ANNUAL REPORT 2017-'18

ANGRAU

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Acharya N. G. Ranga Agricultural University

Guntur, Andhra Pradesh, India

49th Annual Convocation organized at Sri. Venkateswara Kasturbha, Kalakshetram at Nellore on 04th October, 2017

ICAR Team Visit to College of Food Science and Technology on 13th October, 2017

Fifty-Fourth
Annual Report
2017-`18

ANGRAU

Acharya N.G. Ranga Agricultural University
Lam, Guntur-522 034, Andhra Pradesh, India

Compiled by

Planning and Monitoring Cell

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First Page	:	**Hon'ble Vice - Chancellor & University Officers Interaction with Hon'ble Chief Minister, Government of Andhra Pradesh at AP Ag. Tech. Summit 2017 on 15th - 17th November 2017, Visakhapatnam.**

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ACHARYA N.G RANGA AGRICULTURAL UNIVERSITY

Guntur-522 034, Andhra Pradesh, India

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Acharya N.G Ranga Agricultural University
Lam, Guntur-522 034, Andhra Pradesh, India

Dr. V. Damodara Naidu
Vice-Chancellor

FOREWORD

It is a great pleasure for me to present the 54th Annual Report of Acharya N.G Ranga Agricultural University for the year 2017-'18 during the time when we are building up of our own State Agricultural University after bifurcation. Indeed, this period has witnessed significant progress in all spheres of our University's mandate. This report summarizes the various achievements of the University during 2017-'18 under the major heads : 1. Teaching, 2. Research and 3. Extension. It also contains an executive summary summing up the major outcome. During the year, emphasis was given on building up competent human resources in Agriculture. Home Science and Agricultural Engineering faculties.

On the academic front, a total number of 1441 students comprising of 1108 in Agriculture, 292 in Agricultural Engineering & Technology and 41 in Home Science faculty have passed out and the students on roll are 5201. The library facilities were also strengthened during this period under report with approximately 3872 books, 275 reports and 183 theses and dissertations have been added to the stock.

On the research front, varietal release is indeed our main stay with five varieties based on our breeding efforts in crops like rice (Varam & Ksheera), groundnut (TCGS 1157 & Kadiri Chitravathi) and sugarcane (Srimukhi). 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 personal in presenting research at various national and international fora.

The information and communication technologies are effectively used to ensure fast and smart transfer of technologies by DAATTC and KVKs right from sowing to final use of the produce, a total of 200 frontline demonstrations covering 1098.94 ha under pulses, cereals, oilseeds, commercial crops, horticulture crops, fodder crops, livestock and fisheries. The Extension team have organized 151 capacity building programmes to Extension Personnel, 651 programmes to Farmers and farm women, 101 programmes to NGOs and input agencies, 79 programmes to Rural Youth, 622 Method demonstrations, 45 Vocational training programmes, 79 Rythu Sadassus, 753 Group discussions and 143 Field days were organized for the benefit of the farmers etc. Certain new initiative 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.

On the academic front, the Students' Counselling and Placement Cells are functioning in all the Colleges andPolytechnics of the University. During this year, the campus interviews were held and about 251 students were placed in different public and private organizations. I appreciate the students' efforts that were successful on getting qualified to JRFs, SRFs, NET examinations at National Level and for their active involvement in NSS activities.

I congratulate the team on their strenuous efforts in coming up with the compilation of 54th Annual Report of ANGRAU.

వల్లభనేని దామోదర నాయుడు

(Dr. V. DAMODARA NAIDU)

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SUMMARY

Acharya N G 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.

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 met six times during the year and took decisions on various policy issues and aspects. The Vice-Chancellor acts as the Chief Executive Officer of the University with the assistance of FIVE 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.

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, NINETEEN Polytechnics, of which fifteen Agriculture, one Organic Farming, one Seed Technology and two Agricultural Engineering. There are THIRTY SIX research stations including SIX Regional Agricultural Research Stations (RARS), THIRTEEN District Agricultural Advisory and Transfer of Technology Centres (DAATTCs), THIRTEEN Krishi Vigyan Kendras (KVKs) and ONE Farmers' Call Centre (FCC), located through out Andhra Pradesh.

The activities of the University in the areas of education, research and extension carried out during the period of June 2017 to May 2018 have been summarized and placed below.

Teaching

- During the academic year 2017-`18, a total of 1778 students were admitted in the University. Out of them, 1030 were admitted in Undergraduate courses, 142 in Masters, 53 in Doctoral programmes and 553 in Diploma courses.
- A total number of 5201 students are on rolls of the University in different Undergraduate, Postgraduate, Doctoral and Diploma programmes. Of them, 2223 were boys and 2978 were girls.
- A total number of 1441 students comprising of 1108 in Agriculture, 292 in Agricultural Engineering & Technology and 41 in Home Science faculty have passed out during the academic year 2017-`18.
- A National Conference for Post Graduate Students (NCPGS-2018) on "Techno

Strategic Interventions for Profitable Agriculture" was organized during 26th-27th March 2018 at Agricultural College, Bapatla.

- Ms. V. Tejeswani (I Year), Mr. M. Satya Sivaram (IV year) and Mr. Vinod Kumar (IV year) students of Agricultural College, Rajamahendravaram participated in XVIII ICAR All India Inter Agricultural Universities meet at UAS, GKVK, Bangalore. Students attended the training camp and also participated in meet from 26-1-2018 to 3-2-2018.
- Ms. P. Sruthi, Agricultural College, Naira participated in the AGRI UNIFEST at S.V. Veterinary University, Tirupati from 12th -16th February, 2018.
- 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 seven days duration were organized for the students of all the final year Undergraduate and Diploma programmes.
- The students' counseling and placement cells functioned in all the Colleges and Polytechnics of the Universityand acted as liaison between the colleges and the public & private sector organizations / institutes that are in need of graduates/diploma holders.This year, the campus interviews were held by several organizations and a total of 251 students got placed in different public and private organizations.
- The ANGRAU University Library has very rich collections of print and non-print documents viz. of books, e-books (CABI, Elsevier, CRC Netbase, Arts and Science Academy Publications), e-journals, data bases such as J-Gate Agriculture and Biological Sciences (CeRA), KrishiKosh, DELNET, CMIE-Commodities, Indiastat.com and many more.All the libraries together continued to receive over 474 (Indian) and 66 Foreign Periodicals in Agriculture and allied sciences. In addition, 3872 books and about 183 theses and 275 reports have been added during the year. All the libraries have a separate reference book collections *viz.*, dictionaries, encyclopedias, almanacs, etc.

Research

Research has been carried out in the areas of crop improvement *viz.*,rice, millets, legumes, oil seeds, crop management practices, soil health, organic farming, drought mitigation aspects, bio fertilizers etc., studies are initiated on natural farming. Important research findings are summarized.

- In North Coastal zone, dry direct seeding of rice with total mechanization (sowing with seed drill, pre-emergence spray of pretilachlor @ 500 ml ac^{-1}+ post emergence spray of bispyribacsodium @100 ml ac^{-1}, power weeding, mechanical harvesting and threshing / winnowing fan, seed processing) recorded an average grain yield of 6.47 t ha^{-1}, an increase of 28.37% when compared to farmers practice (5.23 t ha^{-1}).

- Among crop establishment methods during *rabi* 2017, modified SRI method was found superior (with a mean grain yield of 5.38 t ha^{-1}) over conventional transplanting and direct wet seeded system (5.26 & 4.99 t ha^{-1}).

- The study on identification of cropping systems module for different farming systems revealed that, highest grain yield of 5.30 t ha^{-1} was recorded with cropping system involving pulses to meet house hold nutrition followed by 5.13 t ha^{-1} with ecological cropping system involving pulses for improving soil health compared to predominant cropping system (4.27 t ha^{-1}) during *kharif*, 2017.

- Delayed sowings of blackgram /greengram in rice fallows from November 3rd week to December 1st week & December 3rd week resulted in progressive decline in the yield respectively. Among blackgram varieties, LBG 752 and LBG 787 performed better when sown early and LBG 752 and PU 31 under late sown conditions. While greengram varieties, LGG 460 and IPM 2-14 under early sown conditions and LGG 460 and WGG 42 when sown under late conditions were found suitable for different rice fallow situations of North Coastal Zone.

- During *rabi*, 2017, highest grain yield was recorded with NLR 34449 (6.15 t ha^{-1}) followed by MTU 1010 (5.25 t ha^{-1}) and the lowest grain yield was recorded in BPT 5204 (4.11 t ha^{-1}) under machine transplantation.

- Among the age of seedlings tested, highest grain yield was obtained when the seedlings transplanted at the age of 25 days (5.64 t ha^{-1}) followed by 20 days (5.27 t ha^{-1}) & 30 days (5.11 t ha^{-1}) compared to 15 days aged seedlings (4.66 t ha^{-1}).

- Three years of research in organic farming of rice (*rabi*, 2015, 2016 & 2017) revealed, a 41.2% yield reduction in organic cultivation (3.69 t ha^{-1}) when compared to inorganic farming (6.32 t ha^{-1}).

- Among the pesticide combinations tested in rice, Spinetoram 6% + methoxyfenozide 30% was found effective (4.86 t ha^{-1}) followed by DPX-RAB 55 + contaf (4.5 1 ha^{-1}) Spinetoram 6% + methoxy-fenozide 30% was also found effective with low leaf folder damage (5.7%) and DPX-RAB 55 + hexaconazole combination was found effective with low population of white backed brown plant hopper (2.4 hill^{-1}) and brown plant hopper (2.7 hill^{-1}).

- In population dynamics studies during *kharif* 2017, the yellow stemborer catches were found high (1572 + 1392) during 44th SW whereas gallmidge peak catches (4710) were recorded in 42th SW. The Leaf folder, BPH and WBPH catches were more in 44th SW,whereas yellow stem borer, gall midge and plant hoppers were the major insect pests during *rabi*, 2017-'18. Peak catches of gall midge and stem borer was observed during 16th standard week.

- Potassium silicate as foliar spray @ 80 mg l^{-1} at 2 wks after transplantation and at active tillering stage followed by *Beauveria bassiana* @ 1.3 x 10^{6} conidia ml^{-1} recorded maximum reduction (42.8 %) in leaf folder incidence compared to *B. bassiana* spraying (17.55 %).

- Studies on flea beetle management in rice fallow greengram (3 years data) revealed that, diafenthiuron 50% at WP 1 g l^{-1} followed by thiomethaxam 25 WG at 0.2 g l^{-1} were the best in managing flea beetle damage and imidacloprid 17.8% SL at 0.4 ml l^{-1} followed by acephate 75% SP @ 1 g l^{-1} were the other best treatments in managing leaf miner damage.

- Integrated Disease Management of sheath blight, bacterial leaf blight and blast (*kharif* & *rabi*) indicated that, low sheath blight severity and incidence (16.38 % & 10.72%) was recorded with incorporation of FYM in nursery plot, seed treatment, application DAP, FYM + *Trichoderma* in the main field along with recommended dose of fertilizers, granular insecticide application and need based fungicide spray compared to the control plot (40.66% & 36.67%).

- Evaluation of biocontrol agents against rice blast disease (*rabi*) revealed that four sprays with *P.fluorescens* @ 10 g l^{-1} at 15, 30, 45 and 60 DAT recorded lowest per cent (28.07) of disease.

- The finger millet PR 10-45, which is a promising, non-lodging & high yielding culture has been proposed for varietal identification by State Varietal Release Committee.

- Release proposal of SiA 3222 of Foxtail millet 60 days duration with average grain yield of 1.5 to 2.0 t ha^{-1} and suitable for cropping systems and machine harvest was submitted to SVRC, Andhra Pradesh.

- Influence of weather parameters on growth and yield of *rabi* maize indicated that sowing of maize during first FN of November gave significantly higher grain yields of 9.0 t ha^{-1} as compared to second FN of December sowings (7.2 t ha^{-1}) or sowings of first FN of January (5.9 t ha^{-1}).

- In maize + pulse intercropping system, among all the legumes, cowpea recorded highest green fodder yield of 18.2 t ha^{-1} in 1:2 ratio and 13.4 t ha^{-1} in 2:2 ratio. As a whole system, maize intercropped with cowpea either in 2:2 or 1:2 ratio recorded significantly highest green fodder yield (47.8 & 42.9 t ha^{-1} respectively) followed by maize intercropped with sunhemp, rice bean and horse gram.

- Seed treatment with thiamethoxam 30 FS @ 8.0 ml kg^{-1}against stem borers in maize recorded higher grain yield of 8.14 t ha^{-1} followed by imidacloprid 600 FS @ 8.0 mlkg^{-1} seed (7.56 t ha^{-1}) during *rabi*, 2017.

- *Trichogramma chilonis* released plots recorded zero incidence of stem borer in maize compared to monocrotophos spray (2.1% dead hearts) and untreated control (13.97% dead hearts) at Chollangipeta village, Denkadamandal, Vizianagaram district.

- Pre-emergence application of herbicide, atrazine @ 0.5 kg a.i ha^{-1} and post-emergence application of atrazine @ 0.5 kg a.i ha^{-1} at 25 days after sowing have reduced weeds during *rabi* season and recorded higher yields (0.39 t ha^{1}) compared to metsulfuron methyl + chlorimuron ethyl application.

- Among different insecticides tested against sorghum stem borer, spinosad 45 SC @ 60 ml $acre^{-1}$ (5.8%), flubendiamide 48 SC @ 40 ml $acre^{-1}$ (7.0%) and whorl application of carbofuran 3G granules @ 4 kg acre^{-1} (7.3%) are effective.

- Hand weeding twice at 20 and 40 DAS in pearl millet recorded lowest weed density and dry weight as well as the highest weed control efficiency and higher grain and straw yield, which was on par with pre-emergence application of atrazine @ 750 g a.i ha^{-1} + one hand weeding at 30 DAS with higher net returns (Rs. 22038 ha^{-1}) and B:C ratio (2.33).
- Among different inter crops tested, finger millet equivalent yield (6.58 t ha^{-1}) was significantly high in finger millet + bhendi (8:2) system with high net returns (Rs.110021) and B:C ratio (3.65) followed by fingermillet + pigeon pea (8:2) system.
- Weeding in fingermillet at 20 and 40 days after planting recorded higher grain yield (3.42 t ha^{-1}) followed by pre emergence applicationof pendimethalin @ 0.5 kg a.i ha^{-1} + one hand weeding at 20 DAP (3.18 t ha^{-1}) compared to control (2.36 t ha^{-1}).
- The results of eco-friendly management of banded blight revealed that, lowest sheath blight severity (6.67%) and highest grain yield (1.65 t ha^{-1}) and fodder yield (4.20 t ha^{-1}) was recorded in soil application of value added *P. flourescens* + *T. asperellum* + *B. subtilis* (one kg each talc formulation mixed in 25 kg FYM or vermi compost, incubated for 15 days) applied in one acre at the time of sowing.
- In inter cropping studies, the *Setaria* grain equivalent yield (5.27 t ha^{-1}) and net returns (Rs. 42174 ha^{-1}) were found to be higher with foxtail millet + red gram 5:1 followed by foxtailmillet + blackgram 4:4 (2.89 t ha^{-1} and Rs. 26447 ha^{-1}).
- Formation of conservation furrows after every row of groundnut in groundnut + pigeonpea (8:1) intercropping system at 25 DAS produced more number of filled pods per plant, test weight, total groundnut equivalent yield (3.14 t ha^{-1}) and was on par with formation of conservation furrow after every 2nd row (2.94 t ha^{-1}) and significantly superior to formation of conservation furrow after every 8th and 12th row of groundnut.
- Among three intercropping systems, foxtail millet + pigeonpea, bajra + pigeonpea and groundnut + pigeonpea evaluated during 2017, highest pigeonpea equivalent yield of 1.24 t ha^{-1} was recorded by groundnut + pigeonpea intercropping with high net returns of Rs. 35,215 ha^{-1} and 2.12 B:C ratio.
- Among different drought management practices, application of VAM @ 12.5 kg ha^{-1} + crop residue mulching @ 5 t ha^{-1} + P 100% registered highest grain yield (2.94 t ha^{-1}) followed by VAM + 100% P (2.89 t ha^{-1}) and Phosphorus 100 % (2.72 t ha^{-1}) compared to control (1.90 t ha^{-1}).
- Insecticidal schedule i.e., chlorantraniliprole 18.5 SC @ 30 g a.i ha^{-1} (0.3 ml l^{-1}), followed by flubendiamide 480 SC @ 73 g a.i ha^{-1} (0.2 ml l^{-1}) and dimethoate 30 EC @ 300 g a.i ha^{-1} (2.0 ml l^{-1}) at 10 days interval starting from 50% flowering was highly effective against pod borers and corresponding pod damage (15.2%) with high yield (1974 t ha^{-1}) and International Conference on Building Resilience (11.63)(2015-16 to 2017-18).

- Among the blackgram varieties tested, the maximum grain yield was recorded with GBG1 (1.29 t ha^{-1}) and it was significantly superior to LBG 752 and LBG 787 and was on par with TBG104 (1.25 t ha^{-1}). The optimum sowing time for *rabi* blackgram is from 1st to 15th October.

- In rice fallows, delayed sowings from November 3rd week to December 1st week and December 3rd week resulted in progressive decline in both greengram and blackgram seed yield respectively.

- Seed treatment with thiamethoxam 35 FS @ 5 g kg^{-1} and spraying of thiamethoxam 25 % WG @ 0.2 g 1^{-1} at 20-25 DAS was effective in reducing the YMV and leaf curl viral diseases in urdbean.

- Management of viral diseases in urdbean indicated that, seed treatment with imidacloprid 600 FS @ 5 ml kg^{-1} seed + 4 border rows of jowar + removal of virus infected plants + yellow sticky traps @ 4 ac^{-1} + spraying of diafenthiuron @ 1.25 g l^{-1} was found to be effective with low bud necrosis (3.11%) incidence and YMV (3.19%) resulting in highest yield (1.29 t ha^{-1}).

- Manual weeding twice at 20 and 35-40 DAS registered highest grain yield (0.79 t ha^{-1}) and was at par with imazethapyr 10% SL @ 55 g a.i. ha^{-1} as post emergence at 15-20 DAS (0.71 t ha^{-1}). The yield reduction in *kharif* greengram due to weed competition was to the extent of 39%.

- In bengalgram, hand weeding at 20 and 40 DAS recorded higher yield (2.23 t ha^{-1}) and weed control efficiency (88%) than post emergence application of acifluorfen sodium + clodinafop propargyl at 140 + 70 g a.i. ha^{-1}(2.12 t ha^{-1}) and 160 + 80 g a.i. ha^{-1} at 20 DAS (2.08 t ha^{-1})with weed control efficiency of 68 and 69%, respectively.

- The Rajamah variety Utkarsh (1.16 t ha^{-1}) has recorded higher yield followed by Arun (1.14 t ha^{-1}) compared to local variety CTPL Red (0.48 t ha^{-1}).

- Groundnut variety TCGS 1073, a water-use efficient spanish bunch culture with high yield potential matures in 105-110 days suitable for cultivation in irrigated situation both in *kharif* (2.37 t ha^{-1}) and *rabi* (3.44 t ha^{-1}) seasons was proposed for release at state-level.

- TCGS 1157, a short statured spanish groundnut culture with high yield potential and seed dormancy with high frequency of three seeded pods maturing in 110 days recorded mean pod yield of 2.56 t ha^{-1} in *kharif* season and 3.08 t ha^{-1} in *rabi* season and was identified for release for Zone III (Maharashtra and Madhya Pradesh).

- TCGS 1425 recorded high WUE, with low transpiration rate and highest drought adaptive traits (SCMR, Chlorophyll content, SLA) whereas TCGS 1694 showed high drought adaptive traits and highest photosynthetic rate, high transpiration rate with moderate WUE, highest shelling percent, 100 kernel weight, pod yield and oil percent.

- Identification of most suitable drought resistant groundnut varieties for drought affected areas of Anantapuramu for three years (2014 to 2016) indicated that the genotype K 1809 recorded highest yield (1.14 t ha^{-1}) followed by K 1535 (1.08 t ha^{-1}) and K 1802 (1.02 t ha^{-1}).

- Among the different alternate *rabi* crops suitable for coastal sands of Nellore, groundnut crop is superior compared to other crops during *rabi* 2017-18. The highest net returns of Rs 1,87,688 ha^{-1} was recorded by groundnut followed by water melon Rs 1,64,615 ha^{-1}compared to onion (Rs 7,840 ha^{-1}).

- Significantly highest weed control efficiency (98.4) and lowest weed index (6.0) was recorded with the pre emergence application of pendimethalin followed by post emergence application of imazethapyr 10% S.L.@ 75 g a.i ha^{-1} (97.4) at 45 DAS and 65 DAS respectively with highest net (Rs. 73,010 ha^{-1}) and B:C ratio (3.22).

- Post-emergence herbicides *viz*., imazethapyr and quizalofop-p-ethyl with insecticides *viz*., monocrotophos and imidachloprid in groundnut were found highly compatible with one another at the recommended doses.

- Long term application of manure and fertilizers in groundnut indicated that, application of HRFD along with FYM @ 4 t ha^{-1} recorded higher pod yield (2.20 t ha^{-1}), followed by recommended dose of fertilizers (20-40-40 N, P_2O_5, K_2O kg ha^{-1}) (2.05 t ha^{-1}) and other treatments.

- Integration of both organics (FYM @ 4 t ha^{-1}) and inorganics (half of the RDF @ 10-20-20 N-P_2O_5-K_2O kg ha^{-1}) in groundnut over 33 years recorded an average yield of 0.99 t ha^{-1} over RDF @ 20-40-40 N-P_2O_5-K_2O kg ha^{-1} (0.96 t ha^{-1}).

- Significantly higher groundnut pod yields were recorded with RDF + foliar application of nanoscale Zn O @ 2 g l^{-15} at 25 and 45 DAS (2.58 t ha^{-1}) followed by RDF along with soil application $ZnSO_4$ @ 50 kg ha^{-1} (2.55 tha^{-1}).

- Studies on compatibility of insecticides, fungicides and nutrients as foliar spray in indicated that, a combination of monocrotophos @ 1.6 mll^{-1}, hexaconazole @ 2 ml $l^{-1}$and 19-19-19 sprayable formulation was found effective in reducing foliar damage caused 58.22% by thrips as well low incidence of leaf spot (2 score) compared to untreated control (29.10% and 6.67).

- Among different IPM modules evaluated in groundnut, module 2 (seed treatment with *Trichoderma* @ 4 g kg^{-1} seed + need based spray of imidacloprid 17.8 SL @ 0.3 ml l^{-1} + need based spray of novaluron 10 EC @ 1 ml l^{-1} for defoliator at 50-70 DAS + need based spray of tebuconazole 25.9 EC @ 1.5 ml l^{-1} at 50-70 DAS) and module 4 (seed treatment with carbendazim + mancozeb @ 2 g kg^{-1} seed + need based spray of dimethoate 30 EC @ 1.5 ml l^{-1} + need based spray of quinalphos 25 EC @ 2 ml l^{-1} for defoliator at 50-70 DAS + need based spray of propiconazole 25 EC @ 1ml l^{-1} at 50-70 DAS) were effective in reducing leaf damage by thrips (17.70 & 21.61%), leaf hopper (20.47 & 22.12%), *Spodoptera* (26.91 & 30.13%), *Helicoverpa*(12.62 & 13.61%), leaf miner (21.92 & 22.61%) and lowest diseases of stem rot (7.0 %), dry root rot (6.6 %) early leaf spot (45.0 PDI), rust (26.0

% PDI), *Alternaria* blight (17.0 % PDI) with higher pod (1.55 t ha^{-1}), haulm yield (2.23 t ha^{-1}) and ICBR of 4.0.

- Effect of carbon dioxide (CO_2) treatment on the control of storage insect pests and the seed quality indicated that CO_2 concentration of 20 and above were fatal to *C. serratus* while 10% CO_2 controlled the pest immediately after treatment.

- Efficacy of different chemicals against peanut stem necrosis disease (PSND) (three years data) indicated that, significant reduction of PSND and highest pod yield (0.90 t ha^{-1}) was recorded by treating the seed with imidacloprid 600 FS @ 1 ml kg^{-1} seed + foliar spray with imidacloprid 17.8 SL @ 0.3 ml l^{-1} at 20 DAS with highest ICBR of 3.9.

- In management of peanut bud necrosis disease, high reduction of both PBND (4.3 %) and thrips damage (38.0 %) and high pod (2.05 t ha^{-1}) and haulm yield (2.46 t ha^{-1}) were recorded by adopting practices of border crop with bajra (4 rows) + seed treatment with imidacloprid 600 FS @ 1 ml kg^{-1} seed + foliar sprays using thiocloprid 480 SC @ 150 ml ha^{-1} at 20 - 25 DAS followed by fipronil 5 SC @ 2 ml l^{-1} @ 40 DAS and acetamiprid 20 SP @ 100 g ha^{-1} at 35-40 DAS.

- Soil and water conservation practices, ridge and furrow method of planting, thinning, boron spray @ 0.2% at sunflower ray floret stage as good agricultural practices, recorded higher seed yield (2.13 t ha^{-1}) than farmers practice (1.65 t ha^{-1}).

- Compiled data of sesame seed yield from 3 centres (ARS Utukur, ARS Amadalavalasa & ARS Ragolu), indicated that the entries YLM-142 (1.02 t ha^{-1}) and YLM-146 (1.03 t ha^{-1}) have recorded higher seed yield compared to the check YLM-66 (0.93 t ha^{-1}).

- Sequential application of pre and post emergence herbicides for weed management revealed that two hand weedings at 15 and 30 DAS significantly reduced weed population and weed dry weight at 30 & 50 DAS over rest of the treatments.

- In vertisols, highest seed cotton yield of 2.57 t ha^{-1} was recorded with 150% RDF + FYM @ 5 t ha^{-1} + Gypsum @ 500 kg ha^{-1} + $ZnSO_4$ @ 50 kg ha^{-1} followed by 150 % RDF + FYM @ 5 t ha^{-1} (2.52 t ha^{-1}) in long-term fertilizer application compared to control (1.23 t ha^{-1}).

- Monitoring of pink bollworm through pheromone traps, indicated that the sleeve traps are performing better than delta traps and funnel trap for trapping the adult moths. Among the two trap densities, the trap density of 8 traps acre^{-1} is most effective for monitoring of pink bollworm.

- Studies on compatibility of seed treatment fungicides (2015-17) revealed that thiram @ 3g kg^{-1}, carbendazim @ 2g kg^{-1}, streptocyclin @ 100 ppm, trifloxystrobin @ 1ml kg^{-1}, captan @ 3 g kg^{-1},carboxin @ 2 g kg^{1}, mancozeb @ 3g kg^{-1}and penflufen @ 2ml kg^{-1} are compatible with imidaclopridin terms of germination, seedling vigour without any phytotoxicity.

- Integrated weed management in mesta revealed, that application of pretilachlor 50 EC @ 900 ml ha^{-1} with one hand weeding recorded highest mesta fibre yield along with maximum weed control and was on par with two hand weedings and significantly superior over all other treatments.

- In mesta based inter cropping system, mesta + maize sown at 2:1 ratio recorded highest mesta equivalent fibre yield (9.0 t ha^{-1}) followed by mesta + cluster bean at 3:4 ratio (2.78 t ha^{-1}) compared to sole mesta (2.57 t ha^{-1}).

- The cane quality deterioration over 76 hrs after cutting in terms of per cent sucrose loss, increased reducing sugars, increased dextran content and cane weight loss is more in March harvest than January harvest.

- Among the sugarcane clones tested for salt tolerance during 2017-18, the clones 2009 V89 (89.0 t ha^{-1}), 2008 V 52 (84.89 t ha^{-1}) and 2009 V 127 (83.72 t ha^{-1}) recorded higher cane yield and were found to be tolerant to salt stress. All clones recorded higher per cent juice sucrose and were on par with the standards 2003 V 46 and 83 V 15.

- Population density of 24,700 seedlings ha^{-1} registered significantly higher cane yield of 74.3 t ha^{-1} than higher population density of 37,000 seedling ha^{-1} (69.4 t ha^{-1}) and it was on par with 18,500 seedling ha^{-1}(72.6 t ha^{-1}).

- Among different tillage systems tested, sugarcane planted in conventional tillage registered higher cane yield of 72.7 t ha^{-1} when compared to zero tillage (67.8 t ha^{-1}) or minimum tillage (66.0 t ha^{-1}). Among different types of seed material, three budded setts registered significantly higher cane yield of 70.3 t ha^{-1} when compared to single node seedlings (66.9 t ha^{-1}).

- Studies on use of plant growth regulators (PGRs) for enhanced yield and quality of sugarcane (2015-17) indicated that highest number of milleable canes (69,728 ha^{-1}) and cane yield (75.3 t ha^{-1}) was observed with planting of setts after over soaking over night in 100 ppm ethrel solution + GA3 spray (35 ppm) at 90,120 and 150 DAP.

