty nine germplasm clones were maintained under field conditions. The clones 2009 V 61 & 2009 V 80 (23.80) and Co 8368 (23.73) recorded higher H.R- Brix values. The clones 93 A 134 (3.37 cm), 97 R 44 (3.34 cm) Annual Report 2015-2016

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and 2006 V 87 (3.33 cm) recorded higher cane diameter and the clones 2000 V 59 & 2006 V 51 (291.3 cm) and 2006 V 41 & 97 V 60 (283.3 cm) recorded higher length of millable cane.

In seedling nursery, 1836 g fluff of 74 cross combinations was sown and 12,133 seedlings were transplanted and out of them 6,291 (51.85%) seedlings survived.

In Main Yield Trial (Early) Plant crop-I, the clones 2011 V 100 (129.95 t/ha) and 2011 V 226 (128.56 t/ha) recorded significantly higher cane yield over the standard 2003 V 46 (110.68 t/ha). The clone 2011 V 226 also recorded higher CCS yield of 18.11 t/ha and per cent juice sucrose of 19.18 compared to the standard 2003 V 46 which yielded 15.27 t/ha CCS with 18.93% juice sucrose.

In Main Yield Trial (Mid-late) Plant crop-I, the clone 2011 V 159 recorded significantly higher cane yield of 135.42 t/ha and higher CCS yield of 18.75 t/ha whereas the standard 83 V 15 recorded 110.57 t/ha cane yield and 15.69 t/ha CCS yield.

In Main Yield Trial (Mid-late)- Ratoon, the clones 2010 V 146 (114.67 t/ha), 2010 V 116 (96.18 t/ha) and 2010 V 36 (83.33 t/ha) recorded significantly higher cane yield. The clone 2010 V 146 also recorded higher CCS yield of 16.83 t/ha. The standard 83 V 15 recorded 67.45 t/ha cane yield and 9.73 t/ha CCS yield.

In Advanced Varietal Trial (early) Plant crop-I, the clones Co A 12-322 (118.93 t/ha) and Co A 12-321 (117.80 t/ha) recorded significantly higher cane yield over the standard Co C 01-061 (90.43 t/ha). The clone Co A 12-321 recorded higher CCS yield of 13.66 t/ha while the standard Co C 01-061 recorded CCS yield of 12.00 t/ha.

Crop Production

Regional Agricultural Research Station, Anakapalle

The mean data of three years study (two plant crops and one ratoon) indicated that, among different sugarcane genotypes (Mid late group), 2007 A 126 and 2004 A 104 recorded higher number of millable canes (65,300/ha and 61,800/ha) and cane yield (69.4 t/ha and 68 t/ha). Higher number of millable canes (65,500/ha), cane yield (72.8 t/ha) and sugar yield (8.9 t/ha) were recorded at 125% (140 k g N/ha) recommended nitrogen. However highest mean juice sucrose per cent was recorded at 100% recommended dose of nitrogen.

Integrated application of organics and inorganics in improving soil health and sugarcane productivity indicated that application of FYM @ 10 t/ha + Biofertilizer + inorganic nutrient application based on soil test (95.6 t/ha) or application of FYM @ 10 t/ha + Biofertilizer + 100% RDF (95.4 t/ha) registered significantly higher cane yield.

Use of plant growth regulators (PGRs) significantly enhanced cane yield when the setts were planted after overnight soaking in 100 ppm (92.0 t/ha) or 50 ppm ethrel solution (90.6 t/ha) followed by spraying of GA_3 at 90,120 and 150 days after planting (90.6 t/ha). Conventional 3 budded sett planting recorded significantly lower cane yield of 80.0 t/ha.

The mean data of three years (2013-14 to 2015-16) experimentation indicated that, planting of single bud seedlings in paired rows of 60/120 X 60 cm (80.2 t/ha) registered significantly higher cane yield as compared to wider row planting of 150 cm x 45 cm (66.0 t/ha) but found more or less similar to normal planting at 90 X 60 cm (76.9 t/ha). Among the nitrogen levels, application of nitrogen at 175% recommended dose recorded higher cane yield of 79.9 t/ha and found

superior to 150% recommended N (73.7 t/ha) or 100% recommended dose of nitrogen (68.7 t/ha).

Among different intercrops grown in sugarcane, Sugarcane + Guar – Ginger Sequence registered higher sugarcane equivalent yield of 97.1 t/ha which was closely followed by sugarcane + Greengram – Ginger (94.2 t/ha) and Sugarcane + Bhendi – Ginger (90.7 t/ha) while Sugarcane + Coriander registered lesser sugarcane equivalent yield of 78.2 t/ha.

Harvesting of early maturing sugarcane genotypes at 10 months (71.8 t/ha) or 11 months (72.7 t/ha) registered higher cane yields and delay in harvesting from 10 months to 13 months age drastically reduced the cane yields to a tune of 11.2 t/ha. Among different early maturing sugarcane genotypes, 2000 A 240 registered higher cane yield of 70.2 t/ha while 2003 V 46 recorded the lowest yield (65.6 t/ha).

Under sugarcane seedling cultivation, conventional hand weeding thrice at 30, 60 and 90 DAP controlled the weeds effectively and recorded higher no. of millable canes (75006/ha) and cane yield (96.7 t/ha). Post emergence spraying of halosulfuran (75% WG) @ 80 g a.i./ha at 30 days after planting controlled the *cyperus* to certain extent and recorded cane yield 91.6 t/ha.

Standardization of agrotechniques for micro propagated plantlets of sugarcane showed that cane yield was highest at a spacing of 60 x 45 cm (62.15 t/ha) and with nitrogen level of 200 % RDN (63.63 t/ha) and their interaction has recorded significantly highest cane yield (72.69 t/ha). Sugar yield (9.71 t/ha) was highest at a nitrogen level of 200% RDN.

Shoot population at harvest (85126/ha), cane yield (87.55 t/ha) and sugar yield

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(12.82 t/ha) were the highest with 100% recommended dose of fertilizers + liquid Azospirillum + liquid PSB compared to carrier based bio fertilizers indicating the efficacy of liquid biofertilizers than the solid biofertilizers.

Planting of single bud seedlings in dual rows under drip fertigation with 150% RDN recorded higher cane yield of 106.7 t/ha as compared to normal planting with three budded setts (99.5 t/ha) or planting of bud chip seedlings in paired (99.5 t/ha) or dual rows (102.5 t/ha).

In third year ratoon crop, significantly highest yields (77.40 t/ha) were recorded with 150 % chemical fertilizer N + 100 % PK fertilizers. However, significant improvement in microbial population (Azospirillum, Azatobacter and phosphorus solubilizing bacteria), juice quality and soil physical properties were noticed in 50 % chemical fertilizer + 25 % N through vermi compost + 25 % N through green manure + biofertilizer applied plots.

Cane and sugar yields (Plant crop) recorded after 6 years of organic farming were 74.6 and 10.45 t/ha, where as in 100 % chemical fertilizer treatment it was 76.15 and 10.06 t/ha. Significant improvement in soil available organic carbon status, micronutrient status and soil micro flora with improved physical properties were observed in organic farming plot over 100 % chemical fertilizer plot.

Carbon sequestration potential of sugarcane under organic farming vs inorganic farming was 2.10 and 1.82 mg C/ha, respectively. Effect of organic farming in different soil carbon pools revealed that significantly higher microbial biomass carbon *i.e.* labile carbon (1344 μ g C/g fresh soil) and readily oxidizable carbon (16.8 μ g C/g fresh soil) was recorded over inorganic farming.

In standardization of rooting media for raising

sugarcane seedlings in protrays, coir pith + vermi cost in 1:1 ratio + urea 5 kg/100 kg media recorded higher seedling vigour index (7478) followed by coirpith + vermi compost (1:1) + 10% lime dipping (6520).

Agricultural Research Station, Perumallapalle

In sugarcane under drip irrigation in late planting situation (June–July), planting of three budded setts recorded highest cane yield (92.7 t/ha) compared to bud chip seedlings (73.2 t/ha) and two budded setts (85.2 t/ha). With regard to drought management techniques, lime soaking of seed material + gypsum application (500 kg/ha) in furrows + urea @ 2% and muriate of potash @ 2 % as foliar spray each at 90, 105 and 120 DAP recorded highest cane yield of 87.3 t/ha.

Among 9 entries tested to evaluate post harvest and delayed harvest deterioration, the juice extraction %, sucrose % and CCS % in all varieties were decreased with increasing staling period (0 to 96 hours) and months (12, 13 and 14 months) of harvest. However, 2009 T 33, and 2009 T 23 showed tolerance to post harvest and delayed harvest deterioration when compared with other entries.

Under saline conditions, entries CO 99004, 83V15, 2005T52 and 2010 T 172 showed less % reduction in cane weight, while entries CO 99004, 2010 T 58, 2010 T 161 showed less % reduction in sucrose % and CCS compared to control.

Agricultural Research Station, Vuyyuru

In ratoon crop, all the three new clones 2006 V 41, 48 and 51 (125.1, 125.8, 125.7 t/ha) recorded significantly higher cane yield as compared to check 87 A 298 (116.5 t/ha). Higher per cent juice sucrose (20.39%) at 11th month

(delayed) harvesting was recorded in 2006 V 41 as compared to other clones. In all the clones significantly lower yields were recorded at delayed harvest (11^{th} month) except in 2006 V 48.

In plant trial, transplanting 35 days old single node seedlings recorded higher cane yield (123.88 t/ha at 125 % RDN & 125.6 t/ha at 150 % RDN) as compared to planting three budded setts (120.58 t/ha). In case of per cent juice sucrose, transplanting single node seedlings recorded significantly higher per cent sucrose (20.57 to 20.60 %) as compared to planting three budded setts (20.26%).

Under waterlogged conditions, clone 2009 V 127 from early group recorded highest cane yield 124.80 t/ha with highest per cent juice sucrose (19.55) and clone 2009 V 89 from midlate group recorded highest cane yield 132.33 t/ha with more per cent juice sucrose (18.63) and were found tolerant to waterlogged conditions when compared to other clones and standards.

Under moisture stress conditions, in early group, clone 2008 V 240 recorded highest cane yield of 85.46 t/ha with per cent juice sucrose of 19.99. In Mid-late group the clones 2008 V 337 (89.46 t/ha) and 2008 V 216 (89.74 t/ha) recorded highest cane yield when compared to the other clones.

Among the early genotypes tested for tolerance to saline irrigation water, 2006 V 51 recorded highest cane yield (74.06 t/ha), sucrose (20.58 %) and nutrient availability in the post harvest soils and among the mid-late genotypes, 2007 V 83 recorded highest cane (81.98 t/ha) yield and nutrient availability in the post harvest soils.

In the sixth year of organic farming research, more shoot population, yield and nutrient uptake were recorded in inorganic plot (84.28 t/ha) than

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organic plot (66.12 t/ha) while quality and nutrient availability in post harvest soils were more in organic plot (20.33 % juice sucrose, 128.37 kg/ha phosphorus and 505.28 kg/ha potassium) than inorganic plot (19.88 % juice sucrose, 104.79 kg/ha phosphorus and 475.59 kg/ha potassium).

In sugarcane, transplanting of single bud seedlings with 120 cm x 40 cm spacing -single row at 150 % RDN + RDP&K recorded highest E.C (0.42 dS m⁻¹), organic carbon (0.94 %) and potassium availability (631.44 kg/ha) in the post harvest soils.

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Tirupati

Lowest incidence of internode borer was recorded in culture 2012 T 78 (10.78%) among PVT entries and 2011 T 111 (10.66%) among MYT entries.

Among IVT midlate entries, Co 12016 (8.51%) and among AVT midlate entries, Co T 10368 (2.7%) recorded lowest incidence of internode damage.

Regional Agricultural Research Station, Anakapalle

White grub damage was low (1.47%) when *Metarhizium anisopliae* @ 5 kg/ha in 250 kg FYM was applied to soil followed by application of *Heterorhabditis indica* @ 20 kg/ha in 150 kg moist sand two times (2.17%) while plant damage due to white grub was high in untreated control (48.04%) followed by neem cake (25%). Cane yield was high in *Metarhizium anisopliae* (87.4 t/ha) followed by *Heterorhabditis indica* two times application (77.08 t/ha) and low in control (24.93t/ha).

Application of both Entomopathogenic fungi



i.e., *Metarhizium anisopliae* and *Beauveria bassiana* and entomopathogenic nematode *i.e.*, *Heterorhabditis indica* two times were effective in reduction of bud damage due to termites and recorded significantly high germination (59.62%, 58.15% and 54.75%), low bud damage (40.38%, 41.85% and 45.63%), low seedling mortality (12.04%, 8.54% and11.72%) and high yields (71.71 t/ha, 71.85 t/ha and 64.21 t/ha) respectively.

IPM Module 3- Trash mulching + *T. chilonis* release @ 50,000/ha from 30 DAP for 6 times and 2 releases after node formation and Module 6- Trash mulching + *T. chilonis* release @ 75,000/ha from 30 DAP for 6 times and 2 releases after node formation were found effective in managing shoot borers in sugarcane with high incremental benefit cost ratio.

Sugarcane sett treatment with imidacloprid 48% FS (0.1%) + soil drenching with imidacloprid 600FS (*a*) 250 ml/ha effectively managed the incidence of termite and resulted in significantly high germination (64.25%), low bud damage (35.75%), significantly low seedling mortality (5.18%) and significantly high seed cane yields (72.18 t/ha).

Entries Co V 12 356 (6.69 % DH) and Co A 12 322 (6.82% DH) from Advanced varietal trial (early), 2011 A 78 (10.22% DH) from MYT (midlate) entries and 2010 A 402 (6.54% DH), 2010 A 344 (7.91% DH), 2010 A 154 (7.97% DH), 2010 A 159 (8.6% DH) and 2010 A 302 (9.78% DH) among MYT (early & midlate) ratoon crop entries showed less incidence of early shoot borer and found promising. Similarly, the entry 2011 A 67 (26.67%) from MYT (midlate) and 2010 A 154 (26.67) from MYT (early & midlate) - ratoon crop recorded less incidence of internode borers.

Pheromone traps @ 25/ha reduced the

incidence of early shoot borer and internode borer to an extent of 72.04 % and 49.60% respectively, and recorded high percent juice sucrose (20%) and cane yield (82.44 t/ha) which resulted in 7.34% increase of cane yield over control (19.20%; 76.80 t/ha) with a cost benefit ratio of 1:1.25

Soil application of chlorantraniliprole 0.4G @ 22.5kg/ha (2.31% DH), fipronil 0.3G @ 25 kg/ha (5.40% DH) at planting and 60 days after planting (DAP) significantly reduced the incidence of early shoot borer compared to untreated control (30.66%).

Agricultural Research Station, Vuyyuru

Studies on termite management indicated the plant mortality due to termite damage was less in chlorpyriphos treated plots either alone or in combination with malathion or monocrotophos followed by imidacloprid treated plots. Highest cane yield of 100.41 t/ha was recorded in chlorpyriphos treated plots and lowest yield of 81.07 t/ha was recorded in control plots.

Disease Management

Regional Agricultural Research Station, Anakapalle

Among 50 entries evaluated against smut under artificially inoculated conditions, eight entries *viz.*, Co A 13324, Co A 13325, Co A 13326, Co A 13328, 2012 A 319, 2012 A 277, Co V 13356 and Co 29094 exhibited resistant reaction.

Out of 51 entries, eleven entries viz., 87 A 298, 2006 A 102, 2006 A 64, Co A 11321, 2011 A 259, Co A 13325, 2012 A 340, 2012 A 249, 2012 A 319, 2012 A 277 and 2012 A 255 exhibited resistant reaction to the established pathotypes (Cf- 419, Cf- 671 and Cf- 997) of red rot fungus under plug method of inoculation; three entries *viz.*, 2011 A 313, Co A 13321 and



Co A 13325 exhibited highly resistant reaction to wilt and two entries 2006 A 64 and 2006 A 102 showed resistant reaction against YLD under natural conditions.

Twenty six bacteria isolated from the rhizosphere of ten sugarcane clones were evaluated for their antagonism against *Colletotrichum falcatum*. The rhizospheric bacteria 7 and *Pseudomonas putida* isolated from the rhizosphere of Co V 92102 have shown 70% inhibition of mycelial growth *of C. falcatum*.

The germination of virus infected single budded setts was enhanced by hot water treatment at 50°C for 20 minutes followed by carbendazim treatment.

Agricultural Research Station, Perumallapalle

Among the 17 entries tested, the entry 2010 T 83 showed moderate resistant reaction against three red rot pathotypes, Cf 419, Cf 671 and Cf 997 both in plug method and cotton swab method while 2010 T 344 showed highly susceptible reaction to all the three pathotypes tested.

Agricultural Research Station, Vuyyuru

In red rot screening trial, the varieties 2008 V 257, 2008 V 240, 2009 V 127, 2010 V 32, 2010 V 146, 2007 V 127 and 2005 V 96 were found to be promising in respect of yield and quality with additional advantage of horizontal resistance to all the three distinct pathotypes of red rot pathogen.

Out of 57 varieties evaluated to smut disease, 17 varieties showed resistant and 22 varieties showed moderately resistant reaction. Among the resistant and moderately resistant varieties, the varieties 2010 V 32, 2008 V 257, 2008 V 240 and 2009 V 127 were promising in yield and quality along with resistance to smut. Sett dip in systemic fungicides Propiconazole and Hexaconazole was found effective in control of sett borne infection of smut in planting crop while no chemical was effective in control of internally sett- borne infection of red rot.

4.4 Tobacco

Crop Improvement

Regional Agricultural Research Station, Nandyal

The entry NyBD 55 entered into All India Coordinated trials (IVT) of bidi tobacco during 2015-16.

In AVT-1, the entries ABD-146 (1380 kg/ha) & NyBD 56 (1371 kg/ha) recorded significantly higher cured leaf yield compared to checks A 119 (1190 kg/ha) and NBD 119 (1221 kg/ha).

Pooled analysis of AVT II revealed that ABD 132 (2145 kg/ha), NBD 260 (2005 kg/ha) and ABD 131 (1992 kg/ha) recorded significantly higher cured leaf yield compared to check A 119 (1695 kg/ha).

ABD119 (1277 kg/ha) recorded higher cured leaf yield compared to the check, A 119 (1124 kg/ha) in BYT.

In SHT-II, entries NyBTH-121 (1417 kg/ha) and NyBTH-124 (1397 kg/ha) recorded significantly higher cured leaf yield than check, MRGTH-1 (1253 kg/ha).

Crop Production

Regional Agricultural Research Station, Nandyal

In bidi tobacco, cured leaf yield was though higher (1138 kg/ha) with ridge planting method, it was on par with flat bed method of planting (1101 kg/ha). Among spacings 60 cm x 75 cm spacing recorded significantly higher cured leaf



yield (1356 kg/ha) compared to 75 cm x 50 cm (1184 kg/ha) and 75 cm x 75 cm (1046 kg/ha).

Pre release culture ABD-115 at 130 kg N/ha with 15 leaf stage topping recorded the highest cured leaf yield of 1309 kg/ha compared to NBD-119 (1138 kg/ha).

Cured leaf yield was significantly higher with foliar application of KNO_3 twice at 45 and 60 DAT (1463 kg/ha) whereas foliar spray of ammonium sulphate and urea with sulphate of potash did not influenced the yield.

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Nandyal

Spodoptera litura infestation was low in NyBTH-142 (1.87%), NyBTH -145 (2.54%), NyBTH 149 (3.84%) and ArBD 40 (2.4%). Rynaxypyr, novaluron, emamectin benzoate and spinosad were effective against *S. litura*.

B. DISCIPLINE ORIENTED RESEARCH

1. Agronomic Research

1.1 Cropping Systems and Farming Systems

Agricultural Research station, Utukur

Among the crops and cropping systems tested for performance under delayed monsoon conditions, redgram recorded higher net returns under two dates of sowing *i.e.* August II FN (Rs 1,02,480/ha) and September I FN (Rs 1,12,320/ha) followed by castor + korra cropping system (Rs 89,020/ha & Rs 85,968/ha respectively) while at September II FN sowings, cowpea recorded highest net returns of Rs 1,27,400/ha followed by castor + korra cropping system (Rs 70,416/ha).

Agricultural Research Station, Seethampet

Among the small and marginal individual

households, the varietal replacement with the best nutrient management in Paddy-Pulse cropping systems and value addition with the optional kitchen gardening increased the net returns in the range of Rs 11,200 - Rs 16,400 with the additional man days of 68 to 113 days per year.

In rice – rice cropping system, the response of rice to nutrients (N, P and K) over 24 locations revealed that, crop received recommended NPK (80-60-50 kg/ha) recorded significantly higher grain yield (5432 kg/ha) over application of either sole N (3212 kg/ha) or NP (3765 kg/ha) or NK (3667 kg/ha). Grain yield was reduced by 13.8% and 17.2% in the absence of application of potassium and phosphorus respectively.

The results of IFS module showed that, introduction of Vanaraja backyard poultry, vegetables in kitchen garden mode and mineral mixture feed to the cattle increased the income of marginal farmers to the tune of 41-43% over Rs. 7894 base level income per month.

In rice, grain yield was reduced in organic farming by 30.89% compared to chemical farming (6150 kg/ha). Swarna recorded the highest grain yield under organic farming (4800 kg/ha) where as MTU 1001 recorded significantly higher grain yield under chemical farming (6800 kg/ha). Rice fallow greengram performed superiorly under organic farming by producing 16.86% higher compared to chemical farming (783 kg/ha).

Among different IFS modules, Paddy -Dairy - poultry system recorded 194 % higher Rice Equivalent yield, 171 % higher net returns and 131 % additional man days over sole crop component.

1.2 Agro-Forestry

Agricultural Research Station, Kavali

Among the spacings adopted for Eucalyptus, higher plant girth (28.7cm) was recorded with

3.0 m x 1.5 m and application of 300 g nitrogen per tree recorded higher plant girth of 29.2 cm.

Among the Eucalyptus clones the clone BCM-23 recorded highest girth of 42.3 cm followed by BCM-571 (41.9 cm). The lowest girth was recorded with BCM-27 (21.1 cm). The average girth of clones was 21.8 cm.

In Simarouba adopting a spacing of 4 m x 4m recorded higher plant height of 3.65 m followed by 6 m x 6 m (3.69 m) and application of 300 gN/plant recorded higher mean plant height of 3.66m followed by 200 g N/plant (3.56 m).

1.3 Saline Water Management, Bapatla

Soil Science

Studies at benchmark locations in Guntur District to monitor the changes in ground water quality and soil properties revealed that pH of surface and sub surface soils remained unchanged. Soil salinity was decreased over a period of fifteen years at Nidubrolu – I and Nidubrolu – II. Marginal increase was observed at Chintalapudi and Machavaram. Quality of groundwater was decreased at Nidubrolu I and II in terms of EC, while it was increased at Chiluvuru, Angalakuduru and Amarthaluru.

Reclamation of abandoned aqua ponds

Adoption of reclamation technologies in abandoned aqua ponds of Gokarnamatam and Adavuladeevi villages resulted in 17-33% increase in the yields of rice compared to control. Adoption of reclamation technology for two years resulted in improvement in soil pH (8.30-8.82 changed to 7.3-8.0) and SAR (17.8-48.2 changed to 16.2-30.4).

Improvisation and demonstration of reclamation technologies for black alkali soils

Adoption of reclamation technology

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developed by CSSRI in alkali soils of Narravaripalem village during *kharif*, 2015 showed an increase in yield to extent of 13 to 25 per cent compared to non-reclaimed soil.

Survey and characterization of ground water of Prakasam district (Revisiting the sites)

A total of 306 ground water samples were collected covering all mandals of Prakasam district during October 2015 to find out the changes in water quality to that of samples collected during 1987 to 1990. The results of revisiting the sites indicated that the quality of irrigation water was found to deteriorate as compared to earlier studies. Per cent good quality water declined to 58.6 as compared to 80.5 during 1987-90. While, the per cent marginally saline water increased to 30.3 (2015) compared to 15.5 (1987-90).

Screening of newly released rice varieties for salinity tolerance

Screening of newly released rice varieties to salinity revealed that the highest paddy yield was observed with MCM -100 and MTU-1061 followed by CSR -36 and MTU -1010

Management of paddy grown in salt affected soils by using raw spentwash

Application of raw spentwash to the soil resulted in decrease in pH of the soil from 8.7 to 8.2, whereas, the ECe of the soil increased from 9.3 to 14.6 dS m⁻¹. This could be due unavailability of irrigation water through canal or rainfall resulting in upward movement of salts and also due to high concentration of salts in spentwash.

Effect of chemical and organic amendments in reclamation of salt affected soils under rice

Application of biocompost and gypsum to





the soil having high pH resulted in decrease in pH of the soil, while ECe increased due to unavailability of water and more evaporation demand.

Agronomy

Performance of Groundnut with saline water through drip irrigation system

Groundnut sown on sandy loam soils with pH of 7.3 and EC 0.3 dS m⁻¹ during *rabi* 2014-15 and 2015-16 revealed that, significantly superior pod yield was recorded with Kadiri 6 (1459 kg/ha and 1789 kg/ha) than Kadiri 7 Bold and Anantha varieties. And among the salinity levels, the highest pod yield (1600 kg/ha and 2052 kg/ha) was recorded with treatment that received the best available water (BAW) through drip irrigation system.

Influence of silicon on alleviation of salinity effect on rice

Paddy grown at salinity of 2 dS m⁻¹ recorded maximum grain yield (15.66 g/plant) and significantly superior to 5 and 10 dS m⁻¹ salinity levels. Among different sources of silica, potassium silicate treatment recorded significantly higher grain yield (15.03 g/plant) when compared to all other silica sources whereas the lowest yield was recorded in no silica treatment (10.90 g/plants). The highest grain yield (16.77 g/plant) was obtained in treatment combination of potassium silicate at 2 dS m⁻¹.

Agricultural Engineering

Micro (drip) irrigation system with saline water for different vegetable crops in coastal sandy soils.

The mean yields of capsicum, clusterbean and palak followed inverse linear relation with irrigation water salinity. Capsicum, Clusterbean and Palak were found economically viable up to 3.15, 4.25 and 4.50 dS m⁻¹ irrigation water salinity in open field cultivation. The order of salinity tolerance was found to be Clusterbean > Capsicum > Palak.

Probability analysis for prediction of rainfall for different locations of Krishna zone for designing appropriate structures

As a base for designing the soil and water conservation structures and irrigation and drainage systems, the predicted rainfall events with probability of exceedence at 80 per cent for daily maximum, weekly average, monthly average, cumulative seasonal and annual rainfall for Darsi region were determined and found to be 57.88,15.56,42.05,424.30 and 665.5 mm respectively.

Effect of irrigation water salinity on infiltration rate of different soils in Krishna Western Delta

Per cent reduction of basic infiltration rate was found to be17, 26, 35, 52 in black soils, 4, 32, 48 and 60 in red soils and 6, 18, 28 and 31 in sandy soils, respectively for irrigation water salinity levels of EC_w viz. 2.0, 4.0, 6.0 and 8.0 dS m⁻¹.

2. Agricultural Engineering

Agricultural Research Station, Anantapuramu

Groundnut sown with aqua seed planter during July achieved maximum yield of 1710 kg/ha when compared with other dates of sowing. Aqua seed planter was found to be superior over Anantha planter by recording increased pod yields in all four different dates of sowing.

Evaporation losses from the farm ponds were effectively minimized by using bamboo mat or spray with *stearyl* alcohol or silicon oil.

Tractor drawn clusterbean planter was



designed and developed suitable to Anantapuram region. The performance of clusterbean planter was tested and the results indicated that the seed rate was 10 kg/ha and the yield was 463 kg/ha.

The groundnut + redgram planter was designed and developed for sowing groundnut and redgram in 8:1 ratio as per recommendations. The planter was fabricated and tested in field conditions. The results showed that yield of groundnut was 1475 kg/ha and yield of redgram was 326 kg/ha.

Sowing of *setaria* (korra) with Ananta automatic bullock drawn seed planter recorded higher grain yield (1125 kg/ha), net returns (Rs.23,750/ha) and Benefit Cost Ratio (3.3) compared to farmers' practice (1080 kg/ha, Rs.22,400 and 3.3 respectively).

AICRP on Farm Implements and Machinery, College of Agricultural Engineering, Bapatla

Prototype model of manual operated planter suitable for direct sowing of paddy having cone with slots on its periphery as metering mechanism for reducing the seed damage and double disc openers as furrow openers was designed and developed.



Row-paddy weeder

In the field evaluation test it was found that it requires higher seed rate.

Developed 5 row weeder, fertilizer and pes-

ticide applicators suitable to attach to 17.5HP transplanter power unit.

Found that 65HP tractor need no cage wheels while 45HP tractor required attachment of half cage wheels for operating Escort tractor drawn roto puddler having 62 s-type blades rotor in standing water. Average stadning water required for puddling was 5-10 cm in clay loam and sandy loam soils and water should be filled just one day before of puddling to reduce power requirement for operating the equipment. The depth of puddling after completion of operation was 12-17 cm. Field capacity of puddler was 2.7-3.0 h/ha. Fuel consumption of tractor was 3-3.5 l/h for 34KW tractor and 6.5 l/h for 48KW tractor. Puddling index of puddler after two passes was found as 78% in clay loamy soils and 83% in sady loam soils. Cost of operation was observed as Rs.920/h for 34KW tractor with rotopuddler.



Zero till multi crop planter in operation

Feasibility testing of Zero Till commercial model of 4 row Dashmesh Multi crop planter for planting maize in rice fallows indicated that the planter operated in clay loamy fields when soil moisture was about 18-22% (db) and the stubble height of previous harvested paddy was not more than 15 cm, planted the seed at desired spacing of 60 x 25 cm and 60 x 22 cm with 0.32 ha/h field capacity and 83% field efficiency. Cost of operation for planting the maize in rice fallows with the planter was observed as Rs.1200/ha.



Regional Agricultural Research Station, Tirupati

Proper tillage with primary tillage implement gave 15.9% more yield in groundnut crop. Further, adopting control track system of planting could reduce expenditure on intercultural operations by about Rs.3,500/ha.

The use of moisture conservation equipment namely sub-soiler & basin-lister resulted in improvement of water holding capacity in groundnut and redgram fields. The crop yields improved over control by about 22% in basinlister and 125% in sub-soiled plot even after 30 days of dry spell.

In sugarcane, deep vertical ploughing (sub-soiling) resulted in registering higher cane yield of 18% in main crop and 12% in ratoon crop.

4. Agrometeorology

Regional Agricultural Research Station, Tirupati

On verification of forecast, during South-West monsoon period, the error structure for rainfall forecast both correct and usable put together was found to be 83% and during North-East monsoon period it was 67% while 17% of the forecasts during South-West monsoon period and 33% of the forecasts during North-East monsoon period were under unusable range.

To record significantly higher yields in groundnut, sowings should be done during first fortnight of July during *kharif* season and second fort night of December during *rabi* season.

In crop weather relationship of sesamum, the crop sown during second fort night of January gave highest seed yield (1152 kg/ha) than the crop sown during January 1st fortnight (1097 kg/ha) and the least yield was recorded with December 2nd fortnight sown crop (472 kg/ha). Among varieties YLM 66 recorded highest yield (991 kg/ha) followed by Madhavi (873 kg/ha). January second F.N. sown crop has attained 2772 Growing Degree Days (GDD) with highest bright sunshine hours (8h) during its crop period.

Under FASAL project, crop yield forecasting was carried out based on 26 years data for 5 districts (Anantapuram, Kurnool, Chittoor, Prakasam and Nellore districts) during *kharif* season for rainfed groundnut. The forecasted yield ranged from 230 kg/ha in Anantapuramu district to 2802 kg/ha in Nellore District in the state. Forecast and actual yields were compared and the percentage deviation for various districts revealed that the error per cent ranged from -61.3% in Prakasam district to -4.9% in Nellore district. On an average for all the major groundnut growing districts of A.P., the error per cent between observed and predicted was -31.1.

Crop yield forecasting was also carried out for *kharif* rice in 6 districts (Anantapuram, Kurnool, Chittoor, Prakasam, Nellore and Guntur districts) during *kharif* 2015. The forecasted yield ranged from 2852 kg/ha in Anantapurum district to 4128 kg/ha in Guntur District in the state. Forecast and actual yields were compared and the percentage deviation for various districts revealed that the error per cent ranged from -18.3 in Chittoor District to 29.6 in Anantapuram district. On an average for all the major rice growing districts of A.P., the error per cent between observed and predicted was -18.3.

Regional Agricultural Research Station, Anakapalle

During 2015-16, a total of 101 Agro-Advisory bulletins were prepared and communicated to farmers, JDAs, KVKs, DAATTCs and local news papers of North Coastal Zone for further dissemination to the farmers. Also sent the weather forecast through way2sms and uploaded the advisory bulletins in IMD website and Kisan Portal.

Crop weather relation in sugarcane raised with single bud seedlings revealed that the survival percent of seedlings was not influenced by dates of planting or varieties. February planting recorded highest cane yield (109.7 t/ha) and found significantly superior to March (91.1 t/ha) and April planting (75.7 t/ha). In February planting, cane crop utilized 6419 Growing Degree Days followed by March (6385) and April (6298) planting. Highest heat use efficiency was recorded with February planting (0.017 t/ha/°C day) followed by March (0.014 t/ha/°C day) and April planting (0.012 t/ha/°C day).

Agricultural Research Station, Anantapuramu

Relationship between weather and incidence of leaf miner on groundnut indicated that the intensity of leaf miner incidence was less in the crop sown during 1st F.N. of June to 1st F.N. of July and very meager in the crop sown during 2nd F.N. of July and 1st F.N. of August. Pooled analysis of 2012-2015 revealed that the no. of webs per m² shown positive significant correlation with sunshine hours, rain free days and morning RH and negative significant correlation with minimum temperature, afternoon RH, wind speed, rainfall received during the previous 7 days.

Developed crop weather calendar for rainfed *kharif* groundnut in Ananthapuramu district which contains the normal climatic conditions during crop growing period, duration of various phenophases, phenophase wise weather for higher yield (>1500 kg/ha) and congenial weather for incidence of major pests and diseases.

Estimation of actual evapotranspiration and

crop coefficients for groundnut revealed that highest pod yield was recorded with 0.6 IW/CPE ratio under all sowing environments and hence the crop coefficients developed by irrigating the crop at 0.6 IW/CPE can be used for realizing higher yields along with saving of irrigation water.

During 2015-16, 89 weather based Agroadvisory bulletins were issued to the farmers of Anantapuram district through mass media (Newspaper and Radio), ATP channel, Project Director, Velugu, District Collector, NGOs and extension agencies. Further, 133 times SMS were communicated to the farmers and different stake holders of the scarce rainfall zone through mkisan portal. A total of 8, 88,525 farmers have been benefitted by these agro advisory services. In collaboration with Reliance Foundation 139 voice messages were communicated to the 3500 farmers of this zone.

5. Post Harvest Technology

Post Harvest Technology Centre, Bapatla

Accelerated ageing chamber lab model was designed and fabricated during 2015-'16.

In Accelerated ageing process of rice, in order to achieve ageing levels of 6 months, 12 months, 15 months and 18 months, the treatment corresponding to 50°C for 2h, 50°C for 6h, 50°C for 8h and 50°C for 8h of pulsed incubation periods (2h ON and 2h OFF) respectively were found better for paddy of both BPT 5204 and MTU 7029 varieties.

The estimated storage (weight) losses for raw rice at CWC, Machilipatnam in closed warehouse were found to be 2.82 % after 24 months. At FCI, Nalgonda, the estimated storage losses were 2.48 % after 18 months for both parboiled rice and wheat in closed warehouse and under CAP storage, wheat and paddy suffered 0.07% and 2.51% loss respectively after 12



months. At SWC, Vadlakonda, the estimated storage losses for parboiled rice in closed warehouse were 1.63 % after 21 months.

A Trolley dryer (PAU model-batch type) was fabricated and feasibility trials for chilly drying were conducted. Drying time required for moisture reduction from 66% to 15% was 36 h and electricity consumption was 278 kWh and discoloured pods were 4%. The capacity of the trolley dryer for chillies produce was 250 kg per batch.

Storage studies on five local rice varieties NLR 9674, NLR 33892, BPT 1768, BPT 5204 and MTU 7029 with regard to physical, biochemical and cooking quality parameters up to 10 months of storage revealed a decrease in protein and phenol content and an increase in amylose content. In all the five tested varieties the physical parameters *viz.*, grain length, width, volume expansion and cooking time were decreased upon storage. Highest antioxidant activity was recorded in MTU 7029.

In tomato, Vitamin-C content and total phenol content decreased upon storage and the rate of decrease was more in tomatoes stored at room temperature compared to those stored at refrigerated conditions.

Studies on debittering of sweet orange juice indicated that the cyclodextrin is effective in reducing the Limonin content to a significant level and amberlite is effective among others in reducing the naringin content.

Microbial load and insect infestation were significantly less in paddy seed stored in GrainPro Grainsafe II[™] (GS II) capsule (made of polyvinyl chloride material, moisture proof and air tight) compared to the seed stored in gunny bags. Germination (93%) and milling quality (55.8%) were also found better in seed stored in hermetic bag than that stored in gunny bags (82% and 47.6% respectively).

In Turmeric godowns, the activity of cigarette beetle, *Lasioderma serricorne* decreased as the rhizomes arrivals were decreased. In rice godowns, even after fumigation for more than one week some adults of *Tribolium* (1.6%) were found alive indicating development of phosphine tolerance.

During storage, mixing of pepper powder @ 0.4% or treatment with piperin in Nuwood block @ 3.0% (w/v) were found very effective in controlling pulse bruchid in greengram while in groundnut no adult emergence of groundnut bruchid was observed when pepper powder was mixed even at lowest dose (0.1%) compared to the untreated control.

Seed sample analysis revealed that infestation of storage insect, bruchids on groundnut and on greengram and blackgram was not taking place at field level or during drying on threshing floor while in paddy, 50% of field collected samples found to be infested with *Sitotroga cerealella*.

Regional Agricultural Research Station, Anakapalle

MOU's were signed with M/S Chakravarthy Agro Foods Private Limited, Tirupati; M/s KVL Bio Products Pvt. Secunderabad and M/s Jayalakshmi Agro Industries, Butchayyapeta mandal, Visakhapatnam district towards transfer of design and machinery details of mechanized jaggery granulator for the production of granular jaggery.

Four different edible binders *viz.*, milk, lactose, di-calcium phosphate and microcrystalline cellulose at different concentration of 1, 2, 3, 4 and 5% enabled semi automatic tablet machine to produce compressed jaggery cubes of diameter

9.45 mm and thickness of 3.75 mm with an average weight 300 mg. Hardness and colour brightness of the compressed jaggery cubes increased with increase in concentration of binder.



Compressed jaggery cubes with different binders

Design and fabrication of mechanized system for production of edible paper films for production of paper sweet was completed. Performance evaluation and refining of the machine was under progress.

In jaggery preparation, steam boiling system reduced 20% of boiling time for the first boiling and 34% for the second boiling. Saving of bagasse was also observed as 14% for the first boiling and 40% for the second boiling respectively. Good quality of jaggery was obtained with bright colour.

The performance evaluation of the sugarcane juice filtration machine revealed that the machine was able to remove 85% of the impurities from the sugarcane juice. The jaggery prepared from the juice obtained from filtration system was bright in colour compared to the jaggery prepared from the juice without filtration.



Jaggery prepared from juice with and without filtration

Mechanized planting of sugarcane using budchip planter and sugarcane cutter planter was done in comparison with conventional planting. There was savings in labour cost, seed cost and time by 52, 75 and 58% respectively with budchip planter and 51%, 69% and 58% for sugarcane cutter planter compared to conventional planting.

6. Seed Research

Seed Production

A quantity of 11,926 quintals of Breeder seed and 14,430 quintals of foundation seed of all field crops has been produced during the year 2015-16 in the University, to meet the indents of Government of India, State Government, NGOs and Seed industry, and supplied without any shortfall. Special emphasis was given for the nucleus seed production of all the field crops.

7. Agricultural Statistics

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Regional Agricultural Research Station, Tirupati

The outcome of study on optimum allocation of agricultural land to the major crops would be directly helpful to farmers who have multiple crops based on their available resources in order to achieve high profit at the face of uncertain prices/profits.

An automatized TM calculator for SSR markers using three methods *viz.*, shortcut, Salt


adjustment and thermodynamics was developed. Similarly Fertilizer cost calculator cum planner as per the soil test values was developed and kept in RARS website for public use. ANGRAU fertilizer planner 2015 has been developed, tested and applied for copyrights before keeping in public domain.

Under capacity building programme, six trainings (1 day programme) were conducted on latest statistical applications for scientists of Southern Zone.

Regional Agricultural Research Station, Anakapalle

Rice yield was found to be positively correlated with the weather parameters- maximum temperature and relative humidity (forenoon and afternoon) and negatively correlated with rainfall, minimum temperature and BSS. The knowhow on prevailing weather conditions and the interaction among the various weather factors would help the farmers to plan better by resorting to the modern crop management techniques for rice and would also enable to take timely decisions such that huge crop losses are avoided.

7. Agricultural Biotechnology

Regional Agricultural Research Station, Tirupati

Genetic diversity within 20 released and pre-released sugarcane cultivars was estimated with random amplified poly-morphic DNA (RAPD) fingerprinting. A total of 11 RAPD markers were used to develop RAPD profiles. A total of 77 markers were scored for 11 RAPD markers. The number of amplification products ranged from 5 (OPC5 and OPG8) to 11 (OPB5). OPG8 is monomorphic in all the 20 sugarcane genotypes with 5 amplicons. The UPGMA-based phenogram consisted of two clusters; the first group consists of 11 varieties and the second one included the rest.

In groundnut, polymorphism screening between CS19 (Stem rot resistant) and Narayani (stem rot susceptible) parents with 341 SSR markers was completed and 29 SSRs were found polymorphic between them.

In groundnut, DNA isolation from 323 lines comprising of both advanced breeding lines and RILS derived from a cross between Dharani and Kadiri 6 and quantification was completed. Among 354 SSR markers screened between Kadiri 6 and Dharani, 40 were found polymorphic. These markers can be successfully employed for genotyping the whole germplasm and can be used to accumulate desirable genes into a single or a few genotypes by marker assisted selection to ultimately arrive at a high yielding drought tolerant genotype.

8. APICULTURE

Agricultural Research Station, Vijayarai

Number of *Tetragonula* visiting flowers of mango variety A.U.Rumani were highest at 9.00 am (0.60/2min) followed by *Tetragonula* (0.25/2min) at 12.00 noon. Number of flowers visited by each *Tetragonula* worker was highest at 9.00 am (0.70 flowers/2min) followed by black wasp (0.33 flowers/2min) at 9.00 am.

In cucumber, the no. of metallic green wasps were highest at 9.00 am (1.92/min) followed by *A. cerana* (0.59/min). Highest no. of flowers were visited by Metallic green wasp (1.94) followed by *A. cerana* (1.30) and 1.13 by *A. mellifera*. Metallic green wasp spent more time (11.71 sec) followed by *A. cerana* (4.51 sec) and *A. mellifera* (2.90 sec) at 9.00 am.

Highest yield in cucumber was recorded in open pollination treatment (34.93 kg/16 sq. m), followed by bee pollination (10.12 kg/16 sq. m) while the pollinators exclusion treatment recorded



lowest yield (6 kg/16 sq. m). No. of seeds were highest in open pollination (12,899). However in bee pollination, thousand seed weight was higher than (13.02g) pollinators exclusion (11.82g).

The number of *Tetragonula* visiting gulab jamun flowers for pollen and nectar collection was highest at 9.00 am (1.43) followed by *A. florea* at 12.00 noon. The other *Apis spp*. were less than one pollinator. *Tetragonula* has visited highest number of Gulab jamun flowers at 9.00 am (3.25) followed by *A. florea* at 12.00 noon (1.43) and *A. mellifera* (1.25) at 9.00 am. *A. florea* has spent less time at 3.00 pm (0.81 sec/ flower) followed by *A. mellifera* (1.75 sec) at 12.00 pm. The number of *Tetragonula* were highest at 9.00 am (0.96/min) followed by *Megachilid sp.* (0.82/min) at the same time. Among all the insect pollinators *Megachilids* were highest at all times.

9. Agro-Economic Research

Regional Agricultural Research Station, Anakapalle

Forecasted monthly price range of jaggery (per quintal) in Anakapalle market for April 2016 to March 2017 are Rs 2450 to 2855, Rs 2499 to 2977, Rs 2500 to 2921, Rs 2481 to 2843, Rs 2510 to 2900, Rs 2506 to 2969, Rs 2518 to 2919, Rs 2531 to 2941, Rs 2530 to 2844, Rs 2518 to 2840, Rs 2516 to 2874 and Rs 2523 to 2895.

For North Coastal Zone, the cost of cultivation per hectare was worked out for crops such as sugarcane (Irrigated- plant crop Rs 1,91,288, ratoon crop Rs 1,36,100), rice (Rs 91,065), maize (Rs 1,00,452), groundnut (Rs 59,110), ragi (Rs 63,050), redgram (Rs 29,750), Rice fallow Blackgram (Rs 13,738), Rice fallow Greengram (Rs 14875), sesame (Rs 22,000) and mesta (Rs 71,320).

In paddy, the labour cost accounts 47-50 per cent to total costs. The variable and fixed cost accounts to 70.21 and 29.79 per cent respectively. Paddy farmers recorded 54.20 q/ha and realized Rs 17243/- per ha as negative net returns. The cost of production was Rs 2121/q. The return on rupee of investment was -0.15.

The per quintal cost of production of cotton, sugarcane, bengalgram, chillies, redgram and turmeric was Rs 4701, Rs 2562, Rs 4140, Rs 6923, Rs 4582 and Rs 6997, respectively and farmers realized -0.21, -0.19, 0.27, 0.59, 0.60 and 0.17 as Return on rupee of investment, respectively.

The cost of production per quintal of paddy in Direct Seeded Rice (DSR) was Rs 1718 where as in traditional transplanting paddy it was Rs 2116. The additional benefit of Rs 20,204/ha to DSR adopted farmers was due to less cost of cultivation and slight increase in yields. The BCR of DSR and transplanting Rice was 0.01 and -0.19 respectively. About 25-27 per cent less labour was required to direct seeded rice when compared to traditional transplanting method.

Adoption of farm mechanization in paddy *i.e.*, mechanized transplanting, Roto-weeder, mechanized harvesting realized 5.76 per cent more yield and reduced cost of cultivation of Rs 20147/ha when compared to traditional transplanting method. The cost of production per quintal and BCR of transplanted paddy and Farm Mechanization in Paddy were Rs 2174, Rs 1706 and -0.02 and -0.11, respectively.

During 2015-'16 the area of rice- fallow blackgram was 13.5 per cent more when compared to last year in rice- fallow cropping systems in the zone due to remunerative price. The return on rupee of investment of paddy-paddy, Rice-Blackgram, Rice-Greengram, Rice-Maize and Rice-Jowar system were -0.11, 0.01, -0.14,

Regional Agricultural Research Station, Lam



-0.12 and -0.11 and the cost of production per quintal were Rs 2024, Rs 1502, Rs 2047, Rs 1927 and Rs 1986, respectively.

10. AINP on Biofertilizers, Amaravathi

A total of 185.6 metric tons of powder biofertilizer formulations and 26.0 metric tons of liquid bio-fertilizer formulations to a worth of Rs 151.8 lakhs were produced and supplied to the farming community of Andhra Pradesh during the year 2015-16.

The bacterial population in the biofertilizer packets ranged from 5.0×10^8 to 5.7×10^9 per gram of inoculum.

Overall, by application of biofertilizers, the chemical fertilizers could be saved by 50% with an extra benefit of 13.6% grain yield increase over 100% RDF in pigeon pea crop under deficit soil moisture conditions in Alfisol soil. And among formulations liquid biofertilizers of *Rhizobium* + PSB with 50% RDF gave 22% higher grain yields (1775.8. kg/ha) over powder biofertilizers + 50% RDF treatment (1526.9 kg/ha).

In blackgram, application of liquid biofertilizers within 15 days of sowing was found to be the better option for the farmers missing the application of biofertilizers at the time of sowing when compared to solid biofertilizers. The results also indicated that the mixed microbial consortium significantly influenced in obtaining higher grain yields when compared to humic acid treatments.

Six AM Fungal cultures were isolated using single spore collection technique. The strength of

200 IP per gram of inoculum with a dosage of 12.5 kg/ha could significantly increase the dry matter and seed cotton yield and also soil glomalin, a recalcitrant carbon source in the soil, to maximum extent.

Microbial consortium, "Decompo A" containing compatible bacterial cultures was found rapidly decomposing all the agricultural crop residue at a faster rate than consortium "Decompo B" with fungal cultures under pit culture technique.

Among the five potash releasing bacterial isolates, KRB 111 isolate showed the maximum solubilisation index of 6.33 and released maximum quantity of potassium in the liquid broth. In sorghum, the treatment 75% RDF+ KRB+NFB+PSB gave significantly higher grain yield over 100% RDF.

11. Agricultural Extension

Regional Agricultural Research Station, Tirupati

Developed a mobile application on groundnut in an android platform with visual illustrations for the benefit of the farmers. The application contains seed to seed package of practices including varieties, insect pests and diseases, value addition, farm mechanization etc. The application is offline in telugu language with a total of 120 screens.



V. EXTENSION

Extension is one of the three mandates of the ANGRAU which reads "Assist the Development Departments of Government in the process of dissemination of the improved agricultural technologies to the farmers of the State".

The organogram of the University extension services is given in the Fig. 8. The extension services and activities of the ANGRAU are described below.

I. EXTENSION SERVICES

The extension services of ANGRAU are being offered through the following extension centers.

- 1. District Agricultural Advisory and Transfer of Technology Centres (DAATTCs)
- 2. Krishi Vigyan Kendras (KVKs)
- 3. Farmers Call centre
- 4. Agricultural Information & Communication Centre (AI & CC)
- 5. Extension units in RARS

1. DISTRICT AGRICULTURAL ADVISORY AND TRANSFER OF TECHNOLOGY CENTRES (DAATTCs)

In ANGRAU, 13 DAATTCs are functioning one each at 13 district headquarters of Andhra Pradesh located either in Agricultural Market Committees or Regional Agricultural Research Stations/Agricultural Research Stations with a multidisciplinary team of 3 Scientists mainly consisting of crop production, crop protection and agricultural extension.

2. KRISHI VIGYAN KENDRAS (KVKs)

Krishi Vigyan Kendras are grass root level

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institutions devoted for imparting skill oriented programmes to illiterate, small, marginal, landless farmers, farm women and rural youth by organizing short and long term vocational training courses and income generating activities in addition to demonstration of latest technological developments at the centre and technology assessment and refinement in the farmers' field conditions. Twelve KVKs are working under ANGRAU in the rural areas at Reddipalli(Anantapuramu), Nellore(Nellore), Amadalavalasa (Srikakulam), Rastakuntubai (Vizianagaram), Utukur(YSR Kadapa), Darsi(Prakasam), Undi(WestGodavari), Garikapadu(Krishna), Banavasi(Kurnool), Kalyandurg(Anantapuramu), Kalikiri(Chittoor) and Ghantasala(Krishna).

3. FARMERS CALL CENTRE

First and foremost in the country "Farmers Call Centre" was inaugurated in Andhra Pradesh on July 1st, 2003 with an innovative idea of transferring scientific Agriculture technology to the farming community. Govt. of Andhra Pradesh launched "Parishkaram" call centre with agriculture service as its pilot project with experienced scientists of Acharya N.G. Ranga Agricultural University. It is accessible to the farmers of Andhra Pradesh on toll free number 1800 425 0430. There are three specialists of crop production, crop protection, horticulture and one from Department of Agriculture for answering the queries of farmers. Presently, call centre is functioning from 10:00 am to 5:00 pm on University working days.

Since inception of the call centre, farmers from different districts of Andhra Pradesh utilized its services and benefited by taking suggestions from the Scientists of Acharya N.G. Ranga







Agricultural University on various crops.

Farmers can get the information on improved technologies of various crops. *viz*; food crops, pulses, oil seeds, commercial crops, vegetables, fruit crops, flower crops, spices and condiments. Farmers can seek clarifications on various aspects related to agriculture and take suggestions from scientists to improve crop yields with reduced cost of cultivation.

During the year 2015-2016, a total of 7028 calls were received from different districts of Andhra Pradesh, of which 1328 calls in crop production, 935 calls in crop protection, 3003 calls in horticulture and 1762 calls related to Agriculture Department.

In order to reach the maximum number of farmers, the answers of the important queries (Question & Answers) received at Farmers Call Centre were given for scrolling in "GramaDarshini" programme of "Saptagiri channel" daily and these question and answers were sent weekly to All India Radio of different regions to broadcast them in their agriculture programme. Important questions and answers were also published in Telugu magazines *viz.*, Vyavasayam, Paadipantalu, Raithubandhu and Raithunestham.

II. EXTENSION ACTIVITIES

The significant highlights of the extension activities carried out during 2015 - 16 are presented below

1. TECHNOLOGY ASSESSMENT AND REFINEMENT (TAR)

"On-station research-adaptive researchextension" is a continuum culminating in the generation and dissemination of profitable technologies to the farmers. Technology refinement and development are crucial intermediate steps between research and extension to develop location specific/relevant technologies for adoption. The yield gaps between technologies generated by researchers at research centers and the farmers' field conditions, resource poor and risk situations are often mistakenly attributed to inadequate extension efforts. But, this has been traced to the unsuitability of the technologies flowing out of the research stations. Hence, technology assessment and refinement under farmer's field conditions assume greater importance. DAATTCs and KVKs have enhanced extension reach through TAR.