- Revisiting of fertilizer doses for important crops in North Coastal Zone revealed that, highest cane (87.68 t ha^{-1}) and sugar yields (11.32 t ha^{-1}) of plant crop (II year) was recorded with 150% RDN and 100 RDPK + 25 % of recommended dose of zinc and sulphur with FYM @ 10 t ha^{-1}compared to recommended dose of chemical fertilizers. (84.07 t ha^{-1} and 10.05 t ha^{-1}).

- The difference in the cane and sugar yields in organic plots (7 years organic farming) and inorganic plots narrowed down and recorded 76.14 and 9.96 t ha^{-1} respectively, where as in 100 % chemical fertilizer applied plots, it was 72.52 and 9.39 t ha^{-1} respectively. Soil organic carbon status raised to 0.78 % in organic plot, 0.69 % in inorganic plot from its initial value of 0.52 %.

- Application of trash by trash shredder registered higher cane yield (121.6 t ha^{-1}), sucrose (18.93%) and CCS (13.33%) and it was at par with application of trash as mulch (116.2 t ha^{-1}of cane yield, 18.72% of sucrose and 13.30% of CCS).

- Evaluation of liquid bio-fertilizers on yield and quality of sugarcane (Plant-I) indicated that highest yield was recorded in 75% RDF + liquid bio-fertilizers as basal & at 45 DAP + FYM @ 10 t ha^{-1} (172.7 t ha^{-1}) followed by 75% RDF + liquid bio-fertilizers as basal & at 45 DAP.

- Temperature tolerant strain *T. chilonis* release (8+4 times) in March ratoon crop recorded low incidence of early shoot borer upto 120 days (3.42 % DH) and internode borer incidence (20.73 %) and registered high cane yield (84.47t/ha) compared to farmer's practice (early shoot borer incidence of 42.16% and internode borer intensity of 4.61%.

- Entomopathogenic nematode, *Heterorhab-ditisindica* was found significantly effective in reducing white grub damage (79.86 % reduction) and high yield increase (39.1 %) in sugarcane compared to entomo pathogenic fungus *Metarhizium anisopliae* (67.74% reduction and 35.24 % yield increase).

- Sett treatment with azoxystrobin + tebuconazole (4.62%) recorded low smut incidence and which was at par with trifloxystrobin + tebuconazole (6.18%), propiconazole (6.28%) and tebuconazole (7.54%) followed by difenaconazole (10.81%), and hexaconazole (14.91%) compared to untreated control (66.46%).

- Bidi tobacco cultures NyBTH 124 (1.84 t ha^{-1}) and NyBD 60 (1.79 t ha^{-1}) performed well and promoted for testing in All India Coordinated trials.

- Studies on foliar application of K at different intervals on leaf quality and cure leaf yield revealed that, higher cured leaf yield (1.71 t ha^{-1}) of bidi tobacco was recorded with foliar application of KNO_3 @ 2.5 % twice at 45 and 60 days after transplanting.

- In rice-maize cropping system, NPK + Zn recorded significantly higher grain yield (5.80 t ha^{-1} & 7.37 t ha^{-1}) over other treatments and was on par with recommended dose of NPK application (5.59 t ha^{-1} & 7.07 t ha^{-1}) respectively. NPK + Zn recorded higher system net returns (Rs.119023 ha^{-1}) and B:C ratio (1.57) followed by recommended dose of NPK application (1.56) and farmer practice (1.33).

- Among the rice varieties tested for salt tolerance, CS 36 was significantly superior over other varieties with grain and straw yields being 6.40 and 7.46 t ha^{-1} respectively, while, BPT 2615 realized significantly lower corresponding yields of 5.27 and 6.24 t ha^{-1} respectively.

- Gypsum + FYM + 25 % extra nitrogen treated plot recorded the highest seed yield (1.43 t ha^{-1}) in alkali soils followed by gypsum + 25% extra nitrogen application (1.03 t ha^{-1}) compared to farmers practice (0.48 t ha^{-1}).

- Mini tractor drawn Ananta planter and Kissan planter were designed and developed with suitable seed metering devices for sowing groundnut and summarized that the seed rate of Kissan planter is less than that of Ananta planter.

- The use of ratoon management device in sugarcane field could save 69% labour cost and 75% time compared to conventional method of ratoon management.

- Among the plant powders tested, clove (8.0 adults), sweet flag rhizome (6.0 adults), pepper (9.67 adults) and tobacco leaf powders (16.67 adults) were found effective as grain mixing at 0.4% for controlling pulse bruchid in blackgram compared to untreated control (301.33 adults).

- There was no population buildup of pulse bruchid in camphor, ash mixed blackgram in six months period, while 3261 insects emerged from the untreated control inflicting 61.67 per cent damage.

- Standardized the process technology for the preparation of value added products from jaggery *viz*., jaggery-pineapple jellies using liquid jaggery and granular jaggery, jaggery rasgulla and pineapple-jaggery leather, pumpkin halwa using pumpkin pulp and granular jaggery and nutrient rich jaggery based infant food.

- Effect of seed priming with 2% $CaCl_2$for 6 hr on seedling vigor, crop growth and yield of rainfed groundnut revealed that, significantly highest seed yield (4.82 t ha^{-1}) was recorded and was on par with1% $CaCl_2$ for 6 hr.

- The percent incidence of PSND at different days of pest incubation (7,14,21 days respectively) significantly reduced with the application of nanoscale ZnO @ 1000 ppm (12%, 27% & 38% at 7 DPI, 14 DPI & 21 DPI respectively) compared to all other treatments.

- Out of 28 plants visited by different pollinators at Agricultural Research Station, Vijayarai, *A.mellifera* was found to be the dominant pollinator on seventeen plants.In three plants (*Tamarind*, *Portulaca* & Duranta) *Nomia* sp. on two plants (Teak & *Seemarouba*) *Tetragonula irridipennis* have visited. On sunhemp (Yellow butterflies) and on mango black ants (*Monomorium* sp.) were dominant visitors recorded.

- The forecasted prices of jaggery (per quintal) from April 2018 to March 2019 arrived at RARS, Anakapalli are Rs. 2,632 to 2,996, Rs. 2,745 to 3,118, Rs. 2,791 to 3,197, Rs. 2,813 to 3,193, Rs. 2,778 to 3,446, Rs. 2,796 to 3,676, Rs. 2,725 to 3320, Rs. 2,801 to 3,266, Rs. 2,713 to 3,183, Rs. 2,812 to 3,034, Rs. 2,957 to 3,034 and Rs. 3,089 to 3,275, respectively.

- The cost of production per quintal of paddy in direct seeded rice is Rs.1463/- where as in Traditional transplanting rice, it is 1750/- the additional benefit of Rs.21211/- per DSR adopted farmers due to less cost of cultivation and slight increase in yields.

- The return on rupee of investment of greengram, blackgram, redgram and bengalgram were -0.06, -0.31, -0.32 and -0.26 respectively and the cost of production (Rs/q) were Rs.6013.51/-, Rs.6684.28/-, Rs.5409.02 and Rs.4737.88/- respectively.

- Developed a microbial consortium for decomposition of agricultural wastes with a target of meeting good share of nutrients from organic sources and also to protect the soil health.

- The ANGRAU Research Management System (ARMS) portal was brought in to operation since *Kharif* 2017. At present, 270 scientists were using and 1984 technical programmes were uploaded and being updated every month along with other related activities being attended by the scientists.

- A study on crop shift in NC Zone of Andhra Pradesh revealed that 97.2 % of farmers opined that high labour cost is the main reason for crop shift in sugarcane fallowed by unavailability of machinery for farm activities (90%) and labour shortage (83.3%).

- A quantity of 15,100 quintals of breeder seed was produced during 2017-'18 against the target of 11,419 quintals. Large quantity of breeder seed (3,599 q) was produced in rice particularly in five varieties *viz*., BPT 5204, MTU 1001, MTU 1010, MTU 7029 and NLR 34449. Groundnut breeder seed 9246 quintals was also produced during 2017-18 against the target of 7,271 quintals. In addition, 12, 856 quintals of foundation seed was produced in different crops during the year 2017-18.

- A total of 388 Metric tons of powder biofertilizer formulations and 46,000 litres of liquid biofertilizer formulations to a worth of Rs. 311.6 lakhs were produced and supplied to the farming community of Andhra Pradesh during the year 2017-18.

Extension

- The DAATT Centres and KVKs (5 no.) together have tested 47 minikit cultures of 12 crops i.e., Jowar, Bajra, Ragi, Korra, Redgram, Blackgram, Greengram, Bengalgram, Groundnut, Cotton and Chillies at 1773 locations covering all the districts of the State.

- A total of 264 technologies in field crops, horticultural crops, fisheries and home science were assessed by KVKs and DAATT Centres.

- A total of 148 frontline demonstrations were conducted covering pulses, cereals, oilseeds, commercial crops, horticulture crops, fodder crops and livestock.

- A total of 2378 diagnostic surveys were undertaken in different districts of the State. Out of 2378, 817 surveys were undertaken by the DAATTC scientists and ESs alone and 853 by KVKs alone while 712 surveys were conducted jointly by the DAATTC, KVK, ARS Scientists and Officers of DOA.

- About 115 capacity building programmes to Extension Personnel, 560 programmes to Farmers and farm women, 5 programmes to NGOs, 486 method demonstrations, 50 Vocational training programmes, 21 Rythu Sadassus, 624 group discussions and 40 Field Days were organized for the benefit of the farmers etc.

- A total of 624 group discussions were organized by the DAATTCs and KVKs for 11,117 farmers during 2017-'18. The topics included like ICM in bengal gram, groundnut, integrated rodent management in paddy, pink boll worm management in cotton, Zero Tillage Sorghum, viral disease management in *rabi* rice fallow pulses, seed production at village level, *kharif* management practices in vegetable crops, terrace gardening, kitchen gardening, plant protection in mango, nutritional gardening, entrepreneur development, marketing for Taiwan Guava, better management practices in Vannamei culture, use of ICTs in transfer of technology, agriculture farm machinery, importance of women empowerment, diet for school going children etc.

- A total of 40 field days were conducted by DAATTCs and KVKs and benefited 4525 farmers. These included field days on *rabi* sunflower, groundnut, 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 etc.

- The technologies of ANGRAU were displayed digitally in the exhibition of AP Agritech Summit 2017 at Visakhapatnam during 15th -17th November, 2017 for the benefit of farmers. Scientists and students from ANGRAU have also participated in the AP Ag Tech Summit.

- KVK, Garikapadu, Krishna district, ANGRAU organized season long training on integrated pest management on chilli from 13th December 2017 to 11th January 2018 in collaboration with Central IPM Centre, Vijayawada covering different class room lectures and field visits on IPM, IDM, ICM, processing post-harvest, and other aspects related to chillies. About 40 Agricultural Extension Officers from different districts of Andhra Pradesh and Telangana were trained in this programme and certificates were distributed.

- ANGRAU is one of the few Agricultural Universities in the country to start distance education through a private TV channel, ETV under "Annadata-Velugubata" programme from 2nd October, 1998 twice a week, Tuesday and Friday.

- Electronic Media Wing became functional from July 2016 after bifurcation of the university.

- 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) programmes were telecasted during the period under report.

- 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 pre-informed topic for the day from 6.00 pm to 6.55 pm. The Electronic Wing identified the topics and the resource persons for 51 programmes telecasted on Doordarshan phone-in-live programme.

- A blog has been designed for the Electronic Wing, Guntur to provide the agricultural information with customized, visual, multi-perspective and multi-level active service, digital agricultural information resources sharing plan based on cloud computing to integrate and publish the digital agricultural information resources efficiently and timely.

- Agricultural Information and Communica-tion Centre (AI & CC), Guntur has brought out the publications *viz.*, Vyavasaya Panchangam, Journal of Research, ANGRAU (Quarterly), ANGRAU e-News Letter and Vyavasayam – Monthly Telugu Farm Magazine during the year 2017-18.

- Technology Week for a duration of 3-5 days was organized at KVKs of Rastakuntubai, Banavasi and Reddipalli and created awareness on soil health management, farm mechanization, entrepreneurial activities, home science technologies, horticulture, animal health camps and fisheries technologies to the farmers.

- The scientists of the DAATTCs and the KVKs along with other scientists of the Research stations have actively participated in T & V Meetings, Polampilusthondi, AMC level interaction meetings, Janmabhumi – MaaVuru programme and Swachhta Pakhwada programme and interacted with the farmers and suggested solutions for their problems.

- Protection of Plant Varieties and Farmers Right Act 2001 with an objective of creation of awareness among farmers and other stake holders were organized by three (3) Krishi Vigyan Kendras *viz.*, Nellore, Reddipalli and Utukur during the year 2017-'18. A total of three awareness cum training programmes on provisions of PPV and FR act 2001 were organized and 500 farmers have participated.

- Several android based mobile applications were developed and kept for downloading by the farmers free of cost from Google Play Store. The applications developed /supported from ANGARU are Eruvaka, Greeshma, Krishi Vigyan, Manaverusanaaga, Plantix, and also Pocket Cards for the benefit of the farming community.

- 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

- 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 276 number by the teaching faculty, 19 in agricultural engineering, 244 number by the research scientists and 23 number by the extension specialists, besides 20 number under chapters and books, during the report period.

Awards

- Dr. V. Radha Krishna Murthy, Professor, Agronomy, Agricultural College, Bapatla received Life Time Achievement Award at DISHA-2017.

- Dr. Sk. Nafeez Umar, Asst. Professor, Dept. of Statistics & Computer Applications, Agricultural College, Bapatla received outstanding achievement award in the field of Agricultural Statistics at DISHA-2017.

- Dr. D. Ramesh, Asst., Professor, Dept. of Statistics & Computer Applications, Agricultural College, Bapatla received Young Teacher Award in the field of Agricultural Statistics at DISHA-2017.

- Dr. P. R. K. Prasad, Professor & Head, Dept. of Soil Science & Agricultural Chemistry, Agricultural College, Bapatla received Ugadi Puraskaram Award for the outstanding performance in the discipline of Soil Science & Agricultural chemistry.

- Dr. R. Naseeruddin, Assistant Professor, Agricultural College Farm, Bapatla received best oral presentation award from University of Kelentan, Malaysia during National Conference on "Emerging Trends in Agri-nanotechnology – 2017" on 2nd & 3rd November, 2017, held at RARS, Tirupati.

- Dr. A.V. Nagavani, Professor, Dept. of Agronomy, S.V. Agricultural College, Tirupati received Meritorious teacher Award for the year 2015 in 49th Annual Convocation held at Nellore on 04.10.2017.

- Dr. M.V.S. Naidu, Professor, Dept. of SSAC, S.V. Agricultural College, Tirupati received State Level Best Teacher Award.

- Dr. M.V.S. Naidu, Professor, Dept. of SSAC, S.V. Agricultural College, Tirupati received Prof. Sant Singh Award.

- Dr. M. Reddi Sekhar, Professor, Dept. of GPBR, S.V. Agricultural College, Tirupati received State Best Teacher for 2017.

- Dr. V. Umamahesh, Assistant Professor, Dept. of Crop Physiology, S.V. Agricultural College, Tirupati received Meritorious teacher Award for the year 2015 presented in 49th Annual Convocation held at Nellore on 04.10.2017.

- Dr. B. Ravindra Reddy, Associate Professor, Dept. of Statistics & Comp. Applications, S.V. Agricultural College, Tirupati received Best Research Paper Award from 'Society of Agri-nanotechnology' for Best Research paper 2017.

- Dr. K. Madhusudhana Reddy, Assistant Professor & Head, Dept. of Agril. Engineering, S.V. Agricultural College, Tirupati received Vasantha Rao Naik award for outstanding contributions in dry-land Agriculture for the 2016 on the occasion of ICAR foundation 16th July, 2017 at IARI, New Delhi.

- Dr. V. Umamahesh, Assistant Professor, Dept. of Crop Physiology, S.V. Agricultural College, Tirupati received Excellence in Teaching Award by SIRI, Warangal based N.G.O. during the national seminar on doubling the farmers income organized at S.V. University, Tirupati – 2017.

- Dr. P. Seetharamu, Assoc. Professor, Dept. of Entomology, Agricultural College, Naira received Fellow of Plant Protection Association of India (FPPAI) at Brain storming Session on" Emerging Plant Protection Technologies Opportunities and Challenges" at NIPHM, Hyderabad on 20.04.2018.

- Dr.Ch.Sreenivas, Associate Professor (SSAC), Agricultural College, Rajamahendravaram received Best Oral Presentation Award from UMK, Malasia in Agrinano-2017 conference on 3rd, November, 2017 at Tirupati.

- Dr.Ch.Sreenivas, Associate Professor (SSAC), Agricultural College, Rajamahendravaram selected for Out Standing Scientist award, 2018 in International Journal of Tropical Agriculture in "7th International Conference".

- Dr. M. S.Chaithanya Kumari, Associate Professor, College of Home Science, Guntur received Meritorious Teacher Award presented at the 49th annual convocation held on 4th October 2017 at Nellore.

- Mrs. M. Sandhya, Assistant Professor, College of Home Science, Guntur received Meritorious Teacher Award in the Faculty of Agricultural Engineering & Technology presented at the 49th annual convocation held on 4th October 2017 at Sri Venkateswara Kasturba Kalakshetram, Nellore.

- Dr. B.V.S. Prasad, Professor & University Head, College of Agricultural Engineering, Bapatla received "State Best Teacher" award by Government of Andhra Pradesh.

- Dr. A. Ashok Kumar, Assistant Professor, College of Agricultural Engineering, Bapatla received "Young Engineer Award" by the Institute of Engineers India (IEI) in Agricultural Engineering.

- Dr. Ch.V.V. Satyanarayana, Professor & Head (Food Engg.), College of Food Science & Technology, Bapatla received ISAE Fellow Award.

- Dr.M.Bharathalakshmi, Principal Scientist (Sugarcane), RARS, Anakapalle received Best Researcher Award for 2016 in the National Workshop organized by IRDP group of journals, Chennai, India on 14.10.2017.

- Dr.Ch.Mukunada Rao, Principal Scientist (Crop Physiology), RARS, Anakapalle received an Out Standing Scientist Award 2017 / ICAHPS by International Journal of Tropical Agricultural of Serials publications private limited, New Delhi on 24.7.2018.

- Dr.Ch.Mukunada Rao, Principal Scientist (Crop Physiology), RARS, Anakapalle received Bharat JyothiPuraskar 2018 award by Best Citizen Publishing Home, New Delhi, Feb, 2018.

- Dr.Ch.Mukunada Rao, Principal Scientist (Crop Physiology), RARS, Anakapalle received Best Research Scientist award by IRDP journal at Chennai on 14.10.2017.

- Dr.P.V.K.Jagannadha Rao, Principal Scientist (Ag Engg.), RARS, Anakapalle has been selected by research editors of International publisher "Rufacimento International", New Delhi for inclusion of his bio-graphical note in the 'Asia Pacific Who's Who (Vol.XVI) on 14.09.2017.

- Dr. K. Vijay Krishna Kumar, Senior Scientist & Head and Dr. N. Raja Kumar, Senior Scientist (Plant Pathology), RARS, Anakapalle were awarded Best Achievement award for his contribution to Asian PGPR society during 5th Asian PGPR, International Conference for Sustainable Agriculture held at Bogor, Indonesia held from 16th to 19th July at Bogor, Indonesia.

- Dr.V.Gouri, Senior Scientist (Agronomy), RARS, Anakapalle received Best Poster Award for the research article entitled "Effect of micro nutrient application through soil and drip fertigation on yield and quality of sugarcane" at the International Symposium on "Sugarcane Research Since Co 205:100 years and beyond, Sucrosym-2017, held at Coimbatore from 18th to 21st September, 2017.

- Dr. Manukonda Srinivas, Senior Scientist (Agronomy), RARS, Maruteru received World Agricultural Excellence Award 2017 sponsored by World Achievers Foundation, Kolkata during Common Wealth Vocation University Doctoral Convocation on 25th June, 2017 at Mumbai.
- Dr.M.Girija Rani, Scientist (Genetics and Plant Breeding), RARS, Maruteru received MandavaVenkata Ramaiah Gold medal and Vadadi Narasimha SwamyMemorial Gold medal on 04-10-2017 at 49th Annual convocation of ANGRAU at Nellore.
- Dr. A.Sireesha, Scientist (Soil Science), RARS, Maruteru received Acharya NG Ranga Young Scientist Award on 04-10-2017 at 49th Annual convocation of ANGRAU at Nellore.
- Dr. M.Sesha MahaLakshmi, RARS, Lam Received Meritorious Research Scientist Award from the University on 04.10.2017 during 49th Annual Convocation at Nellore.
- Dr.T.Murali Krishna, Principal Scientist (Entomology), RARS, Tirupati received Best Poster presentation award for the research article on *"Detection of Pesticide Residues in Groundnut leaf Samples"* in National Seminar on Emerging Trends in Agri-Nanotechnology" held from 2nd - 3rd November, 2017.
- Dr. L. Prasanthi Principal Scientist (PB), RARS, Tirupati received Mandava Venkataramaiah best Researcher Award for the year 2016-17 on 04.10.2017 from ANGRAU.
- Dr.M.V.Ramana, Principal Scientist (Ag.Engg), RARS, Tirupati received Australian award fellowship by ICE Warm International center of excellence in Water Resources Management, Adelaide, Australia, Government of Australia.
- Dr.K.John, Principal Scientist (Pl.Br.), RARS, Tirupati received the Professionally Excellence award in the International Conference held at Jaipur on 08.11.2017.
- Dr.K.John, Principal Scientist (Pl.Br.) RARS, Tirupati received the Award of Ugadi Puraskaram-2018 from the Hon'ble Chief Minister of Andhra Pradesh on 18.03.2018.
- Dr.T.N.V.K.V.Prasad, Senior Scientist (Soil Physics), RARS, Tirupati received ASN-YSM Young Scientist award-2017 from Academy of Sciences, Malaysia.
- Dr.T.N.V.K.V. Prasad, Senior Scientist (Soil Physics), RARS, Tirupati received Australian Endeavour Awards Ambassador Award-2018 from Australian High Commissioner to INDIA.
- Dr.T.N.V.K.V.Prasad, Senior Scientist (Soil Physics), RARS, Tirupati received prestigious Smt.Vallabhaneni Lakshmamma Gold medal (First person to receive this award).
- Dr.K.V.Naga Madhuri, Senior Scientist (Soil Science), RARS, Tirupati received Young Scientist Innovator award from National Agricultural Sciences, Malaysia during National conference on Agrinano-2017.

- Dr. P.Latha, Senior Scientist (Crop Physiology), RARS Tirupati received Meritorious Research Scientist award during 49th Annual Convocation of ANGRAU held at Nellore on 04.10.2017.

- Dr. A.R. Nirmal Kumar, Scientist (Crop Physiology), RARS Tirupati received International award for the best poster presentation from Malaysia Kelantan University, Malaysia, during the National conference on Emerging trends in Agrinano technology 2017 held at Tirupati on 2-3, November 2017.

- Dr.Kadiri Mohan, Scientist (Agril.Extn), RARS Tirupati received best oral paper presentation awards by UMK, Malaysia received in the Agrinano 2017, National Conference held on 2-3 Nov 2017 at RARS, Tirupati.

- Dr. S. KhayumAhammed, RARS, Nandyal received Sri Veerapaneni Narsimham Gold Medal Award, ANGRAU, Lam, Guntur.

- Dr. V. Jayalakshmi, RARS, Nandyal received Ugadi Puraskaram, Govt. of Andhra Pradesh.

- Dr.V.Gouri, Senior Scientist (Agronomy), ARS, Vijayarai received best poster award for poster presentation on "Effect of Micronutrient Application through Soil and Drip Fertigation on Yield and Quality of Sugarcane" during International Symposium on Sugarcane Research Since 100 Years and Beyond (SucroSym 2017) held at Sugarcane Breeding Institute, Coimbatore from 18th-21st, September,2017.

- Dr. K. Jhansi, Principal Scientist (Entomology), SRS, Vuyyuru received V. R. Durgamba Charitable Trust Endowment Prize for the year 2015-16 during the 49th Annual Convocation for organic research in sugarcane held on 04-09-2017 in Sri Venkateswara KasturbaKalakshetram, Nellore.

- Dr. P. Ramesh Babu, Principal Scientist (Plant Breeding), ARS, Nellore received Padmasri. Dr. I.V. Subba Rao RytuNestham Puraskaram-2017 in Rytu Nestham Puraskaralu organized at Vijayawada on 03.10.17.

- Dr. P. Ramesh Babu, Principal Scientist (Plant Breeding), ARS, Nellore received Sri Neelakantapuram Kaverappa Gold Medal for the year 2015-16 in 49th Annual Convocation held at Nellore on 04.10.2017.

- Dr.K.L.Rao Krishi Vigyan Kendra, Garikapadu, Krishna District Received "Best KVK award for the year 2016-17" in 47th REAC meeting on 21.12.2017.

- Dr.M.Rajasri, Programme Coordinator, Dr. K L Rao Krishi Vigyan Kendra, Garikapadu, Krishna district, Andhra Pradesh received "Ugadi Puraskaralu Award 2018" on 18.03.2018.

- Dr. CH. Varaprasad Rao, KVK, Darsi received best scientist under extension category in 49th Convocation of ANGRAU held at Nellore on 04.10.2017.

Other events

Inauguration

- Inaugurated Geo Spatial Technology Centre at RARS, Lam and also conducted interaction meeting with the scientists of ANGRAU, NRSC and APSAC on 01.06.2017.

- The Engineering Division of ANGRAU at Rajamahendravaram was inaugurated on 13.12.2017 by Dr. G.V. Nageswara Rao, Member, Board of Management, ANGRAU in the presence of Dr. P. Rambabu, Associate Dean, Agricultural College, Rajamahendra-varam, Sri B. Narasinga Rao, Deputy Executive Engineer along with his staff.

- Inaugurated the Bio-control unit and laid foundation stone for liquid bio-fertilizer unit, Centre of Excellence in sugarcane research, and Advanced Post-Harvest technology & Premier training institute at Regional Agricultural Research Station, Anakapalle by Sri Somireddy Chandramohan Reddy, Hon'ble Minister for Agriculture, Horticulture, Sericulture and Agri-Processing, Sri Ganta Srinivasa Rao, Hon'ble Minister for Human Resources Development (Primary Education, Secondary Education, Higher & Technical Education), Smt. Lalam Bhavani Bhaskar, Chairperson, Zilla Parishad, Visakhapatnam, Hon'ble Vice Chancellor of ANGRAU, Sri Peela Govinda Satyanarayana, MLA, Anakapalle, Sri K.S.N.S. Raju, MLA, Chodavaram, Joint Collector-II, Visakhapatnam, and University officers, ANGRAU, Guntur on 29.01.2018.

- Laid foundation stone for bio-fertilizer units at RARS, Tirupati on 23.02.2018 on the eve of *Kisan Mela* celebrations.

- Director of Research along with Director of Extension, Dean of Student Affairs and Dean of Home Science, ANGRAU, Guntur inaugurated Trichocard production unit constructed under TSP of ICAR – AICRP on bio control, RARS, Anakapalle at Asarada tribal village, G.K.Veedhi mandal, Chintapalle.

- Custom Hiring Centre under R K V Y Project was inaugurated on 10.04.2018 at Dr. K L Rao, KVK, Garikapadu.

BhoomiPooja

- The '***BhoomiPooja'*** was performed in the endowments land on 08-12-2017 for construction of Agricultural College, Rajamahendravaram by Dr. G.V. Nageswara Rao, Hon'ble Member of Board of Management, ANGRAU, Dr. P. Rambabu, Associate Dean, and staff of Agricultural College, Rajamahendravaram.

- Director of Extension performed Bhoomi Puja for construction of Administrative Building at KVK, Darsi on 4th March 2018. Estate Officer, Sri P. V. Narasimha Rao; Dr. P. Jayarami Reddy and Dr. B.Vijayabhi-nandana, Principal Scientists have participated in the event.

- 'Bhoomi pooja' was performed by Hon'ble Vice Chancellor for construction of Mens' Hostel at Lam on 26.04.2018. The staff of Acharya N.G Ranga Agricultural University, Lam, Guntur were present at the function.

49th Annual Convocation

- The 49th Annual Convocation was held on the 4th of October, 2017 at Shri Venkateswara Kasturba Kalakshetram, Nellore. The Hon'ble Vice President of India Shri M. Venkaiah Naidu garu was the Chief Guest.

MoUs

- MoU between ANGRAU and Jigjiga University, Ethiopia is in process (sent to Department of Agricultural Research and Education (DARE), Ministry of Agriculture & Farmer's Welfare, Govt. of India, New Delhi for approval).
- MoU between ANGRAU and Ethiopian Somali Region Pastoral And Agro-Pastoral Research Institute (ESoRPARI) is in process (sent to DARE for approval).
- Entering into MoU with University of Western Australia, Australia (approved by the ICAR and final MoU sent UWA for signing by the competent authority).
- Renewed the MoU between Acharya N.G. Ranga Agricultural University and Centre for Cellular and Molecular Biology (CCMB).