During 2015-16, DAATTCs and KVKs together assessed the 68 technologies in 579 locations. The technologies assessed include prereleased cultivars of rice, pulses, oilseeds, cotton, sugarcane, chillies, amaranthus and fodder crops, high density planting in cotton, groundnut sowing with bullock drawn and tractor drawn Anantha planter, in-situ moisture conservation with subsoiler and chisel plough, mechanical harvesting of redgram, zero tillage in maize, ragi and jowar, soil test based fertilizer application in all major crops, bio-fertilizers and liquid bio fertilizers application, drip irrigation in rice, single node seeding of sugarcane, greengram as an alternate crop to blackgram in rice fallows under late sown conditions, weed control in direct seeded rice, micronutrients application in banana, castor and guar gum (cluster bean) as alternate to groundnut, sweet corn in tribal areas, marigold and chrysanthemum alternate to tomato, weeders for drudgery reduction, cotton picking bags, plastic mulching in watermelon, poultry breeds of Kadaknath, Srinidhi, Rajasri for backyard poultry, Azolla feed for sheep lambs, regional specific mineral mixture for milch animals, mineral licks for large animals, captive rearing fish seed, feed based disease management in fish seed farms, wild boar management etc.



2. DIAGNOSTIC FIELD VISITS

The DAATT Centers are mainly involved in the activities of periodic diagnostic visits and timely advices to overcome the maladies identified in agriculture and allied aspects. During 2015-'16, a total of 2093 diagnostic visits were undertaken in different districts of the State, comprising of 651 visits undertaken by the scientists of DAATT Centres and ESs, 650 by KVKs, while 792 visits were conducted jointly by the Scientists of DAATTCs, KVKs, research stations and officers of the State Department of Agriculture.

Major biotic and abiotic stresses identified in different crops and handled through diagnostic surveys are given below

Rice	BPH, leaf folder, gall midge, cut worm, hispa, stem borer, panicle mite, thrips, mealy bugs, blast, bacterial leaf blight, sheath blight, narrow brown spot, false smut, bacterial leaf spot, Zn, K, Fe deficiencies, sulphide injury
Maize	Shoot borer, pink borer, aphids, cob borer, <i>Turcicum</i> blight (sheath blight), leaf blight, downy mildew, banded leaf and sheath blight, Zn, Fe, P deficiencies
Jowar	Stem borer, shoot fly, Helicoverpa, aphids
Ragi	Blast
Greengram & Blackgram	<i>Spodoptera</i> , flea beetles, <i>Maruca</i> pod borer, aphids, stem fly, white flies Powdery mildew, Cercospora leaf spot, <i>Corynospora</i> leaf spot, YMV, bud necrosis, rust, Fe, N, K deficiencies
Redgram	Pod borers (<i>Helicoverpa</i> and <i>Maruca</i>), pod fly, leaf folder, wilt, sterility mosaic disease, rust
Bengalgram	pod borers (Helicoverpa, Spodopteraexigua, S. litura), wilt and dry root rot
Cotton	Sucking pests (aphids, thrips, leaf hoppers, whiteflies, mealybugs), pink boll worm, flower and square drop due to <i>Earias, Helicoverpa</i> damage, <i>Spodopetra</i> damage, Cotton bugs, stem weevil, root rot, <i>Fusarium</i> wilt, bollrot, powdery mildew, tobacco streak virus, B, Mg, Zn deficiencies, herbicide toxicity
Groundnut	Leaf miner, root grub, <i>Spodoptera</i> , mealy bugs, aphids, jassids, leaf webber, red hairy caterpillar, <i>Helicoverpa</i> , thrips, nematodes, root rot, collar rot, tikka leaf spot, stem rot, bud necrosis, late leaf spot, peanut stem necrosisZn, Fe deficiency
Sunflower	Spodoptera, mealy bug, Helicoverpa,: Alternaria blight, necrosis
Sesame	Semilooper, sucking complex, botrytis, powdery mildew, Alternaria leaf spot
Castor	Semilooper, Botrytis
Coconut	<i>Rhinocerous</i> beetle, <i>eryophid</i> mite, redpalm weevil, sucking pest, black headed caterpillar, root rot, sigatoka leaf spot, B, K deficiencies.

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Sugarcane	Early shoot borer, <i>Pyrilla</i> , root grub, mealy bugs, mites, white grub, termites, ring spots, rust, whip smut, wilt, scales, red rot, Fe deficiency.
Mesta	Mealy bugs, aphids, stem rot, leaf spot
Chillies	<i>Spodoptera</i> , thrips, mites, midge, tobacco caterpillar, fruit borer, sucking pest, flower midge, damping off, stem and fruit rot, <i>Cercospora</i> leaf spot, wilt, anthracnose, collar rot, die back & fruit rot, root rot, virus diseases, Zn, Fe deficiencies.
Tomato	<i>Helicoverpa</i> , <i>Spodoptera</i> , fruit borer, red mite, leaf miner, wilt, leaf spot and fruit cracking, root rot, viral diseases, early blight, damping-off.
Brinjal	Fruit and shoot borer, shoot and root borer, white fly, ash weevil, <i>Spodoptera</i> , red spider mite, bacterial wilt, root rot.
Ridge gourd	Flea beetle, thrips, aphids
Bitter gourd	Leaf miner, fruit fly
Bhendi	Fruit borer, jassids, mites, shoot and fruit borer, YMV.
Onion	Thrips, Helicoverpa, purple blotch.
Cashew	Tea mosquito bug, stem and root borer.
Mango	Mealy bugs, thrips, stem borer, hoppers, leaf webber, fruit borer, scale damage, powdery mildew, stem end rot, red rust, dry root rot, anthracnose, blossom blight, N, Fe, B, Mg deficiencies.
Banana	Rhizome weevil, nematodes, <i>Spodoptera</i> , panama tegulu, sigatoka leaf spot, soft rot, root rot, bunchy top, bract mosaic virus,K, Zn deficiencies.
Papaya	White fly, sucking pest, red palm weevil, mealy bugs, leaf curl virus, ring spot virus, Zn, B deficiency.
Guava	Mealy bug, white fly, fruitfly.
Watermelon & Musk melon Sweet orange	Mite damage,red pumpkin beetles, <i>Spodoptera</i> , sucking pest, leaf miner, Fruit fly, bud necrosis, downy mildew, viral diseases, B deficiency (fruit cracks). Mites, white scales, root rot, Micro nutrient deficiencies.
Acid lime	Aphids, mites, black flies, thrips, mealy bugs, leaf miner, leaf weevils, leaf mites, citrus butterfly, canker, white scales, gummosis, root rot, <i>Ganoderma</i> , wilt, iron chlorosis, boron deficiency.
Turmeric	
	Rhizome fly, rhizome rot, leaf spot, Fe deficiency.



3. CAPACITY BUILDING PROGRAMMES

TheDAATTCs and KVKs organized training programmes to stake holders at different levels for capacity building on various aspects covering crop production, crop protection, agricultural engineering, home science, fisheries, etc. and the details are presented hereunder.

3.1 Farmers

A total of 718 training programmes were conducted, covering 25148 farmers and farm women by the DAATTCs and the KVKs. These programmes have focused on latest production technologies in crops such as rice, maize, sunflower, pulses, groundnut, fiber crops and vegetables. They also included aspects like soil test based fertilizer application, climate resilience agriculture, value addition to millets, natural dye extraction, use of bio-fertilizers, vermi compost, sheep and goat rearing, integrated farming system, farm mechanization, formation and management of Self Help Groups, farmers' organizations, preparation of low cost nutritious diet, preparation of value added multi grain products, weaning foods for infants and amylase rich food preparations etc.

3.2 Extension Personnel

The DAATTCs and KVKs conducted 198 training programmes and trained altogether 9043 Extension Personnel. The training programmes included IPM, INM and IWM in maize, groundnut, pulses and oilseeds; soil test based fertilizer application; soil health and fertility; water use management and weed management in different crops; alternate ID crops to rice etc.

3.3 NGOs

Sixty Five training programmes were conducted benefitting 3,654 personnel of NGOs, banks and others. The training programmes covered particularly aspects like soil test based fertilizer application, plant protection measures in vegetables, critical interventions in production technologies and cost reduction technologies in agriculture, horticulture and animal husbandry, vermicompost, bee keeping, soil health management, seed village programme, integrated pest management and long term-storage of cereals.

3.4 Skill Teachings

A total of 252 skill teachings were imparted by KVKs and DAATTCs to 4,814 farmers and rural youth. The training programmes imparted skills on preparation of tomato products, natural dye extraction, farm machinery, vermicomposting, diagnosis and management of major insects and diseases in different crops, printing and embroidery, candle making, fabric painting, value addition to millets and tomato, seed production in *kharif* oilseed crops, hybrid seed production in sunflower and castor, low cost play material for anganwadi children and mushroom cultivation.

3.5 Vocational Trainings

The KVKs conduct short, medium and long term vocational training programmes, to the farmers/farm women/rural youth for providing opportunity to impart skills leading to self employment. The training areas include vermicomposting, mushroom production, value addition to millets, home needs, fruits and vegetables processing etc. During the year 2015-16, the KVKs had organized 50 such programmes benefiting 2050 participants.

3.6 Group Discussions

The DAATTCs and KVKs altogether conducted a total of 902 group discussions for 15462 farmers, which include green manure crops before rice, weed management in direct sown rice, zero tillage in maize, management of YMV in pulses, production technology for summer pulses, IPM in groundnut, management of *Botrytis* grey mildew in castor, good agricultural practices in cotton, budchip method of planting in sugarcane, seed production at farmers level, *kharif* contingency plan, management practices in vegetable crops, plant protection in mango, nutritional gardening, techniques in Vannamei culture, feed management in carp culture, management of acidic and alkaline soils, agriculture farm machinery, importance of drudgery reducing implements etc.,

3.7 Field Days

A total of 151 field days were conducted by DAATTCs and KVKs and benefited 4396 farmers. Field days on varieties of rice (MTU 1061, NDLR 47), sugarcane, groundnut (Dharani, TCGS 1073), redgram, blackgram (LBG 752), MSRI in rice, sunflower, drum seeder technology in rice, zero tillage cultivation in maize, soil test based fertilizer application in paddy, management of foliar diseases in cotton, liquid bio fertilizer in rice, captive rearing of fish were organized.

4. KISAN MELAS

The Acharya N.G. Ranga Agricultural University has been organizing Kisan Melas at various Research Stations and Colleges throughout the state to create awareness and educate farmers about latest farming technologies and developments. During 2015-16, KisanMelas were organized at RARS, Chintapalli; Anakapalle; Maruteru; Tirupati and Nandyal. As a part of Kisan Melas, Farmers - Scientists interaction sessions and Rytusadassus were conducted and farmers participated in large numbers. Kisan Melas helped in transfer of technologies with least dissemination losses.



Kisan Melas at Regional Agricultural Research Stations, Maruteru and Anakapalle



5. SOUTHERN ZONE REGIONAL AGRICULTURAL FAIR 2015

South Zone Agri-Expo – 2015 sponsored by Ministry of Agriculture, Government of India was organized from 19th December to 21st December, 2015 at Regional Agricultural Research Station, Lam, Guntur with a theme on Small Farmers Friendly agricultural technologies. A total of 50 stalls were arranged and about 10, 000 farmers had visited the Expo and Exhibition during the three days. Simultaneously, technical interaction sessions with farmers on various topics were organised during the Expo. Innovative and low cost technologies useful for farmers were showcased by the NGOs as well. The programme was inaugurated by Sri P. Pulla Rao, Hon'ble Minister for Agriculture and the University Officers. Principal Scientists, scientists of University participated in the Fair.



ANGRAU stall and farmers participated during Southern Agri Expo-2015

A souvenir with the topics envisaged for technical interaction sessions was released during the inaugural session by the chief guest of the Agri-Expo. The exhibition was organized with the partnership of Agri-Horticultural Society of Andhra Pradesh.

6. DISTANCE EDUCATION

ANGRAU is one of the few agricultural universities in the country to start distance education through a private TV channel, ETV under "Annadata- Velugubata" programmes from 2nd October, 1998 twice a week, Tuesday and Friday. In the wake of WTO and highly diverse micro-farming situations present in the state, in order to exploit the role of electronic media to educate the farmers on efficient use of inputs in sustainable and export oriented agriculture, postharvest handling, market information etc., an Electronic Media Wing was established during 2001 to promote e-extension.

7. PHONE IN LIVE PROGRAMMES

Every month topics and resource persons has been identified for phone in live programmes

I. Pasidipantalu (Doordarshan): On Wednesday and Friday, Pasidipantalu Phone – in-Live programme on agriculture and allied subjects is being organized by Doordarshan in which a scientist from the university will answer the questions asked by the farmers on a preinformed topic for the day from 6.00pm to6.55 pm. The Electronic Wing identified the topics and the resource persons for 51 programmes telecasted on Doordarshan phone-in-live programme.

II. <u>Annapurna (TV5)</u>: The phone in live programme was initiated in September, 2009 as part of Annapurna programme of TV5. The



programme will run for three days in a month on first three Thursdays on agriculture and allied subjects in which a scientist from the university will answer the questions asked by the farmers on a pre-informed topic of the day, from 5.30 pm to 6.00 pm. Fourteen (14) prorgammes were telecasted during the period under report.

8. TECHNICAL PUBLICATIONS

Agricultural Information and Communication Centre (AI & CC), Guntur has brought out the following publications during the year under report.

- VyavasayaPanchangam 2016-2017
- Journal of Research ANGRAU (Quarterly)
- Vyavasayam Monthly Telugu Farm Magazine
- Research & Extension Highlights 2015-2016

The VyavasayaPanchangam 2016-17 has been released by theHon'bleChief Minister of Andhra Pradesh Sri N. Chandrababu Naidu, on the eve of Ugadi day celebrations held at Guntur. **9.TECHNOLOGY WEEKS**

In order to sensitize the farmers about the technologies at Instructional farm and inculcate the habit of visiting KVKs and also for direct interaction of farmers with the

Scientists, Technology weeks for a duration of 3-5 days were organized at KVKs of Amadalavalasa, Garikapadu, Ghantasala, Kalikiri, and Nellore, benefitting 2,518 farmers.

10. DIPLOMA IN AGRICULTURE EXTENSION SERVICES FOR INPUT DEALERS (DAESI)

In order to transform practicing input dealers into para-extension professionals for enabling them to serve the farmers better, MANAGE had launched DAESI programme in the year 2003. The programme was spread over a period of 48 weeks, with 40 classroom sessions and 8 Field visits to various institutions and farmers' fields. The classroom sessions and field visits were conducted on Sundays or local market holidays. The field visits are intended to acquaint the input dealers with location-specific field problems and expose them to relevant technologies and also to identify pests, diseases and nutritional disorders. Study material in local language was provided and multi-media instructional devices were used in the classrooms. This programme was taken up by three Krishi Vigyan Kendras of Nellore, Banavasi and Reddipalli. A total of 120 input dealers got benefited by this training programme during the year 2015-16.



Dr. K. Raja Reddy, Director of Extension addressing the Input dealers during the inaugural function of DAESI one year long training programme at KVK, Reddipalli

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11. ATTRACTING AND RETAINING YOUTH IN AGRICULTURE (ARYA)

Realizing the importance of rural youth in agricultural development especially from the point of view of food security of the country, ICAR has initiated a program on "Attracting and Retaining Youth in Agriculture" in 2015-'16 as one of the three components of National Agricultural Innovation Fund. KVK, Nellore, the only KVK for Andhra Pradesh State has been chosen for implementation of the ARYA Project. Special efforts were made under this scheme to attract the rural youth under the age of 35 years in agriculture so that the increase in the migration of rural youth towards cities is controlled.

The ARYA project of KVK Nellore was launched formally on 31-03-2016 in the presence of Director of Extension, ANGRAU, Dr. K.Raja Reddy and Dr.J.V.Prasad, Principal Scientist and Nodal Officer of ARYA from ICAR-ATARI, Hyderabad. The KVK need to establish the mushroom production / vermicopmosting / frutits and vegetable nurseries units with the 200 youth either in groups or individuals. During the Year 2015-16, twenty groups with four members each (80 rural youth) were identified in 11 villages in five clusters and efforts were made to establish 20 enterprise units (mushroom -8, vermicompost -8 and nursery on fruits and vegetables -4).

12. VIDEO CONFERENCING

With a view to have quick timely and effective review and monitoring of various University activities, the online review by establishing Video Conference facility was taken up at University Head Quarters, Rajendranagar Campus during August 2007. The multi point conferencing with headquarters was linked to 12 centres of ANGRAU viz., Vizianagaram, Ragolu, Anakapalle, Reddipalli, Maruteru, Guntur, Bapatla, Darsi, Utukur, Nellore, Tirupati and Nandyal.

The technical programme reviews were conducted frequently using the Google Hangouts. The University Officers reviewed the progress of activities of the Research Stations, Colleges, DAATTCs and KVKs every month with the Associate Directors of Research, Associate Deans, Coordinators of DAATTCs and Programme Coordinators of KVKs during the period under the report.

13. VILLAGE ADOPTION PROGRAMME

The major research stations and Agricultural Colleges of ANGRAU have adopted one village each during the year with an objective for the overall development of the village. The programme works by utilizing Farmer-Scientist linkages in technology transfer. This enables the adoption of technologies without time lag between technology generation and adoption and with least dissemination losses. The technology assessment and refinement under the socio-economic and agro ecological situations of the farmer will help to develop relevant technologies and scientist will also get first hand feedback for planning effective research programmes.

14. T & V MEETINGS

The Training & Visit meetings were conducted on 1st saturday of every month at 13 lead research stations of ANGRAU to cater the needs of respective districts. The problems identified by the Agricultural Officers and Assistant Directors of Agriculture of the concerned district were thoroughly discussed jointly by the scientists of lead research stations and suitable corrective measures and impact points were given to adopt at field level. Every meeting was followed by the field visit in the afternoon. The timely and successful conduct of T&V meetings shows the functional linkages between ANGRAU and Department of Agriculture.





T & V meeting at Tirupai



T & V meeting at Anakapalle

15. POLAMPILUSTHONDI

All the Scientists of DAATTCs and KVKs of ANGRAU have actively participated in the

POLAM PILUSTHONDI organized by the State Government in all the districts of AP held on Tuesday and Wednesday of every month during the year under report.



Participation of KVKs in Farmer - Scientist interaction programmes during Polam pilusthondi

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16. AMC LEVEL INTERACTION MEETINGS

All the scientists of DAATTCs and KVKs of ANGRAU have actively participated in the AMC level interaction meetings organized by the State Government in all the districts of AP held on 1st and 16th of every month during the year under report.

17. RYTUKOSAM CHANDRANNA

All the Scientists of DAATTCs and KVKs of ANGRAU have actively participated in the Rytukosam Chandranna Yatralu organized by the State Government in all the districts of AP held from 09-09-2015 to 29-09-2015.

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Participation of Scientists as Resource persons in the Rytukosam Chandranna programme



18. JANMABHUMI – MAAUURU

All the Scientists of DAATTCs and KVKs of ANGRAU have actively participated in the Janmabhumi–MaaUuru programme during 02nd to 10th January 2016 and discussed the seasonal conditions, nutrient management practices, IPM measures and other better management practices which helps the farming community.



Participation of DAATTC Scientists in Janmabhumi Maauuru programme

19. NATIONAL INITIATIVE ON CLIMATE RESILIENT AGRICULTURE (NICRA)

Under the Technology Demonstration component of NICRA, five Krishi Vigyan Kendras (Amadalavalasa, Undi, RASS, Reddipalli, Yagantipalle) in Andhra Pradesh, were selected for conducting such technology demonstrations. During the year under report, KVKs conducted 397 demonstrations under NRM interventions viz., in-situ moisture conservation practices, water harvesting and recycling, ground water recharge, improved drainage in flood prone area, micro irrigation systems and various resource conservation technologies. A total of 466 crop production demonstrations were conducted in 277 ha on drought tolerant and short duration varieties, location specific inter cropping systems, crop diversification, disease and pest management, nutrient management etc. Under livestock and fisheries interventions, KVKs covered 356 farmers on fodder production, hydroponic method of fodder production, Silage making, breed up gradation, mitigation of mineral deficiency, improved birds for backyard poultry, management of fishponds etc. KVKs under institutional interventions covered 486 farmers under custom hiring of farm implements covering 620 ha area. KVKs also organized 109 training programmes for 3327 participants (2693 farmers and 634 farm women) on soil health management, contingency cropping, vegetable production, farm mechanization, pest and disease management, livestock management, etc. A total of 229 extension activities were conducted with participation of 5,456 farmers and 1,413 farm women.

Flood tolerant varieties with MTU 1061 and MTU 1064 demonstrated by the KVK, Undi could reduce loss by 31 per cent compared to Swarna grown by the farmers in the adopted village of Matsyapuri inspite of heavy cyclonic rains received during November 2015. These varieties are widely adopted by the farmers and the area spread to 200 ha.

Direct sown paddy demonstration was conducted by KVK, Undi in an area of 16 hectares during *rabi* 2015-16, thereby the cost of cultivation was reduced by Rs. 4422 per hectare than manual planting. The crop got matured a week earlier than that of manual planting.

Plastic mulching in mango under *in situ* moisture conservation was demonstrated under Natural Resource Management by the KVK, RASS, in an area of 2 ha recorded higher yield of 8.96 t/ha compared to farmers' practice (7.43 t/ha).

The crop diversification intervention taken up by the KVK, Yagantipalle with foxtail millet in place of desi cotton gave sustainable yield and higher income under drought in Kurnool district of A.P. Foxtail millet realized net returns of Rs. 36879/ha with a benefit cost ratio of 3.4. The adoption of setaria crop by the farmers was due to its suitability to delayed monsoon, short duration, higher market price and additional benefit of fodder. In view of its superior performance, the crop area increased from 40 to 1200 acres in the villages during *kharif* 2015.



Foxtail millet as an alternate crop

Drought tolerant groundnut variety Dharani demonstrated in seven locations by the KVK, RASS in Chitticherla village gave more yield (11.3 per cent increased) over Kadiri-6 variety resulting in more net returns to the farmers.

Low cost hydroponic fodder production technology with limited available water was



demonstrated in NICRA villages of Kurnool by the KVK, Yagantipalle to overcome the scarcity of green fodder. Eight kg of fodder can be grown from 1kg maize seed within seven days. Cost of the unit is Rs.13000/-. Each animal was offered with 12 kg hydroponically grown maize fodder along with 7 kg jowar straw every day. The results indicated that there was an increase of 8.11% milk yield with the additional net income of Rs.32.00 per day. It was also observed that, through feeding of hydroponic fodder the use of concentrates can be reduced in the feed.

The KVK Srikakulam undertook the interventions on captive rearing of fish seed i.e., rearing of fish up to fingerling stage in nursery pond followed by stocking in the main tank. This practice reduced mortality during acclimatization. Captive rearing not only increases the percentage of survival but also reduces the cost of seed when purchased directly from the market and an amount of Rs.10,800 was saved in captive rearing of fish in 20 days period.

Due to improved storage of the tank, sufficient water was available during *Kharif* (1,38,575 m³). Due to this reason, paddy transplanting operations were carried out in time and water has been conveniently used up to end of the crop season.Paddy yields were increased by 16.35% over before NRM works. Area in *rabi* increased from 12ha to 37.5ha due to availability of water in community tank.

Drainage channel has been arranged in a length of 800m which resulted 25 acres of medium inundation area and 20 acres of high inundation area to overcome the threat of complete inundation due to runoff of excess rain water, thus reducing the period of complete inundation by 1-2 days during August. Drainage channel was dug to a length of 800 m could reduce the inundation of rice crop to the extent of 18 ha.



Frontline Demonstration on Zero tillage maize at Sirusuwada NICRA adopted village of KVK Amadalavalasa

Frontline demonstration on zero tillage maize was organized in an area of 8 ha with 25 farmers. Net income was increased by Rs. 38,350 compared to blackgram in rice fallow and saved two irrigations. The cost of cultivation was reduced



Demonstration of captive rearing of fish seed was conducted to minimize the mortality of fish seed and reduced the cost on fish fingerlings, in hapa for 25 days culture period. A total number of 19,000 fish fry released in hapa for 25 acres of community tank and got 11,100 number of fingerlings with 58.42 survival rate and reduced the cost on fingerling by Rs. 0.97.



INSTITUTIONAL INTERVENTIONS: CUSTOM HIRING CENTRE

In the custom hiring centre established in Sirusuwada village in Srikakulam district, power

sprayers and water carrying pipes were used frequently by the farmers to provide irrigation and spray fluid preparation for spraying of chemicals.



Different NICRA activities at KVK Amadalavalasa

20. PRADHAN MANTRIFASAL BIMAYOJANA (PMFBY)

Pradhan Mantri Fasal Bima Yojana is aimed to provide insurance coverage and financial support to the farmers in the event of failure of any of the notified crop as a result of natural calamities, pests & diseases and to stabilize the income of farmers to ensure their continuance in farming and multiple localized risks and post harvest losses taken into account to ensure that no farmer is alone in times of distress. It is also to encourage farmers to adopt innovative and modern agricultural practices to ensure flow of credit to the agriculture sector. In order to bring the awareness on PMFBY, 11 KVKs (8 ANGRAU and 3 NGO) had organized one day Farmers Fair and interaction meetings involving Public Representatives of the local area, farmers, district officials including Panchayat Raj Institutions, officials from the banks, NABARD officials and farmers organizations. Exhibitions and cultural programmes were arranged on the occasion. About 6548 farmers participated in the awareness programmes. Hon'ble Union Minister of Civil Aviation, Sri Ashok Gajapati Raju, participated in the PMFBY programme organized at Vizianagaram by KVK, Rastakuntubai. Dr. K. Raja Reddy, Director of Extension participated at KVK, Kalikiri and KVK, Garikapadu.

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Awareness cum interaction programme with the farmers on Pradhan mantri fasal bheema yojana

21. AWARENESS ON PROTECTION OF PLANT VARIETIES & FARMERS RIGHTS ACT 2001

With an objective of creation of awareness among farmers and other stakeholders about the provisions of Protection of Plant Varieties and Farmers Rights Act 2001, five Krishi Vigyan Kendras viz., Amadalavalasa, Garikapadu, Nellore, Reddipalli and Utukuru organized PPV and FR Act awareness cum training programmes during the year 2015-'16. A total of 10 programmes on provisions of PPV and FR Act 2001 were organized involving 435 farmers and 65 extension personnel.



Awareness cum training programme on protection of plant varieties and farmers right act 2001 programme organized by KVK Nellore

23. DISASTER MANAGEMENT

The University has constituted the committees with scientists for field visits and advising farmers about precautions to be taken during heavy rains in Nellore, Kadapa and East Godavari districts in November 2015 and droughts in Srikakulam, Kurnool and Anantapuramu districts in October, 15. Accordingly, farmers' advisories through Flag method, display of advisories through flexes, recorded messages through loud speakers, local news papers/print media, TV programmes, distributing pamphlets and booklets, and awareness through rythu clubs and IIDS were conducted to alert farmers time to time.