Visitors

- Dr. Dato Imbrahim Bin Che Omar, Deputy Vice-Chancellor, University of Malasia Kelantan visited and discussed issues pertaining to students and faculty exchange programme, collaborative research programmes and organization of joint conferences etc., on 03.01.2018 & 04.01.2018 at Administrative office, ANGRAU, Lam, Guntur.
- South Asia Representative, IRRI, India and Team visited 29-06-2017 and discussed about implementation of SRMS project (AP-IRRI collaborative project).

Foreign Tours for Participation in Seminars / Conferences / Workshops

- Seventeen faculty members from the three Faculties of Agriculture participated in the overseas Conferences / Workshops / Seminars held in various foreign countries like Singapore,Thailand, Indonesia, USA, Ethiopia, Japan, USA, Vietnam and Philippines, Morocco and Sri Lanka.

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 N G Ranga Agricultural University in honor 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 and six affiliated colleges. The University also offers two year Diploma in Agriculture, Diploma in Organic Farming 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 39,733 students, comprising 29,499 graduates and 10,243 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 412 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 agro-techniques 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 Organic Farming 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 13 *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 54th 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 2017 to May 2018.

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

from 279th to 285th meetings of Board of Management

Chairman	**Dr V Damodara Naidu** 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 (For 279th and 280th Meeting of Board of Management only)
	Dr. M. Hari Jawaharlal, I A S Director of Agriculture (from 281st to 284th Meeting of Board of Management only)
	Sri D. Muralidhar Reddy, I A S Special Commissioner for Agriculture & Director of Agriculture (For 285th Meeting of Board of Management)
	Dr G Somasekharam, M.V.Sc, Director of Animal Husbandry

	Y Ramakrishna Addl. Secretary to Government, Financial Department (For 279th and 280th Meeting of Board of Management only)
Other Members *ICAR Nominee*	**Dr M B Chetti** Assistant Director General (ADG), Agricultural Education Division, ICAR, New Delhi
Distinguished Agricultural Scientist	**Dr D S Koteswara Rao** Professor (Retd.), ANGRAU (For 284th & 285th Meeting of Board of Management)
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
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 (From 279th to 283rd Meeting of Board of Management only)
	Sri Bobbili Chiranjeevulu Hon'ble Member of Legislative Assembly, Govt. of Andhra Pradesh (For 284th & 285th Meeting of Board of Management)
	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 (From 279th to 284th Meeting of Board of Management only)
	Dr D Bhaskara Rao Registrar (For 285th Meeting of Board of Management)

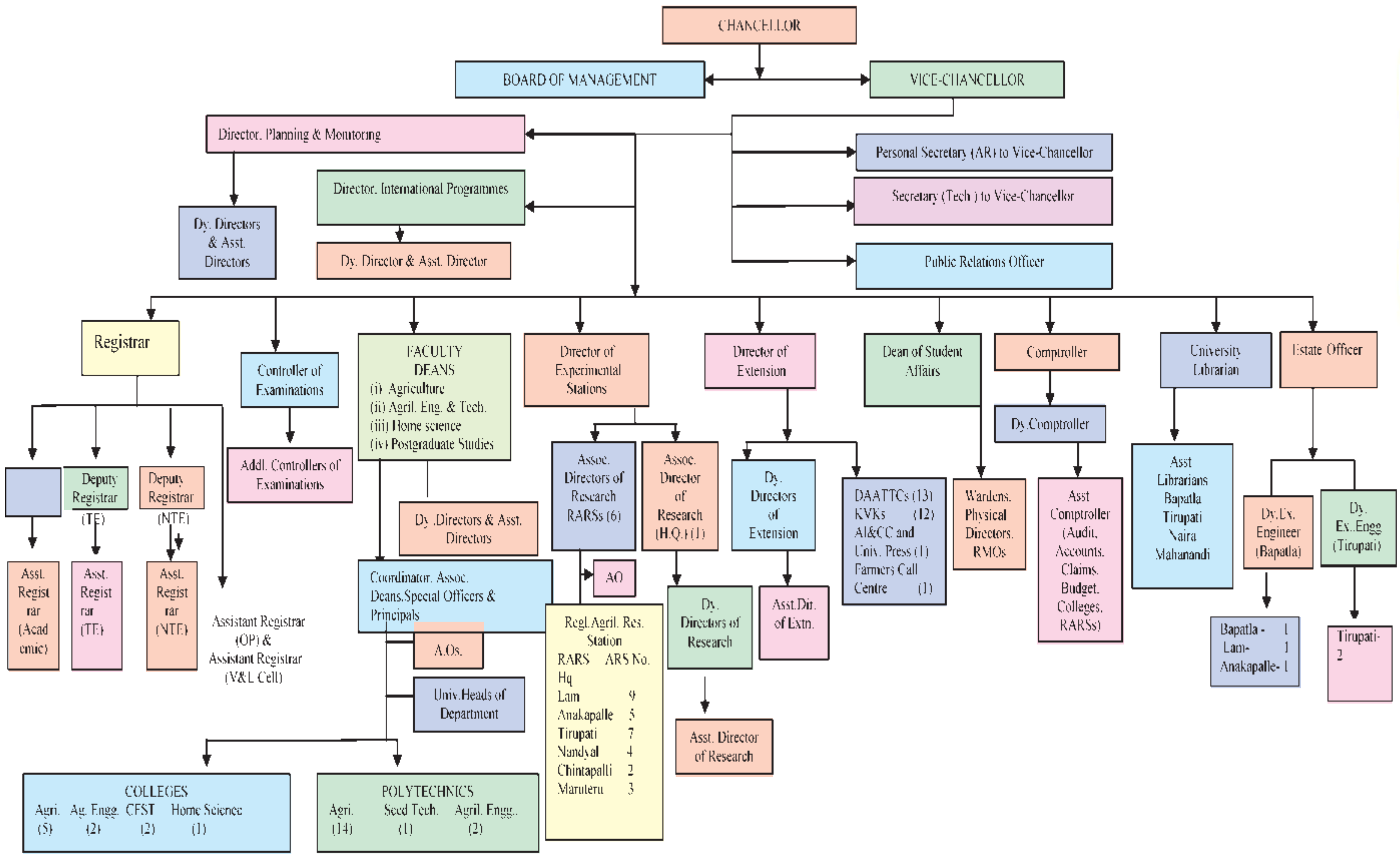


Fig. 1: ORGANOGRAM OF THE UNIVERSITY

8

2. Officers of the University

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

University Officers	
Vice-Chancellor	**Sri B Rajsekhar** (Up to 05.06.2017)
	Dr. V. Damodara Naidu (05.06.2017 onwards)
Registrar	**Dr T V Satyanarayana** (Up to 24.03.2018)
	Dr D Bhaskara Rao (25.03.2018 onwards)
Comptroller	**Sri K L Raju** (Up to 31.01.2018)
	Dr A Siva Sankar (Up to 23.03.2018)
	Dr A Subrahmanyeswara Rao (24.03.2018 onwards)
Dean of Postgraduate Studies	**Dr R Veeraraghavaiah** (Up to 24.03.2018)
	Dr D Balaguravaiah (25.03.2018 onwards)
Dean of Agriculture	**Dr T Ramesh Babu** (Up to 24.03.2018)
	Dr J Krishna Prasadji (25.03.2018 onwards)
Director of Experimental Stations	**Dr N V Naidu**
Director of Extension	**Dr K Raja Reddy** (Up to 24.03.2018)
	Dr P Ram Babu (25.03.2018 onwards)
University Librarian	**Dr R Sarada Jayalakshmi Devi** (Up to 23.03.2018)
	Dr S R Koteswara Rao (24.03.2018 onwards)
Controller of Examinations	**Dr A Siva Sankar**
Dean of Agril. Engg. & Technology	**Dr D Bhaskara Rao** (Up to 26.03.2018)
	Dr K Yella Reddy (27.03.2018 onwards)

Dean of Home Science	**Dr T Neeraja** (Up to 23.03.2018)
	Dr L Uma Devi (24.03.2018 onwards)
Dean of Student Affairs	**Dr P Sambasiva Rao** (Up to 23.03.2018)
	Dr S R Koteswara Rao (24.03.2018 onwards)
Estate Officer	**Sri K Purushotham** (Up to 29.06.2017)
	Sri P V Narasimha Rao (30.06.2017 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	**Sri B Rajsekhar, I A S** Special Chief Secretary to Govt. (FAC), Agriculture & Cooperation Dept, Govt. of Andhra Pradesh and Vice Chancellor (i/c)
	Dr V Damodara Naidu Vice Chancellor
Ex-Officio Secretary	**Dr T V Satyanarayana** Registrar
Members	Vide Annexure I

4. Research and Extension Advisory Council

The *Research and Extension Advisory Council (REAC)*, headed by Vice-Chancellor with Director of Experimental Stations, Director of Extension, 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 7 times during the year under report. The dates and venues of the meetings are given below.

S. No.	No. of the Board Meeting	Date	Venue
1	279th	15.06.2017	RARS, Anakapalle
2	280th	12.08.2017	Lam, Guntur
3	281st	04.10.2017	Agricultural Research Station, Nellore
4	282nd	30.11.2017	Lam, Guntur
5	283rd	24.01.2018	Rajamahendravaram
6	284th	24.03.2018	Lam, Guntur
7	285th	26.05.2018	RARS, Chintapalle

2. Academic Council

The Academic Council normally meets once in six months. The 98th meeting of Academic Council was held on the 09th of June, 2017 at Lam, Guntur.

The 99th meeting of Academic Council was held on the 20th of December, 2017 at Advanced P.G. Centre, Lam, Guntur.

3. Research and Extension Advisory Council (REAC)

The 47th REAC Meeting was held on 21st & 22nd December, 2017 at Regional Agricultural Research Station, Lam, Guntur.

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.

Table 1: Faculty Strength in the ANGRAU during 2017-18

S. No.	Item	Professor		Associate Professor		Assistant Professor		Total	
		S	IP	S	IP	S	IP	S	IP
1.	Teaching	13	10	58	37	210	143	281	190
2.	Research	14	09	78	63	216	169	308	241
3.	Extension	-	-	13	13	119	84	132	97
4.	Administration	10	33	-	01	05	06	15	40
	Total	**37**	**52**	**149**	**114**	**550**	**402**	**736**	**568**

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, fifteen Agricultural Polytechnics, one Agricultural Polytechnic (organic farming) 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.

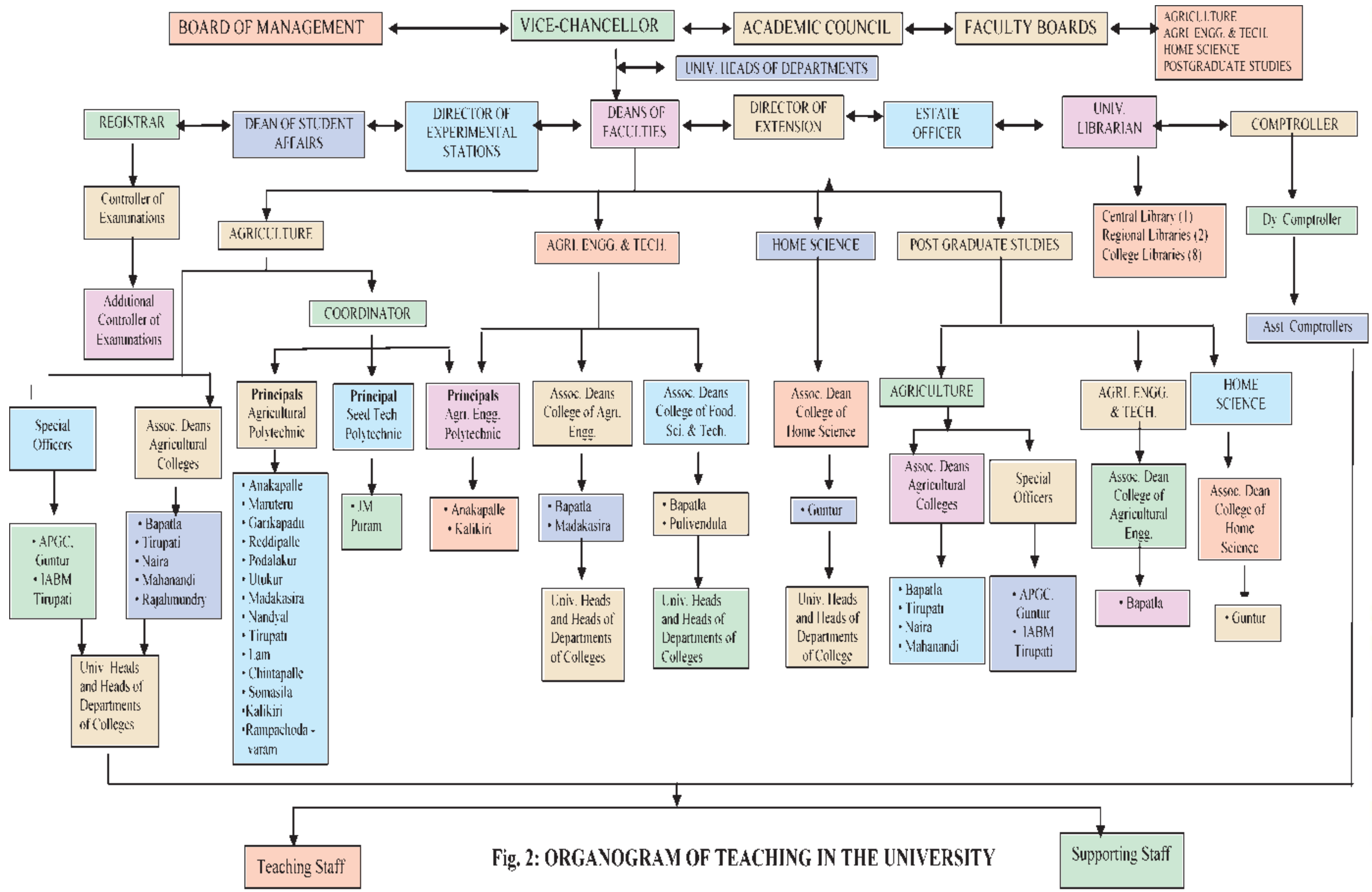


Fig. 2: ORGANOGRAM OF TEACHING IN THE UNIVERSITY

Table 2. Teaching Institutes of the University

S. No.	Teaching Institute with Location	Year of Establishment	Name of the Associate Dean / Principal	Courses Offered
Faculty of Agriculture				
1.	Agricultural College Bapatla – 522 101 Guntur Dist.	1945	Dr.P.R.K.Prasad (upto 31.07.2017) Dr. D. Lokanadha Reddy (from 31.08.2017)	B.Sc. (Ag.) M.Sc.(Ag.) Ph.D. (Ag.)
2	S V Agricultural CollegeTirupati – 517 502 Chittoor Dist.	1961	Dr. V. Rajarajeswari (up to 31.03.2018) Dr. P. Ramesh Babu (from 01.04.2018)	B.Sc. (Ag.) M.Sc.(Ag.) Ph.D. (Ag.)
3	Agricultural Collège Naira – 532 185 Srikakulam Dist.	1989	Dr. R. Ankaiah (upto 11.10.2017) Dr. P. V. Krishnayya (from 12.10.2017)	B.Sc. (Ag.) M.Sc. (Ag.)
4	Agricultural College Mahanandi- 518 502 Kurnool Dist.	1991	Dr. D. Balaguaravaiah (from 27.04.2016 upto 24.03.2018) Dr. B. Narendra (from 25.03.2018)	B.Sc. (Ag.) M.Sc. (Ag.)
5.	Agricultural College Rajamahendravaram – 533 103, East Godavari Dist.	2008	Dr. P. Jayarami Reddy (upto 05.09.2017) Dr. P. Rambabu (from 06.09.2017 to 24.03.2018) Dr. G. V. Nageswara Rao (from 25.03.2018)	B.Sc. (Ag.)
6.	Advanced Post-Graduate Centre, Lam, Guntur-522034, Guntur Dist.	2015	Dr. K. L. Narasimha Rao	M.Sc. (Ag.) M.Sc. (H.Sc.) Ph.D. (Ag.) Ph.D. (H.Sc.)
7.	Institute of Agri. Business Management, S.V. Agricultural College, Tirupati – 517 502, Chittoor Dist.	2015	Dr. I. Bhavani Devi	MBA (ABM)
Agricultural Polytechnics				
1.	Agricultural Polytechnic Regional Agricultural Research Station Maruteru – 534 122 West Godavari Dist.	1999	Dr.P.V.Satyanarayana (upto 05-09-2017) Dr. P. Munirathnam (from 06-09-2017)	Diploma in Agriculture

S. No.	Teaching Institute with Location	Year of Establishment	Name of the Associate Dean / Principal	Courses Offered
2.	Agricultural Polytechnic Regional Agricultural Research Station Anakapalle – 531 001 Visakhapatnam Dist.	1999	Dr. N. Venugopalarao (upto 30.08.2017) Dr. J. Krishna Prasadji (from 31.08.2017 to 24.03.2018) Dr. M. Bharatha Lakshmi (from 25.03.2018)	Diploma in Agriculture
3.	Agricultural Polytechnic Podalakur– 524345 SPS Nellore Dist.	2005	Dr. D. Kodandarami Reddy	Diploma in Agriculture
4	Agricultural Polytechnic Reddipalli– 515001 Anantapuramu	2005	Dr. K. Bhargavi	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	Smt. D. Sudha Rani (from 01.06.2017 to 03.09.2017) Dr. Y. Padma Latha (from 04.09.2017)	Diploma in Agriculture
7.	Agricultural Polytechnic Madakasira – 515 301 Anantapuramu Dist.	2007	Dr. B. Narendra (upto 26.09.2017) Dr. C. Ramana (from 26.09.2017)	Diploma in Agriculture
8	Agricultural Polytechnic Regional Agricultural Research Station, Tirupati – 517 502 Chittoor Dist.	2011	Dr. T. C. M. Naidu (upto 28.02.2018) Dr. P. Rajasekhar (from 01.03.2018) Diploma in Agriculture	Diploma in Agriculture
9.	Agricultural Polytechnic Regional Agricultural Research Station, Nandyal – 518 502 Kurnool Dist.	2011	Dr. B. Gopal Reddy (upto 31.07.2017) Dr. M. Subba Rao (from 01.08.2018)	Diploma in Agriculture
10.	Agricultural Polytechnic Somasila, SPS Nellore Dist.	2012	Dr. D. Kondandarami Reddy (from 01.06.2016 to 24.11.2017) Dr. M. C. Obaiah (from 24.11.2017)	Diploma in Agriculture

S. No.	Teaching Institute with Location	Year of Establishment	Name of the Associate Dean / Principal	Courses Offered
11.	Agricultural Polytechnic Kalikiri- 517234 Chittoor Dist.	2012	Sri. A. Subramanyam	Diploma in Agriculture
12.	Agricultural Polytechnic Rampachodavaram Rajahmundry – 533 103 East Godavari Dist.	2013	Dr. P. Jayarami Reddy (from 28.04.2016 to 05.09.2017) Dr. P. Rambabu (from 06.09.2017 to 24.03.2018) Dr. T. V. P. Rajendra Prasad (from 25.03.2018)	Diploma in Agriculture
13	Agricultural Polytechnic Jangameswarapuram, Gurajala-522415 Guntur Dist.	2015	Dr. N. Sambasiva Rao	Diploma in Agriculture
14	Agricultural Polytechnic Ghantasala (MD), Krishna (Dist.) - 521133	2016	Dr. Y. Varaprasad (from 01.06.2017 to 31.08.2017) Dr. K. Srinivasulu (from 08.09.2017)	Diploma in Agriculture
15	Agricultural Polytechnic Ramagiri, Ramagiri (Mandal), Anthapuram Dt	2016	Dr. B. Ravindra Reddy (upto 06.12.2017) Dr. Y. Narasimhudu (from 07.12.2017)	Diploma in Agriculture
16	Agricultural Polytechnic (Seed Technology) Jangameswarapuram, Gurajala-522415 Guntur Dist.	2011	Dr. N. Sambasiva Rao	Diploma in Seed Technology
17	Agricultural Polytechnic (Organic Farming) Regional Agricultural Research Station, Chintapalle-531 111 Visakhapatnam Dist.	2016	Dr. G. Jogi Naidu	Diploma in Organic Farming
Faculty of Agricultural Engineering & Technology				
1.	College of Agricultural Engineering, Bapatla–522 101 Guntur Dist.	1990	Dr. A. Mani	B.Tech. (Ag. Engg.), M.Tech. (Ag. Engg.) Ph.D.(Ag. Engg.)

S. No.	Teaching Institute with Location	Year of Establishment	Name of the Associate Dean / Principal	Courses Offered
Faculty of Agricultural Engineering & Technology				
1.	College of Agricultural Engineering, Madakasira - 515 301 Anantapuram Dist.	2008	Dr. C. Ramana (upto 05.07.2018) Dr. P. V. K. Jagannadha Rao	B.Tech. (Ag.Engg.) Engineering
2.	College of Food Science & TechnologyBapatla–522 101 Guntur Dist.	2003	Dr. Sivala Kumar (upto 31.08.2017) Dr. D. Vishnu Sankar Rao (from 01.09.2017)	B.Tech. (Food Technology)
3.	College of Food Science & Technology Pulivendula – 516 390 YSR Dist.	2008	Dr. S. Kaleemullah (upto 30.06.2018) Dr. D. D. Smith (from 01.07.2017)	B.Tech. (Food Technology)
Agricultural Engineering Polytechnics				
1.	Polytechnic of Agricultural Engineering, Kalikiri, Chittoor Dist.	2013	Sri A. Subramanyam	Diploma in Agricultural Engineering
2.	Polytechnic of Agricultural Engineering, Anakapalle, Vishakapatnam Dist.	2013	Dr. N. Venugopalarao (upto 30.08.2017) Dr. J. Krishna Prasadji (from 31.08.2017 to 24.03.2018) Dr. M. Bharatha Lakshmi (from 25.03.2018)	Diploma in Agricultural Engineering
Faculty of Home Science				
1.	College of Home Science Guntur	2013	Dr. L. Uma Devi (upto 24.03.2018) Dr. T. Neeraja (from 25.03.2018 to 25.04.2018) Dr. L. Uma Devi (from 26.04.2018	B.Sc. (Hons.) Home Science B.Sc. (Hons.) Community Science

2. Admission Strength and Out-turn of Students

During the academic year 2017-18, a total of 1777 students were admitted in the University. Out of them, 1030 were admitted in undergraduate courses,142 in masters, 53 in doctoral programmes and 552 in diploma courses. Student enrolment by courses and year-wise is presented in Annexure-IV and students strength in various colleges of the ANGRAU is shown in Annexure-V.

A total number of 1422 students were admitted in to the Faculty of Agriculture, comprising of 768 in undergraduate courses, 115 in postgraduate programmes, 44 in doctoral programmes and 495 in diploma programmes. The Faculty of Agricultural Engineering & Technology comprised of 187 undergraduate students, 14 masters students, 6 doctoral students and 57 diploma students, with the total student strength of 264. Home Science Faculty comprised of 75 Undergraduate students, 13 postgraduate students and three doctoral students, with a total strength of 91.

A total number of 5201 students are on rolls of the University in different undergraduate, postgraduate, doctoral and diploma programmes. Out of them 2223 were boys and 2978 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, Students on Rolls and Out-turn of Students under Various Programmes during the Year 2017-18

Degree	Faculty & Course	Intake Capacity	Students Admitted			Students on Rolls			Students Out-turn		
			Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Faculty of Agriculture											
Diploma	Diploma in Agriculture	520	201	253	454	351	431	782	150	178	328
	Diploma in Seed Tech.	25	06	13	19	15	25	40	13	10	23
	Diploma in Organic Farming	25	06	16	22	13	31	44	09	13	22
	Total (Diploma)	**570**	**213**	**282**	**495**	**379**	**487**	**866**	**172**	**201**	**373**
UG	B.Sc. (Ag.)	560	326	442	768	1143	1510	2653	218	324	542
PG	M.Sc. (Ag.)	119	50	48	98	117	129	246	67	81	148
	M.Sc. (ABM)	16	11	06	17	19	10	29	08	04	12
	Total (PG)	**135**	**61**	**54**	**115**	**136**	**139**	**275**	**75**	**85**	**160**
Doctorate	Ph.D. (Ag.)	37	18	26	44	54	72	126	14	21	35
Sub Total (Agriculture)		**1302**	**618**	**804**	**1422**	**1712**	**2208**	**3920**	**479**	**631**	**1110**
Faculty of Agricultural Engineering & Technology											
Diploma	Diploma in Ag. Engg.	60	21	36	57	71	96	167	20	32	52
UG	B. Tech. (Ag. Engg.)	110	63	36	99	257	179	436	62	48	110
	B. Tech. (Food Sci. & Tech.)	70	37	51	88	155	209	364	47	76	123
	Total (UG)	**180**	**100**	**87**	**187**	**412**	**388**	**800**	**109**	**124**	**233**
PG	M. Tech. (Ag. Engg.)	13	07	07	14	10	19	29	05	12	17
Doctorate	Ph.D. (Ag. Engg.)	04	05	01	06	18	08	26	03	07	10
Sub Total (Agril. Engg.)		**257**	**133**	**131**	**264**	**511**	**511**	**1022**	**137**	**175**	**312**
Faculty of Home Science											
UG	B.Sc. (Community Science)	83	-	75	75	-	229	229	-	27	27
PG	M.Sc. (Home Science)	12	-	13	13	-	27	27	-	14	14
Doctorate	Ph.D. (Home Science)	02	-	03	03	-	03	03	-	-	-
Sub Total (Home Science)		**97**	-	**91**	**91**	-	**259**	**259**	-	**41**	**41**
Total (Diploma)		630	234	318	552	450	583	1033	192	233	425
Total (U.G)		823	426	604	1030	1555	2127	3682	327	475	802
Total (P.G)		160	68	74	142	146	185	331	80	111	191
Total (Ph.D)		43	23	30	53	72	83	155	17	28	45
GRAND TOTAL		**1656**	**751**	**1026**	**1777**	**2223**	**2978**	**5201**	**616**	**847**	**1463**

Note: 1. ICAR and other States – 25% of seats in M. Sc. Through All India Entrance Examination conducted by ICAR
2. Foreigners / ICAR Employees – 10% in M. Sc. / Ph. D. Courses

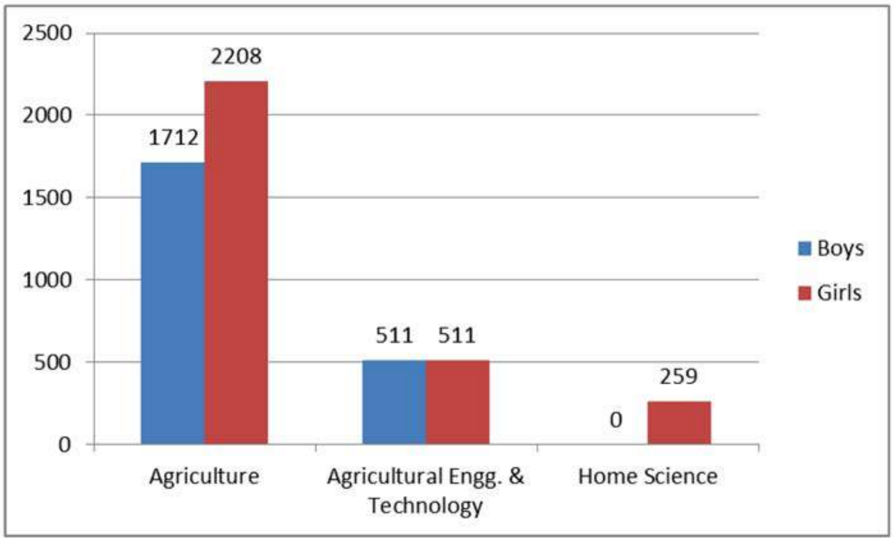


Fig. 3: Faculty-wise Students on Rolls

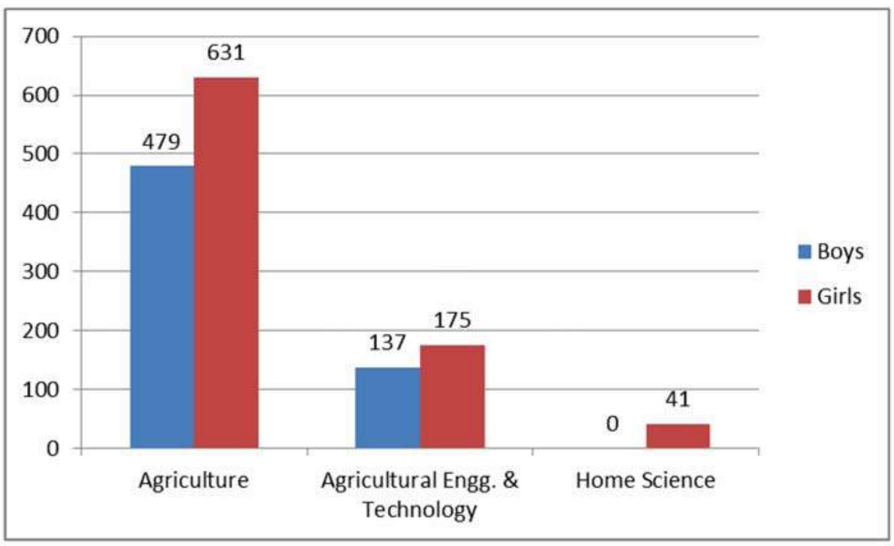


Fig. 4: Faculty-wise Students Passed

A total number of 1463 students comprising of 1110 in Agriculture, 312 in Agricultural Engineering & Technology and 41 in Home science faculties have passed out of the different portals of the University during the academic year 2017-18.

In the Faculty of Agriculture, 542 undergraduates, 160 postgraduates and 35 at doctoral level have passed. In addition, 328 students obtained their diploma in Agriculture, 22 in Organic farming and 23 students got diploma in Seed Technology.

Two hundred thirty three undergraduate, 17 postgraduate,10 doctoral and 52 diploma students passed out in the Faculty of Agricultural Engineering and Technology. Twenty seven undergraduates and 14 postgraduates obtained their degree in faculty of Home Science.

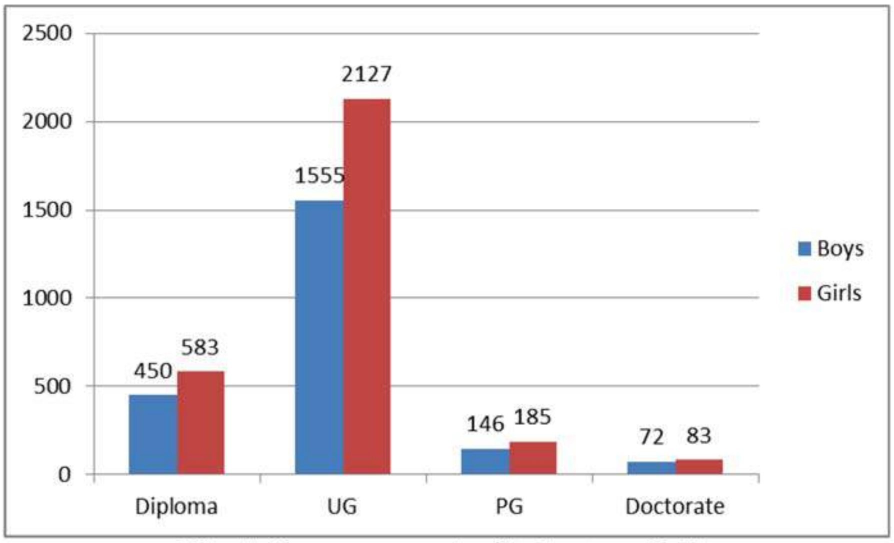


Fig. 5: Programme-wise Students on Rolls

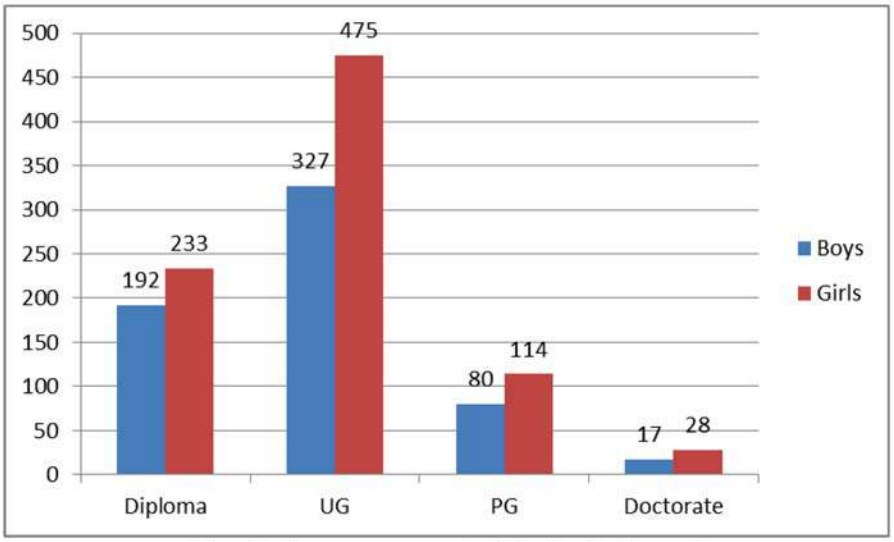


Fig. 6: Programme-wise Students Passed

3. Academic Excellence

Ninety three students of different colleges of ANGRAU qualified in ICAR- JRF/ SRF and GATE examinations. While 124 students obtained different fellowships, awards and medals during 2017-18 as detailed below

S.No.	Name of the College	No. of ranks secured				
		ICAR-JRF	ICAR - SRF	GATE	Others	TOTAL
1	Agricultural College, Bapatla	04	-	-	-	4
2	S.V. Agril. College, Tirupati	21	3	-	-	24
3	Agril. College, Naira	2	1	-	a) CAT at IIBM, Bikaneer:01	4
4	Agril. College, Rajamahendravaram	5	-	-	12	17
5	College of Agril. Engg., Bapatla	10	7	8	0	25
6	College of Agril. Engg., Madakasira	06	-	03	a) University of Manitoba, Canada (Ms Programme) (APFE) : 01 b) ANGRAU, PG Fellowships : 06	16
7	College of Food Science and Tech., Bapatla	-	-	18	a) CAT-3	21
8	College of Food Science and Tech., Pulivendula	-	-	2	a) NIFTEM-1 b) IIFPT-2 c) PGCET-6	11
9	College of Home Science, Guntur	2	-	-	-	2

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.

Biometric observations in Rice

Harvesting of Sugarcane

CONOWEEING IN RICE

SOWING RICE SRI METHOD

AN EXHIBITION IN RYTHUSADASSU

RYTHUSADASSU

AELP Unit

Arogya Vegetable Unit

Presentation of AELP Work

Review on AELP Work

Seving of Vermicompost

Mushroom Unit

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

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

(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)

During RAWE Programme the students handle problems related to rural families for a period of 6 weeks by staying in villages and extend their knowledge to improve the standard of living in rural areas. The students apply their theoretical knowledge gained in class room and skills acquired in laboratories in real life situation. They get familiarized with socio economic conditions of rural community which helps the students in programme planning and implementation of the knowledge gained in respective fields of specialization by conducting need based activities in villages for rural families.

Demonstration on construction of Soak pit at Vejendla Palle Anganwadi Center

Demonstration on low cost recipes

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

In ELP the students gain hands-on experience in various core areas of their study. The ELP would be undertaken in “Business mode” and the students “Earn while they learn”. The students have an excellent opportunity to observe, think, analyze, synthesize, evaluate and apply the acquired knowledge. Through this programme, the students of the departments of Foods and Nutrition, Apparel and Textiles, Resource Management and Consumer Sciences, Human Development and Family Studies, Home Science Extension and Communication Management will be provided in-depth training in managerial and entrepreneurial skills in production, marketing and management of products and services related to Food Processing, Food Service, Diet Counselling, Value addition to textiles through dyeing, printing and fabric embellishment, Designing and developing plans for commercial and residential interiors, Development of teaching learning materials, Teaching of preschool children and special children, Developmental assessment of children and Designing & development of various ICT modules.

Interns involvement in offline & online studio works as editors, readers and anchors at Metro TV

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

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

Name of the College and Degree Programme	No. of Students Attended	No. of Villages / Plants	No. of Host Farmers
Faculty of Agriculture			
Agricultural College, Bapatla	207	29	207
S.V. Agricultural College, Tirupati	132	19	31
Agricultural College, Mahanandi	73	11	73
Agricultural College, Naira	85	17	85
Agricultural College, Rajahmundry	56	08	52
Faculty of Agricultural Engineering & Technology			
College of Agricultural Engineering, Bapatla	69	11	11
College of Agricultural Engineering, Madakasira	34	-	-
College of Food Science & Technology, Bapatla	43	12	12
College of Food Science & Technology, Pulivendula	26	-	-
Faculty of Home Science			
College of Home Science	27	03	135

5. *Scholarships and Stipends*

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

Table 5. Details of Scholarships and Stipends

S. No.	Name of the Scholarship	No. of Students Awarded	Amount in Rs. per Year
1	2	3	4
1	National Merit/ Talent Scholarship	48	12,76,000
2	Govt. of India Post-Matric Scholarship to Scheduled Castes	147	25,50,839
3	Govt. of India Post-Matric Scholarship to Scheduled Tribes	35	5,41,313
4	Govt. of India Post-Inter Merit Scholarship (Dist. Level) to SCs and STs	24	2,71,620
5	Post Matric Scholarship to BC	-	-
6	Post Matric Scholarship to EBC	-	-
7	Minority Post Matric Scholarship	10	1,11,028
8	State Scholarship to Denoted Tribes	8	86,625
9	State Scholarship to Listed Backward Class	610	77,10,154
10	State Scholarship to Economically Poor Persons	126	13,71,586
11	Stipend to P.G. Students	242	1,24,79,182
12	Stipend to Ph.D. Students	67	49,45,265
13	Stipend to U.G. Students from Other States	8	1,28,000
14	Stipend to Agril. Officers studying M.Sc. (Ag.) Course	-	-
15	Stipend to VEOs studying B.Sc. (Ag.) Course	-	-
16	Stipend to VDOs studying B.Sc. (Ag.) Course	14	1,96,000
17	Dress and Book Allowance	478	2,87,400
18	Others, if any a) Bayer Fellowship (M.Sc.) (Ag.)	6	5,04,000
	b) Bayer Fellowship (Ph.D.) (Ag.)	5	6,00,000
	c) ANGRAU Stipend	26	13,00,000
19	State Post-Matric Scholarship to BC-E	-	-
20	Inspire Fellowship for Ph.D. Students	1	4,10,000
21	Rajiv Gandhi Fellowship for Ph.D. Students	-	-
22	State scholarship to scheduled castes	11	3,27,586
23	State scholarship to scheduled tribes	3	37,387
24	ICAR- JRF Scholarship	6	5,60,400
25	ICAR- SRF Scholarship	2	3,80,000

6. Students Hostels :

The hostel facilities available in the colleges and number of students accomodated in different hostels in all the campuses of the university are given in Table. 6.

Table 6. Campus-wise Hostel Accommodation

S. No.	Campus	No. of Hostels			No. of Students Accommodated		
		Boys	Girls	Total	Boys	Girls	Total
Faculty of Agriculture							
1	S.V. Agricultural College, Tirupati	03	01	04	214	406	630
2	Agricultural College, Bapatla	05	04	09	618	371	987
3	Agricultural College, Mahanandi	02	03	05	169	167	336
4	Agricultural College, Naira	02	01	03	210	96	306
5	Agricultural College, Rajamahendravaram	-	-	-	-	-	-
6	Advanced P.G. Centre	-	-	-	-	-	-
7	Institute of Agricultural Business Management	-	-	-	-	-	-
8	Agricultural Polytechnic, Maruteru	01	01	02	87	44	131
9	Agricultural Polytechnic, Anakapalle.	01	01	02	37	64	101
10	Agricultural Polytechnic, Podalakur	-	01	01	-	24	24
11	Agricultural Polytechnic, Reddipalli	01	01	02	15	34	49
12	Agricultural Polytechnic, Utukuru	01	01	02	20	22	42
13	Agricultural Polytechnic, Kalikiri	-	01	01	-	36	36
14	Agricultural Polytechnic, Rampachodavaram	-	-	-	-	-	-
15	Agricultural Polytechnic, JM Puram	01	01	02	21	27	48
16	Agricultural Polytechnic, Madakasira	01	01	02	18	29	47
17	Agricultural Polytechnic, Chintapalli		RARS, Staff Quarters		06	06	22

S. No.	Campus	No. of Hostels			No. of Students Accommodated		
		Boys	Girls	Total	Boys	Girls	Total
18	Agricultural Polytechnic, Nandyal	RARS Staff quarters			19	22	41
19	Agricultural Polytechnic, Somasila	ARS Staff quarters			21	24	45
20	Agricultural Polytechnic, Garikapadu	ARS Staff quarters			28	41	69
21	Agricultural Polytechnic, Tirupati	Hostels of Ag College			20	27	47
22	Agricultural Polytechnic, Gantasala	Tribal welfare department hostels			25	46	71
23	Agricultural Polytechnic, Ramagiri	Boys at Sarvasiksha Abhiyan and girls at Dist. Sports Authority pavilion			23	19	42
24	Agricultural Polytechnic, (SST) JM Puram	Hostels of APT			19	22	41
25	Agricultural Polytechnic, (Org.F'ing) Chintapalle	RARS Staff quarters			07	16	23
Faculty of Agricultural Engineering & Technology							
26	College of Agricultural Engineering, Bapatla	01	01	02	136	122	258
27	College of Agricultural Engineering, Madakasira	01	01	02	83	53	136
28	College of Food Science & Tech., Bapatla	01	01	02	53	104	157
29	College of Food Science & Tech., Pulivendula	01	01	02	31	44	75
30	Polytechnic of Agricultural Engg, Kalikiri	-	01	01	-	39	39
31	Polytechnic of Agricultural Engg, Anakapalle	Farmers guest house RARS staff quarters			28	42	70
Faculty of Home Science							
32	College of Home Science, Guntur	0	0	0	0	0	0

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, Tirupathi

a. ICAR extramural research project on "Agricultural Graduates as Successful Agri - Entrepreneurs – Process Analysis".

b. DBT project on Finding Natural allelic variants for yield related genes in Rice (2016-18).

c. DBT project on Development of high yielding, non-lodging and biotic resistant varieties of Black scented rice of Manipur & Joha rice of Assam through Biotechnological intervention (2017-19).

d. "Institutional development project" of funded by World Bank-ICAR and accordingly 25.00 crores was sanctioned.

2. College of Agricultural Engineering, Bapatla

a. ICAR Extramural project on "Gaps in Agricultural Engineering education to the Industry and Farmers needs"

b. ICAR Extramural project on "Spatio-Temporal explicit water foot print modeling for hydrological sustainability and enhanced water productivity in coastal Andhra Pradesh".

c. ICAR Extramural project on "Extraction and Mechanical Separation of Chiaseed Mucilage"

3. College of Food Science and Technology, Bapatla

a. ICAR Extramural Funded Project entitled "Extraction and Mechanical Separation of Chia Seed Mucilage".

b. Studies on Gender discrimination and minimum wages in Burly Tobacco cultivation in Andhra Pradesh".

C. STUDENT'S RESEARCH

1. Agricultural College, Bapatla

Department of Agronomy

Performance of cotton under high density planting and varied nitrogen levels indicated that, spacing of 60 cm x 10 cm was found to be optimum to realize higher growth, seed cotton yield and net returns under high density planting system. Increase in nitrogen levels from 60 kg N ha^{-1} to 150 kg N ha^{-1} recorded higher growth and seed cotton yield.

Integration of pre and post emergence herbicides with one hand weeding was found to be superior to sequential and one time application of herbicides and recorded maximum crop growth parameters, yield attributes and yield of rice as well as reduced density and dry weight of weeds with increased weed control efficiency. Though all the weed management practices were found effective in increasing yield, pendimethalin + pyrazosulfuron ethyl @ 920 g a.i. ha^{-1} at 1 or 2 DAS followed by manual weeding at 230 DAS followed by halosulfuron @ 35 g ha^{-1} at 35 DAS was proved best due to higher gross and net returns and benefit: cost ratio.

Application of defoliants Dropp Ultra 540 SC (Thiadiazuron 360 + Diuron180) @ 200 ml ha^{1} and Ethereal at 60 BOP resulted in reduction of crop duration by 20 days, while desiccants urea and NaCl reduced crop duration by 5 days compared to control. Quality parameters were not influenced by defoliants except fibre fineness and elongation percent which were highest with Ethereal @ 2000 ppm

Application of Metsulfuron + Chlorimuron ethyl @ 4 (2+2) g a.i. ha^{-1} was effective and economical in controlling weeds in pearl millet with high grain yield and effective alternative for manual weeding. The lower weed density, weed dry matter accumulation and high weed control efficiency was obtained with the application of penoxsulam @ 22.5 g a.i ha^{-1}

Among the dates of transplantation of rice, 1st fortnight of August transplantation recorded the higher values of growth parameters, yield attributes and yield. Among the varieties, BPT-2270 recorded highest values of these parameters and its performance was superior to BPT-5204 and NLR-33892. Significant linear relationships were observed for drymatter and grain yield for all the three varieties of rice with agro climatic weather health indices indicating that regression equations can be applied to predict rice growth and yield using daily recorded weather data on temperature, photoperiod, day length and sunshine hours during the crop season.

Application of pre emergence herbicide followed by intercultivation at 20 DAS and hand weeding at 30 DAS or hand weeding twice at 20 DAS and 40 DAS recorded higher yield. However, the sequential application of pre emergence (Pendimethalin @ 0.75 kg ha^{-1} or alachlor @ 0.75 kg ha^{-1}) followed by post emergence herbicide (Imazethapyr @ 50 g ha^{-1} or acifluorfen + Cladinofop propargyl) @ 124 + 60 g ha^{-1} was found economically viable by recording high benefit : cost ratio.

Bio-efficacy of sequential application of herbicides in direct sown rice-greengram sequence revealed that pre emergence application of bensulfuron methyl@ 60 g a.i. ha^{-1} + Pretilachlor with safener @ 500 g a.i. ha^{-1} was found to be the most effective weed management practice followed by post emergence application of azimsulfuron @ 20 g a.i. ha^{-1} at 25 DAS followed by post emergence application of metsulfuron methyl and chlorimuron ethyl @ 4g a.i. ha^{-1} applied at 45 DAS and was on par with pre emergence application of bensulfuron methyl @ 60 g a.i. ha^{-1} + Pretilachlor with safener @ 500 g a.i. ha^{-1} followed by post emergence application of Bispyribac sodium @ 25 g a.i. ha^{-1} at 25 DAS followed by post emergence application of Metsulfuron Methyl and chlorimuron ethyl @ 4 g a.i. ha^{-1} applied at 45DAS.

Effect of Integrated Nutrient Management on growth and productivity of foxtail millet- chickpea crop sequence indicated, that application of 100 % RDN + boron @ 2.5 kg ha^{-1} to succeeding chickpea was found to be the best agronomic management practice for foxtail millet - chickpea sequence in rainfed areas of Prakasam district in AP. Integrated Nutrient Management i.e. application of FYM along with nitrogen levels has considerably increased the available soil moisture in *rabi* chickpea crop.

In integrated nitrogen management in rice-based cropping systems of high altitude region the rice-rajmash cropping system with integrated nitrogen management practice of 100% recommended dose of nitrogen through fertilizer and green manure in-situ to rice crop with 100% RDF to succeeding *rabi* crop has resulted in higher productivity, better economic returns and maintaining the adequate soil fertility status for sustainable cropping system in high altitude tribal region of Andhra Pradesh.

Integrated nutrient management in rice-jowar sequence in Krishna zone reaveled that combined application of inorganic and organic source i.e. green manure and poultry manure (at 50 % per cent each) were more effective in realizing higher grain yield of rice, availability of nutrients and monetary benefits which was on par with application of inorganic fertilizers alone and other combinations of inorganic levels and organic sources of nutrients tested.

Agronomic evaluation of crop establishment techniques, N-levels on rice (*Oryza sativa*.L) and effects on succeeding greengram indicated that, planting of rice with machine recorded improvement in grain yield since the yield levels of normal planting and dry direct sown rice are statistically at par with machine planting. Irrespective of the crop establishment techniques, application of N @ 150 kg N ha^{-1} was found to be optimum for reaping higher grain yield and economic returns. Aerobic rice establishment technique was found to be suitable for water scarce situation as it recorded highest water productivity and showed positive influence on succeeding greengram also. Aerobic rice and DDS rice establishment techniques exerted significant influence on yield and economics of succeeding greengram.

Effect of different dates of sowing and irrigation on growth and yield of chickpea cultivars revealed that sowing of chickpea during 1st fortnight of November was found to be the best time in the Krishna Agro-climatic zone of Andhra Pradesh. Application of deficit irrigation at a rate of 15000 to 20000 L ha^{-1} at pod filling stage or same level at maximum vegetative stage and pod filling stage were found beneficial in increasing the growth and yield attributes and yield of chickpea and thus gross return and net return and benefit : cost ratio.

Groundnut- maize cropping system under integrated use of 125 % RDF, FYM @ 5 t ha^{-1}, Rhizobium inoculation, PSB and VAM to *kharif* groundnut followed by incorporation of groundnut residue in combination with 100 % RDF and biofertilizers to rabi maize has resulted in higher system productivity, better economic returns and sustained soil fertility status in Integrated nutrient management in groundnut (*Arachis hpogaea L*)-Maize (*Zea mays*) cropping system.

Department of Statistics & Computer Applications

In analysis of growth and instability of Chickpea (gram) production in Prakasam district, an attempt has been made to fit the trend equations to the area, production and productivity of the Chickpea crop and best fitted model was chosen based on the criteria *viz.,* least MAPE, MAE, RMSE and highest significant R^2 value for the purpose of future prediction by 2020. The time series data pertaining to the area, production and productivity of selected chickpea crop in Prakasam district, Andhra Pradesh was collected from the Chief Planning Office, Prakasam district for the period of 39 years i.e., 1976-77 to 2014-15.It was observed that an average area, production and productivity of chickpea in Prakasam district of Andhra Pradesh during the study period were 32896.14 thousand hectares, 56252.71 thousand tones and 1118.718 kg ha^{-1} respectively and exhibited significant positive trend with linear growth rate (9.03 per cent) and significant positive trend in case of compound growth rate (19.4 per cent) for area and for production, it was 9.42 and 23.3 per cent respectively.

An analysis of farmer's preference in the selection of farm machinery indicated that majority (52.22%) of the farmers belonged to middle age category, followed by 24.44 per cent in the old age and 23.33 per cent under young age category. In case of education levels, majority of the farmers were educated up to high school (41.11%), followed by primary school (40.00%) and then followed by intermediate education (18.89%). With regard to farm size, it was evident that majority of the farmers were small (48.88%), followed by marginal (33.33%) and large (17.78%). Majority of farmers were growing two crops in a year (57.78%)

followed by farmers who were growing one crop in a year (27.78%) and more than two crops in an year (14.44%). When comes to level of usage of machinery, majority of the farmers were having machinery usage as medium (77.78%) followed by machinery usage low (15.58%) and machinery usage high (6.67%). After conducting Spearman's Rank correlation, it was revealed that farmers prefer branded machinery which can have best engine capacity and their performances to agricultural operations were very good. It was also revealed that the farmers were buying the farm machinery based on the media influence. Hence, when the farmer was looking for a branded farm machinery, he was not considering spare parts availability, cost of machine, appearance of the machine, offers from the dealers, resale value and subsidy from the Government because the branded machinery will have all these characteristics automatically.

Department of Entomology

In bio-intensive management of *Helicoverpa armigera* (Hubner) and *Maruca vitrata* (Geyer)in Pigeonpea, the results showed that, five genotypes *viz*., LRG 30, LRG 41, ICPL 87119, ICP 8863 and BSMR 853were found resistant with regard to per cent pod and grain damage by pod borers *viz., H. armigera* and *M. vitrata*. Trichome density on upper and lower surface of leaf showed a significant negative correlation with pod damage due to pod borers. Thus, the genotypes having higher density of trichomes on leaves suffered less pod damage due to pod borers. Total sugars and proteins present in flowers, pod walls and seeds showed significant positive correlation, whereas phenols showed significant negative correlation with pod damage by pod borers. Spinosad 45 % SC @ 73 g a.i. ha^{-1} was highly effective in controlling the two lepidopteron pod borers *viz., H. armigera* and *M. vitrata* by recording lowest per cent pod and grain damage with highest yield (1.67 t ha^{-1}) and incremental cost benefit ratio (2.47).

Cotton genotype GISV-267 was resistant against leafhoppers by recording the lowest damage injury index level (1.0 - 1.5 per cent) harbouring mean population of only 5.3 leaves^{-3} plant^{-1} and also recorded the highest yield (18.5 q ha^{-1}). GSHV-173 genotype was also found promising with low leafhopper population together with high yield. Genotypes with the highest hair density in leaf lamina and midrib had exhibited the lowest leafhopper injury index and proved as resistant genotypes against leafhoppers. The genotypes with higher quantity of biochemical components such as tannins and phenols both at vegetative stage and reproductive stage showed resistance or tolerance against leafhoppers. Thiacloprid + flubendiamide 480 SC was proved as significantly superior over the other treatments in suppressing the leafhopper population both at 3 and 7 days after treatment by recording the highest reduction over control. The other treatments in the order of efficacy in suppressing the leafhopper population are thiacloprid 48 SC and azadirachitin 10000 ppm with more than 50 per cent reduction in leafhopper population over untreated control.

Rearing of eri silkworm, *Samia cynthia ricini* as an alternate host against *Trichogramma chilonis* multiplication studies indicated that, the per cent parasitization of *T. chilonis* on rice moth eggs was higher (83.67%) compared to eri silkworm (75.40%). In no choice test, the adult parasitoids emerged from rice moth eggs and eri silkworm eggs preferred rice moth eggs (85.00% and 80.00%, respectively) compared to eri silkworm eggs (72.33% and 75.33%, respectively) for parasitisation. The eri silkworm eggs can be used as an alternate host to rice moth in trichocard production.

Incidence and management of major sucking pests of cotton under high density planting system, the aphid population crossed ETL at 120 DAS i.e. 40.5 aphids / leaves^{-3} in high density planting system whereas in case of normal spacing aphid population never crossed the ETL and the aphid population in HDPS showed significant difference with the normal spacing at 105, 120 and 135 DAS remaining days of observation did not show any significant difference. Through out the crop growth period whitefly population did not cross ETL in normal as well as HDPS, but peak incidence of whitefly was observed at 60 DAS. In normal spacing, flonicamid 50% WG and monocrotophos 36% SL were found effective against aphid population. Flonicamid 50% WG was found effective against leafhopper population. Thrips population was effectively managed by fipronil 5% SC. Diafenthiuron 50% WP found to be effective against whitefly population. All the insecticides were similar in controlling sucking pest in normal and HDPS as there is no difference in population reduction over control.

In assessment of insecticide resistance in pulse beetle, *Callosobruchus maculatus* (Fab.) (Bruchidae: Coleoptera) and its management studies, Ghantasala, Darsi and Lam strains of *C. maculates* recorded higher to moderate level of resistance of 136.83, 50.25 and 25.58 folds at LC50 and showed lower level with 3.24, 1.94 and 1.89 folds at LC99.9 to malathion in comparision with Bapatla laboratory susceptible strain. With reference to deltamethrin, the Ghantasala strain recorded moderate level of resistance with 32.04 folds at LC50 and lower resistance with 2.14 at LC99.9 when compared with laboratory susceptible strain. Spinosad was found effective at LC50 level with the highest relative toxicity of 18.443 and 28.148 folds compared to malathion and deltamethrin respectively followed by ß-cyfluthrin + imidacloprid (17.675 and 26.975 folds) against Ghantasala strain of *C. maculatus*.

Monitoring of stem borer species and their egg parasitoids in irrigated rice ecosystem revealed that incidence of YSB observed on rice was from the 35th standard meteorological week (SMW) i.e., the first week of September (1.93% Dead hearts) and attained peak infestation during 40th SMW (7.53 % DH) and continued up to 47th SMW with 2.07 per cent white ears during *kharif*, 2016-17, during *rabi*, 2016-17 it was started from the 4th SMW (last week of January) with 2.10 per cent DH with the peak infestation at 7th SMW (6.28% DH) and continued up to 12th SMW (2.84% WE) with a significant and positive correlation with evening relative humidity during *kharif*, 2016-17 and there was no significant correlation with other parameters during both the seasons.

Groundnut + cowpea intercropping system in 7:1 recorded lower mean population of thrips (2.90 and 3.10), leafhoppers (4.08 and 7.83) and looper (0.49 and 0.38) per plant as compared to groundnut sole crop (4.29, 5.58 and 1.53) and cowpea sole crop (4.08, 10.64 and 0.33), respectively. The lower mean aphid population in cowpea was recorded in 7:1 ratio (14.22 aphids plant^{-1} on leaves and 18.71 aphids/ plant on shoots) when compared to cowpea sole crop (23.20 aphids plant^{-1} on leaves and 34.01 aphids/plant on shoots). Groundnut + cowpea intercropping system in 7: 1 recorded lower mean population (0.39 larvae/plant) and per cent damage (5.20%) of *Spodoptera* litura when compared to the groundnut sole crop recorded 0.72 larvae plant^{-1} and 9.19 per cent damage. The cowpea sole crop observed highest mean population of *Helicoverpa armigera* i.e., 1.50 larvae/plant and 12.68 per cent damage when compared to the 11:1 (0.69 larvae plant^{-1} and 3.62%) and 7:1 (0.80 larvae plant^{-1} and 4.50%). Significantly lesser larval population, least number of webs and least per cent damage of *Maruca vitrata* was observed in 11:1 and 7:1 ratios of intercropping systems i.e., 1.22 and 1.58 larvae/plant^{-1}, 1.64 and 1.87 webs/plant^{-1} and 19.1 and 18.5 per cent damages, respectively when compared to the cowpea sole crop which recorded 3.08 larvae/plant^{-1} with 3.23 webs/plant^{-1} and 33.8 per cent damage.