Field visit of Sri T. Vijay Kumar, IAS, Special Chief Secretary to Govt. and Hon'ble Vice Chancellor, ANGRAU; Dr. K. Raja Reddy, Director of Extension, ANGRAU and DAATTC Scientists to the cyclone affected fields

24. PARTNERSHIP ACTIVITIES OF ANGRAU AND RELIANCE FOUNDATION

Since its inception in 2013, the Reliance Foundation Information Services (RFIS) programme is closely working with Acharya NG Ranga Agricultural University for providing critical information and linkages using various communication mediums to poor households. Information is disseminated though audio and dial out conferences, local cable TV, Live TV Phone in Programmes, TV scrolls on daily basis Agro



weather News Bulletins, Voice advisories and text SMS, Jio Chat, Whats App and field based programmes and trainings. These enable farmers to make better decisions in areas of livelihood, health and disaster preparedness. Themes covered on broadcasts include agriculture, horticulture, fisheries, health, employment, microenterprises and skill development.

More than 3500 farmers were participated in the different field awareness & plant diagnostic programmes to save their crops and reduce the input cost.



Dial out programme and Phone-in-live programme with ANGRAU Scientist





In this year, ANGRAU disseminated 3256 News bulletins with 1500+ Seasonal based & need based validated content with resources of ANGRAU through 11 cable channels of coastal Andhra Pradesh

More than 3,64,000 users got benefited by 266 voice advisories on seasonal based content for 8 different crops (paddy, sugarcane, blackgram, greengram, cotton, chillies, maize and mango) grown in coastal Andhra Pradesh.

A total of 13,846 users utilized the toll-free help line services across AP & Telangana and got the advisories received from different thematic experts of ANGRAU to reduce the crop losses and increase the crop yields by taking timely decision on crop management aspects.

25. VOICE MESSAGES ON MOBILES THROUGH E – KAPAS NETWORK

E- Kapas Network and Technology Documentation project implementing at Regional Agricultural Research Station, Lam has been working with an objective to identify cotton farmers as beneficiaries and enroll their mobile numbers to deliver voice messages on cotton cultivation.

Around 8192 farmers registered themselves in this project from nine districts (Guntur, Krishna, Prakasam, Nellore, Kurnool, Kadapa, Ananthapuram, Khammam&Nalgonda) after publicity through Newspaper, T.V. programme and farmer meetings etc. A total of 35 messages on cotton cultivation and other aspects have been recorded and sent during the crop season.

26. VYAVASAAYA SUCHANALU IN SAKSHIDAILY

In order to create massive awareness among the farmers about the university technologies, the ANGRAU has contributed weekly technical content for Vyavasaaya suchanalu for publication in Sakshi daily Newspaper in 13 districts of Andhra Pradesh.

27. Integrated Agromet Advisory Services

Under Graameena Krishi Mausam Sewa Project, five Agromet Field Units (AMFUs) are working in ANGRAU, Andhra Pradesh covering five Agro-climatic zones with AMFU, Tirupati as nodal centre. These five units are located at Tirupati, Anakapalle, Chintapalli, Ananthapuram and Lam. All these 5 units used to issue Agro Advisory bulletins to the farmers of respective zones with technical and financial support from Indian Meteorological Department, New Delhi and Met centre, Hyderabad. Under this project, weather forecast and weather based agroadvisories were issued twice a week (Tuesday and Friday) and also agrometeorological research was carried out for their respective crops in the zone.

Number of farmers registered so far in Kisan Portal – More than 3.32 lakhs (in 5 AMFU units)

Number of SMS sent to the farmers on weather and agro advisory: 2287

Number of agro advisory bulletins prepared and disseminated (June, 2015 to May 2016) – 400

28. FARM SCIENCE CLUB

Krishi Vigyan Kendra (KVK), Rastakuntubai has been conducting "**Science clubs**" as an innovative extension methodology at two Government Junior Colleges of Kurupam and GL.Puram mandals of Vizianagaramdistrict, Andhra Pradesh. The main objective of initiating Science club is to transfer of technology using the **students as media for disseminating technical** **information to the farmers/parents** who are living far away from the current society and who are not having minimum facilities like roads, communication through paper/phone/T.V. etc. and farming from years with more strain & less



productivity. The science club at G.L.Puram Govt. Junior college was named as "**M.S.Swaminathan Science club**" and the Science club at KurupamGovt. Junior college was named as "**Dr. Adivi Reddy Science Club**".



Dissemination of Information to tribal farmers



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29. TRIBAL YOUTH NET WORK

The Krishi Vigyan Kendra, Rastakuntabai had selected 35 tribal youth and formed as a tribal youth net work to transfer the technology in agriculture and allied areas located in remote villages, where adequate communication and transport facilities do not exist. The youth selected are school drop outs having lands and the productivity of their farms was very much low.

There was a significant difference in the knowledge levels on improved agricultural practices and the participation of the tribal youth in agricultural extension programme of the State Department of Agriculture and State Agricultural University activities was increased. Adoption rates were increased. They have adopted nontraditional crops such as turmeric and started mushroom production units for additional income generation. Further number of youth came forward to register their mobile numbers in ICT mode. They were given hands on experience on various activities such as candle making, bakery products preparation, mushroom cultivation and preparation of organic materials. Tribal youth took active participation in inter district exposure visits to inculcate the innovative practices of other farmers.





Capacity building of tribal youth network



Exposure visits to tribal youth

30. WORLD SOIL DAY - SOIL HEALTH CARDS

Soil Health Card Scheme was launched by the central government in February 2015. The scheme is planned to issue 'Soil Health Card' to farmers based on which they will carryout cropwise recommendations of nutrients and fertilizers required for their individual farms. This scheme is aimed to help farmers to improve crop productivity through judicious use of inputs. Budget to the extent of Rs. 1,20,000 was provided for each KVK to provide soil testing kits to prepare soil health cards. A total of 16,786 Soil Health Cards were distributed to the farmers by all KVKs put together in Andhra Pradesh. The card will carry crop-wise recommendations of nutrients/fertilizers required for farms, making it possible for farmers to improve productivity by using inputs wisely.



Kisan Sammelan at KVK, Banavasi on the occasion of World Soil Health Day



Dr. K. Raja Reddy, Director of Extension explaining the implements exhibited in the Kisan Sammelan organized on the occasion of World Soil Health Day at KVK, Kalikiri



To create awareness and distribution of soil health cards to farmers, the KVKs have organized a meeting on 5th December, 2015 (World Soil Day) by involving public representatives like Hon'ble Ministers, Members of Parliament, Members of Legislative Assembly, and local representatives etc.

31. TRIBAL SUB PLAN

The Tribal Sub Plan was implemented in 3 KVKs (Rastakuntubai, Yelamanchili and Darsi) with an outlay of Rs. 30.00 lakhs. The KVK districts were selected based on the tribal population of the District/Mandals in which the KVKs are operating. An action plan meeting of these KVKs was conducted by Director, ATARI on 06-02-2016 to apprise the Heads of KVKs implementing TSP of the guidelines to be followed while implementing TSP, review the progress of work that has already been initiated and to discuss the action plan for the future. The KVKs were suggested to ensure that the benefits of the interventions/activities taken up under TSP reach exclusively tribal individuals/families/colonies/ villages. It was emphasized that more focus be given to imparting skills and to establish enterprises for enhancing livelihood security of the tribal beneficiaries. As per the guidelines of Ministry of Tribal Welfare, Government of India, the activities of the KVKs implementing TSP have been covered under four major thematic areas viz., Agri-service center, Micro-enterprises, Skill development training and Agro-eco tourism.









Providing Critical inputs to the tribal farmers under TSP Exposure visit to the tribal farmers



VI. PLANNING AND MONITORING CELL

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The Planning and Monitoring Cell, headed by the Director (Planning and Monitoring), was established in the year 1986 with the objectives of planning, monitoring and evaluation of various developmental programmes and activities of the University.

The P & M Cell helps in preparing the outcome budget of the University prior to the budget session of Legislative Assembly every year. It also assesses and monitors the demand for human resources required to carryout teaching, research and extension activities of the University. It also provides the information pertaining to the ANGRAU to the State Legislative Assembly through the address given by His Excellency the Governor of Andhra Pradesh and the Budget Speech of the Hon'ble Minister of Finance, Government of Andhra Pradesh.

The Cell also attends to preparation of Annual Report of the University; maintenance and upgradation of human resource data base of the University; collection, compilation and submission of data and information in various formats to different agencies within the Country and outside; furnishing information required by other statutory bodies; preparation of the Convocation Report of the Vice-Chancellor reflecting the achievements and objectives of the University; submission of monthly reports of the ANGRAU to His Excellency the Governor of Andhra Pradesh and the Chancellor of the University; compilation and preparation of significant events of the ANGRAU to be presented at the Meetings of Board of Management, ANGRAU, etc. It also acts as the liaison office between the University and other Government and Non-Government Institutions.

The Director, Planning and Monitoring acts as the Transparency Officer of the University under the RTI Act 2005 and oversees the implementation of Section (4) obligations of RTI Act, 2005 and maintains due transparency in implementation of the Act.

Reports Prepared and Activities taken up during the Year

- 51st Annual Report of the University
- University Outcome Budget (2016-'17) for Andhra Pradesh
- University Monthly Reports to His Excellency the Governor of Andhra Pradesh
- ✤ 46th and 47th Annual Convocation Reports



VII. FINANCE AND BUDGET

The major financial grants to the University come from the Andhra Pradesh State Government under Plan and Non-Plan Schemes. The Non-Plan assistance is by way of block grants for running the University. The block grant approved in the budget for the year 2015-16 was Rs. 26,773.36 lakh. The ICAR assistance was Rs. 11,137.34 lakh and the Government of India assistance was Rs. 73.04 lakh. During the year, an amount of Rs.1371.00 lakh was received from RKVY.

Thus, the total Finances of the University during the year 2015-'16 was Rs. 40461.65 lakh as detailed below.

(Rupees in lakhs)

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Sl.No.	Particulars	Grants-in-Aid		Expendit	ure
		Amount	(%)	Amount	(%)
1.	Direct Receipts	882.83	2.18	0.00	0.00
2.	Non-Plan	26773.36	66.17	26485.58	68.12
3.	Dept. Sponsored Schemes	2.50	0.01	611.71	1.57
4.	R.K.V.Y	1371.00	3.39	480.29	1.24
5.	I.C.A.R. Plan	11137.34	27.53	10686.70	27.48
6.	Government of India	73.04	0.18	419.66	1.08
7.	Other Agencies	221.58	0.55	199.18	0.51
8.	Other Accounts	0.00	0.00	0.00	0.00
	Total	40,461.65	100.00	38,883.12	100.00

Funding Sources - 2015-'16



Source Wise Funds (%)







VIII. BUILDINGS AND CONSTRUCTION PROGRAMMES

During the period under report, the following civil works were completed by the Engineering Department of the University.

- Construction of Boys Hostel at Agricultural College, Bapatla, Guntur District for an amount of Rs. 460.00 lakhs.
- Construction of Bio Fertilizer unit at RARS, Anakapalle, Visakhapatnam District for an amount of Rs. 56.38 lakhs.
- Construction of Bio-Fertilizer unit at ARS, Utukur, YSR (Kadapa) District for an amount of Rs. 47.38 lakhs.
- Construction of Bio-Fertilizer unit at RARS, Tirupati, Chittoor District for an amount of Rs. 47.38 lakhs.
- Construction of Polytechnic Building at Kalikiri, Chittoor District for an amount of Rs. 150.00 lakhs.
- Construction of Boys Hostel for Agricultural Polytechnic at Kalikiri, Chittoor District for an amount of Rs. 95.00 lakhs.
- Construction of Polytechnic Building at Somasila, Nellore District for an amount of Rs. 140.00 lakhs.
- Construction of Boys Hostel for Agricultural Polytechnic at Somasila, Nellore District for an amount of Rs. 95.00 lakhs.



IX. OTHER EVENTS OF THE YEAR

An account of significant events, workshops, conferences, meetings, extension activities and other events that took place during the period under report is as follows.

Significant Events

Laying of Foundation Stone

Foundation stone for Dairy Engineering Laboratory under ICAR S&D Grants was laid at College of Agricultural Engineering, Madakasira on 31st October, 2015 by Dr. T.V. Satyanarayana, Dean of Agricultural Engineering & Technology and Registrar, ANGRAU.

Foundation Stone for new Agricultural University was laid at Lam, Guntur by Shri Radha Mohan Singh, the Hon'ble Union Minister for Agriculture, Govt. of India in the august presence of the Hon'ble Union Ministers, Hon'ble Chief Minister, and Ministers of State on 16th November, 2015. University Officers and the staff of ANGRAU, led by the Hon'ble Vice-Chancellor Dr. A. Padma Raju have organized the ceremony.

Foundation Stone for Faculty Building was laid at Lam, Guntur by Shri Prathipati Pulla Rao, the Hon'ble Minister for Agriculture, Govt. of A.P. in the august presence of MPs, MLAs, Vice Chancellor and staff of ANGRAU on the 10th February, 2016.

Inauguration

Apex and referral laboratory for soil, plant, water and Fertilizer was established and inaugurated by Dr. A. Padma Raju, Vice Chancellor, ANGRAU on 4th December, 2015 at RARS, Tirupati. **Pesticide Residue laboratory** was inaugurated by Dr. A. Padma Raju, Vice Chancellor, ANGRAU on 4th December, 2015 at RARS, Tirupati.

Advanced Post Graduate Centre - the University has started the Advanced Post Graduate Centre at RARS, Lam with the following Post Graduate programmes for the academic year 2015-16 and the classes commenced on 01-08-2015.

- 1. M.Sc. in Agronomy (Water Management)
- 2. M.Sc. in Seed Science & Technology
- 3. M.Sc. in Environmental Science

Institute of Agri-Business Management The University has started the Institute of Agri-Business Management at S.V. Agricultural College, Tirupati during the academic year 2015-16 and started offering MBA (ABM) Course.

Counseling Centre -Family guidance and counseling centre named "**Aalambana**" established by the Department of Human development and Family studies at College of Home Science, Guntur was inaugurated by Dr. A. Padma Raju, Hon'ble Vice Chancellor, ANGRAU along with University Officers on 10th February 2016 to help people of different age groups to solve their problems by themselves through counseling.

Annual Convocations

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The 46^{th} and 47^{th} Annual convocations were held during the period under consideration.

The 46th Annual Convocation was held on the 9th September 2015 at Agricultural College,



Bapatla. Dr. Harsh Kumar Bhanwala, Chairman, National Bank for Agriculture and Rural Development (NABARD), Mumbai was the Chief Guest-cum-Orator. He has been conferred with Honorary Degree of Doctor of Philosophy (*Honoris causa*).

The 47th Annual Convocation was held on the 4th January, 2016 at Sri Venkateswara Anam Kala Kendram, Rajahmundry, East Godavari dist. Shri Siraj Hussain, IAS, Hon'ble Secretary, Ministry of Agriculture, Govt. of India, Department of Agriculture, Cooperation & Farmers Welfare, Krishi Bhawan, New Delhi was the Chief Guestcum-Orator. He has been conferred with Honorary Degree of Doctor of Philosophy (*Honoris causa*).

External Funding- Ten Extramural Projects of ICAR were sanctioned to ANGRAU with an out lay of Rs. 2.7332 crores.

NABARD team visited RARS, Nandyal on 2nd September 2015 for establishment of Advanced Research Centre for Millets, Pulses and Sunflower.

Centre for Economic and Social Studies (CESS) committee, Govt. of AP visited RARS, Nandyal on 8th September 2015 and interacted with scientists and farmers regarding the measures for sustainable growth and for obtainable yields. A new Telugu App 'Greeshma' developed by ANGRAU was inaugurated by Dr. A. Padma Raju, Vice-Chancellor on 29.7.2015. The App contains the characteristics of diseases and their control measures in respect of rice, groundnut, sugarcane, maize and sunflower crops.

The 40th VC's Convention was held at Fortune Select Grand Ridge, Tirupati on 2nd and 3rd December, 2015. Indian Agricultural Universities Association (IAUA) came up with a set of recommendations. Integrated farming system involving animals and horticulture should be encouraged to replace monocropping. This should be coupled with awareness about the usage of fertilizers and importance of soil health cards, so as to meet the sustainability of farming.

South Zone Regional Agriculture Fair

The University organized South Zone Regional Agriculture Fair at Regional Agricultural Research Station, Lam Farm, Guntur for three days from 19th – 21st December 2015 with a theme on "Small Farmers Friendly Agriculture Technologies" with the involvement of SAUs, ICAR and Government Departments. Shri Prathipati Pulla Rao, Hon'ble Minister for Agriculture, Sri Rayapati Sambasiva Rao, Hon'ble Member of Parliament for Narasaraopet constituency have inaugurated the event.

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Other Significant Events

S. No.	Event	Date	Venue
1	University Foundation Day	12.06.2015	All Centres of the ANGRAU
2	Monitoring team on Mesta	08.09.2015	ARS, Amadalavalasa
3	ICAR monitoring team on Sugarc	ane 10.09.2015	ARS, Perumallapalle
4	AICRIP Monitoring team	19.09.2015	ARS, Vizianagaram
5	Monitoring Team of AICRP on Pearl millet	23.09.2015	ARS, Anantapuramu
6	ICAR monitoring team on Pearl millet	24.09.2015	ARS, Perumallapalle
7	ICAR Monitoring Team	28.09.2015	RARS, Anakapalle
8	AICRIP Monitoring team	01.10.2015	AICRP on Sorghum, Bapatla
9	AICRP-Small millets Monitoring team	06.10.2015	RARS, Nandyal For Monitoring of AICRP-Small Millets trials
10	Monitoring Team on Sunflower (kharif)	27.10.2015	RARS, Nandyal
11	Pre Rabi Kisan sammelan	29.10.2015	Krishi Vigyan Kendra, Amadalavalasa
12	AICRIP Monitoring team	02.11.2015	APRRI, Maruteru
13	ICAR Monitoring Team Monitoring of AICCIPTrials	26.11.2015	RARS, Lam
14	Southern States Agri-Fest	19.12.2015	RARS, Lam
15	Monitoring Team on Sunflower (<i>Rabi</i>)	23.01.2016	RARS, Nandyal
16	Kisan mela	16.11.2015 12.12.2015 18.02.2016 24.02.2016 26.02.2016	KVK, Undi RARS, Anakapalle RARS, Nandyal Agricultural Research Station, Ghantasala RARS, Anakapalle



S. No.	Event	Date	Venue
		16.03.2016 25.03.2016 31.03.2016 31.03.2016 07.05.2016	RARS, Tirupati APRRI and RARS, Maruteru KVK, Nellore RARS, Chintapalle KVK, Undi
17	Millet Fest	12.03.2016-14.03.2016	Mahima Gardens, Guntur
18	QRT Team (2009-10 to 2013-14) of AICRP on Sugarcane	15.03.2016	AICRP Sugarcane programme at RARS, Anakapalle.
19	Technology and Machinery Demonstration Mela	18.03.2016	CAE, Bapatla
20	IFAD Team: Ernald Millone, IFAD, Rome; Helen Leitch, FAO, Rome; Dr. S. Gopala Krishnan, ICRISAT, Hyderabad	29.03.2016	ARS, Anantapuramu
21	AGRI CARNIVAL, with the theme of Bio Approaches in Pests and Diseases Management in Agriculture	14.05.2016 Ag	ricultural College, Naira

Technology and Machinery Demonstration Mela



Laser Leveller



Groundnut Wet pod thresher





Meetings Organized

S. No.	Event	Date	Venue	Organized by
1	26 th Research and Development Meeting of Sugarcane workers of Andhra	21.09.2015 to 22.09.2015	Andhra University, Visakhapatnam.	Regional Agricultural Research Station, Anakapalle
2	Farmer-Scientist interaction meeting as part of	28.12.2015	RARS, Maruteru	RARS, Maruteru
3	"Jai Kisan-Jai Vignan" Farmer-Scientist interaction meeting	08.02.2016	RARS, Maruteru	RARS, Maruteru
4	SLTP Meetings	02.05.2016 to 13.05.2016	Bapatla, Maruteru and Tirupati	ANGRAU
5	Farmer-Scientistinteraction meeting	07.05.2016	KVK, Undi	KVK, Undi



Training Programmes / Short Courses / Orientation Programmes Organized

S. No.	Event	Date	Venue	Organized by
1	Training on "Cultivation aspects of groundnut	01.06.2015 to 03.06.2015	ARS, Kadiri	DAATTC, Utukur
2	Awareness cum hands on training on "Employment generation through village level Mango leather making industry" to Scheduled Tribe Farmers of Pondugala village.	09.06.2015	Shobanapuram village, Krishna Dist.	PHET, Bapatla
3	"Cheraku sagulo karchutha- gginchataniki suchanalu	26.06.2015	RARS, Vuyyuru	ANGRAU
4	Training Programme on "Sugarcane Bud Chip Technology"	02.07.2015 to 04.07.2015	RARS, Anakapalle	RARS, Anakapalle
5	Training on farm mechanization	17.08.2015, 19.08.2015 & 21.08.2015	RARS, Tirupati	RKVY
6	Training on "Bee Keeping"	17.08.2015 to 22.08.2015	ARS, Vijayarai	ARS, Vijayarai
7	"Recent Advances in Groundnut Production Technology" (21 days Winter School)	25.09.2015 to 15.10.2015	RARS, Tirupati	RARS, Tirupati
8	One day training to the ST workers on "Processing of cashew and awareness on health hazards".	14.10.2015	Vetapalem village, Prakasam Dist.	PHET, Bapatla
9	An Integrated training on groundnut seed production certification, processing and storage	27 .10.2015	ARS, Kadiri	ARS, Kadiri
10	Training on "Bee Keeping"	07.12.2015 to 08.12.2015 & 21.12.2015 to 22.12.2015	ARS, Vijayarai	Dept. of Horticulture under MIDH programme
11	Training on "Management of honey bee colonies"	14.12.2015 to 19.12.2015	ARS, Vijayarai	ARS, Vijayarai



S. No.	Event	Date	Venue	Purpose
12	One day training program on "Safe storage of food grains" to the ST farmers.	15.12.2015	Ganapavaram, Guntur Dist.	PHET, Bapatla
13	Training on Integrated farming systems	02.01.2016	ARS, Seethampet	ARS, Seethampet
14	Training programme on "New technologies and developments in oilseeds cultivation" for MPEOs	12.01.2016 & 13.01.2016	ARS, Seethampet	ARS, Seethampet
15	Improved cultivation practices for realizing higher yields in paddy crop under changing climatic conditions in Krishna zone	29.01.2016	RRU, Bapatla	RRU, Bapatla
16	Training on "Management of Apis cerana colonies"	08.02.2016 to 13.02.2016	ARS, Vijayarai	Dept. of Horticulture under MIDH programme
17	Mushroom Production	20.02.2016 & 03.03.2016	Ag. College Naira	Mushroom Unit Ag. College Naira
18	Training programme on "Nutrient deficiencies and correction measures in different crops in saline soils under rainfed situation" and "Crops and cropping system management for higher productivity in problematic soils"	24.02.2016	Karlapalem	SWS, Bapatla
19	Production technologies of I D Crops	04.04.2016	Ag. College Naira	Faculty and Students of Agril. College, Naira
20	"IPM in major field crops" to farmers of Chittoor, YSR Kadapa, Ananthapuram and Nellore	23.05.2016 to 28.05.2016	RARS, Tirupati	ICAR - Unnat Bharat Abhiyan & ANGRAU
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Workshops/ Seminars / Conferences/Symposia Organized

S. No.	Event	Date	Venue	Organized by
1	Exploration for collection of wild relatives of jute	25.11.2015 to 05.12.2015	AP & Telangana	ARS, Amada- lavalasa & ICAR
2	National Symposium on Future Technologies: Indian Cotton in the Next Decade,	17.12.2015 to 19.12.2015	ANU Campus, Guntur	ANGRAU & CRDA, CCS HAU, Hisar
3	Capacity building workshop for "strengthening the management and monitoring of CFTs of Regulated GE crops"	29.12.2015	RARS, Tirupati	ANGRAU & BCIL, New Delhi
4	Conference on "National Priorities in Plant Health Management"	04.02.2016 & 05.02.2016	RARS, Tirupati	Plant protection Association of India and ANGRAU
5	Annual workshop of AICRP on small millets	17.04.2016 to 19.04.2016	RARS, Tirupati	ANGRAU & ICAR
6	Organic farming and Bio-fertilizers	25.04.2016 to 30.04.2016	RARS, Lam, Guntur	ANGRAU & ICAR
7	IWM in major cereals and pulses	25.04.2016 to 30.04.2016	RARS, Lam, Guntur	ANGRAU & ICAR

Participation / Visits of Vice-Chancellor

S. No.	Event	Date	Venue	Purpose
1	Tenth meeting of the expert committee for technical evaluation of sponsored/ competitive grant components under plan on NICRA	23.06.2015	CRIDA, Hyderabad	Participation
2	Interaction meeting with scientists, farmers and NGOs of the sub-committee to alternative agricultural technologies.	26.06.2015 to 28.06.2015	Ananthapuram	Chairman



S. No.	Event	Date	Venue	Purpose
3	Indian Institute of Public Health Advisory Council Meeting	07.07.2015		Participation
4	Meeting of Board of Management of Dr. YSR Horticultural University	08.07.2015	Commissionarate of Horticulture, Government of Andhra Pradesh	Participation as Member
5	Interaction with scientists, farmers and NGOs in Guntur district.	11.07.2015	RARS, Lam	Chaiman
6	Inaugurated Vice- Chancellor's Camp Office along with other University Officers	12.07.2015	RARS, Lam, Guntur	Participation
7	Seed Review Meeting with private seed industries	16.07.2015	DOR, Hyderabad	Participation
8	Meeting with Sri T. Vijay Kumar, IAS, Spl. Chief Secretary, Government of Andhra Pradesh	20.07.2015	Kurnool	To discuss on developing Kurnool district as the seed hub.
9	Interaction meeting with ICRISAT officials on Primary Sector Mission	22.07.2015		Participation
10	Interaction meeting with officials of University of Florida and Ex Vice- Chancellor and University Officers.	30.07.2015	Vice- Chancellor's Chamber, Rajendranagar, Hyderabad	To explore the ways for mutual cooperation for initiating new academic programmes.
11	Variety release committee meeting	03.08.2015	Chambers of Special Chief Secretary of Agriculture	Participation
12	Regional Advisory Grants meeting	11.08.2015	NABARD	Participation