Results of physico-chemical pod characters of pigeonpea against podfly, *Melanagromyza obtusa* (Malloch) and its management showed that, the pigeon pea genotypes *viz.*, WRP 1, ICPHaRL 4985-11, ICPHaRL 4985-10, ICPHaRL 4989-7, LRG 52, CO 6, ICP 11957 and BRG 10-2 were found to be resistant as they recorded lowest mean pod and grain damage ranging from 9.33 to 23.67 per cent and 4.78 to 13.00 per cent, respectively with pest susceptibility rating ranging from 1 to 5. The per cent weight loss in grains due to podfly ranged between 54.70 (ICPHaRL 4985-10) to 71.30 (ICPL 87119) with a mean weight loss of 61.38 per cent. The mean number of maggots and pupae per pod ranged from 0.04 (WRP 1) to 0.51 (GRG 2013) and 0.10 (LRG 52) to 0.54 (GRG 2013) in different genotypes, respectively. The genotype, ICPHaRL 4985-10 recorded maximum yield (1.76 t ha^{-1}) followed by BRG 10-2 (1.64 t ha^{-1}), ICPHaRL 4989-7 (1.64 t ha^{-1}), WRP 1 (1.54 t ha^{-1}), ICPHaRL 4985-11 (1.48 t ha^{-1}) and LRG 41 (1.46 t ha^{-1}). Among the various morphological and biochemical parameters, genotypes having thick pod walls, long and more trichomes, small seeds, with high phenol and low protein content offered resistance to pod fly.

In development of life tables for stem borer, *Chilo partellus* (Swinhoe) on promising genotypes of maize and its management with bio rational insecticides**,** forty eight life-tables were constructed for *C. partellus* on six maize cultivars *viz.*, DHM 117, DHM 121, Madhuri sweet corn, Priya sweet corn, Amber pop corn and 30V92. In each season of *kharif* and *rabi* 2014-15 and 2015-16 two generations of the pest were studied. The survivorship curves drawn for all the generations in each year indicated that the mortality rate was higher at the small larval stage. Generation survival declined from first generation in first crop during *kharif* 2014 to second generation in fourth crop during *rabi* 2015-16 in all maize cultivars. The trend index was positive (more than one) and varied in all generations. Key factor analysis revealed major mortality factors influencing population fluctuation included larval parasitoid particularly *Cotesia flavipes* and unknown causes during small and medium larval stage. Density dependant related mortality was observed in the life cycle of *C. partellus*. The lowest mean total K value (0.45) was observed on 30V92 maize cultivar. Correspondingly, the highest mean values of generation survival (0.38) and the trend index (40.2) were obtained on 30V92 cultivar indicate more susceptibility to C. partellus. The high mean total K (0.59) and lowest generation survival (0.27) and the trend index values (25.2) were observed on Amber pop corn. Foliar application of chlorantraniliprole 18.5% SC, spinosad 45% SC and whorl application of chlorantraniliprole 0.4% GR significantly reduced the damage of *C. partellus* and larval population over untreated control.

Response of *Spodoptera exigua* on chickpea under elevated CO_2 and constant temperatures was as contained. The concentrations of nitrogen (9.16/ 22.35 %), amino acids (7.69-14.08 %) and proteins (5.73-13.22 %) were lower compared under elevated CO_2 (*e*CO_2; 550 ± 25 ppm) conditions to ambient CO_2 (*a*CO_2; 380 ± 25 ppm) conditions. But the concentrations of carbon (6.76-12.22 %), C: N (17.53-44.58 %), tannins (23.77-35.00 %), total soluble sugars (TSS) (19.23-29.75 %), starch (31.91-44.29%) and carbohydrates (19.90-30.16

%) were higher under elevated CO_2 conditions compared to that under ambient CO_2 conditions. Under elevated CO_2 conditions, chickpea plants exhibited lower nitrogen levels due to increased photosynthesis resulted in poorer food quality for *S. exigua* larvae leading to prolonged larval duration, lower pupal weight and lower fecundity, increased food consumption and assimilation with reduced food conversion efficiency by larvae and ultimately resulted in slow growth across four generations.

Department of Crop Physiology

Effect of foliar application of nutrients and Plant Growth Regulators on growth, development, quality and yield of *Bt* cotton, indicated that, among all the foliar spray treatments, GA 30 ppm and KNO_3 2% spray at peak squaring, peak flowering, peak boll formation and peak boll developmental stage improved the growth, total chlorophyll content, nitrate reductase activity, photosynthetic rate, yield attributes, yield and fiber quality traits.

In physiological studies on high temperature tolerance in rice (*Oryza sativa.* L), tolerant and susceptible genotypes in rice crop revealed that, reduction in tiller number m -2 and stem thickness under high temperature was less in N22 and Rasi and higher in vandana and MTU-1001. In both *kharif* and *rabi*, N22 Rasi maintained relatively higher PN under high temperature increased under high temperature in tolerant genotypes which lead to subsequent increase in E, while reduced in susceptible ones. High temperature resulted in reduction of yield components and yield in genotypes, relatively less in tolerant ones due to high spikelet fertility in N22 and Rasi. Amaylose content.

Effect of Salicylic Acid on growth, physiological parameters, antioxidant Defense system and yield in chickpea (*Cicer arietinum* L.) under water stress, the exogenous application of salicylic acid @ 0.1 mm at 35 DAS improved the growth and yield of chickpea plants that were stressed from pod formation stage by maintaining antioxidant defence system in terms of higher activity of superoxide dismutase and catalase and proline accumulation, which helped in the mitigation of adverse effects of water stress (i.e. oxidative damage) and can sustain the normal growth and development of chickpea under water stress.

Effect of Calcium, Boron and Salicylic Acid on Tolerance of Balckgram (*Vigna mungo L.*Hepper) to Yellow Mosaic Virus, calcium boron SA and complete nutrient solution (CNS) application delayed the incidence of YMV disease by seven days. The reduction in disease incidence was high with soil application of 300 kg gypsum + boron 1 kg ha^{-1}, CNS spray and 0.3% calcium + 50 ppm SA spray. The reduction in white fly incidence was high with calcium + SA spray. Chlorophyll retention under disease incidence was found high with CNS + 50 ppm SA spray. Total drymatter production increased over control, observed high in gypsum 300 k + boron 1 kg ha^{-1} + 50 ppm SA spray, gypsum 300 kg + boron 1 kg ha^{-1}, CNS +50 ppm SA spray and CNS spray. Spray of CNS + 50 ppm SA increased the yield by 40.7% followed by gypsum + boron soil application alone and in combination of 50 ppm SA spray and 0.3% calcium spray.

Physiological studies on senescence of leaves and nodules in blackgram indicated that, application of paraquat and kinetin, promoted and inhibited the leaf senescence, respectively, in blackgram as seen from the changes in biochemical indicators. Leaf senescence in blackgram stimulated the senescence of root nodules, while inhibition of the leaf senescence was able to inhibit the nodule senescence. Nodule senescence affected the grain quality of blackgram *cv* PU- 31 in a negative manner and inhibition of the same increased the grain quality in terms of nitrogen and protein contents.

Department of Agricultural Economics

Economic and environmental impact assessment of pesticide usage in cotton in Dharwad district of Karnataka total cost of cultivation was highest for large farmers, but the proportion of pesticides cost was more in case of small farmers followed by medium and large farmers. In case of small farmers, the factors like cost of plant protection chemicals, human labour cost, bull power cost and age were found to significantly influence the cotton yield. The optimum quantity of pesticide required for cotton for sample farmers was estimated to be 0.57 a.i. kg ha^{-1} which was double the actual use of 0.58, 0.70 and 0.80 kg ha^{-1} in the case of small, medium and large farmers respectively. The results of plant protection chemical expenditure function showed that total agricultural income, number of pesticide applications and human labor cost were significant factors for small, medium and large farmers.

Economic analysis of coffee cultivation and its impact on socio-economic conditions of tribal farmers in Visakhapatnam district of Andhra Pradesh study revealed that the average total variable cost of coffee was Rs.27,644 ha^{-1}, average gross margin was Rs.56,876 ha^{-1} and profitability index was 2.05 indicating that the farmer earned Rs.2.05 on each rupee invested. Farm investment techniques like net present value, BCR, IRR and payback period were computed and found to be Rs.2,43,136, 2.03, 26.39 and 9 years respectively which pointed out that the investment on coffee plantation was feasible and economically viable. Farm size and farming experience were found positively significant, while farmer’s age was negatively significant on coffee production. The average per hectar annual net income obtained from coffee was three times higher than any other agricultural crops grown by the tribal farmers.

Results of economic analysis of organic farming in rice – a case study in Visakhapatnam district of Andhra Pradesh revealed that the average cost of cultivation per hectare of rice in organic farming was less (Rs. 33,413) as against conventional farming (Rs. 42,309). Among the different variable costs, human labour occupied the major share of total cost of cultivation with 71 per cent in organic farming. The gross income per hectare was higher in conventional farming (Rs. 73,128) compared to that of organic farming (Rs.64,864). Whereas, the net return in organic farming was Rs. 31,451 ha^{-1}, while it was only Rs. 30,818 ha^{-1} in conventional farming. The net benefit - cost ratio was higher in organic farming (0.94) compared to conventional farming (0.72). The price for organic produce may be enhanced by providing a premium price and making arrangements to certify the produce as organic and arranging for buy-back arrangements in the nearby markets, as the net benefit-cost ratio was found high in organic farming.

In a study on the impact assessment of Krishi Vignana Kendras in Andhra Pradesh three KVKs, one KVK from SAUs (KVK-Amadalavalasa, Srikakulam district), one from ICAR (KVK-Kalavacharla, East Godavari district) and one from NGOs (KVK-Yagantipalli, Kurnool district) were selected for the study which has completed minimum five years of functioning. The results revealed that, in KVK-Amadalavalasa increase in yield (12.80 q ha^{-1}) and per cent increase in net returns (42.94%) over farmers practice were highest in case of mechanized system of rice intensification. Zero tillage maize technology resulted in increased net returns of Rs. 18,106 per hectare over farmers practice. In KVK-

Yagantipalli, the results of frontline demonstrations in rice revealed that the increase in yield was highest in case of management of problematic soils i.e. reclamation of sodic soils with gypsum application as per soil test results (20.88 %) followed by foliar application of zinc (14.98 %) and integrated weed management (9.59 %) over farmers' practice. The study indicated that the technology gap was the major contributing factor in the total difference in productivity in all the crops among all the three KVKs which was highest in case of soil test crop response (STCR) in paddy (392.98%) in KVK-Yagantipalli of Kurnool district.

Department of Soil Science & Agricultural Chemistry

Effect of different sources of biochar and microbial consortium on growth and yield of blackgram (*Kharif*) in black soils revealed that sorghum biochar was found to be a rich source of carbon and nutrients with lower pH, EC and bulk density compared to maize biochar.Powdered biochar irrespective of source, created most favourable physical, physico-chemical and biological properties of soils resulting in higher yield of blackgram.Combined application of powdered biochar and bacterial consortium resulted higher yield of blackgram followed by use of coarse biochar along with bacterial consortium.

In zinc biofortification studies of groundnut, application of zinc along with organic manures showed improvement in soil properties, yield, nutrient concentration and uptake by groundnut. Highest pod yield of 2.61 t ha^{-1} was recorded by the treatment RDF + 37.5 Kg $ZnSO_4$ ha^{-1} + pressmud @ 5 t ha^{-1}. Application of $ZnSO_4$ (soil, foliar and along with organic manure *viz.*, pressmud, poultry manure, vermicompost and farmyard manure) significantly increased zinc content over control at all stages of crop growth.The highest net returns of Rs. 78805 as well as B:C ratio of 2.03 was recorded in the treatment RDF+37.5 Kg $ZnSO_4$ ha^{-1} + pressmud @ 5 ha^{-1} .

Nitrogen Dynamics and nitrogen use efficiency with neem coated urea in rice cultivation, application of recommended dose of nitrogen through neem coated urea @ 75 to 125% in three and two split doses maintained maximum amount of ammonical-N, total-N and mineralizable –N and lower levels of nitrate-nin soil. Application of 75% RDN through neem coated urea in 3 and 2 splits recorded the higher macro and micronutrient content in soil and plants.

A field experiment entitled comparative assessment of crop residues incorporation and their application after composting on soil properties and performance of maize revealed that, application of 100% RDFN + 25% N through maize compost resulted in maximum yield, improved soil water holding capacity, nutrient status and biological activity followed by the treatments supplied with 100% RDFN + 25% N through rice compost and 75% RDFN + 25% N through maize compost. Since, maize compost with 75% RDFN exhibited comparable performance to that of best treatments, in improving yield and soil properties it can be stated that substituting nitrogen through maize compost can reduce the fertilizer nutrient requirement by 25 per cent, while improving the quality of produce.

Boron availability and response of blackgram to boron in calcareous soils indicated that, irrespective of the soil calcareousness, increasing doses of boron enhanced the biomass production, seed yield, nutrient content and uptake by blackgram. Application of boron @ 0.25 kg^{-1} (B1) in soils containing 1.08 % $CaCO_3$ was found sufficient to produce optimum yield of blackgram although maximum yield obtained with application of boron @ 0.50 kg^{-1} (B2) was on par with B1 level. For all other soils having more than 1.08 % $CaCO_3$ content, the yields increased with increase in boron doses.

Comparative evaluation of AB-DTPA and DTPA extractants for cationic micronutrients in calcareous soils, it can be concluded from the available data that, the soils were deficient in micronutrient status, due to calcareousness and high pH in the study area. The calcareousness of the soils can be reduced by addition of acidifying amendments, organic manures, inclusion of pulses in cropping system and AB-DTPA extractant can be used as an extractant in soil testing laboratories to extract cationic micronutrients in calcareous soils more effectively than DTPA as it is a multinutrient and universal extractant, Thus it saves time and cost of soil testing.

Potassium dynamics through organic manures and potassium solubilizing biofertilizer indicated that application of organic manures *viz.*, farmyard manure, vermicompost and poultry manure along with the 50% of recommended dose of K_2O and potassium solubilising bacteria in okra is as good as application of 100% recommended dose of K_2O along with organic manures for achieving maximum and comparable okra fruit yield. All the three different organic manures were efficient in increasing the yields of okra based on their local availability any organic manure can be used.The highest net return and B:C ratio was obtained with RDF + PM @ 5t ha^{-1} (Rs 112107 and 2.54) per hectare followed by RDF + VC @ 5t ha^{-1} (Rs 106719 and 2.26). Whereas lowest net returns and B:C ratio was under treatment RDF + FYM @ 5t ha^{-1} + KSB (Rs 83254 and 1.84).

Based on the findings of influence of paddy straw compost and microbial consortium on zinc availability in soil and fortification in maize it may be recommended that application of Zn solubilizers like rice straw compost + microbial consortium with $ZnSO_4.7H_2O$ @ 37.5 kg ha^{-1} in *rabi* maize would be a better option for improved Zn content of kernel and yield (8177 kg ha^{-1}) of maize and also to maintain the soil fertility in zn deficient soils. Rice straw compost with microbial consortium at 25.0 kg $ZnSO_4.7H_2O$ ha^{-1} is ideal for Zn sufficient soils.

A study on assessing the physico- chemical properties and fertility status of maize growing soils of Krishna delta region, Andhra Pradesh indicated that, the soils were neutral to moderately alkaline in reaction, non-saline to slightly saline and low to medium in organic carbon content in both surface and sub-surface samples. The soils were found to be slightly to moderately calcareous. Regarding soil fertility status, available nitrogen was low to medium in surface samples whereas, low in sub-surface samples.

Department of Agricultural Extension

The research study on Information Management Behaviour of Rice Farmers Under Collective Farming of Kudumbashree Mission In Kannur District of Kerala highlighted that majority of the women rice farmers had agricultural + animal husbandry as their main occupation which enhances the income ranging from Rs. 10,000-40,000 and leads to economic empowerment of women. The women rice farmers experienced major problems such as lack of experience in storage and transformation of information, increasing work load of functionaries and mounting aversion to voluntarism and lack of need based training.

The study on knowledge and adoption of turmeric farmers in guntur district reported that constraints encountered by farmers in adoption of recommended practices of turmeric were non-availability of labour at planting time, high costs of fertilizes, lack of knowledge on recommended dosage of pesticides and fungicides, high cost of machinery for small and marginal farmers and low remunerative prices

A study on gender and climate change adaptation in guntur district revealed that differential perceptions, adaptations of men and women to climate change, majority (38.33%) of men adopted intercropping and majority (48.33%) of women not adopting intercropping. Regarding the crop diversification also, majority (51.67%) of the men were adopting in contrast to this majority (66.67%) of women were not adopting.The study enlighten that more than two third (68.33%) of the respondents expressed that existing hybrid crop varieties are not able to withstand local climatic conditions and 65.00 per cent of the respondents perceived that increased pest and diseases was the major obstacle to climatic adaptations.

An analytical study on direct sown rice cultivation in guntur district of Andhra Pradesh depicts that, nearly 2/3rd of the (65.00%) respondents not received training regarding direct rice cultivation. The profile characteristics such as training received, sources of information experience & innovativeness showed a positive significant relationship with adoption level of direct sown farmers.

The study on knowledge and extent of adoption of the farmers on recommended Rice fallow blackgram production technology in guntur district found that social participation, economic motivation, scientific orientation, market orientation was significant with the variation in the level of knowledge of blackgram growers. Age, education, farm size farming experience, extension contact, mass media exposure, innovativeness, risk orientation, annual income, training received are non significant in their contribution to the variation in the level of knowledge.

The study on adoption of zero tillage maize technologies by the farmers in Guntur district revealed that, zero tillage maize cultivation is highly profitable (Rs.52,500) compared to rice fallow blackgram cultivation (Rs.22,900). High proportion of the respondents suggested that, providing public maize hybrids timely on subsidized rates (88.33%), engagement of MGNREGA workers in agriculture to overcome labour scarcity (84.17%) and provision of remunerative minimum support price to maize (80.33%).

The research study enlighten that 100 per cent, 99.16 per cent, 98.33 per cent and 97.50 per cent of the beneficiaries of Krishna district had high knowledge on farm mechanization programme, cost for the machinery in FMP has to be paid through Mee-seva, ideal time for collection of soil samples and NFSM programme respectively. Majority (67.50%) of the beneficiaries had favourable attitude towards the agricultural extension prorgammes.

Impact of village adoption programme (VAP) in Appikatla village of Guntur District.The study revealed that more than half (55.00%) of the farmers of adopted village had medium level knowledge followed by those with high (37.00%) and low (8.00%) level of knowledge. Whereas, in case of non-adopted village, less than half (47.00%) of the respondents had medium level of knowledge followed by those with high (35.00%) and low (18.00%) level of knowledge about the crops like rice, maize, blackgram and greengram.

Impact of Self Help Groups (SHGS) on Rural Women Empowerment in Andhra Pradesh indicated that more than three fourth of the respondents (82.92%) were having low income (8.75%) followed by high level income & incase of non- members nearly two third (62.50%) of the respondents belongs to high income category to medium income category.Majority of the S.H.Gs (31.25%) of the members had taken consumption loan followed by educational loan (29.17%), marriage loan (16.67%).The various economic activities undertaken by the self help groups members were grocery shop (75.00%), tailors (41.67%) & dairy farming (3.33%), weaving clothes (25.00%).

Highest proportion of (77.50%) tribal farmer's livelihood system in the study area was primarily dependant on combinations of agriculture, non- farm activities and animal husbandry. Non- farm activities including collection and selling of non-timber forest products and animal husbandry includes dairy farming and back yard poultry farming. Research study revealed that 45.83 per cent of the total tribal farmers have not utilized the services of the banks.

Astudy on the impact of agricultural programmes of ITDA on tribal farmers in Vizianagaram district of Andhra Pradesh found that nearly half (48.33%) were poses moderately favorable opinion (80.00%) of the total variation in the opinion towards agricultural activities of ITDA.Organization of more skill training programmes was expected by 90.00 per cent of the tribal farmers followed by increased staffing arrangements (87.50%).

A study on impact of National Food Security Mission (NFSM – Rice) Programme on rice farmers in Guntur district reported that before introduction of NFSM-Rice, majority (57.50%) of beneficiaries had medium yield followed by low (35.00%), high (7.50%) level of yield. After introduction of NFSM-Rice, majority (46.66%) of beneficiaries had high yield followed by medium (41.68%), low (11.66%) level of yield.Under pre NFSM-Rice the yield of rice was 4.76 t ha^{-1}, like in post NFSM-Rice the yield of rice was increased up to 7.30 t ha^{-1}. Under pre NFSM-Rice the net income from rice crop was Rs. 18322.90 ha^{-1}, like, under post NFSM-Rice the net income from rice crop was increased up to Rs. 32504.17 ha^{-1}.

Department of Genetics & Plant Breeding

Under genetic diversity analysis in identification of SSR markers linked to late leaf spot and rust disease in Groundnut (*Arachis hypogaea* L.), characterized 33 genotypes of groundnut for eleven characters and were screened for resistance to late leaf spot (LLS) and rust diseases of groundnut. Screening for LLS and rust revealed that seven genotypes were moderately resistant to LLS and five genotypes were moderately resistant to rust. TMV-2, was highly susceptible to both LLS and rust. Significant positive association with kernel yield per plant was recorded for the traits, SCMR 60 DAS, harvest index, shelling percentage, 100 kernel weight and oil content at both genotypic and phenotypic levels. Path coefficient analysis revealed strong positive correlation and direct effect of harvest index, shelling percentage and 100 kernel weight on kernel yield per plant

Analysis of variance in heterosis and combining ability in intra specific hybrids of upland cotton revealed significant differences among the genotypes for all the characters studied indicating high degree of variability in the material. Wider variability was observed for number of mono podia per plant, number of bolls per plant and seed cotton yield per plant. High heritability coupled with high genetic advance as per cent of mean was observed for number of bolls per plant, micronaire value and seed cotton yield per plant. The character association analysis revealed that plant height, number of sympodia per plant, number of bolls per plant, boll weight, seed index and bundle strength have significant positive association with seed cotton yield per plant both at phenotypic and genotypic levels indicating their importance in direct selection.

The analysis of variance of evaluation of rice breeding lines for brown plant hopper resistance using SSR markers and phenotypic methods revealed significant differences among the lines for all the characters studied indicating the presence of sufficient genetic variability in the material under study which provides sufficient basis for selection. High PCV and GCV were observed for number of grains per panicle (22.92% and 22.45%) and grain yield per plant (31.33% and 30.61%) and difference between PCV and GCV was very low indicating little environmental influence on these characters. High heritability coupled with high genetic advance as percent of mean was recorded for test weight (98.66% and 23.14), number of grains per panicle (95.94% and 45.30) and grain yield per plant (96.66% and 61.99) indicating the operation of additive gene action in the inheritance of these traits and improvement of these characters is possible through direct phenotypic simple selection.The results of phenotypic screening for brown planthopper resistance revealed that out of 123 lines (including resistant and susceptible checks), 33 lines were found to be resistant, 44 lines were moderately resistant, 44 lines were moderately susceptible and remaining two lines were susceptible in standard seed box screening whereas, in field screening 71 lines were resistant, 50 lines were moderately resistant and two lines were susceptible.

The analysis of variance revealed significant differences among 47 genotypes for all the characters studied. High PCV and GCV were recorded for ear height, 100-seed weight, number of kernels per row and grain yield per plant while low PCV coupled with low GCV was recorded for days to 50% tasseling, days to 50% silking and days to maturity indicating the presence of considerable amount of variability for majority of the characters studied. The estimates of heritability and genetic advance as per cent of mean were high for plant height, ear length, ear height, 100-seed weight, number of kernels per row and grain yield per plant indicating the predominance of additive gene action and use of direct selection for the improvement of these traits whereas, days to 50% tasseling showed moderate heritability coupled with low genetic advance indicating the action of non-additive genetic components along with additive gene action in the expression of these traits. Genotypic correlations in general were higher than phenotypic correlations indicating apparent associations are largely due to genetic reasons. The traits, 100-seed weight, number of kernels per row, kernel rows per ear, ear height and plant height had significant positive association with grain yield per plant at both phenotypic and genotypic levels.

Association studies among rice grain properties and glycemic index in rice indicated that glycemic index had significant positive association with the traits, grain yield (0.410**, 0.253*), alkali spreading value (0.526**, 0.535**) and gel consistency (0.312**, 0.283**) at both genotypic and phenotypic levels. Further, glycemic index exhibited significant negative correlation with amylose content (-0.346**,-0269*) at both genotypic and phenotypic levels. Path analysis studies revealed that GI had shown positive correlation and direct effect for the characters *viz*., L/B ratio, alkali spreading value and gel consistency. MTU-2716 (49.16), MTU-1061 (49.3), MTU-1140 (49.36), MTU-2077 (49.8), MTU-1184 (50.95), BPT-2270 (51.14), MTU-1075 (54.5) and BPT-5204 (54.79) recorded lower G. I. value.

Studied 48 genotypes of rice for early vigor traits under anaerobic conditions and molecular diversity. NLR 4002, BPT 2673, NLR 33892, MTU

5182, MTU 1075, BPT 2740 and JGL 17004 recorded high grain yield under dry direct sowing. Among the genotypes studied, 28 exhibited resistance to anaerobic conditions upto one week of submergence suggesting their suitability for direct sowing and their tolerance to submergence for shorter period immediately after sowing. Under 14 days of submergence only 13 genotypes exhibited their resistance to anaerobic germination with > 75% germination

Analysis of variance of evaluation and characterization of rice near isogenic lines for major abiotic stresses of coastal areas revealed significant differences among the genotypes for majority of the characters studied indicating a high degree of variability in the material. The estimates of PCV and GCV were high for characters *viz*., Number of ill-filled grains per panicle. Moderate PCV and moderate GCV were observed for flag leaf length, ear bearing tillers per plant, grain yield per plant, 1000 grain weight, grain L/B ratio, flag leaf area and harvest index. While, low PCV and GCV were observed for days to 50 % flowering, days to maturity, plant height, panicle length, SCMR, grain length, and grain width. The estimates of heritability coupled with genetic advance as per cent of mean were high for the characters *viz*., number of filled grains per panicle, number of ill-filled grains per panicle, 1000 grain weight, flag leaf length, flag leaf area and grain L/B ratio indicating the involvement of additive gene action in the inheritance of these traits.

Grouped 50 genotypes of maize (*Zea mays* L.) into distinct classes based on their genetic diversity to study genetic divergence and character association of rice genotypes suitable for early *kharif* season. The estimates of high heritability coupled with low genetic advance as per cent of mean were recorded by days to 50% tasseling and days to 50% silking indicating the operation of both additive and non-additive gene actions. Considering the nature and magnitude of character associations and their direct and indirect effects, it can be inferred that test weight, kernels per row, kernel rows per cob and plant height could serve as important traits in any selection programme for developing high yielding varieties in maize.

Pearl millet inbred lines comprising of 161-B and 182-R lines were molecularly profiled using 88 polymorphic SSR markers to study genetic diversity and to define heterotic groups based on genetic distance. The SSR markers detected a total of 532 alleles with an average of 6.05 alleles per locus. Thirty nine unique alleles which were specific to a particular accession and useful for germplasm identification were also detected.

Studied combining ability, heterosis and stability of maize hybrids for yield and yield components of promising hybrids over six environments (seasons). In D^2 analysis, grain yield per plant, stover yield per plant, number of kernels per row, LAI at 30 DAS, ear height, SCMR and days to 50% tasseling contributed maximum for the divergence. While in PCA the characters *viz*., LAD at 60-90 DAS, days to maturity, plant height, number of kernel rows per ear, ear height and LAD at 30-60 DAS contributed more towards variability. Presence of additive gene action for ear length and ear girth, the traits governed by additive gen action can be improved through hybridization followed by simple selection.

Characterized the elite rice cultivars for the traits related to direct seeding and yield. Genetic diversity among 48 elite rice cultivars for direct seeding traits was determined using 10 SSR markers (two each for the five direct seeding traits). All the ten SSR loci were polymorphic and produced 36 alleles. PS-140-1 recorded significant *gca* effects in desirable direction for majority of the characters followed by AC39416 A, MTU 1121, MTU 1140 and MTU 1156. Heterosis studies revealed that 15 out of 21 crosses registered significant positive heterosis over both mid and better parents for grain yield per plant. The best heterotic combination identified were MTU 3626 × PS-140-1 for important yield contributing traits; MTU 1140 × AC39416 and MTU 1140 × PS-140-1 for direct seeding traits.

Variability studies in genetic studies on physiological and agronomic traits suitable for direct seeding in rice revealed significant differences among the genotypes for all the 19 characters studied. Estimates of heritability and genetic advance as percent of mean were high for days to 50 % flowering, no of productive tillers per plant. The diversity for 48 cultivars was determined using 10 SSR markers and D^2 analysis.