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S. No.	Event	Date	Venue	Purpose	
13	Interaction visits with scientists, farmers and NGOs in Srikakulam district	14.08.2015 to 15.08.2015	Agricultural College, Naira	Participated in the flag hoisting function	
14	Interaction meeting with ICRISAT officials on Primary Sector Mission	20.08.2015		Participation	
15	Workshop on drinking water quality with special emphasis on "Impact of Agriculture practice in Coastal Tracts of Godavari Delta, Andhra Pradesh	28.08.2015 to 29.08.2015	Sagi Ramakrishnam Raju Engineering College, Bhimavaram	Participation	
16	46 th Annual Convocation of ANGRAU	09.09.2015	Agricultural College, Bapatla	Organized	
17	Farmers Day function	12.09.2015	Indian Institute of Oil Seeds Research, Hyderabad	Participation as Guest of Honour	
18	26 th Research and Development meet on sugarcane	21.09.2015 to 22.09.2015	Andhra University, Visakhapatnam	Participation	
19	Meeting with DG and DDG, ICAR on the bifurcation issue of All India Co-ordinated Research Projects in view of the division of the State into Telangana and Andhra Pradesh.	13.10.2015	New Delhi	Participation	
20	8 th Seed Science Congress	27.10.2015 to 29.10.2015	Hitex, Hyderabad	Participation	
21	116 th Birth Celebrations of Acharya N G Ranga	07.11.2015	Lam, Guntur	Participation	
22	Inaugural function of New Agricultural University by Union Agricultural Minister Shri Radha Mohan Singhji and Chief Minister Shri Nara Chandrababu Naidu	16.11.2015	Lam, Guntur	Organized and Participated	



S. No.	Event	Date	Venue	Purpose
23	National Seminar and delivered a key note address on Sustainable Agricultural Development-Issues and Challenges	22.11.2015	Andhra University, Visakhapatnam	Participation
24	40 th IAUA Vice-Chancellors Conference	01.12.2015 to 04.12.2015	Tirupati	Organized and participated
25	Interaction meeting with Kansas State University team	05.12.2015	Tirupati	Participation
26	Administrative Office Foundation Stone Ceremony of CRIDA along with Dr. S. Ayyappan, Secretary, DARE and DG, ICAR	13.12.2015	Hyderabad	Participation
27	National Symposium on Cotton	17.12.2015 to 19.12.2015	Lam, Guntur	Organized and Participated
28	47 th Convocation, Faculty Meetings and Academic Council Meeting	04.01.2016 to 06.01.2016	Rajahmundry	Organized and participated
29	Interaction meeting with Parliamentary Standing Committee on Agriculture	15.01.2016	Hyderabad	Participation
30	Republic Day Celebrations	26.01.2016	Camp Office, Lam, Guntur	Chief Guest
31	Budget meeting	29.01.2016	Secretariat, Hyderabad	Participation
32	37 th Board of Management meeting of Dr YSR Horticultural University	05.02.2016	AP Secretariat Hyderabad	Participation
33	Visited RARS, Maruteru	07.02.2016	Regional Agricultural Research Station, Maruteru	Interacted with the scientists and other staff

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S. No.	Event	Date	Venue	Purpose
34	Bhoomi Pooja for the University Faculty building and inauguration of new boys hostel at Agricultural College, Bapatla	10.02.2016	Lam, Guntur	Participation
35	Dr. A. Padma Raju, handed over the charge of the post of Vice-Chancellor to Sri. T. Vijay Kumar, IAS, Spl. Chief Secretary (Agri.), Agriculture and Cooperation Department, Government of Andhra Pradesh on superannuation	13.02.2016		
36	Workshop on Natural Farming	28.02.2016	Pulladigunta, Guntur	Participation
37	Budget and Assembly sessions during the month of March 2016			Participation
38	Meeting on 'Man power management in Agriculture'	29.03.2016	Chamber of Chief Secretary, Government of Andhra Pradesh	Participation
39	Discussions with the University Officers about the introduction of distance education in the University	30.03.2016	Guntur	Chairman
40	Interacted with scientists of ANGRAU and CRIDA on Soil Health aspects	05.04.2016	Lam, Guntur	Chairman
41	Ugadi Purasakaramulu and release of Vyavasaya Panchangam function	08.04.2016	Vijayawada	Participation
42	JDAs Conference along with scientists of ANGRAU on finalization of village level action plan	13.04.2016	Vijayawada	Participation



S. No.	Event	Date	Venue	Purpose
43	Interacted with University Officers and Soil Scientists on Soil Health Management.	29.04.2016	Lam, Guntur	Participation
44	ICAR-DAC interface meeting on "Enhancing the preparedness for Agriculture contingencies during kharif, 2016" with Department of Agriculture, Government of Andhra Pradesh	11.05.2016	Kurnool	Participation
45	State Level Technical Programme meeting	13.05.2016	RARS, Tirupati	Inaugurated and suggested to frame out a technical programme for soil health management and sustainability of Agriculture
46	272 nd meeting of Board of Management	21.05.2016	RARS, Lam, Guntur	Chairman
47	97 th Academic Council Meeting	25.05.2016	Vijayawada	Chairman & Participation



Interaction meeting with scientists and Agril. Dept. Officers for making Kurnool district as the seed hub

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Visitors

S. No.	Visitor (s)	Date	Place Visited	Remarks
1	Team from M/s VST Tractors	09.05.2015	RARS, Nandyal	To discuss with Associate Director of Research, Principal scientist Agricultural engineering and other scientists with regard to initiation of collaborative project.
2	ICAR monitoring team on Groundnut	18.09.2015	RARS, Tirupati	Monitored the research work on groundnut
3	AICRP Monitoring team of East Coast zone	19.09.2015	RARS, Anakapalle	Monitored the trials conducted under technical programme 2015-16 of AICRP on Sugarcane
4	Sri. Vidhyanath Reddy, Member, Board of Management, ANGRAU	26.09.2015	RARS, Maruteru	Monitored the progress of research
5	Stephen Cherry, FSP, Canada	12.10.2015	ARS, Peddapuram	To observe research activities
6	Sri. Aarimilli Radhakrishna Hon'ble MLA, Tanuku	6.11.2015	RARS, Maruteru	Visited the Research Station, experimental fields and laboratories
7	Smt. Peetala Sujatha, Hon'ble Minister -Women and Child welfare and Sri. M. Buddha Prasad, Deputy Speaker and Sri. P. Satyanarayana, Hon'ble MLA, Achanta	9.11.2015	RARS, Maruteru	Visited the Institute and interacted with the scientists
8	Dr. A.K. Singh (DDG) Extension, ICAR	15.11.2015	RARS, Maruteru	Visited the research station and interacted with the scientists

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S. No.	Visitor (s)	Date	Place Visited	Remarks
9	General Manager, NABARD along with AGMs of 13 Districts of A.P.	28.01.2016	ARS, Nellore	To interact with Scientists and to know the Technologies developed at ARS, Nellore and Problems faced by farmers
10	Sri Prattipati Pulla Rao, Hon'ble Agricultural Minister, Smt. P. Sujatha, Hon'ble Minister - Women and Child welfare, Sri N. Rama Naidu, Sri P. Satyanarayana, Sri A. Radha Krishna	25.3.2016	RARS, Maruteru	Visited research participated in Kisan mela and addressed the farmers
11	Dr. R. K. Singh, Senior Scientist-II, IRRI, Phillippines	31.3.2016	RARS, Maruteru	To observe ongoing projects at APRRI, Maruteru



X. RESEARCH PUBLICATIONS

A. BY TEACHING FACULTY

1. Agriculture

Books and Chapters

- Hariprasad KV, 2016 "Recent advancement in the development of biopesticides by Actinomycetes for the control of insect pests", In: "Plant growth promoting Actinobacteria. A new avenue for enhancing the productivity and soil fertility of grain legumes", Springer publications, Pp: 47 – 62.
- 2. Penchal Raju M, C Kavitha and M Kirthy Reddy, 2015, "Food processing novel technologies", Kalyani Publishers House, New Delhi. Pp: 85-87.
- 3. Radha Krishna Murthy V, 2016, "Principles and practices of Agricultural Disaster Management", B S Publications, Hyderabad.
- Rangarao GV, B Ratna Kumari, KL Sahrawat and SP Wani, 2015, "Integrated Pest Management (IPM) for Reducing Pesticide Residues in Crops and Natural Resources", In: New Horizons in Insect Science: Towards Sustainable Pest Management, Springer publications, Pp: 397-412.
- 5. Ravi Kumar KN, 2016, "AGRICULTURAL PRODUCTION ECONOMICS", Astral International (P) Ltd., New Delhi, India.
- 6. Reddy SR and G Prabhakara Reddy, 2015, Dryland Agriculture, Kalyani Publishers.
- 7. Reddy SR and Reddi Ramu Y, 2016, Agronomy of Field Crops, Kalyani Publishers.
- 8. Sudhakar P, P Latha and PV Reddy, 2016, "Phenotyping crop plants for physiological and biochemical traits", Academic press, Elsevier Inc.
- 9. Venkata R Prakash Reddy, 2015, "Key notes on Genetics and Plant Breeding", Published by Astral International (P) Ltd., New Delhi, India. (ISBN: 978-93-5124-698-5).
- 10. Venkata R Prakash Reddy, 2016, "Key notes on Plant Biotechnology", Published by Astral International (P) Ltd., New Delhi, India (ISBN: 978-93-5124-791-3).
- 11. Venkata Rao P and S Neelaveni, 2015, "A Scale developed for measuring the extent of conflict faced by Agricultural Extension personnel in the Department of Agriculture in A.P.", In: *Compendium on Agricultural Extension*, Edited by Kalyan Ghadei, Biotech books publications, New Delhi, pp: 121-127.

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- 1. Anitha D and AV Nagavani, 2015, "Productivity of finger millet as influenced by crop geometry and age of seedlings", *Andhra Pradesh Journal of Agricultural Sciences*, 1 (3): 53-57.
- 2. Anitha D, AV Nagavani and V Chandrika, 2016, "Influence of crop geometry and age of seedlings on yield, nutrient uptake, post-harvest nutrient status and economics of finger millet", *Green farming*, 8 (1): 160-163.
- Anitha D, AV Nagavani, and V Chandrika, 2016, "Effect of crop geometry and age of seedlings on growth characters, weed density and yield of finger millet", *Advances in Life Sciences*, 5 (6): 2418-2423.

4. Anitha D, AV Nagavani, and V Chandrika, 2016, "Tillering pattern, light interception percentage and yield of finger millet as influenced by crop geometry and age of seedlings", *Research Journal of Agricultural Sciences*, 7 (2): 450-453.

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- 5. Anitha D, AV Nagavani, V Chandrika and MVS Naidu, 2015, "Productivity of finger millet as influenced by crop geometry and age of seedlings", *Andhra Pradesh Journal of Agricultural Sciences*, 1 (3): 53-57.
- 6. Anitha D, AV Nagavani, V Chandrika and MVS Naidu, 2015, "Productivity of finger millet as influenced by crop geometry and age of seedlings", *Andhra Pradesh Journal of Agricultural Sciences*, 1 (3): 53-57.
- Anitha N, KV Siva Reddy, V Chenga Reddy, PV Rama Kumar and V Srinivasa Rao, 2016, "Genetic variability, heritability and genetic advance for yield and yield contributing characters in inter-specific cotton hybrids (*G hirsutum* L. × *G barbadense* L.)", *The Andhra Agricultural Journal*, 63 (1): 63-66.
- 8. Anitha T, MVS Naidu, K Venkaiah, G Prabhakar Reddy and A Ramakrishna Rao, 2015, "Soil suitability evaluation for major crops grown in Pakala mandal of Chittoor District, Andhra Pradesh", *Andhra Pradesh Journal of Agricultural Sciences*, 1 (3): 106-113.
- 9. Anusha S, GMV Prasada Rao, DV Sai Ram Kumar and V Srinivasa Rao, 2015, "Impact of different levels of nitrogen on the incidence of various sucking insect pests of Bollgard II cotton", *The Andhra Agricultural Journal*, 62 (4): 890-894.
- 10. Arbind Kumar Gupta., G Jayasree, K Surekha, S Hemalatha and S Sudharani, 2015, Simulating phenology, growth parameters and yield of aerobic rice using oryza 2000 model", *Indian Journal of Ecology*, 42 (2): 449-453.
- 11. Ashok Kumar G, V Sailaja, PV Satya Gopal and SV Prasad, 2015, "Construction and Standardization of Knowledge Test to measure the knowledge level of farmers on SRI Technology", *Indian Research Journal of Extension Education*, 15(4), 161-166.
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- 13. Babagouda S Patil, M Lal Ahamed, D Ratna Babu, and Y Ashoka Rani, 2015, "Studies on genetic variability, heritability and genetic advance estimates in maize (*Zea maysL.*)", *TheAndhra Agricultural Journal*, 62 (4): 821-824.
- 14. Balakrishna B, PV Satyanarayana, V Satyanarayana Rao and V Srinivasa Rao, 2015, "Character association and path coefficient analysis in rice (*Oryza sativa* L.)", *The Andhra Agricultural Journal*, 62 (3): 561-564.
- 15. Bayyapu Reddy K, V Chenga Reddy, M Lal Ahamed, V Naidu and V Srinivasarao, 2015, "Multivariate analysis in upland cotton (*Gossypium hirsutum* L.)", *Electronic Journal of Plant Breeding*, 6 (4): 1019-1026.
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- 21. Bharathi DT, PV Krishnayya, T Madhumati and MV Kumar, 2015, "Population development and damage by pulse beetle, *Callobruchus maculates* F. on different pulse hosts-grains", *The Andhra Agricultural Journal*, 62 (4): 879-884.
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- 23. Bhargavi B, N Sunitha, Y Reddi Ramu and G Prabhakara Reddy, 2016, "Efficacy of herbicides on weed suppression in transplanted finger millet (*Eleusine coracana*)", *Indian Journal of Agronomy*, 61 (1): 109-111.
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- 29. Boreddy SR, H Thippareddi, G Froning and J Subbiah, 2016, "Novel radio frequency-assisted thermal processing improves the gelling properties of standard egg white powder", *Journal of food science*, 81 (3): E665-E671.
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 - 37. Deepa M, P Sudhakar, KV Nagamadhuri, K Balakrishna Reddy, T Giridhara Krishna and TNVKV Prasad, 2015, "First evidence on phloem transport of nanoscale calcium oxide in groundnut using solution culture technique", *Applied Nanoscience*, 5: 545–551.
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 - 40. Divya K, S Rajeswari, I Bhavani Devi and P Sumathi, 2015, "Trends in prices of pulses in selected markets of Andhra Pradesh", *Andhra Pradesh Journal of Agricultural Sciences*, 1 (3): 58-63.
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XI. AWARDS AND HONOURS

Dr. M. Girija Rani, Scientist (G&PB), APRRI & RARS, Maruteru was conferred with ANGRAU-Young Scientist Award, 2012 in the 46th Annual Convocation held at Agricultural College, Bapatla on 9-9-2015. She also received Hon. Lt. P.V. Krishnaiah Choudary Memorial silver medal for best research paper on 16-07-2015.

Dr. V. Satya Priya Lalitha, Principal Scientist (G&PB), ARS, Vuyyuru received 'Best Paper Award' and 'Gold Medal' for the research paper presented during 44th Annual Convention of SISSTA in the 45th Annual Convention of SISSTA held from 24th -25th July, 2015 at Bengaluru, Karnataka.

Dr. Ch. Sreenivas, Senior Scientist (SS&AC), APRRI & RARS, Maruteru received Appreciation Award from the District Collector on 15-08-2015 during Independence Day Celebrations at Eluru.

Sri M. Ratnam, Scientist (Agron.), RARS, Lam received Certification of Appreciation for the meritorious services from the District Collector and Magistrate, Guntur on 15th August, 2015.

Dr. A.V. Ramana, Professor (Agron.), Agricultural College, Naira received Meritorious Service Award from Hon'ble Minister for Sports, Youth affairs and Labour, Govt. of A.P. on the eve of Independence Day, 2015.

Dr. E. Narayana, Associate Director of Research, Regional Agricultural Research Station, Lam, Guntur received Sri Mocherla Dattatreyulu Gold Medal for the Best Scientist / Economist for the year 2012 in the 46th Annual Convocation of ANGRAU on 9-09-2015.

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Dr. Lakshmi Jagarlamudi, Associate Dean, College of Home Science, Guntur was bestowed with State Best Teacher Award by Govt. of Andhra Pradesh on the occasion of Teachers day celebrations held on 5th September, 2015 at Visakhapatnam.

Dr. K. Gurava Reddy, Scientist (Ag. Extn.), RARS, Lam received Meritorious Extension Scientist 2012 award on the occasion of 46th Convocation of ANGRAU on 9th September 2015 at Agricultural College, Bapatla.

Dr. S. Krishnam Raju, Principal Scientist (Pl. Path.), APRRI & RARS, Maruteru received Sri Veerapaneni Narasimham Memorial Gold Medal in the 46th Annual Convocation of ANGRAU on 9-09-2015.

Dr. BNVSR Ravi Kumar, Scientist (G&PB), APRRI & RARS, Maruteru received Meritorious Research Scientist Award for the year 2012 at 46th Annual Convocation held at Agricultural College, Bapatla on 9-9-2015.

Dr. P. Radhika, Senior Scientist (Entomology), ARS, Ananthapuram received Meritorious Research Scientist Award for the year 2012 at 46th Annual Convocation held at Agricultural College, Bapatla on 9-9-2015.

Dr. K.V. Naga Madhuri, Senior Scientist (SS&AC), RARS, Tirupati was conferred with KCP Endowment Prize for Best Scientist in Sugarcane during 46th Annual Convocation of ANGRAU at Bapatla on 9.9.2015.

Dr. R.P. Vasanthi, Principal Scientist (G&PB), RARS, Tirupati received Sri Neelakantapuram Kaverappa Gold Medal on 9th September, 2015 in the 46th Annual Convocation held at Bapatla.

ANGRAU

Dr. G. Ravi Babu, Associate Professor, College of Agricultural Engineering, Bapatla received Meritorious Scientist Award in the faculty of Agricultural Engineering and Technology for the year 2012 during 46th Convocation on 9th September 2015 held at Agricultural College, Bapatla.

Dr. B. Hari Babu, Assistant Professor, College of Agricultural Engineering, Bapatla received Meritorious Teacher Award for the year 2012 in the Faculty of Agricultural Engg. & Technology on 9th September 2015 in the 46th Annual Convocation held at Agricultural College, Bapatla.

Dr. Chavan Syam Raj Naik, Additional Controller of Examinations, Administrative Office, ANGRAU, Rajendranagar, Hyderabad received Meritorious Teacher Award for the year 2012 during 46th Convocation on 9th September 2015 held at Agricultural College, Bapatla.

Dr. N. Trimurtulu, Principal Scientist (Micro Biology), ARS, Amaravathi received M/s. V.R. Durgaamba Charitable Trust Endowment Gold Medal, for outstanding research on organic farming in sugarcane in Andhra Pradesh for the year 2012 during 46th Convocation on 9th September 2015 held at Agricultural College, Bapatla.

Dr. T.S.S.K. Patro, Senior Scientist (Pl. Path.), ARS, Vizianagaram received Sri Mandava Venkata Ramaiah Gold Medal for the Best Scientist for the year 2012 during 46th Convocation on 9th September 2015 held at Agricultural College, Bapatla.

Dr. V. Jayalakshmi, Principal Scientist (G&PB), RARS, Nandyal received Nagaraja

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Rao Gold Medal for Best Research Worker in Pulses in September, 2015.

Dr. M. Hemanth Kumar, Principal Scientist (G&PB), ARS, Perumallapalle received best poster award for "Inhibitor design against MurA, a common bacterial target against different strains of *Xanthomonas oryzae*" in the National Conference on Bioinformatics Panorama in Agriculture and Health (NCBPAH – 2015) held at Allahabad from 5-6th Oct., 2015.

Dr. P. Jamuna, Principal Scientist (SS&AC), RARS, Anakapalle received State Best Citizen Award from A.P. State Cultural Awareness Society, Visakhapatnam on 5.10.2015.

Dr. M. Subba Rao, Principal Scientist (Millets) & Head, ARS, Perumallapalle received Dr. I.V. Subba Rao Rythu Nestham Purshkaram award for the year 2015 on 23.10.2015 in Scientists category.

Dr. Ch. Mukunda Rao, Principal Scientist (Pl. Physiol.), RARS, Anakapalle received Rythuneshtam award on 23.10.2015 at Hyderabad, instituted by "Rythunestham" monthly agriculture magazine.

Dr. P. Jamuna, Principal Scientist (SS&AC), RARS, Anakapalle was conferred with Rythunestham Award-2015 on 23.10.2015 at FAPCCI Bhavan, Hyderabad instituted by Rythunestam magazine.

Dr. E. Narayana, Associate Director of Research, RARS, Lam, ANGRAU was conferred with Padma Sri Dr. I.V. Subbarao Memorial Award 'Rytu Nestham' for the year 2015 for his contribution in the field of Crop Management and Research Administration on 23rd October, 2015.



Dr. N. Chamundeswari, Scientist (G&PB), APRRI & RARS, Maruteru received Best Poster Award during International Rice Symposium held at IIRR, Hyderabad on November, 2015.

AICRP on PHET, Bapatla and Anakapalle were awarded with the "Chaudhary Devi Lal Outstanding All India Coordinated Research Project Award" for the year, 2015 by ICAR.

Ms. T. Rajeswari, & Mr. Ch. Satish kumar, Agricultural College, Bapatla won the individual Women and Men Games Championships in Intramural Sports and Games Meet 2015 - 2016 and also received Cash Prize of Rs. 10,000/- each instituted by Dr, Balineni Venkateswarlu, Professor, Department of Agronomy, Agricultural College, Bapatla for the Cause of Excellency in Sports.

Dr. N. Raj Kumar, Scientist (Pl. Path.), RARS, Anakapalle received Sudarsana Raju Memorial Prize for Best Research Worker of Sugarcane for the year 2015- 16 at RARS, Anakapalle.

Smt. K. Hema, Scientist (SS&AC), Saline Water Scheme, Bapatla was conferred with District Level Best Scientist Award on Independence Day 2015 at Guntur.

Dr. T. Anuradha, Principal Scientist (G&PB), ARS, Machilipatnam received Best Scientist Award of M/s Seedsmen Association in the 40th Annual Group meeting for the year 2015.

Dr. A. Upendra Rao, Principal Scientist (Agron.) & Head, ARS, Ragolu was awarded as Best Scientist by the District Administration of Srikakulam on the occasion of Independence Day of 2015.

Dr. T.S.S.K. Patro, Senior Scientist (Pl. Path.) & Head, ARS, Vizianagaram was

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conferred with M.K. Patel Young Scientist Award-2015 by Indian Phytopathological Society, New Delhi.

Smt. Y Sandhya Rani, Scientist (SS&AC), ARS, Vizianagaram received Young Scientist Award of Society for Scientific Development in Agriculture and Technology.

Dr. K.N. Ravi Kumar, Professor (Econo.), Agricultural College, Mahanandi was conferred with Best Research Worker award in the Dept. of Agril. Economics during 47th Convocation of ANGRAU held at Rajahmundry on 4.1.2016.

Dr. P.V. Ramana Rao, Scientist (G&PB), APRRI & RARS, Maruteru received ANGRAU-Young Scientist Award for the year 2013 in the 47th Annual Convocation at Rajahmundry on 4-1-2016.

Dr. T. Usha Rani, Senior Scientist (SS&AC), APRRI & RARS, Maruteru received Meritorious Best Research Scientist award during 47th Annual Convocation held at Rajahmundry on 4-1-2016.

Dr. T. Sreelatha, Principal Scientist (SS&AC), RARS, Anakapalle received the award of Best Sugarcane Scientist working in ANGRAU for adopting organic farming in sugarcane cultivation in Andhra Pradesh for the year 2013 during 47th Convocation of ANGRAU held on 04.01.2016 at Rajahmundry.

Dr. Ch.S. Rama Lakshmi, Scientist (SS&AC), RARS, Anakapalle received Dr. P. G. Krishna Memorial Gold Medal for best published research articles in Soil Science for the year 2013 during 47th annual convocation of ANGRAU on 04.01.2016 at Rajahmundry.

Dr. M. Charumathi, Senior Scientist (G&PB), RARS, Anakapalle received



Endowment Award of "Sugarcane Growers Association of M/S KCP Sugars Ltd., Vuyyur for the year 2013 for contribution on sugarcane production at 47th Annual Convocation of ANGRAU held on 04.01.2016 at Rajahmundry.

Dr. K. Vijay Krishna Kumar, Senior Scientist (Plant Path.), RARS, Anakapalle was conferred with Veerapaneni Narsimhulu Gold Medal for Best Research in Plant Pathology for the year 2013 at the 47th Annual Convocation of ANGRAU at Rajahmundry on 04.01.2016.

Dr. P. Kishore Varma, Scientist (Pl. Path.), RARS, Anakapalle was bestowed with Meritorious Teacher Award for the year 2013 at the 47th Annual Convocation of ANGRAU held at Rajahmundry on 04.01.2016.

Dr. M. Suresh, Scientist (Pl. Path.), RARS, Anakapalle received Meritorious Research Scientist Award for the year 2013 at the 47th Annual Convocation of ANGRAU held on 04.01.2016 at Rajahmundry.

Dr. K. John, Senior Scientist (G&PB), RARS, Tirupati received the award of Sri A.V. Krishnaiah Memorial Gold Medal in the 47th Annual Convocation held at Rajahmundry on 4-1-2016.

Dr. M. Sreekanth, Scientist (Ento.), RARS, Lam was conferred with Dr. B. Nagaraja Rao Memorial Gold Medal for best research work in pulses for the year 2013 during the 47th convocation held at Rajahmundry on 4.1.2016.

Er. A. Sambaiah, Scientist (SWE-1), Saline Water Scheme, Bapatla was awarded with Meritorious Teacher Award by ANGRAU in the 47th Annual Convocation on 04-01-2016 at Agricultural College, Rajahmundry.

Er. R. Swamy, Assistant Professor (Agril.

Engg.), College of Agricultural Engineering, Sangareddy was awarded with Meritorious Teacher Award by ANGRAU in the 47th Annual Convocation on 04-01-2016 at Agricultural College, Rajahmundry.

Dr. P.V.R.M. Reddy, Scientist (SS&AC), RARS, Tirupati received Meritorious Extension Scientist Award from ANGRAU on the occasion of 47th Annual Convocation held on 4th January, 2016 at Rajahmundry.

Er. P. Sreedevi, Scientist (Agril. Engg.), RARS, Anakapalle received Meritorious Research Scientist Award for the year 2013 during the 47th convocation held at Rajahmundry on 4.1.2016.

Dr. P. Venkataram Muni Reddy, Scientist (Soil Science), RARS, Tirupati received Meritorious Extension Scientist Award for the year 2013 during the 47th convocation held at Rajahmundry on 4.1.2016.

Dr. T. Sreelatha, Principal Scientist (Soil Science), RARS, Anakapalle received M/s. V.R. Durgaamba Charitable Trust Endowment Gold Medal, for outstanding research on organic farming in sugarcane in Andhra Pradesh for the year 2013 during the 47th convocation held at Rajahmundry on 4.1.2016.