Screening of 60 identified restorers at seedling stage revealed 12 genotypes to be highly tolerant, 6 to be tolerant, 12 moderately tolerant. A total of 14 salinity tolerant restorers indentified crossed with three male sterile producing 42 hybrids along with parents were evaluated. The hybrids were observed to be highly yielding, early duration. APMSI 2A X MTU1153 & APMS 12 A X MTU 1156 was most promising.

The investigation carried out in *rabi* sorghum with 50 genotypes for divergence, character association and path analysis. ANOVA revealed significant differences among the characters studied while high PCV coupled with high GCV observed for ear head length, grain yield plant^{-1}. Correlation indicated plant height, ear head length, width, harvest index positive association with grain yield and direct positive effect on yield. Good general combiner between genotypes of cluster VII (EC489088) and cluster VIII (EC 489372) to obtain better segregates.

Department of Plant Pathology

Multiple regression analysis of data from *kharif* 2017-18 between weather parameters and *Alternaria* leaf spot indicated significantly negative correlation between PDI and maximum temperature, morning relative humidity and evening relative humidity.Among fifty five *kharif* blackgram genotypes screened, eight genotypes were moderately susceptible, three genotypes were susceptible and rest of the genotypes were highly susceptible.Among the eight fungicides tested in vitro propiconazole @ 0.15%, hexaconazole + captan @ 0.15% and mancozeb @ 0.25% showed highest inhibition (100%) of the mycelia growth of *alternata* followed by hexaconazole @ 0.2% (92.34%) and trifloxystrobin + tebuconazole @ 0.05% (86.29%) over check.

Studies on interaction among fungal leaf spot pathogens in relation to biochemical changes in cotton indicated that, significant negative correlation existed between disease severity and proteins (-0.745), total sugars (-0.870), reducing sugars (-0.891), non reducing sugars (-0.829), total chlorophyll (-0.850), chlorophyll a (-0.790), chlorophyll b (-0.788), while non significant relationship existed between phenols (-0.246) and peroxidases (-0.436) in upper leaves of cotton.

Six groundnut genotypes were selected to study late leaf spot disease of groundnut and categorized into resistant (Kadiri/Harithandra), moderately resistant (ALR-3, JCG-8, GPBD-4) and susceptible (Narayani and K-6). Morphological characters and biochemical parameters were estimated in selected groundnut genotypes. Correlation studies between severity of late leaf spots and weather parameters during rabi 2017-2018 revealed that age of the crop (r = 0.908*) and relative humidity at morning (r = 0.411*) were significant and positively correlated with PDI whereas maximum temperature (r = -0.385*), minimum temperature (r = -0.644*) and relative humidity at evening (r = -0.388*) were significant and negatively correlated with PDI.Regression analysis of LLS PDI with weather factors revealed that age of the crop and maximum temperature influenced the development of LLS in K-6 genotype in all three sowings.

Twelve isolates of *Pythium aphanidermatum* were collected from different districts of Andhra Pradesh and designated as VSP1, VSP2, RJY1, RJY2, BPT1, BPT2, GNT1, GNT2, STPL1, STPL2, CHRL1 and CHRL2 and were isolated by tissue segment method. Among all the isolates CHRL2 showed maximum mycelial growth on different media tested (89.88 mm) and other isolates such as CHRL1, VSP2, RJY2 and BPT1 were also on par in their mycelial growth (89.66, 89.55, 89.77, 89.55 mm respectively). Of all the isolates GNT1 was found significantly slow in its growth on the media tested. Morphological studies marked a significant variation among the 12 isolates of P. aphanidermatum. Sporangial shape of four isolates was globed (VSP1, RJY2, STPL1 and CHRL1), five isolates were globose (RJY1, BPT1, GNT1, STPL2 and CHRL2) and remaining three had inflated sporangia (VSP2, BPT2 and GNT2).

S.V. Agricultural College, Tirupati

Agronomy

Machine transplanted rice responds positively to higher level of nitrogen (200 kg N ha^{-1}) and 60 kg of P_2O_5 ha^{-1} which was comparable with 160 kg of N ha^{-1}.

Greengram sequence- maximum grosss, net returns and B:C ratio were recorded with vertical tillage with sub soiler upto 40 cm depth at 1m interval followed by vertical tillage with sub soiler upto 60 cm depth at 1m interval.

Higher benefit cost ratio was recorded with application of 300 kg N ha^{-1} and 60 kg of P_2O_5 ha^{-1} and highest N,P,K uptake by grain with 300 kg N ha^{-1} and 80 kg of P_2O_5 ha^{-1}.

Highest pod yield groundnut was recorded with supply of 100% of nitrogen through sheep penning and protective irrigation during *kharif*.

Significantly higher grain and straw yields were recorded with 1st F.N of August sowing while lowest with 1st F.N of September and highest yield with foxtail millet + pigeon pea intercropping in 5: 1 ratio which was comparable with foxtail millet + castor intercropping in 5: 1 ratio

Highest seed yield of groundnut was recorded with hand weeding twice at 20 and 40 DAS compared to pre emergence application of pendimethalin @ 1000 g a.i ha^{-1} followed by hand weeding at 20 DAS.

Highest yield, gross returns and net returns in blackgram were recorded with foliar application of 1 % each of $CaNo_3$ and $MgNo_3$ and sulphur + foliar application of 2 % of $ZnSo_4$.

In groundnut, bed and furrows at 90/30 cm received highest pod yield, haulm yield and harvest index which was on par with vertical tillage at 60cm depth at 1.0 m interval.

Incorporation of poultry manure recorded higher summer greengram seed yield and haulm yield followed by panchagavya spray at 15 days interval.

RDF 100% recorded highest pod, kernel and haulm yields in groundnut which was on par with 100% of organic N + seed treatment with Ghana jeevamrutham + foliar spray of panchagavya @ 3% at every 10 days interval upto 15 days before harvest.

Highest kernel yield and stover yield of maize was recorded with pre emergence application of alachlor @ 1000 g a.i ha^{-1} followed by post emergence appliacation of halosulfuron methyl @ 67.5 a.i ha^{-1} + tembotrione @ 100 g a.i ha^{-1} at 20 DAS.

Genetics & Plant Breeding:

Based on *perse* performance and general combining ability (gca) effect, the rice lines, JGL 11118, RNR 2465 and MTU 1010 and testers, NLR 34449, IR 64 and IR 36 were identified as best for utilizing in further breeding programmes for improvement of yield and quality attributes.Based on *perse* performance, specific combining ability (sca) effects and heterosis, the crosses, RNR 2465 x NLR 145, RNR 2465 x IR 64 and WGL 48684 x IR 36 for grain yield were found to be best performers. The crosses, RNR 2465 x NLR 145 and BPT 5204 x IR 36 were identified for future use in rice breeding programme for improvement of the yield as well as quality traits. The inheritance pattern of blast resistance affirmed the dominance of resistance to susceptibility and the role of two gene interactions *viz.*, duplicate (15:1) type of epistasis was observed.

Predominance of non-additive gene action for all the characters was noticed from the ratio of *gca* / sca variance suggesting that there is a good scope for heterotic breeding in redram.Identified the superior parents, based on per se performance and gca effects, the parents ICPB-2047, ICPB-2048 were the promising parents for yield and other yield contributing characters.Identified the superior hybrids, based on sca effects, per se performance and heterosis, the hybrids ICPA-2092 x ICPL-87119 and ICPA-2092 x ICPL-20108 for hybrid breeding programme.

Among four sugarcane varieties rejuvenated through micropropagation, the variety, 87A298 performed better under in vitro studies. Performance of tissue culture seedlings of early varieties *viz.*, 87A298 and 2003V46 was superior to the performance of mid late varieties; Co86032 and CoT8201.Apical meristem derived plants were free from sugarcane leaf mosaic virus when compared to shoot tip and leaf roll explants.

Based on per se performance among 60 foxtail millet germplasm lines, SiA 3636 and Sri Lakshmi (Check) were found to be desirable for development of drought tolerant genotypes with high grain yield potential.Based on D^2 - analysis, SiA 3551, SiA 3545 and SiA 3596 lines were highly divergent while SiA 3636, Narasimharaya (Check), SiA 3569, SiA 3551, Suryanandi (Check), SiA 3613 and SiA 3618 registered high cluster mean values for most of the traits hence, these genotypes serve as potential source for hybridization programme to obtain high yielding foxtail millet genotypes for rainfed environment.Temperature Induction Response (TIR) technique revealed that Prasad (Check)**,** SiA 3580, SiA 3604, SiA 3618 and SiA 3623 showed the highest thermo tolerance.Based on polyethylene glycol (PEG) induced drought stress technique, among 60 genotypes, Suryanandi (Check), Prasad (Check), SiA 3551 and SiA 3615 showed the highest germination per cent, lower reduction of plumule and radicle length.

Soil Science & Agricultural Chemistry:

The groundnut growing soils of Srikalahasti division in Chittoor district, Andhra Pradesh were characterized and classified and evaluated for sustainable land use planning. The Srikalahasti division was characterized by semi-arid monsoonic climate with distinct summer, winter and rainy seasons.The soils were low to medium in available nitrogen (19.20 to 247.60 mg kg^{-1}), low to high in available phosphrous (4.10 to 21.67 mg kg^{-1}) and potassium (30.23 to 408.14 mg kg^{-1}) and deficient to sufficient in available sulphur (5.58 to 47.99 mg kg^{-1}). The available Zn in soils was sufficient in surface horizons and deficient in sub-surface horizons in all pedons expect P13, P15 and P18 where it was found to be sufficient. The soils were sufficient in available Fe, Cu and Mn.

The major soil textural classes identified were sandy loam and sandy clay loam at surface and subsurface. The majority soils of study area were moderately alkaline (72%) and non-saline with low to medium in organic carbon, deficit in N (82%), medium in P (60%) and high in K (68%). The calcium and magnesium were high,low in Zn (78%) and Fe (24%).Leaf Zn deficiency (62%) was the most severe among the 10 mineral elements tested followed by Fe (54%), Mn (52%) and Cu (26%). Irrigation water of was highly saline (76%) to lightly saline (24%) falling under C3 and C4 classes respectively. The detailed study of the sweet orange orchards revealed that the yield and quality of sweet orange are reduced due to poor management practices. For achieving the maximum yield and good quality, sweet orange crops can be grown in sandy loam or sandy clay loam soils free from $CaCO_3$ coupled with best management practices.

Seven typical pedons representing major land forms in semi-arid ecosystem of Puttur mandal in Chittoor district of Andhra Pradesh *viz.,* plains and uplands developed from granite-gneiss parent material under varying land use were studied for their morphological characteristics, physical and physico-chemical properties and soil genesis. These soils were slightly acidic to moderately alkaline (pH 6.54 to 8.27) in reaction, non-saline, deep to very deep in depth and had iso-hyperthermic temperature and ustic soil moisture regime. Texture, organic carbon, CEC and base saturation were ranged from sand to clay, 0.15 to 0.49 per cent, 12.80 to 50.52 c mol (p+) kg^{-1} soil and 50.00 to 90.57 per cent, respectively. Soils were low to medium in available nitrogen (56.18 to 477.65 kg ha^{-1}), low to high in available phosphorus (8.08 to 90.76 kg ha^{-1}), medium to high in available potassium (137.73 to 442.04 kg ha^{-1}) and deficient to sufficient in available sulphur (1.69 to 40.00 mg kg^{-1}).

Ten representative pedons from surroundings of Mahanandi mandal in Kurnool district were studied for their morphological, physico-chemical properties and nutrient status. Based on the soil properties, the soils of the Mahanandi mandal have been classified into land capability classes and sub-classes *viz.,* IIs (Pedons 1, 4, 9 and 10), IIe (Pedons 7 and 8), IIes (Pedon 2), IIIs (Pedon 6) and IIIes (Pedons 3, 5). Soil fertility maps were also prepared for Agricultural college farm, Mahanandi for various parameters such as pH, EC, organic carbon, available macronutrients (N, P, K and S) and micronutrients (Zn, Fe, Cu, and Mn) under GIS environment using *Arc*GIS. Similarly soil map and land capability maps were also prepared for the above farm.

Humic acid content in soil before sowing and at harvest of the crop was significantly varied in organic manure treatments and ranged from 0.25 to 0.92 g kg-1 and from 0.23 to 1.26 g kg^{-1} respectively. Among the treatments FYM recorded highest values followed by pressmud cake treatment. Oxygen containing functional groups (total acidity, carboxyl and phenolic groups) of humic acid were increased with application of organic manures. Potentiometric titration curves of humic acid before sowing and at harvest were similar and sigmoidal in nature with each other indicating the apparent monobasic and had a single break indicating weak acid polyelectrolytic character.

Effect of various organic manures on soil carbon sequestration, soil health and productivity of rainfed groundnut indicated that application of different organic manures had significantly influenced the available nitrogen phosphorus and potassium content of the soil application *viz.*, FYM @10 t ha^{-1} and pressmud cake @ 10 t ha^{-1} were found most effective in sustaining yields similar to The highest pod yield was observed in RDF treatment and onpar with FYM treatment and lowest in control. Organic manure application improved the soil quality by improving the soil physical properties, supplying all the essential nutrients in sufficient amounts in balanced ratio during crop growth and improved carbon stock, carbon sequestration rate and microbial population.

Plant Physiology:

In-vitro evaluation of 45 blackgram genotypes, identified 10 heat stress tolerant and 2 susceptible varieties through Thermo Induction response technique based on survival percentage, percent reduction of root and percent reduction of shoot. Among the genotypes TBG-104, KU-12-13 and KU-12-55 were superior in terms of heat tolerance, physiological efficiency, rooting abilities, drought tolerance and yield under imposed moisture stress conditions. These genotypes can be used as donor source for development of drought tolerant blackgram genotypes through conventional or molecular breeding.

Physiological basis for drought tolerance in Maize (*Zea mays* L.) indicated that among the 10 tolerant genotypes, PDM 1452, PDM 1465 and PDM 1498 were superior in terms of physiological efficiency, rooting abilities, drought tolerance and yield under imposed moisture stress conditions.Of the several physiological traits studied, SCMR and chlorophyll stability index are the most responsive traits to the moisture stress and these traits can be used as selection criterion in screening maize genotypes.

The experiment on effect of photoperiod and temperature on growth, drymatter partitioning and yield in groundnut (*Arachis hypogaea* L.)" the variety Dharani recorded higher physiological efficiency and yield and its components compared to K-6, TMV-2 and Narayani. Among the three dates of sowing, early sowings i.e., June 21st found favourable interms of higher accumulation of GDD, PTU, HTU specially at grain filling stage and recorded higher dry matter partitioning, HI and yield compared to July 14th and July 30th sowings.

Entomology:

Studies on detached leaf assay revealed that the genotypes IG 70012, IG 70022, IG 70018, IG 70006, PI 599046, PI 599066 (*C. bijugum*), IG 69979 (*C. cuneatum*), PI 568217, PI 599077 (*C. judaicum*) and ICCW 17148 (*C. microphyllum*) showed less damage rating and low larval weights compared to susceptible checks.Wild relatives of chickpea genotypes showed high levels of antibiosis to *H. armigera*.Among morphological characters, glandular and non-glandular trichomes showed negative association with oviposition under multi-choice and no-choice conditions. HPLC finger prints of leaf organic acids revealed a negative association of oxalic acid with oviposition, while malic acid showed positive and significant association with oviposition under multi- and no-choice conditions.

Out of 925 soil samples colleceted from Chittoor, Kadapa, Nellore districts of Andhra Pradesh to isolate bacteria, 227 isolates were able to produce endospores and maximum number of endospore producing isolates were observed in soil samples of forest ecosystem (95.77%).About 203 crystal staining positive Bt strains were identified. Study on crystal morphology revealed that spherical crystals (26.11%) were most dominant.Most of the effective isolates were observed with bipyramidal, cuboidal crystals against S. litura. Field evaluation of solid and liquid formulations of Bt isolates revealed that, solid formulations were comparatively more effective. Higher pod yield was recorded in HD-1, F493 and F504 treated plots.

In development of feasible techniques for the management of groundnut bruchid, out of 52 germplasm/varieties screened against *C. serratus*, the entries K1677, K2075, Dharani found moderately susceptible and K1847, K1811, K1813, K2074, K1800, K1501 were found highly susceptible.Among the 12 different bins and bags evaluated against groundnut bruchid, magic cover, triple layered polythene bag and plastic bin were proved as effective barriers. Aluminium and steel bins were also recorded lower damages to the produce. Among the safer and indigenous chemicals tested, spinosad @ 1 ml kg^{-1} pods was highly effective against *C.serratus* followed by azadirachtin 3000 ppm @ 5ml kg^{-1} pods and azadirachtin 1000 ppm @ 5ml kg^{-1} pods.Testing the nanoscale Zno and chitosan encapsulated with neem oil and NSKE, revealed lowest per cent pod damage (3.82) in nanoscale chitosan encapsulated NSKE @ 1% in 5ml kg^{-1} pods followed by nanoscale ZnO encapsulated NSKE (5.21%) @ 0.1% in 5ml kg^{-1}pods. Untreated control treatment recorded 49.33 % mean pod damage.

The total life cycle of *Cryptolemus. montrouzieri* i.e., from egg to adult ranged from 30-36 days. The average life span of male was 70.70 days and female was 77.30 days. Females have longer development period when compared with males. Males are smaller in size when compared to that of females. Among males and females of the predator, females are voracious feeders when compared to that of males. Among the different insecticides tested, dimethoate showed highest per cent of mortality whereas, flonicamid was least toxic. Buprofezin and Neem oil were found to be non- toxic in food contamination method. Screening of twenty-eight castor genotypes against leafhopper *E. flavescens* revealed that the mean leafhopper population varied significantly among the genotypes and high population was recorded in DPC-9 (54.28/3 leaves) followed by DCH-177 (42.93). Least leafhopper population was recorded in GCH-7 (20.48), VP-1 (20.63). Genotypes GCH-7, PCH-254 and SKI-336 could be ranked as the least preferred genotypes with lowest leafhopper population and hopper burn scores while the genotypes DPC-9, DCH-177 could be ranked as most preferred genotypes with highest leafhopper population and hopper burn scores.Highest yield was recorded in SKI-336 (217.25 g $plant^{-1}$) followed by M-574 (174.44 g $plant^{-1}$), PCH-254 (152.16 g $plant^{-1}$) .

Studies on distribution patterns revealed that larvae of leaf webber, *A. catalaunalis* exhibited a uniform distribution at various stages of crop growth, *viz.*, early vegetative stage, peak vegetative stage, flowering stage, pod formation stage. Results on efficacy of certain insecticides against leaf webber, *A. catalaunalis*, hawk moth, *A. styx,* leafhopper, *O. albicinctus* and aphid, *A. gossypii* revealed that the chemical treatment with chlorantraniliprole @ 0.3 ml l^{-1} was found to be highly effective against leaf webber, *A. catalaunalis*. Lambda cyhalothrin @ 1 ml l^{-1} was superior against hawk moth, A. styx where as pymetrozine @ 0.4 g l^{-1} was performed highly against leafhoppers *O. albicinctus* and aphids, *A. gossypi*.

Delta trap installed at crop canopy level caught highest mean moth number of *T. absoluta* while, wota T trap installed at 60 cm above the crop canopy level recorded lowest moth catches. The pheromone lure of two mg replaced every 30 days interval recorded higher moth catches of *T. absoluta*. This is economically viable. Among selected weather factors, maximum and minimum temperature showed non-significant positive association, while evening relative humidity and rainfall showed significant negative association with pheromone trap catches of *T. absoluta*.

The incidence of whitefly was observed from 3rd standard (std.) week (3rd week of January) with a population of 0.16 nymphs/trifoliate leaf during 1st date of sowing of LBG 623 in blackgram.The evaluation of different genotypes against whitefly under field conditions revealed that the genotypes with high trichome density i.e., PU-31 (43.50 cm2), TBG-104 (43.20 cm^2), GBG-1 (42.90 cm^2) and GBG-103 (42.60 cm^2) recorded less number of whitefly population. Seed treatment with imidacloprid 600 FS @ 2.0 ml + 4.0 ml water kg^{-1} seed was effective upto 30 DAS with more than 50.0 per cent reduction in the whitefly population over control. Among all the insecticides evaluated as foliar sprays, buprofezin 25 SC @ 1.5 ml l^{-1} was the most effective and significantly superior over all other treatments with more than 70.0 per cent reduction in whitefly population when compared to untreated control.

Plant Pathology:

A total of 25 diseased specimens were collected from different pigeonpea growing areas of Andhra Pradesh and Telangana. Cultural, morphological and molecular variability was studied in isolated isolates. Screening of pigeonpea germplasm was done under sick plot conditions at Tandur and found TRG-59 as best genotype with lower wilt incidence of 17.42% and highest yield of 214.1 g per plant. In Integrated Disease Management program Potential fungal antagonist T1, potential bacterial antagonist B2 and effective fungicide carbendazim were found best treatments to control disease.

A study was undertaken to characterize and develop suitable management strategies against TSV. Survey conducted during *Kharif* 2014-15 and 2015-16 in Andhra Pradesh and Karnataka. For quick diagnosis of TSV, various molecular diagnostic techniques like IC-RT-PCR, RT-LAMP and IC-RT-LAMP were standardized. Integrated Disease Management (IDM) of TSV in groundnut during *Kharif* 2014-15 and 2015-16, improved practice) (Border crop (4 rows of Jowar) + seed rate @ 200 kg ha^{-1} + seed treatment with imidacloprid 600 FS @ 2 ml kg^{-1} seed and mancozeb @ 3 g kg^{-1} seed + spraying of thiocloprid 480 SC @ 150 ml ha^{-1} at 20 DAS followed by acetamiprid 20 SP @ 100 g ha^{-1} at 35 DAS.) was found to be effective with lowest PSND disease incidence.

Agricultural Extension:

The findings of the study revealed that large percentage of the tomato growers had medium level of knowledge (61.60%) and medium extent of adoption (60.00%) of recommended package of practices of tomato cultivation.Correlation analysis revealed that there was a positive and significant relationship between different independent variables selected for the study and level of knowledge of tomato growers expect marketing facilities and credit orientation which had non significant relationship with the knowledge level of tomato farmers.With respect to correlation between the extent of adoption of the recommended cultivation practices and independent variables, there was a positive and significant relationship between different independent variables selected for the study and level of knowledge of tomato growers expect marketing facilities and annual income. Opportunities as indicated by the respondents were need for strong partnership between private and public sectors, provision of storage facilities, establishment of processing units, training farmers on post harvest technologies, exploring export opportunities and contract farming.

In entrepreneurial behavior of members of Podupu Laxmi Ikya Sangam in Kurnool district revealed that problems related to marketing of the produce is the major constraint as expressed by the respondents followed by lack of local general store for selling, , lack of local sale and mobile vans . The technical constraints faced by the member respondents were lack of awareness, lack of direction and encouragement, lack of knowledge about loan procedure, lack of technical person for supervision, lack of training and lack of infrastructure facilities.

Extent of Information and Communicatin Technology utilization indicated that 31.66 per cent of the agricultural officers had neutral attitude towards ICT utilization followed by 20.84 per cent with moderately unfavorable attitude, 19.16 per cent with moderately favourable attitude and 15.84 per cent with highly unfavorable attitude. Nearly 12.50 per cent of the respondents had favourable attitude towards ICT utilization.Majority (49.16%) of the respondents had moderate extent of utilization.Constraints in ICT utilization as expressed by the respondents were lack of expertise in using ICTs, poor and limited internet speed, lack of ICT facility at office and poor annual maintenance.

Among the different components of entrepreneurial behavior of grape growers, that 70.00 per cent of the grape growers had medium entrepreneurial behaviour.91.66 per cent of the respondents gave given first preference for decision making followed by achievement motivation which was preferred by 75.00 per cent of the respondents and the least preferred component was cosmopolitness (20.83%). Some of the constraints faced by the grape growers were downy mildew, identification of disease free planting material, non availability of labour, high cost of inputs and lack of knowledge of value added products.

Agricultural Economics:

An economic analysis of acid lime cultivation in Nellore district of Andhra Pradesh with special reference to variety balaji revealed that total cost for the 15 years of acid lime orchards worked out to Rs. 24,87,200 on balaji variety orchards as against Rs. 22,00,066 on local variety farms. Of the total cost, human labour was the highest item of the cost accounting for 44.98 per cent and 44.16 per cent of the total cost on the above said categories of farms respectively. Orchardists of balaji variety and local variety realized a net income of Rs. 12,82,797 and Rs 7,81,047.40 per hectare respectively. The orchardists incurred Rs 1,542.93 and Rs. 1,702.83 to produce a quintal of balaji and local varieties of acid lime respectively.

In analysis of vulnerability indices in various agro-climatic zones of Andhra Pradesh, the results pertaining to overall vulnerability to climate change revealed that Anantapuram district continued to remain most vulnerable district during the three periods under study. S.P.S. Nellore was the least vulnerable district in 1994, but East Godavari was found to be most stable with least vulnerability in the decades of 2004 and 2014. Srikakulum district continued to remain most vulnerable during the three periods. Y.S.R. district was the least vulnerable during the period 1994 and S.P.S Nellore in 2004 and Chittoor in 2014 with reference to demographic vulnerability.In terms of climatic vulnerability West Godavari in 1994, Chittoor in 2004 and Y.S.R. district in 2014 were the most vulnerable districts and Chittoor in 1994, Kurnool in 2004 and Visakhapatnam in 2014 were the least vulnerable district.

The study entitled “An economic analysis of millets cultivation in rayalaseema region of Andhra Pradesh” was undertaken mainly to study costs and returns, resource use efficiency and constraints in production of millets. The total human labour was highest in ragi (66.40 mandays) followed by korra (32.49 mandays), jowar (29.46 mandays) and sama (17.66 mandays). The per hectare cost of cultivation of jowar, korra, ragi and sama was Rs.23,775.34, Rs.24,406.11, Rs.32,165.15 and Rs.14,533.67 respectively.The gross income per hectare of jowar, korra, ragi and sama were Rs.30,000, Rs.23,000, Rs.36,947 and Rs.16,258 and net returns for the same crops were Rs.6,224.66, Rs.-1406.11, Rs.4,781.85 and Rs.1,724.33 respectively.

Production and Marketing of Turmeric in Kadapa District of Andhra Pradesh indicated that on an average, the total human labour utilization was 236.87, 244.17 and 241.82 mandays per hectare on small, large and pooled farms respectively and thus indicated positive relationship between human labour use and farm size. The major labour absorbing operations were harvesting (30.33%), weeding (28.99%), irrigation (13.45%) and planting (8.58%) on the pooled farms. The same trend was observed on both the size groups. The per hectare cost of cultivation of turmeric in the study area was estimated at Rs 3,31,566.00, Rs 3,48,441.60 and Rs 3,40,507.93 on small, large and pooled farms respectively and thus exhibiting direct relationship with the size of the farm. The cost of producing a quintal of turmeric exhibited inverse relationship with the size of the holding as it was 3,766.94 on large farms and Rs. 3,900.78 on small farms. A quintal of dried turmeric yielded a net income of Rs 3,099.22, 3,233.06 and Rs 3,150.84 on small, large and pooled farms respectively indicating a direct relationship with the size of the farm.

Statistics & Computer Applications:

The secondary data on major pests (%) and disease (%) incidence of various groundnut varieties along with climate factors were collected for the period from 2007 to 2016 (10 years) during crop seasons for preparation of Forewarning Models for pests and diseases of groundnut. The results revealed that climatic factors from 2007 to 2016 in groundnut growing seasons the rainfall distribution varied greatly within groundnut growing seasons over years (13.61 mm – 36.06 mm). The average minimum temperatures (21.52°C – 22.03°C), maximum temperatures 31.80°C – 34.75°C), morning relative humidity (73.11 - 83.58%) and evening relative humidity (43.81 - 58.36%) were observed.Overall for the years 2007 to 2016 the results of correlation studies revealed that, there was a positive relationship between the leafhopper incidence and climate factors *viz.*, rainfall, evening relative humidity and sunshine hours.There exist positive relationship between the groundnut leaf miner incidence and maximum temperature, minimum temperature, rainfall and evening relative humidity and negative relationship with morning relative humidity and sunshine hours.

Agricultural College, Naira

The results revealed that maximum seed yield, stalk yield, gross returns, net returns and B: C ratio obtained with the highest level of NPK applied to soil (125% RDF) and supplemented with foliar application of 19:19:19 @ 1.0% at early budding stage followed by 1.0% KNO_3 at early capsule formation stage which were however, found parity with foliar application of 19:19:19 @ 1.0% at early budding stage at the same level of NPK application to soil (125% RDF) indicating the sufficiency of one foliar application of 19:19:19 @ 1.0% along with the highest dose of NPK (125% RDF), which is the best and the most economical nutrient management package for rabi sesame in North Coastal Zone of Andhra Pradesh.

Grain yield of sorghum obtained with CSH 25 was significantly higher than all the other hybrids except CSH 16 and lowest was with CSH 15R. Yield obtained at highest nitrogen level (120 kg N ha^{-1}) was significantly superior followed by 100 kg N ha^{-1} and 80 kg N ha^{-1} while lowest was obtained with no nitrogen application. Stover yield obtained with CSH 15R and at the highest nitrogen level (120 kg N ha^{-1}) were significantly superior to all the treatments. Harvest index was highest with MLSH -296 and with 120 Kg ha^{-1}. Hence, it can be concluded sorghum can be successfully grown by choosing hybrid CSH 25 and with application of 120 kg N ha^{-1} for obtaining the highest yield under rice fallow conditions of North Coastal Zone of Andhra Pradesh.