Dr. A. Vishnuvardhan Reddy, ADR (HQ), Admn Office, ANGRAU, Rajendranagar, Hyderabad received Sri Neelakantapuram Kaverappa Gold Medal for the best Agricultural Scientist for the year 2013 during the 47th convocation held at Rajahmundry on 4.1.2016.

Dr. T. Venkata Sridhar, Technical Officer, O/o the Dean of Agriculture, Admn. Office, ANGRAU, Rajendranagar, Hyderabad received Sri Mandava Venkata Ramaiah Gold Medal for



the best Researcher for the year 2014 during the 47th convocation held at Rajahmundry on 4.1.2016.

Dr. P. Madhu Vani, Scientist (SS&AC), RARS, Lam received Best Meritorious Worker Award from the District Collector, Guntur on the eve of Republic day celebrations on 26.01.2016.

Dr. T.S.S.K. Patro, Senior Scientist (Pl. Path.) & Head, ARS, Vizianagaram received Innovative Scientist of the Year Award-2015 during International conference on Innovative approaches in applied sciences and technologies held at Faculty of Science Kasetsart University, Bangkok, Thailand in February 1-5, 2016.

Dr. B. Sree Lakshmi, Principal Scientist (Pl. Path.), RARS, Lam received Certificate of Excellence as Reviewer for Indian Journal of Plant Protection during the National Conference on National Priorities on Plant Health Management, 4th - 5th February 2016, organized by the Plant Protection Association of India at Tirupati.

Dr. B.V. Bhaskar Reddy, Senior Scientist (Pl. Path.), RARS, Tirupati got best poster award for poster entitled "Molecular characterization of phytoplasma associated with pulses and weeds in Andhra Pradesh" during Conference on National Priorities in Plant Health Management held on 4th & 5th February, 2016 at RARS, Tirupati.

Dr. B. Sree Lakshmi, Principal Scientist (Pl. Path.), RARS, Lam received Best Poster Award during the 6th International Conference on Plants, Pathogens and People: Challenges in Plant Pathology to Benefit Humankind held from 23rd to 27th February 2016 at New Delhi.

Dr. Bhavani, Senior Scientist (Ento), RARS, Anakapalle received the Sri Malla Jagannadham Memorial prize for the Best sugarcane Scientist in North Coastal Zone during 58th Kisan Mela celebrations at RARS, Anakapalle on 26-2-2016.

Dr. V. Visalakshmi, Senior Scientist (Ento.), ARS, Ragolu was awarded with "Smt. Malla Ammaji Memorial Prize" for Best Women Scientist in North Coastal Zone for significant research contributions in the field of Entomology during 58th Kisan Mela on 26th and 27th February 2016.

Dr. Ch.S. Rama Lakshmi, Scientist (SS&AC), RARS, Anakapalle was conferred with Sri Konathala Ramunaidu Memorial Prize for Best Scientist in North Coastal Zone during 58th Kisan Mela celebrations on 27.02.2016 at RARS, Anakapalle.

Dr. V. Gouri, Scientist (Agron.), RARS, Anakapalle received the Alluri Achayyamma Memorial Prize for Best Women Scientist in North Coastal zone for the year 2014-15 during 58th Kisan Mela celebrations of RARS, Anakapalle on 27.02.2016.

Dr. K.V. Ramana Murthy, Principal Scientist (Agron.), RARS, Anakapalle received Ragulakollu Chinaveeraiah Memorial Prize for Best Scientist in North Coastal Zone (Other than Sugarcane) for the year 2014-15 during 58th Kisan Mela celebrations of RARS, Anakapalle on 27.02.2016.

KVK, Kadapa received Mahindra AGRI TECH SAMMAN AWARD at Hotel Ashoka, New Delhi on 3rd March, 2016 from Shri Radha Mohan Singh, Union Minister for Agriculture, Government of India as it was adjudged as Best KVK in India for their efforts in promoting the entrepreneurship and creating additional employment opportunities. ANGRAU

Dr. T.V. Satyanarayana, Registrar, ANGRAU was conferred with FAO Award on 4th March, 2016 for his excellent contribution in the field of natural resources management, enhancing water availability and land productivity through the use of efficient on-farm irrigation and drainage water management technologies.

Dr. Prabhu Prasadini, Director of International Programmes, ANGRAU was honored with the "Lifetime Achievement Award" of VIWA 2016 for her best contribution in the field of soil science on the eve of International Women's Day on the 8th of March, 2016.

Dr. Jagarlamudi Lakshmi, Associate Dean, College of Home Science, Guntur was conferred with the "Lifetime Achievement Award" of VIWA 2016 for her best contribution in the field of Home Science on the eve of International Women's Day on the 8th of March, 2016.

Dr. D.V. Subba Rao, Professor (Economics) was conferred with the NABARD Chair Professorship in the University and he assumed the chair on 2nd April, 2016.

Dr. T. Neeraja, Dean of Home Science, ANGRAU, Guntur was conferred with "Best Paper" Award for the paper entitled "Musculoskeletal disorders among unskilled women workers in construction work" presented in PCS Health Care Congress held at Budapest, Hungary on 16th and 17th April 2016.

Dr. P.V. Satyanarayana, Director & ADR, APRRI & RARS, Maruteru was conferred with Ugadi Puraskaram for the year 2016 on the eve of Ugadi at Vijayawada.

Dr. T. Pratima, Senior Scientist (Agromet), RARS, Tirupati received State Level Best Scientist Award from Chief Minister Sri N.

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Chandra Babu Naidu on the eve of Ugadi Puraskaarams, 2016.

Dr. T.S.S.K. Patro, Senior Scientist (Pl. Path.) & Head, ARS, Vizianagaram received Outstanding Scientist Award-2016 in IJTA 3rd International Conference on Agriculture, Horticulture & Plant Sciences, New Delhi, India.

Dr. R. Ankaiah, Associate Dean, Agricultural College, Naira received Ugadi Puraskar from the Hon'ble Chief Minister Sri Nara Chandrababu Naidu, Govt. of Andhra Pradesh on the eve of Ugadi Festival.

Dr. R. Ankaiah, Associate Dean, Agricultural College, Naira received State Level Best Scientist Award from the Hon'ble Vice Chancellor, ANGRAU.

Dr. R. Ankaiah, Associate Dean, Agricultural College, Naira received Life-time Achievement Award from the Chairman of Venus International Foundation, Chennai, Tamil Nadu.

Dr. M. Sudha Rani, Associate Professor (G&PB), Agricultural College, Mahanandi was awarded with Sri Vaddadi Narasimha Swamy Memorial Gold Medal in 46th Convocation of ANGRAU at Bapatla.

Dr. T. Madhumathi, Professor (Ento.), Agricultural College, Bapatla was awarded with Meritorious Teacher Award of the ANGRAU for the year 2013.

Dr. K. Hariprasad Reddy, Professor (G&PB), SV Agricultural College, Tirupati was conferred with the State level Best Teacher Award.

Dr. R. Saradajayalakshmi Devi, Professor (Pl. Path.), SV Agricultural College, Tirupati received the State Level Best Teacher Award.

Dr. G. Mohan Naidu, Associate Professor



(Stats & Maths), SV Agricultural College, Tirupati received the Meritorious Teacher Award.

Dr. D. Subramanyam, Associate Professor (Agron.), SV Agricultural College, Tirupati was conferred with the Meritorious Teacher Award.

Dr. P.V. Satya Gopal, Associate Professor (Ag. Extn.), SV Agricultural College, Tirupati received the Meritorious Teacher Award.

Dr. G. Fareeda, Assistant Professor (SS&AC), SV Agricultural College, Tirupati received Young Faculty Award.

Sri M. Ratnam, Scientist (Agron.), RARS, Lam received Certification of appreciation from Deputy Director General of Meteorology, (Agril Meteorology Division), IMD, Pune for dissipation of agro advisories to the farming community regularly through the <u>www.farmer</u> portal launched

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by Ministry of Agriculture, Gov. of India.

Dr. TNVKV Prasad, Senior Scientist (SS&AC), RARS, Tirupati received Dr. A.V. Krishnaiah Memorial Gold medal Award for the Best Agricultural Researcher for the year 2013.

Dr. V. Jayalakshmi, Principal Scientist (G&PB), RARS, Nandyal was conferred with UGC Research award.

Sri R. Krishna Naik, Scientist (G&PB), ARS, Nellore received appreciation Certificate from the District Collector and Magistrate during the 67th Republic day Celebrations at District level.

Dr NV Naidu, Director of Research and Dr.SJ Reddy, PS (Ag.Engg) receiving the National level **Mahindra Samriddi Award-2016** for developing matching implements to small tractor





ANNEXURE I MEMBERS OF THE ACADEMIC COUNCIL

OTHER UNIVERSITIES

Vice-Chancellor Andhra University, Waltair Visakhapatnam District

Vice-Chancellor

Osmania University Hyderabad

Vice-Chancellor

Sri Venkateswara University Tirupati, A.P.

LINE DEPARTMENTS Commissioner & Director of Agriculture

Government of Andhra Pradesh Fatehmaidan, Hyderabad

Sri Harish Java

Chief General Manager NABARD Hyderabad

Sri Balaji Manjule, IAS

Deputy Secretary to Govt. Agriculture & Cooperation Dept. A.P. Secretariat, Hyderabad

UNIVERSITY OFFICERS Dr A Padma Raju Vice-Chancellor

Dr T V Satyanarayana Dean of Agricultural Engineering & Technology and Registrar i/c

Dr T Ramesh Babu Dean of Postgraduate Studies & Dean of Agriculture i/c **Dr K Raja Reddy** Director of Research & Director of Extension i/c

Dr. R. Veeraraghavaiah

Director (Planning and Monitoring), Dean of Home Science i/c and Dean of Student Affairs i/c

NOMINATED MEMBERS

Dr A Siva Sankar Controller of Examinations ANGRAU Rajendranagar Hyderabad

Dr N Venugopal Rao

Associate Director of Research Regional Agricultural Research Station Anakapalle

Sri K Lakshmipathi Raju

Joint Registrar, Comptroller i/c and University Librarian i/c ANGRAU Rajendranagar Hyderabad

Dr G Sunil Kumar Babu

Coordinator (Polytechnics) and Director (IP) i/c ANGRAU Rajendranagar Hyderabad

BOARD MEMBERS

Dr E A Siddiq National Professor Directorate of Rice Research Rajendranagar, Hyderabad

CO-OPTED MEMBERS

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ANGRAU

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Dr MS Prasad Babu

Professor, Computer Science Andhra University Visakhapatnam

Dr I Muthuchamy

Professor & Head Agricultural Engineering College and Research Institute Dept. of Soil Water Conservation Engineering Tamil Nadu Agricultural University Coimbatore – 641 003

Dr M Sugunakar Reddy

Former Dean of Agriculture, ANGRAU 1-07-145/16, Srinivasanagar Zamistanapur, Hyderabad – 500 048

Dr P Raghavulu

Former Dean of Agriculture, ANGRAU 3-14-13/1/3, Srinivasapuram Ramanthapuram Hyderabad – 500 013

Dr G V Ranga Rao

Special Project Scientist (IPM) GT, Agroecosystems ICRISAT Patancheru Hyderabad – 502 324

DrAnand Kumar

Director Institute of Biotechnology Rajendranagar, Hyderabad – 500 030

Dr N S Shivalinge Gowda

Professor of Extension College of Agriculture University of Agricultural Sciences GKVK Campus, Bangalore – 65

Dr G Lakhsmi Kantha Reddy

Former Director of Research, ANGRAU H.No.120-B, Ground Floor S.R. Nagar, Hyderabad

Prof (Mrs) Vijaya Khader

Former Dean of Home Science, ANGRAU G-2, Navatha Complex Gautham Nagar, Street No.3 Near Electrical Substation Malkajigiri, Hyderabad – 500 047

ASSOCIATE DEANS

Dr P R K Prasad

Associate Dean Agricultural College Bapatla – 522 101 Guntur Dist.

Dr N P Eswar Reddy

Associate Dean and Univ. Head Dept. of Agril. Biotechnology S V Agricultural College Tirupati – 517 502 Chittoor Dist.

Dr R Ankaiah

Associate Dean & Univ. Head Dept. of Crop Physiology Agricultural College, Naira Srikakulam District

Dr B Ravindranatha Reddy

Associate Dean Agricultural College Mahanandi – 518 502 Kurnool Dist.

Dr K V Seetharamaiah

Associate Dean Agricultural College SKVT Degree College Campus Near 'Y' Junction Rajahmundry – 533 101 East Godavari Dist



Dr M Raghu Babu

Associate Dean College of Agricultural Engineering Bapatla – 522 101 Guntur Dist.

Dr M V Ramana

Associate Dean College of Agricultural Engineering Madakasira – 515 301 Ananthapuram Dist.

Dr B V S Prasad

Associate Dean College of Food Science & Technology Bapatla– 522 101 Guntur Dist.

Dr G John Wesley

Associate Dean & Univ. Head Dept. of Agro energy in Agril. Engineering College of Food Science & Technology Pulivendula–516 390 YSR(Kadapa) Dist.

Dr J Lakshmi

Associate Dean College of Home Science Door No: 238, Chinmaya Balanivas S.V.N. Colony, Guntur – 522 006

UNIV. HEADS & OTHERS

Faculty of Agriculture

Dr P Rambabu

Professor (CAS) & Univ. Head Dept. of Agril. Extension Agricultural College, Bapatla-522 101

Dr V Srinivasa Rao

Professor (CAS) & Univ. Head Dept. of Statistics and Mathematics Agricultural College, Bapatla-522 101

Dr J Krishna Prasadji

Professor & Head, Dept. of Plant Pathology, Agricultural College, Bapatla-522 101

Dr Y Ashoka Rani

Professor and Head Dept. of Crop Physiology Agricultural College, Bapatla-522 101

Dr V Radha Krishna Murthy

Professor (CAS) & Head Dept. of Agronomy Agricultural College, Bapatla- 522 101

Dr P V Krishnaiah

Professor & Univ. Head Dept. of Entomology Agricultural College, Bapatla-522 101

Dr P Ratna Prasad

Professor (CAS) and Head Dept. of Soil Science and Agril. Chemistry Agricultural College, Bapatla

Dr D V Subba Rao

Professor & Head, Dept. of Economics Agricultural College, Bapatla

Dr V Satyanarayana Rao

Professor & Head Dept. of Genetics & Plant Breeding Agricultural College, Bapatla

Dr K L Narasimha Rao

Professor and Officer in-charge Advanced PG Centre, Lam, Guntur

Dr S R Koteswara Rao

Professor (CAS) & Head Dept. of Entomology S.V. Agril. College, Tirupati-517 502

Dr V Raja Rajeswari Professor (CAS) & Head

Dept. of Crop Physiology S.V. Agril. College, Tirupati-517 502

Dr D Balaguruvaiah

Professor (CAS) & Univ. Head Dept. of Soil Science & Agril. Chemistry S.V. Agril. College, Tirupati – 517 502

Dr. N V Naidu

ANGRAU

Professor (CAS) & Univ. Head Dept. of Genetics & Plant Breeding S.V. Agril. College, Tirupati – 517 502

Dr R Sarada Jayalakshmi Devi

Professor & Head Dept. of Plant Pathology S.V. Agril. College, Tirupati

Dr S V Prasad

Professor (CAS) & Head Dept. of Extension Education S.V. Agril. College, Tirupati-517 502

DrAnil Kumar

Professor (Direct) Dept. of Plant Pathology S.V. Agril. College, Tirupati-517 502

Dr G Prabhakar Reddy

Professor (CAS) and Head Dept. of Agronomy S.V. Agril. College, Tirupati-517 502

Dr I Bhavani Devi

Professor (CAS) & Head Dept. of MABM Programme S.V. Agril. College, Tirupati-517 502

Dr D Vishnu Shankar Rao

Professor & Univ. Head Dept. of Agricultural Economics S.V. Agril. College, Tirupati-517 502

Dr Ch Ramesh Babu

Professor (CAS) & Head Dept of Agril. Extension Agricultural College, Rajahmundry-533 103

Dr D Srinivas

Professor (CAS) & Head Dept. of Soil Science & Agril. Chemistry Agricultural College, Rajahmundry-533 103

Dr P Samba Siva Rao

Professor & Head Dept. of Crop Physiology Agricultural College, Rajahmundry

Dr K Madhavi

Professor (CAS) & Head Dept. of Agronomy, Agricultural College, Rajahmundry-533 103

Dr G V Nageswara Rao

Professor (CAS) & Head Dept. of Plant Pathology Agricultural College, Rajahmundry-533 103

Dr S Dayakar

Professor & Head Dept. of Entomology Agricultural College, Rajahmundry

Dr B Gopal Reddy

Principal Scientist & Univ. Head Dept. of Agronomy ANGRAU, Administrative Office, Rajendranagar

Dr B Govinda Rao

Principal Scientist & Univ. Head Dept. of Genetics & Plant Breeding Regional Agricultural Research Station Lam Farm, Guntur

Dr C P Dorai Rajan

Principal Scientist & Univ. Head Dept. of Plant Pathology Agricultural Research Station Nellore

Dr K N Ravi Kumar

Professor (CAS) & Head Dept. of Agril. Economics Agricultural College, Mahanandi Kurnool Dist.

Dr A Pratap Reddy

Professor & Univ. Head Dept. of Physical Education Agricultural College, Mahanandi Kurnool Dist.

Dr A V Ramana

Professor & Head Dept. of Agronomy Agricultural College, Naira Srikakulam Dist.

Faculty of Home Science

Dr T Neeraja

Professor & Head Dept. of RMCS, College of Home Science Door No: 238, Chinmaya Balanivas S.V.N. Colony, Guntur – 522 006

Dr L Uma Devi

Professor (CAS) & Head Dept. of Human Development and Family Studies College of Home Science Door No: 238, Chinmaya Balanivas S.V.N. Colony, Guntur – 522 006

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Faculty of Agricultural Engineering and Technology

Dr Sivala Kumar

Professor & Univ. Head Dept. of Agril. Process & Food Engg. College of Agril. Engineering, Bapatla

Dr Ch V V Satyanarayana

Professor College of Food Science & Technology Bapatla

Dr S Kaleemulla

Professor (CAS) & Head Dept. of Agricultural Engineering S.V. Agril. College, Tirupati-517 502

Dr C Ramana

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Principal Scientist & Univ. Head Dept. of Farm Machinery & Power Regional Agricultural Research Station, Tirupati



MEMBERS OF THE 96th and 97th ACADEMIC COUNCIL

OTHER UNIVERSITIES

Vice-Chancellor Andhra University Waltair Visakhapatnam District

Vice-Chancellor Osmania University Hyderabad

Vice-Chancellor Sri Venkateswara University Tirupati – 517 502

LINE DEPARTMENTS

Commissioner & Director of Agriculture Government of Andhra Pradesh

Fatehmaidan Hyderabad – 500 001

UNIVERSITY OFFICERS

Dr A Padma Raju Vice-Chancellor (from 01.06.2015 to 13.02.2016)

and

Sri T Vijay Kumar, IAS Vice-Chancellor i/c (from 14.02.2016 to 31.05.2016)

Dr T Ramesh Babu Dean of Agriculture

Dr D Bhaskar Rao Dean of Agricultural Engineering & Technology and Dean of Student Affairs i/c

Dr N V Naidu Director of Research **Dr R Veera Raghavaiah** Dean of Post Graduate Studies

Dr (Mrs.) T Neeraja Dean of Home Science

Dr K Raja Reddy Director of Extension

Dr T V Satyanarayana Registrar

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Dr A Siva Sankar Controller of Examinations ANGRAU

Dr N V Venugopal Rao

Assoc. Dir. of Research Regional Agricultural Research Station Anakapalle Visakhapatnam District

Dr R Sarada Jayalakshmi Devi University Librarian ANGRAU

Dr G Sunil Kumar Babu Coordinator (Polytechnics) ANGRAU

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Dr D Rama Rao

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Director National Academy of Agril. Research & Management (NAARM) Rajendranagar Hyderabad – 500 030

Dr V Damodar Naidu Professor (Retd.), Acharya N.G. Rang Agril. University H.No.27/1/1270, Puttaveedhi Nellore – 524 002



CO-OPTED MEMBERS

Sri Kantilal Dande, IAS

Collector & District Magistrate Guntur, Andhra Pradesh

Sri Harish Java

Chief General Manager Region Office NABARD, RTC x Road Musheerabad Hyderabad – 500 020

Dr M Maheswaran

Director of Research Tamilnadu Agricultural University Coimbatore

ASSOCIATE DEANS

Dr P R K Prasad

Associate Dean Agricultural College Bapatla – 522 101 Guntur Dist.

Dr V Raja Rajeswari

Associate Dean i/c S V Agricultural College Tirupati – 517 502 Chittoor Dist.

Dr R Ankaiah

Associate Dean & Univ. Head Dept. of Crop Physiology Agricultural College, Naira Srikakulam District

Dr P Jayarami Reddy

Associate Dean Agricultural College SKVT Degree College Campus Near 'Y' Junction Rajamahendravaram – 533 103 East Godavari Dist.

Dr B Ravindranatha Reddy

Associate Dean Agricultural College Mahanandi – 518 502 Kurnool Dist.

Dr M Raghu Babu

Associate Dean College of Agricultural Engineering Bapatla – 522 101 Guntur Dist.

Dr M V Ramana

Associate Dean & Univ. Head Dept. of Farm Machinery & Power College of Agricultural Engineering Madakasira – 515 301 Ananthapuram Dist.

Dr B V S Prasad

Associate Dean & Univ. Head Dept. of Food Science & Technology College of Food Science & Technology Bapatla– 522 101 Guntur Dist.

Dr S Kaleemullah

Associate Dean College of Food Science & Technology Pulivendula– 516 390 Kadapa Dist.

Dr J Lakshmi

Associate Dean College of Home Science Door No: 238, Chinmaya Balanivas S.V.N. Colony, Guntur – 522 006

UNIV. HEADS & OTHERS

Faculty of Agriculture

Dr P Rambabu Professor (CAS) & Univ. Head Dept. of Agril. Extension Agricultural College, Bapatla-522 101

Dr V Srinivasa Rao

ANGRAU

Professor (CAS) & Univ. Head Dept. of Statistics Agricultural College, Bapatla-522 101

Dr PAnil Kumar

Professor (CAS) & Head Dept. of Plant Pathology Agricultural College Bapatla – 522 101

Dr Y Ashoka Rani

Professor & Head Dept. of Crop Physiology Agricultural College, Bapatla

Dr V Radha Krishna Murthy

Prof. (CAS) & Head Dept. of Agronomy Agril. College, Bapatla – 522 101

Dr P V Krishnaiah Professor (CAS) & Univ. Head Dept. of Entomology Agricultural College, Bapatla-522 101

Dr D V Subba Rao

Professor & Head Dept. of Agril. Economics Agricultural College, Bapatla – 522 101

Dr B Govind Rao

Professor & Univ. Head Dept. of Genetics & Plant Breeding Agricultural College, Bapatla

Dr P V Rama Kumar

Professor (CAS) & Head Dept. of Genetic & Plant Breeding Agricultural College Bapatla – 522 101

Dr P Ravindra Babu

Professor (CAS) & Head Dept. of Soil Science & Agril. Chemistry Agricultural College Bapatla – 522 101

Dr K L Narasimha Rao

Special Officer Advanced PG Centre Regional Agricultural Research Station Lam Farm, Guntur

Dr S R Koteswara Rao

Professor (CAS) & Head Dept. of Entomology S.V. Agril. College, Tirupati-517 502

Dr S Kaleemulla

Professor (CAS) & Head Dept. of Crop Physiology S.V. Agril. College, Tirupati-517 502

Dr B Padmodaya

Professor (CAS) & Head Dept. of Plant Pathology S V Agricultural College Tirupati – 517 502

Dr V Munaswamy

Professor (CAS) & Head Dept. of Soil Science & Agril. Chemistry S V Agricultural College Tirupati – 517 502

Dr K Hari Prasad Reddy

Professor (CAS) & Univ. Head Dept. of Genetics & Plant Breeding S.V. Agricultural College, Tirupati – 517 502

Dr S V Prasad

Professor (CAS) & Head Dept. of Extension Education S.V. Agril. College, Tirupati-517 502

Dr A Pratap Kumar Reddy

Professor (CAS) & Head Dept. of Agronomy S.V. Agricultural College, Tirupati – 517 502

Dr I Bhavani Devi

Professor (CAS) & Special Officer Institute of Agribusiness Management S.V. Agril. College, Tirupati-517 502



Smt. V Srilatha

Assistant Professor & Univ. Head Dept. of Horticulture S.V. Agril. College, Tirupati-517 502

Dr K V Seetharamaiah

Professor (CAS) & Head Dept. of Genetics & Plant Breeding Agricultural College Rajamahendravaram – 533 103

Dr Ch Ramesh Babu

Professor (CAS) & Head Dept. of Agricultural Extension Agricultural College Rajamahendravaram – 533 103

Dr D Srinivas

Professor (CAS) & Head Dept. of Soil Science & Agril. Chemistry Agricultural College, Rajamahendravaram-533 103

Dr K Madhavi

Professor (CAS) & Head Dept. of Agronomy, Agricultural College, Rajamahendravaram-533 103

Dr P Samba Siva Rao

Professor (CAS) & Head Dept. of Crop Physiology Agricultural College Rajamahendravaram – 533 103

Dr G V Nageswara Rao

Professor (CAS) & Head Dept. of Plant Pathology Agricultural College, Rajamahendravaram - 533 103

Dr R Sekhar Babu

Professor (CAS) & Head Dept. of Agricultural Economics Agricultural College Rajamahendravaram – 533 103

Dr S Dayakar

Professor (CAS) & Head Dept. of Entomology Agricultural College, Rajamahendravaram – 533 103

Dr K N Ravi Kumar

Professor (CAS) & Head Dept. of Agril. Economics Agricultural College, Mahanandi Kurnool District

Dr A Pratap Reddy

Professor & Univ. Head Dept. of Physical Education Agricultural College, Mahanandi Kurnool District

Dr A V Ramana

Professor & Head Dept. of Agronomy Agricultural College, Naira

Dr G John Wesley

Principal Scientist (CAS) & Univ. Head Dept. of Agro energy in Agril. Engineering, Post-Harvest Technology Centre, Bapatla

Dr B Gopal Reddy

Associate Director of Research & Univ. Head Dept. of Agronomy Regional Agricultural Research Station, Nandyal Kurnool District

Dr N P Eswar Reddy

Principal Scientist & Univ. Head Dept. of Agricultural Biotechnology Agricultural Research Station, Nellore

Dr C P Dorai Rajan

ix

Principal Scientist (CAS) & Univ. Head Dept. of Plant Pathology Agricultural Research Station Nellore

ANGRAU

Dr D Vishnu Shankar Rao

Professor (CAS) & Univ. Head Dept. of Agricultural Economics, CCS, Admn. Camp Office, ANGRAU, Sri Vijaya Durga Towers, M G Inner Ring Road, Guntur – 522 509

Dr Ms. G V Lakshmi

Professor (Soil Science & Agril. Chemistry) Advanced P. G. Centre Lam, Guntur

Faculty of Agricultural Engineering and Technology

Dr Sivala Kumar

Professor & Univ. Head Dept. of Agril. Process & Food Engg. College of Agril. Engineering, Bapatla-522 101

Dr (Mrs.) A. Mani

Professor (CAS) & Head Dept. of Soil and Water Engineering College of Agricultural Engineering Bapatla – 522 101

Dr Ch V V Satyanarayana

Professor (CAS) & Univ. Head Dept. of Food Engineering & Food and Industrial Microbiology College of Food Science & Technology Bapatla-522 101



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Sri N Chandrababu, Progressive Agriculturist Guntur Dist.