Agricultural College, Mahanandi

Agronomy

Efficacy of different herbicides in transplanted rice scarce rainfall zone of A.P indicated that application of Bisparibac sodium in combination with hand weeding at 20 and 40 DAT resulted in higher growth yield economics of rice production

Sowing of blackgram on 1st fortnight of October and the variety PU-31 has performed better over rest of the dates varieties of sowing

Genetics and Plant Breeding Department

Diversity analysis in foxtail millet, revealed that germplasm accessions SiA 3340, SiA 3447, SiA 3396 and SiA 3397 may be used as potential parents in breeding programmes.Higher estimates of genetic variability parameters for number of productive tillers plant^{-1} and culm branches indicated simple selection strategies for them may contribute to genetic improvement.Association studies indicated that direct selection for traits - Plant height and flag leaf blade length lead to crop improvement.

Genotypes MTU 1064, MTU 1081, PD 10 and NLR 4002 were identified promising for most of yield and nutritional traits. Direct selection of 1000 grain weight, kernel L/B ratio, number of filled spikelets per panicle, harvest index and SCMR improve grain yield and quality in rice.

College of Agricultural Engineering, Bapatla

Dept. of Soil and Water Engineering

Design, Development and performance evaluation of polymer casted centrifugal pump

Based on the summary of the research work carried out on polymers to replace the metals for fabrication of centrifugal pumps the following conclusions were drawn.The three optimized polymers for fabrication are Cast Nylon, UHMWPE and Delrin. Based on the accuracy and precision, it could be concluded that all the individual metal pump components could be replaced by the respective polymers.Velocity was 0.1 pa-s minimum and 0.3 pa-s maximum, pressure was 0.8 kg cm^{-2} minimum and 0.9 kg cm^{-2} maximum, mass flow (discharge) was 1.80 liters minimum and 1.88 liters maximum and there was no turbulence in flow in the casing of the pump and the flow followed only steady flow.The projected cost of 1 lakh polymer pumps was Rs. 4.85 cr. and 1 lakh metal pumps market price was Rs. 12 cr. and the difference of cost was Rs. 7.15 cr.The projected cost of 5 lakh polymer pumps was Rs. 24.25 cr. and 5 lakh metal pumps market price was Rs. 60 cr. and the difference of cost was Rs. 35.75 cr. By replacing the metal pump with the polymer pump the cost of the pump was reduced by 59.6 per cent and made very cheap.

Optimum allocation of surface and ground water resourcesof Appapuram channel command in Krishna western delta

For branche no.1,2, 8 & 9, there is no feasibility of conjunctive use planning at present in view of saline ground water. For branch no. 3, 4, 5, 6,7 & 8 the profit could be increased when 40% and 50% additional ground water is pumped from the commands. Though different crops tried, the model allocated more area for chillies followed by rice and cotton in view of their high value and profit contribution. As per the survey conducted in the entire command, it lacks the involvement of institutes particularly in conjunctive use of surface and ground water resources. There is lot of gap and capacity building is highly essential for the line departments and farmers in formulating and for the successful implementation of the conjunctive use plans.

Performance assesment of Thatipudi medium irrigation project

The gross irrigation for Paddy, Banana and Pulse were calculated by CROPWAT 8.0 and it was calculated as 1310.5 mm, 1435.0 mm and 406.5 mm respectively. Actual water utilized by Paddy, Banana and Pulse crops were observed as 813.8 mm, 1898.4 mm and 404.7 mm respectively.Water use efficiency and water productivity for Paddy, Banana were observed as 62.09%, 83.94% and 0.7276 kg m^{-3}, 1.58 kg m^{-3}, m^{-3}. Here there is no quantification for pulses productivity.Reservoir storage efficiency, conveyance efficiency, application efficiency and drainage efficiency were found to be 96.06%, 67.78%, 45.581% and 100% respectively. Finally the overall efficiency of the Thatipudi medium irrigation project was calculated as 29.67%.

Modelling the impact of saline and aterlogged areas in Krishna central delta

NDVI for study area was found to range from 0.72 to -0.92 in KCD region. In Krishna central delta region, Normalized Difference Salinity Index (NDSI) was found the best suitable and ranged from -0.714 to 0.185 and best correlated with ground truth values. Soil salinity was characterized into five classes and it was found that highest area was under moderately saline with an area of 68754.01 ha followed by strongly saline, slightly saline, non saline and very strongly saline.

Simulation of stream flow and soil erosion in Krishna lower sub basin

HEC-GeoHMS generated various basin parameters namely, basin slope, basin elevation, area of each watershed and time of concentration and delineated the watershed.There was a decreasing trend of rainfall amount received from eastern part to western part of the basin. The eastern part of the study area received more rainfall. The basin with highest composite curve number produced more runoff.Simulated runoff was more for the years with high rainfall. The annual runoff is highly correlated with annual rainfall with coefficient of 0.9. The average annual runoff depth during the period of 1993 to 2015 was 668.59 mm.The simulated peak runoff rates were matched well with the inflow discharges that are available at Pulichintala project for different storm events and were in good agreement with R^2=0.89. Hence, the model HEC- HMS can be used to predict runoff rate to plan flood mitigation measures.Build up areas have produced more runoff followed by scrub land, current fallow, *rabi* crop, *kharif* crop, forest, plantation and double crop/triple crop areas.Clay soils produced more runoff followed by silt and loam soils. However, type of soil coupled with landuse determines the amount of runoff.The maximum annual average soil loss rate of the Krishna lower sub basin for the year 1993 to 2015 was computed as 28.69 t $ha^{-1}yr^{-1}$.

Modeling of surface irrigation systems using

'SURDEV' in coastal areas of Guntur district

For rice under basin irrigation system, the overall efficiency was increased from 38.14% to 71.55% using BASDEV module in SURDEV. Similarly, for groundnut the overall efficiency was increased from 32.48% to 65.15%, and for pulses it was increased from 38.49% to 69.15%. For maize under furrow irrigation system, the overall efficiency was increased from 40.8% to 58.32% using FURDEV module in SURDEV. Similarly, for cucumber the overall efficiency was increased from 35.63% to 51.84%, and for watermelon, it was increased from 53.68% to 62.83%. From the t-test, it was observed that the application and overall efficiencies for all the crops of study area for basin irrigation system and furrow irrigation system showed significant variation in the design exercise at 5% level of significance but the storage and distribution efficiencies for all crops under basin irrigation system were not significant whereas only the storage efficiency was not significant for all crops under furrow irrigation system. If measures are taken to improve at least 10% in the efficiency by recommending flow rate, cutoff time, field dimensions, there will be a saving of water in the tune of 6.129 BCM because of the fact that as per AP water vision, the irrigation water consumption is 61.317 BCM at present.

Dept. of Processing and Food Engineering

Designed and developed hybrid solar photovoltaic greenhouse dryer. A single standing greenhouse dryer with 14 feet length and 7 feet width and 8.5 feet height size was selected; structure was covered with twin layer poly carbonate sheet. Forced ventilation was provided with 9 inch diameter, 1200 rpm, 40 watt powered DC power operated exhaust fan. The two no 150 watt power capacity solar photovoltaic panels with 18.5 V rated voltage and 8.10 A rated current was used to drive the DC Exhaust fans.Milling quality of greenhouse dried paddy was studied, revealed that, the head rice yield in greenhouse drying was 65.40% which was higher than mechanical drying method (63.5%) and open sun drying method (62.91%).Payback period of the solar greenhouse dryer was 1.84 years and gave 49.34% rate of return. Cost of drying was 0.2 per kg of paddy. Cost-benefit ratio was 4.13.

The present study was undertaken to optimize the process parameters for spray drying of papaya leaf juice. Spray drying of papaya leaf juice at the optimized condition of inlet air temperature 130^{o}C, maltodextrin concentration 8% and feed flow rate 350 ml/ha^{-1} has given yield, moisture content, water activity, L* values, a* values, b* values, pH values and total flavonoid content of spray dried papaya leaf powders as 20.22 g, 4.65%, 0.32, 51.12, -0.29, -73.88, 37.29, 6.43, 63.13 mg g^{-1} of powder, respectively. Moisture content, water activity, color characteristics, total flavonoid content (TFC) were significantly affected by maltodextrin concentrations, feed flow rates and the inlet air temperatures. pH of spray dried papaya leaf powders was not affected by inlet air temperatures and feed flow rates. An increase in moisture content and water activity were observed during storage period of 0 to 45 days. Slightly decrease of pH was observed with increase in storage period of 0 to 45 days. There was no loss of flavonoid content in papaya leaf powder during storage period of 0 to 45 days.

A study was undertaken to explore the use of stabilizing gums (tannin, gelatin and polysorbate) and mechanical filtration techniques to control the sediments during storage for the production of good quality bottled pasteurized sugarcane juice.Among all the treatments, based on sensory attributes, juice without gelatin (pasteurized at 80^{0}C for 10 min + preservative) was found to be the best treatment. Among three bottles, juice packed in glass and PP bottles was found to be good. PET proved to be the least effective in maintaining the quality of the juice. It can be concluded that membrane processing of sugarcane juice is one of the alternate methods in combination with thermal processing for producing quality juice.

Steaming pressure significantly influenced the physicochemical properties of hydrothermally treated finger millet. Sphericity, surface area, thousand grain weight, volume and bulk density decreased whereas, porosity and hardness increased with increase in steam pressure. Color of the millet darkened because of hydrothermal treatment.Finger millet soaked at 70 °C, steamed at 2 kgcm^{-2} and dried to 14.09% (w.b.) final moisture content resulted in higher milling yield (87.88%), lower brokens (4.44%), more hardness (7.6 kgf) and better color index (L*=49.87) compared to raw finger millet.Milled finger millet recorded lower values of protein (5.66%), fat (0.76%), ash (0.97%), calcium (187 mg/100 g) and crude fiber (1.00%) compared to the raw finger millet because of the seed coat removal. Soaking temperature, steaming pressure and final moisture content significantly influenced the output capacity of finger millet. Highest output capacity of machine recorded was 7.91 kg. h^{-1} at a final moisture content of 14.09% (w.b.).

Fortified Blended Foods (FBFs) serve as an excellent vehicle to address undernourishment. Extrusion cooking is recommended for processing of FBFs from grains because of proven improvement in its quality attributes. The survey revealed that most of the existing high energy density FBFs were made of high sugar content.The study showed that SS Blend could achieve the nutritional and flow requirements even without Whey Protein Concentrate and sugar, while CS Blend needed addition of 10% sugar to achieve the flow rate within the stipulated standards. The industry will greatly benefit due to the option of alternate inexpensive cereal-legume blends with better nutritional and flow profile compared to existing products.

A research work was undertaken to develop an ohmic heating system for pasteurization of grape juice and to investigate the effect of ohmic heating on quality of grape juice.On the basis of overall quality of pasteurized grape juice, treatment 30 V cm--1:85^{0} C:5 min was the best for pasteurization of grape juice through ohmic heating. In conclusion, it may be stated that grape juice can be successfully pasteurized by using ohmic heating technique and can be stored for long time.

In this study, briquettes were produced from maize cobs and cotton stalks using high pressure briquetting machine operated at 118 MPa. Briquettes were produced with the maize cobs and cotton stalks in the ratio of 100M:0C, 50M:50C, 75M:25C, 25M:75C and 0M:100C combinations with and without binders. Briquettes prepared from 75C:25M without binder exhibited maximum calorific value.Among all treatments in terms of all the properties, briquettes prepared from 100% cotton and 75C:25M were rated as best. Cotton briquettes had good strength properties compared to maize briquettes.Net cost of production for maize cobs and cotton stalks were Rs. 3840 tonne^{-1} and Rs. 3340 tonne^{-1}, respectively.

D. STUDENTS' ACTIVITIES

1. National Cadet Corps (NCC)

Five NCC cadets of Agricultural College, Bapatla have participated in Annual Training Camp (ATC)-IV held at K L University, Vaddeswaram from 19-05-2018 to 28-05-2018 and received the participation certificates from 22 BN Tenali.

As many as twenty one students of the

ANGRAU obtained ‘C’ certificates and one student got ‘B’ certificate in NCC during the year 2017-18. The NCC Camps attended by the students during the year are detailed in the Table 7.

National Credit Crop

National Credit Crop

Indipendance Day Celebration at Agricultural College, Bapatla

Republic day celebration at Agricultural College, Mahanandi

Table 7. NCC Camps Attended by the Students

Name of the Colleges	Camp	Venue	Date	No. of Cadets Attended
Agricultural College, Bapatla	Combined Annual Training Camp (CATC) -V	VRS & YRN College, Chirala	05-09-2017 to 14-09-2017	04
	Combined Annual Training Camp (CATC)-VI	Chilumuru	21-09-2017 to 30-09-2017	05
	Combined Annual Training Camp (CATC)-VII	VRS &YRN College, Chirala	16-10-2017 to 25-10-2017	07
	Combined Annual Training Camp (CATC)-VIII	Triplar School, Chilakaluri-pet	27-10-2017 to 05-11-2017	04
	Combined Annual Training Camp (CATC)-IX		18-11-2017 to 27-11-2017	07
	Combined Annual Training Camp (CATC)-X	VRS &YRN College, Chirala	03-02-2018 to 12-02-2018	05
	B and C certificate exam,	Tenali	01.03 and 04 March,2018	21 cadets for C exam and one cadet for B exam
	Annual Training Camp (ATC)-IV	K L University, Vaddeswaram	19-05-2018 to 28-05-2018	05
	International Yoga Day - 2018	Bapatla College of Arts & Science, Bapatla	21-06-2018	15
S. V. Agricultural College, Tirupati	Combined Annual Training Camp (CATC) - III	Tirupati	12-06-2017 to 21-06-2017	08
	Combined Annual Training Camp (CATC) – III	Kadapa	12-06-2017 to 21-06-2017	04
	Combined Annual Training Camp (CATC) - XII	Tirupati	27-10-2017 to 05-11-2017	03

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 seven 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 2017-18 are shown in Table 8.

Table 8. NSS Camps Attended by the Students

Name of the College	Camp	Venue	Duration of Special Camp		No. of Students Attended
			From	To	
Faculty of Agriculture					
Agricultural College, Bapatla	Special Camp (Girls)	Mopidevi (Krishna Dt)	27.10.2017	02.11.2017	128
	Special Camp (Boys)	Kothapatnam (Prakasam Dt)	28.10.2017	03.11.2017	79
S. V. Agricultural College, Tirupati	Special Camp	Pidipalli Village, Tirupati, Rural, Chitoor	21.09.2017	27.09.2017	133
Agricultural College, Naira	Special Camp	Thandyamvalasa (Vill.), Srikakulam Mandal	04.10.2017	10.10.2017	85
Agricultural College, Mahanandi	Special Camp	Mahadevapuram	23.10.2017	29.10.2017	73
Agricultural College, Rajahmundry	Special Camp	Rajavolu village, East Godavari district.	23.10.2017	29.10.2017	50
Faculty of Agricultural Engineering & Technology					
College of Agril. Engg., Bapatla	Special Camp	Pinniboinavaripalem, Bapatla	16.03.2018	22.03.2018	69
College of Agril. Engg., Madakasira	Special Camp	Bullasamudram	03.02.2018	09.02.2018	147
College of Food Science & Tech., Bapatla	Special Camp	Pinniboinavari Palem	20.02.2018	26.02.2018	59
College of Food Science & Tech., Pulivendula	Special Camp	Brahmanapalli	24.10.2017	30.10.2017	26
College of Home Science , Guntur	Special Camp	Vejendla village of Chebrolumandal	02.02.2018	08.02.2018	27

NSS Special Camp

Soil Preparation for Planting ornamental Plants

Land Preparation for lawan making

Bleaching Powder Application at Adopted Village

Blood Donation by NSS Volunteers

Swatch Bharat Programme

Swatch Pakhwada Programme

Swatch Bharat Programme

NSS Special Camp Inauguration

Agricultural Education Day

Vanamu Manam Programme

National Unity Day

International Yoga Day

Rodent Control Programme

1. Sports, Games, Cultural and other Activities

Four students of College of Agricultural Engineering, Bapatla participated in Inter Agricultural University Sports Meet 2017-'18 at UAS, Bangalore from 26-1-2018 to 31-1-2018.

Ms. V. Tejeswani (I Year), Mr. M. Satya Sivaram (IV year) and Mr. Vinod Kumar (IV year) students of Agricultural College, Rajamahendravaram participated in XVIII ICAR All India Inter Agricultural Universities meet at UAS, GKVK, Bangalore. Students attended the training camp and meet from 26-01-2018 to 03-02-2018.

Six students of S.V.Agricultural College, Tirupati participated in the XVIII ICAR all India Inter Agricultural University sports meet held on 30.01.2018 to 03.02.2018 at VAS, GKVK, Bangalore State.

Eight students from ANGRAU participated in 18th All India Inter Agricultural University Sports and Games Meet 2017-18 at UAS, GKVK, Bangalore, from 30th January to 03rd February, 2018.

Ms. D R Pravallika of IV B. Sc. (Ag.) student of Agricultural College, Rajamahendravaram participated in Agri- Unifest 2017-18 at S.V. Agricultural College, Tirupati. Student attended the training camp and Unifest from 06-02-2018 to 16-02-2018.

Ms. P. Sruthi, Agricultural College, Naira participated in the AGRI UNIFEST at S.V. Veterinary University, Tirupati from 12th -16th February, 2018.

Eight students of College of Home Science along with Dr. Lakshmi Kuchibhotla, Asst. Prof. & OSA nominated as Team Manager of ANGRAU, participated in the 18th All India Inter University Youth Festival–AGRIUNIFEST–2017-18 held at Sri Venkateswara Veterinary University, Tirupati. 12-2-18 to 16-2-18.

Students of Agricultural College, Bapatla won the boys overall games championship 2017-18 in the ANGRAU Inter collegiate Sports, Games, Cultural & Literary meet 2017-18 awarded at Agricultural College Naira.

Students of Agricultural College, Bapatla won the girls joint overall games championship 2017-18 in the ANGRAU - Inter collegiate Sports, Games, Cultural & Literary meet 2017-18 awarded at Agricultural College Bapatla.

Ms.N. Indu Latha, BA-16-110 and T. Edwin Blessy, BA-16-038 won the individual women and men games championships in intramural sports and games meet 2017-18 and held on 01st to 21st April, 2018, also received Dr. Balineni cash prize of Rs. 10,000/- each.

Students of Agricultural College, Naira received the over all championship for boys which was also shared by Agricultural College, Bapatla and Tirupati in the ANGRAU - Inter collegiate Sports, Games, Cultural & Literary meet 2017-18.

Mr. V. Venkateswara Rao of IV B.Sc.(Ag.), participated in NSS National Youth Festival at S.V.V. University, Tirupati.

Three students of College of Home Science participated in the 18th All India Inter Agricultural Universities Sports and Games Meet 2017-18 held at GKVK, UAS, Bengaluru.

The students of IABM, Tirupati have excelled in "PRABHANDHANZ" (National Level Management Meet) conducted by the Tamil Nadu Agricultural University at Coimbatore on 23.02.2018 and 24.02.2018. Nine students participated in the event and six students have bagged the prizes. Two students won first prize in financial game event, two students won third prize in marketing game event. In operations game event two more students stood third among the participating groups of different state Agricultural Universities.

March fast by Agricultural College Students

Winning Team with Prizes

Long Jump by the Students

Students Playing the Foot ball

4. Students' Counseling and Placement Cell :

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 this year, the campus interviews were held by several organizations and a total of 251 students got placed in different public and private organizations. The list of firms in which the students got placement is shown in Table 9.

Table 9. Student Placements during 2017-18

Name of the Organization	Name of the Post	Number of students placed
Agricultural College, Bapatla		
Natural Farming Fellow	-	15
Agri Friend	-	15
ITC	-	06
NFCL	-	03
SPIC	-	05
Godfrey Philips	-	18
Nova Group of Companies	-	03
State Government (State Agricultural University)	-	25
S. V. Agricultural College, Tirupati		
M/s Dhanuka Agritech Ltd, Hyderabad	Sales Manager	01
Bank of India /Canara Bank / Indian Bank	Agril. Field Officer	17
Acharya N. G. Ranga Agricultural University, Guntur	Scientist/Research Assistant	02
M/s Indian Tobacco Company, Hyderabad	Post Graduate Trainee	01
Nagarjuna Fertilizers and Chemicals Ltd.,	Sales Manager	01
Private Agricultural Colleges, ANGRAU	Teaching Assistant	12
Private Companies, Andhra Pradesh /Telangana	Sales Personnel	12

Name of the Organization	Name of the Post	Number of students placed
Prof. Jayashankar Telangana State Agril. University, Hyderabad	Assistant Prof,. Scientist	03
State Dept. of Agriculture, Andhra Pradesh	Agril. Officer /Asst. Agril. Officer	06
State Dept. of Agriculture, Telangana	Asst. Extension Officer	01
Agricultural College, Naira		
Central Bank of India	Rural Development Officer	02
Indian Bank	Rural Development Officer	02
Oriental Bank of Commerce	Rural Development Officer	01
Bayer India Ltd.,	Marketing Manager	01
UPL India Ltd.,	Marketing Manager	01
Syngenta India Ltd.,	Marketing Manager	01
Agril. Polytechnic College, Chintapalli	Teaching Assistant	01
Agril. Polytechnic College, Kaviti	Teaching Assistant	01
Agricultural Polytechnic College, Narsipatnam	Teaching Assistant	03
Agricultural College, Mahanandi		
Zuari Agro.Pvt Ltd	Store manager	05
Private Sector	Field Manager	01
Agricultural College, Rajahmundry		
ANGRAU	Assistant Professor	02
APPSC	Agricultural Officer	03
Canara Bank	Agricultural Extension Officer	01
FCI	Manager	01
Dr YSRHU	Research Associate	02

Name of the Organization	Name of the Post	Number of students placed
ANGRAU	Teaching Associate	03
Govt. of A.P. , ZBNF	Natural Farming Fellow	06
CTRI, RJY	Technical Assistant	02
Private Agricultural Polytechnic Colleges	Teaching Associate	06
ATMA, Vijayanagaram	Assistant Manager	01
College of Agricultural Engineering, Bapatla		
Mahindra &Mahindra	Work Engineer	03
Jain Irrigation Systems Ltd, Jalgaon	MI Engineers	10
Natural Farming	Technician	20
Monsanto Pvt. Ltd.	-	01
College of Agricultural Engineering, Madakasira		
Jain Irrigation India Pvt. Ltd.	-	03
Dr. Rama Naidu Institute of Rural Development, Medak	-	01
RDT Ananthapur	-	03
College of Food Science & Technology, Bapatla		
Pepsi Food Products Ltd., Pothireddy pally, Sangareddy Mandal. Medak	Executive Trainee	02
Amul Ltd (in Franchise Industry)	Executive Trainee	03
Hector Beverages , Bengaluru	Trainee	02
AP Food Processing Society, Vijayawada	Young Professional	04
College of Food Science & Technology, Pulivendula		
India Food Park	-	04
Ragamayuri Food Park	-	01
Tirumala Dairy	-	01
Sneha Foods	-	01

5. Equipment Purchased by Different Colleges during the Year 2017-18

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

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

S. No.	Institution	Equipment	Cost (Rs.)
01	Agricultural College, Bapatla	Microscope, Trinocular (Make : Magnus, Model MLX TR- Plus) with phase contract attachment, Dark Field condenser and Digital camera.	1,52,036/-
02		PCR Machine	1,49,000/-
03	S.V. Agricultural College, Tirupati	Seed Germinator (200 Ltr)	1,99,980/-
04	Agricultural College, Naira	Paddy Reaper	1,38,880/-
05		Binocular Microscopes	1,98,400/-
06		Binocular Microscopes	1,98,400/-
07		Bio Chemistry Laboratary Books	1,99,855/-
08		Personality Development	1,00,000/-
09		Bio Metric Devices	1,85,850/-
10		Laptops	1,26,000/-
11		LCD Projectors	1,34,000/-
12		LENOVA Desktops	3,06,000/-
13		LENOVA Desktops	3,74,000/-
14		2 Seater Dual Desks	3,72,113/-
15		Water Dispensers	1,08,000/-
16		R O Water Purifier	1,98,000/-

S. No.	Institution	Equipment	Cost (Rs.)
17		Solar Heaters for Boys Hostel	1,05,600/-
18	Agricultural Colllege, Mahanandi	Cooling Centrifuge – Remi	3,18,045/-
19		Amron Current Tall Tubular Crtt 150 ah/12 Kv (11)	2,20,411/-
20		Motorized Treadmilll (Fitness World Picasso)	1,12,100/-
21		Cooling Centrifuge	3,18,045/-
22		F3 Fixed Volume Micro Pipette 50,100,200,500,1000 Sub Marine Horizontal Gel System Min Model Power Pack Mini Pack (02)	19,22,200/-
23		Samsung LED Tv 55 inch	2,53,800/-
24		Interact White Board (03)	1,70,508/-
25	College of Agricultural Engineering, Bapatla	B O D Incubator	1,19,982/-
26		Refrigerated Centrifuge	
27		Customized PEF Generator with Built in Power Supply 15 KV @ 100 Ma	1,77,000/-
28		Vaccum Oven	1,21,599/-
29	College of Agricultural Engineering, Madakasira	3 KWP Solar Module	1,41,750/-
30		Tractor 3 Point Hitch Dynamometer	1,68,748/-
31	CFST, Bapatla	Acer Desktops – 10 No.	4, 65,000/-

E. UNIVERSITY LIBRARY

ANGRAU Library System and Management

The ANGRAU Library System is having 11 Libraries in its fold including the University Library located at the Head-Quarter in Lam, Guntur. The main motto of these Libraries is to accomplish their 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 Library also focuses on electronic delivery of information and library resources accessible through web & local area network.

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. In nutshell, the ANGRAU University Library has very rich collection of print and non-print documents *viz*. of books, e-books (CABI, Elsevier, CRC Netbase, Arts and Science Academy Publications), e-journals, databases such as J-Gate Agriculture and Biological Sciences (CeRA), KrishiKosh, DELNET, CMIE-Commodities, Indiastat.com and many more. All the library resources are being made available through offline/online.

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. Agricultural College, Naira
		2. Agricultural College, Mahanandi
		3. Agricultural College, Rajahmundry
		4. College of Agricultural Engineering, Bapatla
		5. College of Agricultural Engineering, Madakasira
		6. College of Food Science & Technology, Bapatla
		7. College of Food Science & Technology, Pulivendula
		8. College of Home Science, Guntur

In addition, 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.

OBJECTIVES

- To collect, maintain and make accessible all books and journals of Agriculture and allied subjects to the Scientific and Students community.
- To procure, consolidate and make accessible all types of documents in the principal areas of Agriculture and allied subjects of importance to the University.
- To maintain resource house of information on the continuing research and development in Agriculture and allied areas in the University.
- To interact with the associated institutes in the country for effective e-resource sharing and document delivery service.
- To participate in Agricultural Library and Information Networking at the Regional, National and International levels.

Components of the Library

Books and Periodicals: All the libraries together continued to receive over 474 Indian and 66 Foreign Periodicals in Agriculture and allied sciences. In addition, 3872 books and about 183 theses and 275 reports have been added during the year. All the libraries have a separate reference book collections *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.

Reference Section: The reference section of the library houses the reference books which are meant to provide quick and accessible information on any particular topic. Reference books include topics that are intended to guide researchers in their studies. Each copy of book recommended by Teachers & Students will be kept for reference purpose. Reference material is not meant for circulation.

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, GRE, IELTS, BSRB Bank Exams and all other competitive exams.

Newspaper Section: The University library subscribes eight daily newspapers in different languages viz. Telugu and English which covers National and Regional News. All the college libraries subscribe to daily newspapers in different languages.

Air-Conditioned Reading Halls: University Library and other campus college libraries have well established Air-Conditioned Reading Halls for Students, Faculty, Scientists, Extension Specialists and other staff of the University.

Visitors: During this period, a total of 1,13,644 numbers of visitors utilized the library services in all the campuses of the ANGRAU Libraries. The regular membership of the libraries including teachers and students was 5246.

Library Services

Reprographic Services: The photocopying facilities available in all the campuses have been put to maximum use and nearly 2,85,476 copies were provided to the library users during the year. It is also generated an income of Rs.4,27,780/- from all the ANGRAU libraries.

Exchange of University Publications: The University Library distributes 48 copies of ANGRAU Journal of Research to various National and International institutes. On exchange, the University Library receives foreign and Indian publications.

Library In-House Publications: The ANGRAU University Library is bringing out the following publications regularly for the benefit of Teachers, Scientists, Extension Specialists and Students.