Sri C Reddappa Reddy, Progressive Agriculturist Chittoor district

Sri K Nagabhushanam, Progressive Agriculturist Gannavaram, Krishna Dist.

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Dr K Raja Reddy Director of Extension

Associate Directors of Research

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Dr P V Satyanarayana Godavari Zone

Dr E Narayana Krishna Zone **Dr T Giridhar Krishna** Southern Zone

Dr Y Padmalatha Scarce Rainfall Zone

Dr N Venugopala Rao High Altitude and Tribal Area Zone

Progressive Farmers

Sri S Rama Mutyalu

Kusuki (Village) Seethampeta (Mandal) Srikakulam (Dt)

Sri GAV Ramaraju

Farmer, REAC Member, Tettangi Gurla (Mandal) Vijianagaram (Dt)

Sri Ch V V S V Prasad

Farmer, REAC Member Velangi, Karpa (Mandal) East Godavari (Dt)

Sri K Siva Ramakrishna

Obannapallem (Village) Naguluppalapadu (Mandal) Prakasam Dt.

Agro Business Consortium

Sri K Narasimha Reddy, Farmer REAC Member, Giddangivaripalle Vempalli (Mandal), Kadapa (Dt)

Sri U Shankar Rao Farmer, REAC Member Cherukupakalu, Chintapalle (Mandal) Vishakapatnam (Dt)

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Woman Farmer

ANGRAU

Smt Ch Satyavathi

Farmer, REAC Member W/o Ch Venkateswara Rao Achanta West Godavari (Dt)

Special Invitees

Sri LAN Murthy,

Farmer, Vasadi Village Gantyada (Mandal) Vizianagaram (Dt)

Sri Ch Seetha Reddy

Farmer, REAC Member Badrirajupalyam, Krishna (Dt)

Sri U Prasad

Farmer, REAC Member Ghantasalapalem, Krishna (Dt)

Sri Ch Ramakrishna Prasad

Farmer, REAC Member Kaptanupalem Challapalli, Krishna (Dt)

Sri Nalluri Rambabu

Unguturu (Village) Amaravathi (Mandal), Guntur (Dt)

Sri K N Chary

Farmer, Mumparru Yelamanchali (Mandal) West Godavari (Dt)

Sri B Lakshmi Narayana

Farmer, REAC Member Thimittapadu Karamchedu (Mandal) Prakasam (Dt)

Sri D Madhusudhana Rao

Farmer, REAC Member Sri Gowripuram, Vidavalur (Mandal) Nellore (Dt)

Sri K Madhava Reddy

Farmer, REAC Member Ulvakattamanchi (Village) KG Satram (Post) Bangarupalyam (Mandal) Chittoor (Dt)

Sri N Narasimha Reddy

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Farmer, REAC Member Nadimandalam, Kadapa (Dt)


ANNEXURE III CADRE-WISE FACULTY STRENGTH DURING 2015-16

S. No.	Name of the College / Research Station / Extension Unit	Prof Prir Scie	èessor / ncipal entist	Asso Profe Ser Scie	ciate essor / nior ntist	Assi Prof Scie	stant essor/ entist
		S	I.P.	S	I.P.	S	I.P.
1	2	3	4	5	6	7	8
TEA	ACHING						
1.	Agricultural College, Bapatla	7	2	8	4	67	34
2.	S.V. Agricultural College, Tirupati	5	4	10	10	52	37
3.	Agricultural College, Naira	1	1	11	5	21	12
4.	Agricultural College, Mahanandi	-	-	8	7	15	13
5.	Agricultural College, Rajahmundry	2	-	11	7	22	15
6.	College of Agricultural Engineering, Bapatla	1	1	6	4	15	10
7.	College of Agricultural Engineering, Madakasira	6	1	8	-	17	10
8.	College of Food Science & Technology, Bapatla	1	-	5	2	9	7
9.	College of Food Science & Technology, Pulivendula	5	1	13	-	18	6
10.	College of Home Science, Guntur	-	1	-	-	10	6
11.	Agriculture Polytechnic, Anakapalle	-	-	-	-	-	-
12.	Agriculture Polytechnic, Maruteru	-	-	1	-	2	-
13.	Agriculture Polytechnic, Podalakur	-	-	1	1	-	-
14.	Agriculture Polytechnic, Reddipalli	-	-	1	1	2	0
15.	Agriculture Polytechnic, Utukur	-	-	1	-	2	1
16.	Agriculture Polytechnic, Garikapadu	-	1	-	-	-	3
17.	Agriculture Polytechnic, Madakasira	-	1	1	-	5	1
18.	Agriculture Polytechnic, Chintapalle	-	-	-	-	-	-
19.	Agriculture Polytechnic, Nandyal	-	-	-	-	-	-
20.	Agriculture Polytechnic, Tirupati	-	-	-	-	-	-
21.	Agriculture Polytechnic, Kalikiri	-	-	1	-	4	2
22.	Agriculture Polytechnic, Somasila	-	-	-	-	-	-



S. No.	Name of the College / Research Station / Extension Unit	Prof Prin Scie	èessor / ncipal entist	Asso Profe Ser Scie	ciate essor / nior ntist	Assi Prof Scie	stant essor/ entist
		S	I.P.	S	I.P.	S	I.P.
1	2	3	4	5	6	7	8
23.	Agricultural Polytechnic, Rampachodavaram	-	-	-	-	-	-
24.	Agricultural Polytechnic(Seed Technology) & Agricultural Polytechnic, Jangamaheshwarapuram	-	-	1	0	2	1
25.	Polytechnic of Agricultural Engineering, Kalikiri, Chittoor district	-	-	-	-	-	1
26.	Polytechnic of Agricultural Engineering, Anakapalle, Visakhapatnam	-	-	-	-	-	-
	Sub Total (Teaching)	28	13	87	41	263	159
RES	SEARCH						
	I. KRISHNA ZONE						
	Guntur District						
1	Regional Agricultural Research Station, Lam	3	3	13	10	33	31
2	Agricultural College Campus, Bapatla						
a.	Rice Research Unit, Bapatla	-	2	-	-	5	1
b.	Post Harvest Technology, Bapatla	-	-	1	1	4	3
c.	Saline Water Research Scheme, Bapatla	1	1	1	1	4	3
e.	AICRP on Sorghum	1	1	-	-	1	1
f.	AICRP on FIM	-	-	1	-	-	1
3	Agricultural Research Station, Amaravati	1	1	-	-	2	2
4	Agricultural Research Station, Jangamaheswarapuram	-	-	-	-	3	2
Kris	shna District						
5	Agricultural Research Station, Vuyyuru	-	3	1	1	6	2
6	Agricultural Research Station, Machilipatnam	1 -	-	-	-	3	1
7	Agricultural Research Station, Garikapadu	-	-	2	-	2	1
8	Agricultural Research Station, Ghantasala	-	1	1	1	3	-

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S. No.	Name of the College / Research Station / Extension Unit	Prof Prir Scie	'essor / ncipal entist	Asso Profe Sei Scie	ociate essor / nior entist	Assi Prof Scie	stant essor/ entist
		S	I.P.	S	I.P.	S	I.P.
1	2	3	4	5	6	7	8
Pral	kasam District						
9	Agricultural Research Station, Darsi	-	-	1	-	4	2
II. G	ODAVARI ZONE						
	West Godavari District						
10	Regional Agricultural Research Station, Maruteru	2	2	8	7	22	10
11	Agricultural Research Station, Vijayarai	-	-	1	1	-	-
	East Godavari						
12	Agricultural Research Station, Peddapuram	-	1	-	-	3	1
III.	NORTH COASTAL ZONE						
	Visakhapatnam District						
13	Regional Agricultural Research Station, Anakapalle	2	2	11	10	23	18
14	Agricultural Research Station, Yelamanchili	-	-	-	-	4	2
	Srikakulam District						
15	Agricultural Research Station, Amadalavalasa	-	-	1	1	4	4
16	Agricultural Research Station, Ragolu Srikakulam District	-	1	3	2	4	1
17	Agricultural Research Station, Vizianagaram	-	-	1	1	5	3
IV.	SOUTHERN ZONE						
	Chittoor District						
18	Regional Agricultural Research Station, Tirupati	2	2	10	8	16	12
19	Agricultural Research Station, Perumallapalle	2	2	1	1	4	4
	SPS Nellore District						
20	Agricultural Research Station, Nellore	1	1	3	3	6	6
21	Agricultural Research Station, Podalakur	-	-	1	1	5	2
22	Agricultural Research Station, Kavali	1	1	-	-	-	-
	YSR (Kadapa) District						
23	Agricultural Research Station, Utukur	-	-	1	1	5	5

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S. No.	Name of the College / Research Station / Extension Unit	Prof Prin Scie	fessor / ncipal entist	Asso Profe Ser Scie	ciate essor / nior ntist	Assi Prof Scie	stant essor/ entist
1		S	I.P.	S E	I.P.	S	I.P.
l V	2 SCARCE RAINEALL ZONE	3	4	5	0	1	8
V•	Kurnool District						
39	Regional Agricultural Research Station, Nandyal, Kurnool District	2	2	10	10	23	15
40	Agricultural Research Station, Anantapuramu	2	2	5	5	10	б
41	Agricultural Research Station, Reddipalli	-	-	1	-	-	-
42	Agricultural Research Station, Kadiri	1	1	4	4	4	1
VI.	HIGH ALTITUDE AND TRIBAL AREA	ZON	£				
	Visakapatnam District						
43	Regional Agricultural Research Station, Chintapalle, Visakhapatnam District	1	1	1	-	8	2
44	Agricultural Research Station, Seethampet Sub Total (Research)	- 22	- 30	2 85	1 70	2 218	1 143
Vmi	vhi Vigyon Kondrog (VVKg)						
	sni vigyan Kendras (K v Ks)	1	1			6	2
1	KVK, Reddipalli, Anantapuram Dist.	I	I	-	-	6	3
2	KVK, Kastakuntabai, Vizianagaram Dist.	-	-	1	1	0	2
3	KVK, Amadalavalasa, Shkakulam Dist.	-	-	1	1	0	<u>э</u>
4	KVK, Utukur, TSK (Kadapa) Dist.	-	-	1	1	0	2
5	KVK Darsi Prakasam Dist	-	1	1	-	6	2
7	KVK Nellore SPS Nellore Dist	- 1	- 1	-	-	6	0
8	Dr K L Rao KVK Garikapadu Krishna D	ist 1	1	_	_	6	6
9	KVK, Kalvandurg, Ananthapuram Dist.	1	1	_	_	1	1
10	KVK, Banavasi, Yammiganur, Kurnool Dist	_	1	1	-	6	1
11	KVK, Kalikiri, Chittoor Dist.	-	-	1	-	6	2
12	KVK, Ghantasala, Krishna Dist.	-	1	1	1	6	3
Dist	rict Agricultural Advisory & Transfer of T	[echno	logy Cer	ntres (D	AATT	Cs)	
13	DAATTC, Guntur District	_		_	_	4	4
14	DAATTC, Machilipatnam, Krishna District.	-	-	-	-	3	3

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S. No.	Name of the College / Research Station / Extension Unit	Prof Prir Scie	essor / ncipal entist	Asso Profe Sen Scier	ciate essor / iior ntist	Assi Profe Scie	stant essor/ ntist
		S	I.P.	S	I.P.	S	I.P.
1	2	5	4	5	0	7	δ
15	DAATTC, Eluru, West Godavari District.	-	-	-	-	3	1
16	DAATTC, Kakinada, East Godavari Distric	t -	-	-	1	3	1
17	DAATTC, Ongole, Prakasam District	1	1	-	-	3	2
18	DAATTC, Anakapalle, Visakhapatnam						
	District.	-	1	-	-	3	1
19	DAATTC, Vizianagaram District.	-	-	-	-	3	2
20	DAATTC, Srikakulam District	-	-	-	-	3	3
21	DAATTC, SPS Nellore District.	-	-	-	-	3	2
22	DAATTC, YSR (Kadapa) District.	-	-	-	-	3	2
23	DAATTC, Kurnool District.	-	-	-	-	3	2
24	DAATTC, Anantapuram District.	-	1	1	-	3	1
25	DAATTC, Chittoor District	-	-	1	1	3	1
Oth	ner Extension Centres						
45	Farmers Call Centre	-	2	-	-	4	-
	Sub Total (Extension):	5	12	10	7	111	53
	Administrative Office	5	8	3	4	6	6
	Grand Total	60	63	185	122	598	361



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STUDENTS' ENROLMENT BY COURSES, FIRST YEAR TO FINAL YEAR IN UNDERGRADUATE, POSTGRADUATE, DOCTORAL AND DIPLOMA PROGRAMMES DURING 2015-16

								Enrolr	ment Dis	stributid	u					
		H	otal Stu	dent									Physic	ally	oreign	-
Course	Year		Enrolm	ent	SC Stu	dents	ST Stu	dents	BC St	idents	OC Sti	adents	Challer Studen	nged S ts	ituden	ts
		Boys	Girls	Total	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys (Girls I	3 oys	Girls
1	7	3	4	S	9	7	8	6	10	11	12	13	14	15	9	17
Faculty of Agricul	ture															
UG Programmes																
B.Sc. (Ag.)	IYear	268	314	582	37	48	26	6	114	141	86	111	S	S	0	0
	II Year	220	340	560	27	62	12	13	115	150	63	106	ŝ	6	0	0
	III Year	240	309	549	34	47	16	10	116	147	70	66	4	9	0	0
	IV Year	217	273	490	30	45	16	6	113	111	55	104	С	4	0	0
	Total	945	1236	2181	128	202	70	41	458	549	274	420	15	24	0	0
Sub Total (UG)		945	1236	2181	128	202	70	41	458	549	274	420	15	24	0	0
PG Programmes																
M.Sc. (Ag.)	I Year	49	72	121	9	12	6	0	20	22	14	37	0	1	0	0
	II Year	42	55	76	L	15	4	2	24	23	7	15	0	0	0	0
	Total	91	127	218	13	27	13	2	44	45	21	52	0	1	0	0
MBA (Agri	IYear	5	3	5	0	0	0	0	1	С	1	0	0	0	0	0
Business	II Year	7	5	12	0	1	0	0	1	ю	4		0	0	0	0
Management	Total	6	×	17	6	1	0	0	6	9	S	1	0	0	0	0
Sub Total (PG)		100	135	235	15	28	13	7	46	51	26	53	0	1	0	0

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								Enrolı	ment Di	stributic	n					
Course	Year	Tot E	al Stude nrolmer	ent It	SC Stu	dents	ST Stu	dents	BC St	udents	OC Stu	adents	Physic Challe Studen	ally nged ts	Foreig Studer	n nts
		Boys	Girls	Total	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
	5	e	4	S	9	7	8	6	10	11	12	13	14	15	16	17
Doctoral Programmes																
Ph.D. (Ag.)	IYear	20	27	47	9	5	4	0	5	16	S	9	0	0	0	0
	II Year	13	16	29	4	ю	2	0	5	8	2	S	0	0	0	0
	III Year	23	15	38	ю	2	2	0	12	9	9	7	0	0	0	0
	Total	56	58	114	13	10	8	0	22	30	13	18	0	0	0	0
Sub Total (Ph.D.)	56	58	114	13	10	8	0	22	30	13	18	0	0	0	0	
Diploma Programmes																
Diploma	IYear	144	245	389	29	53	6	13	84	134	21	45				0
(Agriculture)	II Year	189	223	412	46	32	23	14	104	144	15	32	1	1	0	0
	Total	333	468	801	75	85	32	27	188	278	36	77	7	7	1	0
Diploma	IYear	10	10	20	0	2	0	0	6	4	1	4	0	0	0	0
Seed	II Year	6	11	20	1	1	1	1	7	9	0	3	0	0	0	0
Technology)	Total	19	21	40	1	e	1	1	16	10	1	7	0	0	0	0
Sub Total (Diploma)		352	489	841	76	88	33	28	204	288	37	84	7	7	1	0
Sub Total (Agriculture	(1453	1918	3371	232	328	124	71	730	918	350	575	17	27	1	0
Faculty of Agricultura	ll Engine	ering &	Techno	logy												
UG Programmes																
B.Tech. (Ag.Engg.)	IYear	52	37	89	7	8	4	0	26	19	13	10	0	0	0	0
	II Year	59	50	109	9	8	ю	2	31	26	18	13	0	1	1	0
	III Year	53	57	110	4	12	б	2	22	23	18	20	0	0	9	0
	IV Year	62	44	106	9	9	7	2	22	15	21	20	0	0	9	1
	Total	226	188	414	23	34	17	9	101	83	70	63	0	1	15	1

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								Enrolr	nent Di	stributio	u					
{	;	Tot	al Stude	int							; (,	Physic:	ally	Foreig	a ·
Course	Year	E	nrolmen	÷	SC Stu	dents	ST Stu	dents	BC St	udents	OC Str	Idents	Challe Studen	nged ts	Studen	its
		Boys	Girls	Total	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
1	5	e	4	S	9	7	8	6	10	11	12	13	14	15	16	17
B.Tech. (Food Tech.)	IYear	38	51	89	9	10	5	1	14	16	13	24	0	0	0	0
II Year	33	45	78	9	8	4	1	12	18	11	18	0	0	0	0	
III Year	24	40	64	1	4	0	3	13	22	10	11	0	0	0	0	
IV Year	35	59	94	3	6	4	2	16	20	12	28	0	0	0	0	
	Total	130	195	325	16	31	13	7	55	76	46	81	0	0	0	0
Sub Total (UG)		356	383	739	39	65	30	13	156	159	116	144	0	1	15	1
PG Programmes																
M.Tech. (Ag. Engg.)	IYear	12	7	19	7	1	1	0	4	2	4	ю	0	0	1	1
	II Year	4	1	5	1	1	2	0	0	0	1	0	0	0	0	0
	Total	16	8	24	e	7	e	0	4	7	S	e	0	0	1	1
Sub Total (PG)		16	8	24	e	7	e	0	4	6	S	e	0	0	1	1
Doctoral Programmes																
Ph.D. (Ag. Engg.	IYear	ю	7	10	0	1	1	0	1	4	1	0	0	0	0	0
& Tech.)	II Year	5	0	5	2	0	1	0	7	0	0	0	0	0	0	0
	III Year	5	1	9	0	1	0	0	1	0	2	0	0	0	0	0
	Total	13	8	21	4	2	2	0	4	4	3	7	0	0	0	0
Sub-Total (Ph.D.)	13	8	21	4	6	6	0	4	4	ю	6	0	0	0	0	
Diploma Programmes																
Diploma (Ag. Engg.)	IYear	20	36	56	ю	7	1	2	8	19	8	8	0	0	0	0
	II Year	21	27	48	9	4	3	0	5	21	5	7	0	0	0	0
	III Year	24	25	49	4	9	0	1	15	14	б	4	0	0	0	0
	Total	65	88	153	13	17	9	e	30	54	16	14	0	0	0	0
Sub-Total (Diploma)	65	88	153	13	17	9	e	30	54	16	14	0	0	0	0	
Sub Total (Ag. Engg.)	443	466	606	57	83	40	15	191	205	139	160	0	1	16	4	

							Enrolr	nent Dist	tribution							
Course	Year	Tot	al Stude Irolmen	t	SC Sti	line	ST Stu	idents	BC Str	udents	0CStr	udents	Physic Challe Studen	ally nged its	Foreig	n its
		Boys	Girls	Total	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
-	2	3	4	S	9	7	~	6	10	11	12	13	14	15	16	17
Faculty of Home Scier	JCe															
UG Programmes																
B.H.Sc.	I Year	0	46	46	0	14	0	0	0	18	0	14	0	0	0	0
	II Year	0	34	34	0	6	0	9	0	15	0	4	0	0	0	0
	111 47	¢	t c	t	¢	C	C	¢	¢	10	¢	t	¢	<	¢	<

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B.H.SC.	I rear	>	40	40	>	14		C		10	0	14		>		0
	II Year	0	34	34	0	6	0	9	0	15	0	4	0	0	0	0
	III Year	0	27	27	0	~	0	7	0	10	0	Г	0	0	0	0
	IV Year	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	107	107	0	31	0	×	0	43	0	25	0	0	0	0
Grand Total		1896	2491	4387	289	442	164	94	921	1166	489	760	17	28	17	7

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COLLEGE-WISE STUDENTS' STRENGTH - FIRST YEAR TO FINAL YEAR DURING 2015-16

Ś										Physic	cally	Foreig	E.
No	Name of the College	Year	Boys	Girls	Total	SC	IS	BC	00	Challe	enged nts	Stude	nts
										Boys	Girls	Boys	Girls
$\mathbf{F}_{\mathbf{a}}$	culty of Agriculture												
						H	8.Sc. (Ag.)						
		IYear	81	136	217	33	14	102	65	2	1	0	0
		II Year	83	133	216	37	6	104	61	1	4	0	0
		III Year	06	96	186	28	10	89	56	7	1	0	0
		IV Year	79	98	177	29	~	68	67	1	4	0	0
1.	Agricultural					4	1.Sc. (Ag.)						
	College, Baptla	IYear	28	31	59	8	5	23	23	0	0	0	0
		II Year	23	25	48	11	б	20	14	0	0	0	0
							h.D. (Ag.)						
		IYear	8	10	18	5	0	11	2	0	0	0	0
		II Year	9	7	13	5	1	9	1	0	0	0	0
		III Year	7	5	12	1	2	5	4	0	0	0	0
						H	3.Sc. (Ag.)						¢
		IYear	57	72	129	20	9	38	62	2	1	0	Q.
	S V Agricultural	II Year	55	78	133	18	7	40	67	0	1	0	0
	College, Lirupati	III Year	59	82	141	21	9	43	68	1	2	0	0
		IV Year	51	75	126	17	7	48	54	0	0	0	0

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S. No.	Name of the College	Year	Boys	Girls	Total	SC	ST	BC	ő	Physi Chall Stude	cally enged nts	Foreig Studeı	n ats
										Boys	Girls	Boys	Girls
						N	L.Sc. (Ag.)						
		I Year	19	38	57	6	б	17	27	1	0	0	0
		II Year	12	18	30	5	7	17	9	0	0	0	0
							1.A.B.M .						
		IYear	2	3	5	0	0	4	1	0	0	0	0
		II Year	7	5	12	3	0	4	5	0	0	0	0
						P	h.D. (Ag.)						
		IYear	12	17	29	9	4	10	6	0	0	0	0
		II Year	7	6	16	2	1	7	9	0	0	0	0
		III Year	16	10	26	4	0	13	6	0	0	0	0
							B.Sc. (Ag	·					
		I year	58	40	98	7	8	61	19	1	2	0	0
		II Year	30	51	81	11	5	59	4	0	2	0	0
3.	Agricultural	III Year	40	70	110	15	5	69	20	0	1	0	0
	College, Naira	IV Year	30	43	73	9	9	50	10	1	0	0	0
)					N	L.Sc. (Ag.)						
		I Year	1	1	2	0	1	1	0	0	0	0	0
		II Year	1	9	7	2	1	4	0	0	0	0	0
						9							
		I Year	49	34	83	14	4	35	29	0	1	0	0
4.	Agricultural	II Year	33	43	LL	10	7	38	24	0	1	0	0
	College,	III Year	34	36	70	10	\mathfrak{c}	42	14	1	0	0	0
	Mahanandi	IV Year	28	38	66	12	0	37	14	-	0	0	0
						N	L.Sc. (Ag.)						
		I Year	1	2	ю	1	0	1	1	0	0	0	0
		II Year	9	9	12	4	0	9	2	0	0	0	0

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										Physic	cally	Foreig	u:
	Name of the College	Year	Boys	Girls	Total	SC	LS	BC	oc	Chall Stude	enged ints	Stude	nts
										Boys	Girls	Boys	Girls
	Agricultural					B	.Sc. (Ag.)						
	College,	I Year	23	32	55	11	3	19	22	0	0	0	0
	Rajahmundry	II Year	19	34	53	13	2	24	13	0	1	0	0
		III Year	17	25	42	7	2	20	11	0	2	0	0
		IV Year	30	18	48	11	2	21	14	0	0	0	0
the second se	ulty of Agricultural	Engineering & Tee	chnology										
						B.Tec	h. (Ag. Ei	188.)					
		I Year	32	28	60	10	2	30	16	0	0	2	0
		II Year	41	32	73	10	2	41	19	0	0	1	0
		III Year	35	43	78	13	3	30	26	0	0	9	0
	College of	IV Year	40	27	67	7	С	26	24	0	0	9	0
	Agricultural					M.Te	ch. (Ag. E	ngg.)					
	Engineering,	I Year	12	L	19	б	1	9	7	0	0		1
	Bapatla	II Year	4	1	5	2	2	0	1	0	0	0	0
						Ph.D	. (Ag. En	gg.)					
		I Year	ω	L	10	1	1	S	ю	0	0	0	0
		II Year	5	0	5	5	1	2	0	0	0	0	0
		III Year	5	1	9	ю	0	1	7	0	0	0	0

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S.	Name of the College	Year	Boys	Girls	Total	SC	ST	BC	OC	Physi Chall Stude	ically lenged ents	Foreig Stude	gn nts
										Boys	Girls	Boys	Girls
7.	College of					B.Tec	h. (Ag. El	ngg.)					
	Agricultural	I Year	20	6	29	5	2	15	7	0	0	0	0
	Engineering,	II Year	18	18	36	4	\mathfrak{c}	16	12	0	1	0	0
	Madakasira	III Year	17	15	32	\mathfrak{c}	7	15	12	0	0	0	0
		IV Year	23	16	39	5	9	11	17	0	0	0	0
×.	College of Food					B.Tec]	h. (Food '	Fechnolo	gy)				
	Science and	I Year	26	29	55	8	4	22	21	0	0	0	0
	Technology,	II Year	19	32	51	7	2	23	19	0	0	0	0
	Bapatla	III Year	20	26	46	3	3	23	17	0	0	0	0
		IV Year	20	46	99	10	з	32	21	0	0	0	0
9.	College of					B.Tec]	h. (Food '	Fechnolo	gy)				
	Food Science	I Year	11	23	34	∞	7	6	15	0	0	0	0
	and Technology,	II Year	14	15	29	9	3	~	11	0	1	0	0
	Pulivendula	III Year	4	12	16	2	0	11	3	0	0	0	0
		IV Year	16	12	28	1	\mathfrak{c}	10	14	0	0	0	0

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S. No.	Name of the College	Year	Boys	Girls	Total	SC	ST	BC	OC	Physic Challe Stude	cally enged nts	Foreig Studer	n tts
										Boys	Girls	Boys	Girls
Fac	ulty of Home Sciend	Ce											
							B.H. Sc.						
10.	College of	IYear	0	46	46	14	0	18	14	0	0	0	0
	Home Science,	II Year	0	34	34	6	9	15	4	0	0	0	0
	Guntur	III Year	0	27	27	8	2	10	L	0	0	0	0
		IV Year	0	0	0	0	0	0	0	0	0	0	0
Dipl	oma Programmes												
11.	Agricultural					Diplo	ma (Agric	culture)					
	Polytechnic,	I Year	7	22	29	5	2	18	4	0	0	0	0
	Reddipalli	II Year	10	15	25	Э	2	16	4	0	0	0	0
12.	Agricultural					Diplo	ma (Agric	culture)					
	Polytechnic,	I Year	17	40	57	6	3	42	ю	1	1	0	0
	Anakapalle	II Year	30	36	66	12	4	46	4	0	0	0	0
13.	Agricultural					Diplo	ma (Agric	culture)					
	Polytechnic,	I Year	6	13	22	5	ю	15	2	0	0	0	0
	Chintapalli	II Year	13	6	22	2	ю	16	1	0	0	0	0
14.	Agricultural					Diplo	ma (Agric	ulture)					
	Polytechnic,	I Year	10	24	34	10	ı	16	8	0	0	0	0
	Garikapadu	II Year	18	18	36	2	ω	23	ω	0	0	0	0
15.	Agricultural					Diplo	ma (Agric	aulture)					
	Polytechnic,	I Year	17	38	55	14	4	30	7	0	0	0	0
	Manteru	II Year	29	49	78	17	9	46	6	0	0	0	0

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·······································	Name of the College	Year	Boys	Girls	Total	SC	ST	BC	OC	Physi Chall Stude	cally enged nts	Foreig Studei	n its
										Boys	Girls	Boys	Girls
6.	Agricultural					Diplo	ma (Agric	ulture)					
	Polytechnic,	IYear	7	16	23	9	1	11	5	0	0	0	0
	Madakasira	II Year	10	13	23	9	1	10	5	0	1	0	0
Ч.	Agricultural					Diplo	ma (Agric	ulture)					
	Polytechnic,	IYear	6	14	23	4	2	11	9	0	0	0	0
	Utukur	II Year	12	13	25	9	2	12	5	0	7	0	0
×.	Agricultural					Diplo	ma (Agric	ulture)					
	Polytechnic,	IYear	7	10	17	0	1	13	3	0	0	0	0
	Podalakur	II Year	L	14	21	5	2	12	2	0	0	0	0
9.	Agricultural					Diplo	ma (Agric	ulture)					
	Polytechnic,	IYear	17	6	26	4	0	18	3	1	0	0	0
	Nandyal	II Year	10	13	23	4	1	17	1	0	0	0	0
0.	Agricultural					Diplo	ma (Agric	ulture)					
	Polytechnic,	IYear	11	13	24	7	1	6	7	0	0	0	0
	Somasila	II Year	10	11	21	С	3	15	0	0	0	0	0
	Agricultural					Diplo	ma (Agric	ulture)					
	Polytechnic,	IYear	L	0	7	2	1	4	0	0	0	0	0
	Rampachodavaram	II Year	20	0	20	9	4	∞	2	0	0	0	0

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s 2	Name of the College	Year	Boys	Girls	Total	SC	ST	BC	00	Physi Chall Stude	ically lenged ents	Foreig Stude	an nts
22.	Agricultural					Diplo	na (Agric	ulture)		BOYS	GIUS	BOYS	GIrls
	Polytechnic,	IYear	9	18	24	4	6	12	9	0	0	0	0
	Kalikiri	II Year	10	14	24	2	4	17	1	0	0	0	0
23.	Agricultural					Diplo	ma (Agric	ulture)					
	Polytechnic,	IYear	14	10	24	S	0	10	6	0	0	0	0
	Tirupati	II Year	12	16	28	5	5	10	10	1	0	0	0
24.	Agricultural					Diplo	ma (Agric	ulture)					
	Polytechnic,	IYear	8	17	25	10	2	10	ю	0	0	0	0
	J.M.Puram	II Year	0	0	0	0	0	0	0	0	0	0	0
25.	Seed Technology					Diplo	ma (Seed	Technold	gy)				
	Polytechnic,	IYear	10	10	20	2	0	13	5	0	0	0	0
	J.M.Puram	II Year	6	11	20	2	2	13	3	0	0	0	0
26.	Polytechnic					Diplo	ma (Agric	ultural E	ngineerin	(g			
	ofAgricultural	IYear	10	18	28	S	7	11	10	0	0	0	0
	Engineering,	II Year	10	11	21	4	2	10	5	0	0	0	0
	Kalikiri	III Year	14	12	26	5	1	15	5	0	0	0	0
27.	Polytechnic					Diplo	ma (Agric	ultural E	ngineerin	g)			
	ofAgricultural	IYear	10	18	28	5	1	16	9	0	0	0	0
	Engineering,	II Year	11	16	27	9	1	18	2	0	0	0	0
	Anakapalle	III Year	6	14	23	S	2	14	2	0	0	0	0

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ANNEXURE VI

AGRO-CLIMATIC ZONE-WISE LIST OF RESEARCH STATIONS AND THEIR FUNCTIONS

S. No.	Zone/Research Station	FUNCTIO	DNS
		Main	Verification
I. KRI	SHNA ZONE		
	Guntur District		
1.	Regional Agricultural Research Station, Lam - 522 034 Phone: 0863-2524017	Cotton, Pulses, Millets, Regl. Res. Units – Chemistry, Entomology, Plant Pathology, Integrated Weed Management, Agril. Economics, Extension Education	Mustard, Castor, Gingelly, Mushroom Spawn Production, Farming Systems Research, Forage Sorghum, Watershed Management.
2.	Rice Research Unit, Agricultural College Campus, Bapatla-522101 Phone: 08643-225901	Rice	Rice based Cropping Systems
3.	Post Harvest Technology Centre, Agricultural College Campus, Bapatla-522101 Phone: 08643-225180	Post Harvest Equipment, Grain Storage Structures, Evaluation	-
4.	Saline Water Scheme, Agricultural College Campus, Bapatla-522101 Phone: 08643-225098	Research on Use of Saline Water in Agriculture	-
5.	AICRP on Small Millets - Sorghum, Agricultural College Campus, Bapatla -522101	Sorghum	-
6.	AICRP on Farm Implements & Machinery, College of Agricultural Engineering Campus, Bapatla – 522 101	Farm Machinery	-
7.	Agricultural Research Station, Amaravati - 522 020, Phone: 08645-213345	Rhizobium Culture and other Biofertilizers Production	-
8.	Agricultural Research Station, Jangamaheswarapuram- 522 415, Ph: 08649-213108	Seed Production in Rice	-



S. No.	Zone/Research Station	FUNCTIO	NS
		Main	Verification
Krishn	a District		
9.	Agricultural Research Station, Vuyyur - 522 165 Phone: 08676-233236	Sugarcane	Sugarcane based Cropping Systems (rice and pulses)
10.	Agricultural Research Station, Machilipatnam-521 002 Phone: 08672-223266	Rice for Saline Soils	-
11.	Agricultural Research Station, Garikapadu - 521 175 Phone: 08654-288245	Crops and Cropping Systems, Water Management for NSP Left Canal	Rice, Pulses, Oilseeds and Soybean
12.	Agricultural Research Station, Ghantasala - 521 133 Phone: 08671-203160	Rice Fallow Pulses (<i>rabi</i> and summer)	Rice in <i>kharif</i>
Prakasa	um District		
13.	Agricultural Research Station, Darsi - 523 247 Phone: 08407-253248	Crops and Cropping Systems for NSP Right Canal, Oilseeds Millets, Agro-forestry, Soil and Water Management	Pulses S,
II. GO	DAVARI ZONE		
West G	odavari District		
14.	A.P.Rice Research Institute & RARS Maruteru - 534 122 Phone: 08819-246283	Rice, Rice-based Farming Systems, Soil & Water Management for Delta Soils, Post-harvest Technology (Rice), Rice-cum-fish Farming, Summer Pulses	-
15.	Agricultural Research Station, Pulla Phone:08829-282498	Deep water Rice	-
16.	Agricultural Research Station, Vijayarai – 534475 Ph.No.08812-225689	Honey Bee Research	-
East Go	davari District		
17.	Agricultural Research Station, Peddapuram - 533 437 Phone: 08852-241853	Ragi and Maize	Greengram, Blackgram, Sesamum, Groundnut

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S. No.	Zone/Research Station	FUNCTIO	NS
		Main	Verification
III. NO	RTH COASTALZONE		
Visakha	upatnam District		
18.	Regional Agricultural Research Station, Anakapalle - 531 001 Phone: 08924-223370	Sugarcane and Sugarcane Based Cropping Systems	Oilseeds and Millets, Watershed Management
19.	Agricultural Research Station, Yelamanchili - 531 005 Phone:08931-232441	Sesamum	Groundnut, Sunflower
Srikakı	ılam District		
20.	Agricultural Research Station, Amadalavalasa - 532185 Phone: 08942-286270	Mesta and Mesta based Cropping Systems	Oilseeds and Pulses
21.	Agricultural Research Station, Ragolu - 532 484 Phone: 08942-279836	Rice and Rice based Cropping Systems, Technolog for Tankfed Areas	Oilseeds, Pulses gy Oilseeds, Pulses
Viziana	garam District		
22.	Agricultural Research Station, Vizianagaram- 531 202 Phone: 08922-225983	Ragi, Bajra	Oilseeds and Pulses
IV. SO	UTHERN ZONE		
Chittoo	r District		
23.	Regional Agricultural Research Station, Tirupati - 517 502 Phone 0877-2248739	Groundnut and Groundnut based Cropping Systems, Soil and Water Management	Pulses, Bio-fuels, Watershed Management and Fodders
24.	Agricultural Research Station, Perumallapalli - 517 505 Phone: 0877-2276240	Sugarcane, Finger Millet	Pearl Millet and Sweet Sorghum
25.	Agricultural Research Station, Palamaneru	Fodder crops	-
SPS Ne	llore District		
26.	Agricultural Research Station, Nellore - 524 004 Phone: 0861-2327803	Rice and Rice based Cropping Systems	g Rice fallow Cotton and Pulses, Groundnut, Sesamum, Sugarcane
27.	Agricultural Research Station, Kavali - 524 202 Phone: 08626-241528	Agro-forestry	Rice



S. No.	Zone/Research Station	FUNCTIO	NS
		Main	Verification
28.	Agricultural Research Station, Podalakur - 524 345 Phone: 08621-225279	Sorghum based Cropping Systems, Pulses, Soil Management	Chillies, Fodder Jowar
YSR (K	adapa) District		
29.	Agricultural Research Station, Utukur - 516 003 Phone: 08562-231150	Rice and Rice based Cropping Systems, Water Management	Oilseeds, Pulses and Sugarcane
V.SCAI	RCE RAINFALL ZONE		
Kurnoo	l District		
30.	Regional Agricultural Research Station, Nandyal- 518 502 Phone: 08514-242296	Korra, Groundnut, Sunflower, Bengalgram, Tobacco, Sorghum, Cotton, Fodder crops, Water Management,	Paddy, Mustard, Soybean, Maize, Castor, Redgram, Safflower
31.	Seed Technology Research & Production Centre, Thangadancha	Seed Production Seed research, Seed Production	-
Ananta	puramu District		
32.	Agricultural Research Station Anantapuram 515 001 Phone: 08554-200303	Dry Farming, Groundnut, Arid Fruits, Pulses, Fodder Crops, Farm Implements, Watershed Management on Red Soils	Sorghum, Bajra, Korra, Horsegram, Groundnut, Field Bean, Pulses
33.	Agricultural Research Station Reddipalli 515 001 Phone: 08554-257239	Pulses, Groundnut, Cropping Systems	Dryland technology
34.	Agricultural Research Station, Kadiri - 515 591 Phone: 08494-221180	Groundnut and Groundnut based Cropping Systems	Sunflower
XI. HIG	GHALTITUDE AND TRIBAL	ZONE	
Visakha	patnam District		
35.	Regional Agricultural Research Station Chintapalle - 531 111 Phone: 08937-238244	Rice, Millets, Pulses, Niger, Watershed Management, <i>Podu</i> Cultivation	Farming Systems, Technologies for Tribal Areas
Srikaku	lam District		
36.	Agricultural Research Station Seethampet - 532 443 Phone: 08941-238628	Rice, Millets, Pulses, Oilseeds, Forage Crops and Grasses	Agro-forestry and Farming Systems for Tribals.

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ANNEXURE VII

LIST OF ICAR COORDINATED RESEARCH PROJECTS OPERATED IN RESEARCH STATIONS

I. NORTH COSTAL ZONE

- 1. AICRP on Sugarcane, RARS, Anakapalle
- 2. AICRP on Processing, Handling and Storage of Jaggery and Khandasari, RARS, Anakapalle
- 3. AICRP on Biological Control, RARS, Anakapalle
- 4. AICRP on Small Millets, ARS, Vizianagaram
- 5. AICRP on Jute and Allied Fibers, ARS, Amadalavalasa
- 6. AICRP on Rice Galmidge Scheme, ARS, Ragolu

II. GODAVARI ZONE

- 7. AICRP on Rice, RARS, Maruteru
- 8. AICRP on Cropping System Research (MAE), RARS, Maruteru
- 9. AICRP on Rodent Control, RARS, Maruteru
- 10. AICRP on Honey Bee Research & Training, ARS, Vijayarai

III. KRISHNA ZONE

- 11. AICRP on Pulses, MULLaRP, RARS, Lam
- 12. AICRP on Cotton, Main Centre, RARS, Lam
- 13. AICRP on Pulses (Pigeonpea), RARS, Lam
- 14. AICRP on Management of Salt Affected Soils and Use of Saline Water, Bapatla

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15. AICRP on Post Harvest Technology, Bapatla



- 16. AICRP on Millets- Sorghum, Bapatla
- 17. AICRP on Farm Implements and Machinery, Bapatla
- 18. AINP on Soil Biodivesity & Biofertilizers, ARS, Amaravathi
- 19. AICRP on MULLaRP, ARS, Ghanatasala

IV. SOUTHERN ZONE

- 20. AICRP on Groundnut, RARS, Tirupati
- 21. AICRP on Rice, ARS, Nellore

V. SCARCE RAINFALL ZONE

V. SCARCE RAINFALL ZONE

- 22. AICRP on Cotton, Sub-Centre, RARS, Nandyal
- 23. AICRP on Improvement of Small Millets, RARS, Nandyal
- 24. All India Network Project on Tobacco, RARS, Nandyal
- 25. AICRP on Oilseeds, Sub-Centre on Sunflower, RARS, Nandyal
- 26. AICRP on Chickpea, RARS, Nandyal
- 27. AICRP on Dryland Agriculture, ARS, Anantapuramu
- 28. AICRP on Pearl Millet Improvement Project, ARS, Anantapuramu
- 29. AICRP on Agro-meteorological Research Centre, ARS, Anantapuramu
- 30. AICRP on New Operational Research Project, ARS, Anantapuramu
- 31. AICRP on Oilseeds, Main Centre for Groundnut, ARS, Kadiri

VI. HIGH ALTITUDE AND TRIBAL ZONE

32. AICRP on Integrated Farming Systems, ARS, Seethampet

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ANNEXURE VIII

LIST OF PROJECTS UNDER RASHTRIYA KRISHI VIKAS YOJANA

S. No.	Title of the project	Centre of Operation
I	Production and productivity growth in major food cro	ps such as Paddy, Coarse
	Cereals, Minor millets, Pulses, Oilseeds, Cotton, Sug	arcane etc.,
1	Micro propagation in Sugarcane	RARS, Anakapalle
2	Sugarcane seed production through single bud seedling	
	development and popularization of mechanisation	RARS, Anakapalle
3	Standerdization and commercialization of technology for	
	jaggery powder	RARS, Anakapalle
4	Micro propagation in sugarcane to produce virus free	
	seed material	ARS, Perumalapalle
5	Development of lodging resistant varieties for irrigated	
	rice ecosystem using molecular markers.	RARS, Maruteru
6	Development of multiple resistant rice varieties suitable	
	for cultivation under direct seeding in Andhra Pradesh.	RARS, Maruteru
7	Production and marketing of Oyster Mushrooms	S.V.Agril. College, Tirupati
8	Standerdization of measures to overcome the ill effects	
	of water logging stress conditions of cotton, maize and	
	sunflower crops of vertisols and improve the productivity	RARS, Nandyal
9	Development and identification of drought tolerant guar	
	gum varieties suitable for Scarce Rainfall Zone of	
	Andhra Pradesh	ARS, Anantapur
10	Development of high yielding and extra-large seeded	
	kabuli chickpea varieties suitable for export purpose	
	and / or mechanical harvest	RARS, Nandyal
11	Identification of suitable maize based cropping system	
	for HAT Zone	RARS, Chintapalle
II	Promoting Production of Organic and Bio-fertilizers,	Organic Pesticides etc.,
1	Strengthening of bio-pesticide unit	RARS, Tirupati
2	Enhancing production of egg parasitoid	RARS, Anakapalle
III	Pest surveillance and for promoting in integrated pest	management which may
	include training of farmers through FFS etc.,	
1	Development and demonstration of integrated	
	management of insecticide resistant larval populations	
	of Tobacco cater pillar, Spodoptera litura in Ground nut	RARS, Tirupati

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S. No.	Title of the project	Centre of Operation
2 3	Integrated management of stem rot and dry root rot diseases of groundnut (Arachis hypogea L.) Bio-rational management of pulse beetle in chickpea	ARS, Kadiri
	during storage	ARS, Anantapur
IV	Enhancing productivity through development of varieti- high yield potential, resistance to abiotic and biotic str nutritive quality.	es / hybrids with progressively resses, desired cooking
1	Evaluation of advanced stage YMV resistant lines of black gram for yield	RARS, Lam
2	Seaweed cultivation for economic rehabilitation of coastal farmers in Andhra Pradesh sea coast. Saline Water Scheme, Bapatla.	RARS, Lam
3	Screening and evolving sugarcane varieties adapted to drought situation	RARS, Anakapalle
4	Introgression of Low Grain Shattering Genes in Mega Rice Variety MTU 1010 through Marker Assisted Breeding	RARS, Maruteru
5	Drought mitigation: Identification of reliable methods to sustain crop growth and yield in groundnut	RARS, Tirupati
6	Mapping stem rot resistance genes in groundnut (Arachis hypogea L.) with SSR markers	RARS, Tirupati
7	Mapping and tagging of drought tolerance related traits in the already advanced breeding lines based mapping populations and use of the knowledge for development of future groundnut varieties with progressively improved tolerance to drought	RARS, Tirupati
8	Mapping and tagging of drought tolerance related traits in the already advanced breeding lines based mapping populations and use of the knowledge for development of future groundnut varieties with progressively	
9	improved tolerance to drought Identification of reces of Fusarium wilt in Andhra Pradesh and Marker assisted selection for wilt strain	ARS, Kadiri
	specific resistance in chick pea (Cicer arietinum L.)	RARS, Nandyal

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S. No.	Title of the project	Centre of Operation	
10	Characterization and Development of DNA based screening techniques for yellow mosaic virus (YMV) infecting blackgram in Andhra Pradesh	RARS, Tirupati	
V	Enhancing the productivity on economically and ecologically sustainable basis by development of cost effective and natural resource conserve crop/management		
	systems/cropping systems/soil health management		
1	Soil fertility management in rice-Maize cropping system	RARS, Maruteru	
2	Refinement of nutrition management under different methods of rice cultivation	RARS, Maruteru	
3	Micro level crop planning to mitigate climate change effects for southern zone	RARS, Tirupati	
VI	Defending against biotic stresses		
1	Setting up of Pesticide Residue Testing Lab at Institute of Frontier Technology.	RARS, Tirupati	
2	Establishment of Pheromone lures making centre	ARS, Ananthapuram	
VII	Farm Mechanisation and post-harvest management		
1	Development of low cost light weight tractor mounted multi crop combine harvester	RARS, Nandyal	
2	Seed to seed mechanization of Bengalgram through		
	(16 hp) for small and marginal farmers	RARS, Nandyal	
VIII	Establishment of Seed Processing & Storage facilities		
1	Establishment of Seed Processing & Storage facilities	Agril.College, Naira	
2	Establishment of Seed Processing & Storage facilities		
	at N.P.Kunta	ARS., Kadiri	
3	Establishment of Seed Processing & Storage facilities	Agril.College, Mahanandi	
4	Establishment of Seed Processing & Storage facilities		
	at T.P Gudur	ARS, Nellore	
5	Seed production - Development of irrigation facilities including micro irrigation, farm pond and fencing	STR & pc, Thangadancha	



S. No.	Title of the project	Centre of Operation	
IX	Establishment of soil health analysis facilities		
1	Establishment of soil health analysis facilities	RARS, Anakapalle	
2	Establishment of soil health analysis facilities	RARS, Tirupati	
3	Establishment of soil health analysis facilities	RARS, Nandyal	
X	Farm Mechanization Hub for alleviating rural Drudgery and Productivity Enhancement		
1	Farm machinery hub for cost reduction and Productivity		
	Enhancement	RARS, Tirupati	
XI	Establishment of Liquid Bio-fertilizer Units		
1	Establishment of Liquid Bio-fertilizer Unit	RARS, Anakapalle	
2	Establishment of Liquid Bio-fertilizer Unit	RARS, Tirupati	
3	Establishment of Liquid Bio-fertilizer Unit	ARS, Amaravathi	
XII	Strengthening of Soil testing laboratories and facilities	8	
	for soil fertility mapping and micro nutrients		
1	Facilities for soil fertility mapping and micro nutrients	RARS, Nandyal	
2	Facilities for soil fertility mapping and micro nutrients	RARS, Anakapalle	
XIII	Development of infrastructure facilities for research on		
	virus indexing on Yellow Leaf Disease (YLD) in Sugarcane.		
1	Development of infrastructure facilities for evolving sugarcane clones tolerant to YLD	RARS, Anakapalle	

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ANNEXURE IX

DISTRICT AGRICULTURAL ADVISORY & TRANSFER OF TECHNOLOGY CENTRES (DAATTCs)

District Agricultural Advisory & Transfer	District Agricultural Advisory &
of Technology Centre	Transfer of Technology Centre
Agricultural Research Station	Agril. Marketing Committee Premises
Amadalavalasa – 532 185	Vizianagaram – 535 001
Srikakulam Dist.	Vizianagaram Dist.
District Agricultural Advisory & Transfer of Technology Centre Regional Agril. Research Station Anakapalle – 521 001 Visakhapatnam Dist.	District Agricultural Advisory & Transfer of Technology Centre Agril. Marketing Committee Premises Mohor Mansion Main Road Kakinada – 533 004 East Godavari Dist.
District Agricultural Advisory &	District Agricultural Advisory &
Transfer of Technology Centre	Transfer of Technology Centre
Agril. Marketing Committee Premises	ARS, Pedana Farm
Eluru – 534 005	Machilipatnam – 521 001
West Godavari Dist.	Krishna Dist
District Agricultural Advisory & Transfer of Technology Centre RARS, Lam Farm Guntur – 500 034	District Agricultural Advisory & Transfer of Technology Centre Agril. Marketing Committee Premises Trovagunta – 523 002 Prakasam Dist.
District Agricultural Advisory &	District Agricultural Advisory &
Transfer of Technology Centre	Transfer of Technology Centre
Agricultural Research Station	Agril. Marketing Committee Premises
Nellore – 524 004	Chittoor – 517 001
SPS Nellore Dist.	Chittoor Dist.
District Agricultural Advisory &	District Agricultural Advisory &
Transfer of Technology Centre	Transfer of Technology Centre
ARS, Utukur – 516 003	Agril. Marketing Committee Premises
YSR (Kadapa) Dist.	Kurnool – 518 001, Kurnool Dist.
District Agricultural Advisory & Transfer of Technology Centre Agril. Marketing Committee Premises (Traders Guest House) Anantapuram – 515 001 Anantapuram Dist.	



KRISHI VIGYAN KENDRAS (KVKs)

Krishi Vigyana Kendra Amadalavalasa – 532 185 Srikakulam Dist.	Krishi Vigyan Kendra Rastakuntabai – 535 523 (via) Gummalaxmipuram Vizianagaram Dist.
Krishi Vigyan Kendra H.No. 4-41 B Caritianpeta Undi – 534 199 West Godavari Dist.	<i>Krishi Vigyan Kendra</i> Ghantasala - 521133 Krishna Dist.
Dr.K.L.Rao <i>Krishi Vigyan Kendra</i> Garikapadu – 521 175 Krishna Dist.	<i>Krishi Vigyan Kendra</i> Agricultural Research Station Darsi – 523 247 Prakasam Dist.
Krishi Vigyan Kendra Agricultural Research Station Nellore – 524 004 SPS Nellore Dist	<i>Krishi Vigyan Kendra</i> Kalikiri – 517 234 Chittoor Dist.
Krishi Vigyan Kendra Agricultural Research Station Utukur – 516 003 YSR (Kadapa) Dist	<i>Krishi Vigyan Kendra</i> Banavasi, Yemmiganur Kurnool – 518 003 Kurnool Dist.
Krishi Vigyan Kendra Bukkarayasamudram, Reddipalli Anantapuram – 515 001 Anantapuram Dist.	Krishi Vigyan Kendra Garudapuram, Kalyandurg – 515 761 Anantapuram Dist.

FARMERS CALL CENTRE

Toll Free No.1100 & 1800 425 1110 E-seva centre upstairs, Seethafalmandi, Opp to Suresh theatre, Secunderabad - 500 061

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Hon'ble Minister for Agriculture Sri Prathipati Pullarao Garu releasing a souvenir on 'Small Farmers Friendly agricultural technologies' in South Zone Agri-Expo – 2015 from 19th December to 21st December, 2015 at Regional Agricultural Research Station, Lam, Guntur



Inauguration of Vice-Chancellors Office at Lam, Guntur



Inauguration of Advanced Post Graduate Centre by Hon'ble Vice-Chancellor Dr. A. Padma Raju at RARS, Lam, Guntur



Release of *Vyavasaya Panchangam*-2016 by Shri. N. Chandrababu Naidu, Hon'ble Chief Minister of Andhra Pradesh on Ugadi (08.04.2016)



Hon'ble Minister of State for Ministry of Science & Technology & Earth Sciences Shri Sujana Chowdary addressing the Scientists and Farmers in Agricultural Technology Day on the eve of 115th birthday celebrations of Acharya N.G. Ranga organized at RARS, Lam, Guntur