Sl.No.	Name of the Publication	Periodicity	Form
1.	ANGRAU Theses Abstracts	Yearly	Print and softcopy
2.	ANGRAU Current Agricultural Titles	Half yearly	Print and softcopy
3.	ANGRAU Library Bulletin	Half Yearly	Print and softcopy

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, Indian journals.com with full text journals, KrishiKosh, 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, 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.

Resources / Online Resources

The ANGRAU University 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 6051 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.
- **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 University 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 ANGRA University Library has purchased 810 CAB 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.
- **Elsevier e-Books / e-Books on Science Direct:** Elsevier e-Books / e-Books on Science Direct provide the comprehensive and reliable content that researcher's 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.
- **Informatics e-Books on Agricultural Science:** Informatics Publishing Ltd provide 176e-Books on Agricultural and allied Sciences, comprehensive and reliable content that researcher's 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.
- **Arts and Science Publication e-Books:** About 697 e - Books on Agricultural Science provide the comprehensive and reliable content that researcher's 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 provides access to 1985 online e-Journals Portal called J-Gate Agriculture and Biological Sciences for the year 2017-18 (which covers data from 2001 to 2018).
- **AgriCat:** AgriCat is the Union Catalogue of the holdings of 12 major libraries of the ICAR Institutes, Deemed Universities and SAUs. It has been created with the partnership of OCLC WorldCat. The ANGRAU University Library is also a member library in AgriCat / WorldCat and contributed nearly 35,000 bibliographical records.
- **KrishiKosh:** KrishiKosh 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).
- **DELNET:** Developing Library Network (DELNET) DELNET provides access to

more than 1.75 crore bibliographic records of books, journals, articles, CD's etc. The internet Library Loan/document Delivery Services are one of the most popular services of DELNET. The main objectives of DELNET are to promote resource sharing among the Member-Libraries by collecting, storing and disseminating information by offering networking services to users.

- **EzProxy Remote Login Server:** The ANGRAU University Library has implemented EzProxy middleware software to provide remote access to web-based licensed resources offered by the library. The EzProxy server authenticates library users against local authentication authorization. It enables to access all the Library subscribed online resources in a single platform and to download full text articles through EzProxy server without any IP Address.

ACADEMIC ACTIVITIES

PGS-501 Library Services Course: Offering PGS-501, Non-Credit Library and Information Services Course to the PG and Ph.D. Students. The main objective of the course is to educate the users on how to access resources of library, search strategies, online educational resources etc.

Orientation Programme: University libraries are being conducting Orientation Programmes for newly admitted U.G., P.G and Ph.D students about the library system, rules and regulations, access to library facilities and services.

Awareness Programmes on e-Resources: The University Library is regularly conducting training cum and awareness Programmes on e-Resources on accessing online information resources viz., CeRA, CABI, CMIE, e-Books, e-Journals, Databases etc. for the benefit of Scientists, Teachers, Students and Extension Specialists.

ICAR -OPEN ACCESS POLICY

ICAR Open Access Policy has implemented in ANGRAU and 350 M.Sc. and Ph.D. Theses were uploaded in the KrishiKosh Repository after embargo period of one year from 2014 onwards.

CeRA usage statistics from 01-06-2017 to 31-05-2018

Sl. No.	Group Name	Services	Hits
1	Successful Logins	Successful IP / Login BASED	2878
2		Successful Profile User Login	363
3	Journal Finder	Archive	463
4		Browse Journal A-Z Listing	1108
5		Browse Publisher A-Z Listing	40
6		Current	1031
7		Search Journal By Title	1062
8		Table of Contents	2631
9		Search Within	786
10	Basic Search	Home page	5931

Sl. No.	Group Name	Services	Hits
11		Results Page	10253
12		View All	8258
13		View Fulltext	1305
14	Advanced Search	Home page	1303
15		Results Page	1254
16		View All	948
17		View Fulltext	127
18	Author Finder	Home page	263
19		Results Page	187
20	Lateral Search	Lateral Author Search	44
21		Lateral Journal Search	99
22	Refine Search	Refine Search	2409
23	New Search	New Search	9260
24		Sort By Relevancy	61
25	Filter Results By	Subject	695
26		Journal	4213
27		Year	76
28		Country of Publication	30
29	List of services	Abstract view	9907
30		Fulltext view	6167
31		Find in library	14
32		Available in library	54
33		Request Article	438
34	Preview Article	Preview Article	40
35	Print Article	Print Article	96
36	Download Article	Download Article	507
37	Email Article	Email Article	40
38	Registered Profile Users	Registered Profile Users	43
39	Change search settings	Change search settings	778
40	Search History	Search History	106
41	Add To Folder	Add To Folder	41

Library facilities and services for the year 2017-2018

S. No	Name of the Library	Books		e-Books	Theses		Periodicals Subscribed		Membership		Books Issued	No. of Readers Visited	No. of Internet Users	No. Of Xerox Copies Exposed	Income Generation (Rs.)
		Number added during the Year	Total	Total	Number Added during the year	Total	Indian	Foreign	Number Added during the year	Total					
1.	University Library, Lam	1001	2032	1680	3	3	62	11	50	50	352	2378	1848	18794	14,095.00
2.	Regional Library, Bapatla	529	53966	--	81	1963	85	18	375	1009	3195	22130	365	17602	59,748.00
3.	Regional Library, Tirupati	622	22752	--	68	4087	142	25	193	885	3621	25085	2503	94557	2,06,350.00
4.	Agricultural College Library, Naira	351	13170	--	--	28	31	--	151	567	2079	13905	3518	46443	63,624.00
5.	Agricultural College Library, Mahanandi	492	12956	--	3	45	54	--	121	925	5875	8425	260	19120	17,253.00
6.	Agricultural College, Rajahmundry	75	3845	--	--	--	--	--	96	289	560	2505	178	--	--
7.	Agricultural Engineering College Library, Bapatla	208	11101	--	20	78	9	9	101	750	8786	7591	577	5600	17449.00
8.	Agricultural Engineering College, Madakasira	403	5407	--	--	--	21	2	43	157	2000	16619	142	17450	9471.00
9.	College of Food Science & Technology Library, Bapatla	25	8092	--	8	80	23	1	60	251	8576	278	1039	2707	2336.00
10.	College of Food Science & Technology, Pulivendula	72	2596	--	--	--	47	--	36	114	1956	12278	331	37223	32,444.00
11.	College of Home Science, Guntur	94	798	--	--	--	--	--	78	249	1760	2450	1913	25980	5010.00
	TOTAL	**3872**	**136715**	**1680**	**183**	**6284**	**474**	**66**	**1304**	**5246**	**38760**	**113644**	**12674**	**285476**	**4,27,780.00**

Statement showing the brief Annual Statement for the Period from 1-6-2017 to 31-5-2018

S.No	Name	Added	Total
1	Books	3872	136715
2	Foreign Periodicals	66	66
3	Indian Periodicals	474	474
4	Theses	183	6284
5	Membership	1304	5246
6	No. of Users Visited	—	113644
7	Issue of Books	—	38760
8	Xerox	—	285476
9	Internet Users	—	12674
11	Total Collection of Amount	—	4,27,780.00

F. INTERNATIONAL PROGRAMMES

The ANGRAU established a centre to facilitate International Programmes under the control of the Director 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.

Table 12 a. PARTICIPATION OF FACULTY IN OVERSEAS PROGRAMMES

S. No.	Name of the Faculty	Programmes attended	Period	Place
1	Dr K. Lakshmana Scientist (ToT) & Coordinator, DAATTC, Vizianagaram	Participated and presented a research paper on "Use of information and communication technologies for diffusion of information to the farming community - A successful case in Vizianagaram district, India" in 2nd International Conference on Innovative Approaches in Applied Sciences and Technologies.	19th to 23rd June, 2017	Singapore
2	Dr M.Srinivas Scientist (Agronomy), APRRI & RARS, Maruteru	Participated and presented a research paper on "A long-term trial to develop organic farming package for rice based cropping system in Godavari Delta Region of Andhra Pradesh" in the International Conference on "Rural Development Conference 2017" in the field of Agriculture.	9th to 11th July, 2017	Bangkok, Thailand
3	Sri S. Chandramohan Reddy Hon'ble Minister for Agriculture, Govt. of A.P	Participated in World Agricultural Forum Conference (WAFC), 2017 on "Solving the Triple Challenge to Agriculture - Trade, New Technologies and Food Security".	6th to 7th July, 2017	Singapore
4	Sri T. Vijay Kumar, IAS (Retd.) Former Special Chief Secretary, Agriculture & Advisor to Government, Govt. of A.P			
5	Sri B.Rajasekhar, IAS Special Chief Secretary (Agri.), Govt. of A.P			
6	Dr V. Damodara Naidu Hon'ble Vice-Chancellor, ANGRAU			
7	Dr S.R.Koteswararao Professor & Head, Member, BOM, ANGRAU			
8	Dr T.V.Satyanarayana Registrar, ANGRAU			

S. No.	Name of the Faculty	Programmes attended	Period	Place
9	Dr P. Kishore Varma Scientist (Plant Pathology), RARS, Anakapalle	Participated and presented a research paper on "Endopytic PGPR of sugarcane: Characterization studies on plant growth-promoting and pathogen suppression traits" in the 5th Asian PGPR International Conference for Sustainable Agriculture.	9th to 11th July, 2017	Bangkok, Thailand
10	Dr N. Raja Kumar Scientist (Plant Pathology), RARS, Anakapalle	Participated and presented a research paper on "Characterization of Sugarcane Mosaic Disease and Its Management using PGPR" in the 5th Asian PGPR International Conference for Sustainable Agriculture.		
11	Dr B. Ravindra Reddy Asst. Professor (Stats & Maths), S.V. Agricultural College	Participated and presented a research paper on "Forecasting of Rice Leaf Folder Incidence and Scope of Biofertilizer Application in Andhra Pradesh, India" in the 5th Asian PGPR International Conference for Sustainable Agriculture.	16th to 19th July, 2017	Bogor, Indonesia
12	Dr Ch. V.V. Satyanarayana Professor & Univ. Head of Food Engg., College of Food Science & Technology, Bapatla	Participated and attended a short course on "Extrusion Processing: Technology and Commercialization".	15th to 18th Aug, 2017	Kansas State University, USA
13	Dr. Prabhu Prasadini Director of International Programmes, Admin. Office, ANGRAU	Participated in a Workshop on “Asian Partnerships, Projects and JJU’s 5 year Strategic Internationalization Plan”.	14th and 15th Sep, 2017	Jigjiga University, Ethiopia
14	Dr. A .S. Rao Nodal Officer, Admin. Office, ANGRAU	Participated and presented a research article entitled "Bio-efficacy of post emergence herbicides alone and as tank mixtures on weed control, growth and yield of roselle (Hibiscus sabdariffa L.)" in 26th Asian pacific Weed Science Society Conference.	19th to 22nd Sep, 2017	Kyoto, Japan

S. No.	Name of the Faculty	Programmes attended	Period	Place
15	Dr. V. Damodara Naidu Hon'ble Vice-Chancellor, ANGRAU	Participated in the International Programmes, acclaimed Borllaug Dialogue International Symposium and 11th Iowa Hunger Summit on World Food Day on 16th Oct, 2017; presented of the Norman Borlaug Award for Field Research and Application on 18th Oct, 2017 and the Global Youth Institute on 21st Oct, 2017 in Des Moines, Iowa, USA and for discussions on Mega Seed Park. The theme of the Symposium is "The Road out of Poverty".	16th to 21st Oct, 2017	USA
16	Sri Somireddy Chandramohan Reddy Hon'ble Minister for Agriculture, Government of Andhra Pradesh.	Participated in the study tour of IRRI field sites in Vietnam, Philippines and Thailand as the part of ongoing Andhra Pradesh Government sponsored IRRI-ANGRAU-Andhra Pradesh collaborative project on "Satellite Based Rice Monitoring System for Andhra Pradesh".	2nd to 11th Feb, 2018	Vietnam, Thailand and Philippines
17	Dr. V. Damodara Naidu Hon'ble Vice-Chancellor,ANGRAU			
18	Dr. N.V. Naidu Director of Research & Director of Intl. Prog.(I/c), ANGRAU			
19	Dr. P. Prasuna RaniPrincipal Scientist (SSAC) & Head, I/c of IRRI-ANGRAU-AP SRMS Project, GTC, Lam, Guntur.			
20	Dr. V. Jayalakshmi Principal Scientist (PB), RARS, Nandyal	Participated and presented the abstract paper of the entitled "Genetic improvement of traits amenable to mechanical harvesting in chickpea" in the Seventh International Food Legume Research Conference (IFLRC-VII), hosted by the ICARDA.	6th to 8th May, 2018	Palis des Congres, Morocco

S. No.	Name of the Faculty	Programmes attended	Period	Place
21	Dr. S. Rajasekhar Naidu Programme Coordinator, KVK, Kalikiri	Participated and presented the abstract paper of the entitled "Multiple Cropping System for Sustainable Resource Management in Mango orchard" in the International Conference on "Transforming Agricultural Extension Systems: Towards Achieving the Relevant Sustainable Development Goals (SDGs) for Global Impact".	10th to 12th May, 2018	Kandy, Sri Lanka

Table 12.b. Visit of foreign delegations to ANGRAU

S. No.	Name	Purpose	Date
1	South Asia Representative, IRRI, India and Team	Discussed about implementation of SRMS project (AP-IRRI collaborative project).	29-06-2017
2	IRRI Team	Field visits for SRMS project.	27-11-2017
3	Dr. Dato Imbrahim Bit Che Omr Deputy Vice-Chancellor, Universiti Malaysia Kelantan, Malaysia	Visited ANGRAU and discussed issues pertaining to students & faculty exchange programme, collaborative research programmes and organization of joint conferences.	03-01-2018 and 04-01-2018

MoU with different Universities

- MoU between ANGRAU and Jigjiga University, Ethiopia is in process (sent to Department of Agricultural Research and Education (DARE), Ministry of Agriculture & Farmer’s Welfare, Govt. of India, New Delhi for approval).
- MoU between ANGRAU and Ethiopian Somali Region Pastoral And Agro-Pastoral Research Institute (ESoRPARI) is in process (sent to DARE for approval).
- Entering into MoU with University of Western Australia, Australia (approved by the ICAR and final MoU sent UWA for signing by the competent authority).
- Made correspondence with the twenty one International/National Universities for renewal of MoU.
- Renewed the MoU between Acharya N.G. Ranga Agricultural University and Centre for Cellular and Molecular Biology (CCMB).

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, *Rashtriya Krishi Vikas Yojana* (RKVY), NABARD, Department of Biotechnology (DBT), Department of Science & Technology (DST), paid up trials and seed production *etc.*

The University continued its research efforts in Agriculture, Agricultural Engineering & Technology, Home Science and allied fields with renewed vigor and commitment for improving the production and economic status of 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 and also to some extent Home Science are being carried out at 36 Research Stations including six Regional Agricultural Research Stations spread over in 13 districts of 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.

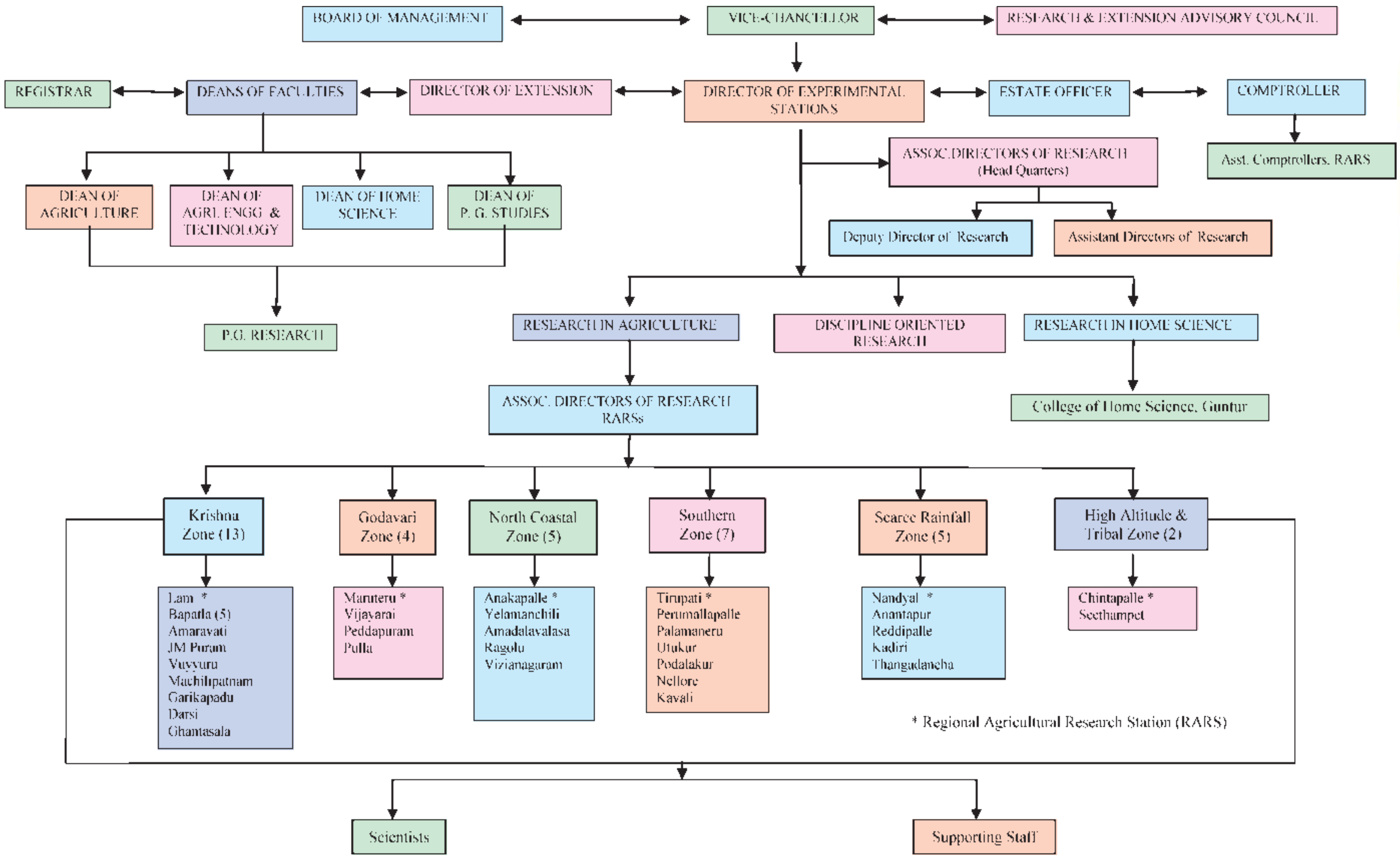


Figure No. 7. Organogram of Research in the University

SEASONAL CONDITIONS AND CROP PERFORMANCE

A rainfall of 567.1 mm was received in the State during the South West Monsoon period of 2017-18 as against the normal rainfall of 556 mm with excess rainfall of 2 %. A deficit rainfall of 40.0% was received in the North East monsoon period as only 177.6 mm rainfall was received as against the normal rainfall of 296 mm is during the period. Winter period recorded 1.40 mm rainfall as against the normal rainfall of 15.7 mm. Rainfall recorded during summer period was 80.7 mm as against normal rainfall of 98.4 mm.

During the year 2017-`18, the average rainfall received was 826.9 mm as against normal rainfall of 966.1 mm, deficit being 14.4 percent. The rainfall was deficit in Srikakulam, Viziangram, Visakhapatnam, East Godavari, West Godavari, Krishna, Guntur, Prakasam and Nellore districts; and was excess rain in Chittoor, Kadapa, Ananthapuramu and Kurnool districts of the State.

Rice crop was grown in an area of 22.18 lakh ha (14.77 lakh ha in *Kharif* and 7.41 lakh ha in *rabi*) during the year 2017-`18. During *rabi*, rice crop recorded 52.79 lakh tons production with a productivity of 7122 kg ha^{-1}. Increase in *rabi* area and productivity has resulted in higher rice production in the state (126.91 lakh tons). Significant increase in the production of Rice during *rabi* season together with productivity improvement in some of the crops was through adoption of best practices largely contributed to this improved production.

Groundnut crop was sown in an area of 7.35 lakh ha. Normal or excess rainfall received during south-west monsoon period favoured the groundnut in obtaining good yields both in kharif (1291 kg ha^{-1}) and rabi (2664 kg ha^{-1}) during 2017-`18 with a total production of 10.48 lakh tons.

Cotton, an important commercial crop of the State was sown in an area of 6.46 lakh ha, 20.87 lakh bales of lint was produced in the State.An increase of 39% area in cotton during *kharif*, 2017-`18 resulted in increase of production to 20.87 lakh bales during the year 2017-`18 compared to 2016-`17.

Maize crop grown in 3.37 lakh ha (2.29 lakh ha in *rabi*) recorded average productivity of 6317 kg ha^{-1} and total production during *Kharif* and *rabi* seasons was 23.26 lakh tons. In this crop also the area in both *kharif* and *rabi* was increased during 2017-`18 compared to 2016-`17 which resulted in icreased production of 23.26 lakh tons.

Redgram, an important *Kharif* pulse crop was grown in an area of 2.80 lakh ha^{-1} and total production in the state was 1.20 lakh tons. During *rabi*, bengalgram, blackgram and greengram were grown in 5.20, 3.57, 1.12 lakh ha, respectively. The total pulse production during the year 2017-`18 was 11.72 lakh tons.

Season and district wise normal and actual rainfall received and area, production and productivity of major crops in Andhra Pradesh for the year 2017-`18 are given in table 13 and table 14.

Table 13:

District wise and Monsoon wise rainfall received in Andhra Pradesh: 2017-2018

S. No	District	South – West Monsoon (mm) (June – September 2017)			North – East Monsoon (mm) (October – December 2017)		
		Normal	Actual	% Dev	Normal	Actual	% Dev
01	Srikakulam	705.7	710.8	0.7	276.0	182.8	-33.8
02	Vizianagaram	692.7	721.6	4.2	245.9	182.2	-25.9
03	Vishakapatnam	712.5	765.6	7.5	297.1	143.3	-51.8
04	East Godavari	768.1	703.7	-8.4	305.4	124.0	-59.4
05	West Godavari	792.0	722.1	-8.8	239.3	117.3	-51.0
06	Krishna	685.1	651.0	-5.0	249.4	110.1	-55.9
07	Guntur	525.8	545.3	3.7	228.8	82.8	-63.8
08	Prakasam	388.3	433.1	11.5	393.7	111.5	-71.7
09	SPSR Nellore	331.4	441.1	33.1	661.4	327.3	-50.5
10	YSR Kadapa	439.4	517.7	17.8	395.4	354.7	-10.3
11	Chittoor	393.5	485.4	23.4	251.0	206.3	-17.8
12	Anantapuramu	338.4	365.4	8.0	155.3	194.4	25.2
13	Kurnool	455.1	475.3	4.4	149.6	155.3	3.8
Average of Andhra Pradesh		**556.0**	**567.1**	**2.0**	**296.0**	**177.6**	**-40.0**

S. No	District	Winter Period (mm) (Jan. and Feb. 2018)			Summar Period (mm) (March to May 2018)			Annual Rainfall (mm)2017-2018 (Jan. 2018 to May 2018)		
		Normal	Actual	% Dev	Normal	Actual	% Dev	Normal	Actual	%Dev
01	Srikakulam	25.9	0.00	-100.0	153.9	159.9	3.9	1161.5	1053.5	-9.3
02	Vizianagaram	25.5	0.00	-100.0	166.6	167.5	0.5	1130.7	1071.3	-5.3
03	Vishakapatnam	22.4	0.00	-100.0	170.2	189.7	11.5	1202.2	1098.6	-8.6
04	East Godavari	19.7	0.00	-100.0	124.6	76.6	-38.5	1217.8	904.3	-25.7
05	West Godavari	17.7	0.00	-100.0	104.0	33.8	-67.5	1153.0	873.2	-24.3
06	Krishna	15.8	0.00	-100.0	83.2	43.0	-48.3	1033.5	804.1	-22.2
07	Guntur	18.5	0.00	-100.0	80.0	26.2	-67.3	853.1	654.3	-23.3
08	Prakasam	16.3	0.00	-100.0	73.2	55.6	-24.0	871.5	600.2	-31.1
09	SPSR Nellore	19.9	0.40	-98.0	67.8	47.6	-29.8	1080.5	816.4	-24.4
10	Chittoor	12.1	10.10	-16.5	87.0	95.5	9.8	933.9	978.0	4.7
11	Kadapa	3.4	1.40	-58.8	51.6	89.9	74.2	699.5	783.0	11.9
12	Anantapur	2.9	2.20	-24.1	55.7	84.7	52.1	552.3	646.7	17.1
13	Kurnool	4.6	0.30	-93.5	61.1	48.7	-21.4	670.4	678.9	1.3
Average of Andhra Pradesh		**15.7**	**1.40**	**-91.1**	**98.4**	**80.7**	**-17.8**	**966.1**	**826.9**	**-14.4**

Table 14: Area, Production and Productivity of major crops in Andra Pradesh (2017-2018)

S.No. & Crops	Area (In Lakhs ha.)			Yield (Kg/ha.)			Production (In Lakh M Ts)		
	Kharif	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi	Total
1. Rice	14.77	7.41	22.18	5019	7122	12141	74.12	52.79	126.91
2. Jowar	0.30	1.10	1.40	1018	2750	3768	0.30	3.02	3.33
3. Bajra	0.43	0.05	0.48	1912	2054	3966	0.83	0.10	0.93
4. Maize	1.07	2.29	3.37	4678	7956	12634	5.02	18.24	23.26
5. Ragi	0.27	0.08	0.34	1131	1775	2906	0.30	0.14	0.44
6. Minor Millets	0.18	0.03	0.21	811	429	1240	0.15	0.01	0.16
7. Bengalgram	0.00	5.20	5.20	0.00	1132	1132	0.00	5.89	5.89
8. Redgram	2.75	0.04	2.80	424	818	1242	1.17	0.03	1.20
9. Greengram	0.18	1.12	1.40	594	672	1266	0.11	0.82	0.92
10. Blackgram	0.46	3.57	4.03	823	933	1756	0.38	3.33	3.71
11. Horsegrm	0.17	0.22	0.39	420	691	1111	0.07	0.15	0.22
12. Other pulses (cowgram etc)	0.07	0.19	0.26	746	987	1733	0.05	0.19	0.24
13. Groundnut	6.48	0.87	7.35	1291	2435	3726	8.37	2.11	10.48
14. Sesamum	0.13	0.26	0.40	220	302	522	0.03	0.08	0.11
15. Sunflower	0.03	0.06	0.09	758	1544	2302	0.02	0.09	0.12
16. Safflower	0.00	0.00	0.00	0.00	645	645	0.00	0.00	0.00
17. Niger seed	0.00	0.06	0.06	0.00	413	413	0.00	0.02	0.02
18. Soyabean	0.00	0.00	0.00	1888	0.00	1888	0.01	0.00	0.01
19. Castor	0.31	0.01	0.32	651	651	1302	0.20	0.01	0.21
20. Rape & Mustard	0.00	0.03	0.03	0.00	457	457	0.00	0.01	0.01
21. Cotton (*)	6.44	0.02	6.46	550	334	884	20.83	0.04	20.87
22. Mesta (#)	0.05	0.00	0.05	1686	0.00	1686	0.43	0.00	0.43
23. Chillies	1.02	0.17	1.19	5270	4689	9959	5.36	0.82	6.18
24. Sugarcane	0.99	0.00	0.99	78683	0.00	78683	77.83	0.00	77.83
25. Turmeric	0.20	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00
26. Tobacco	0.04	0.79	0.83	2910	2121	5031	0.13	1.67	1.80
27. Onion	0.17	0.07	0.25	0.00	0.00	0.00	0.00	0.00	0.00
28. Coriander	0.00	0.03	0.03	0.00	633	633	0.00	0.02	0.02
Total Cropped area	36.51	23.79	60.30						

(#) Mesta production in lakh bales of 180 kgs. (*) Lakhs balas of line.
Source: Directorate of Economics & Statistics, AP

AGRICULTURE

Crop improvement is one of the major mandates through which development of superior varieties/ hybrids with high yielding ability, resistant to biotic and abiotic stresses in tune with the changing needs and climate is a continuous process. During 2017-18, five new crop varieties, two each in rice and groundnut and one variety in sugarcane were released from ANGRAU.

Crop Varieties/ Hybrids released during 2017-18 at National level

RICE

Variety : MTU 1190(Varam)
Parentage : MTU 1081 x Swarna sub1
Duration : 140-145 days
Season : *Kharif*
Reaction to pests, diseases and abiotic stresses : Moderately tolerant to leaf blast, neck blast, bacterial leaf blight
Average yield : 5.5 - 6.5 t ha^{-1}

Salient features : Non lodging, possess as two weeks seed dormancy, low input use variety and also tolerates 7-10 days flash floods. Identified for five states *viz.,* Chhattisgarh, Maharashtra, Andhra Pradesh, Telangana, and Tamil Nadu

RICE

Variety : MTU1172 (Ksheera)
Parentage : MTU 7029/ MTU 1064
Duration : 150 days
Season : *Kharif*
Reaction to pests, diseases and abiotic stresses : Moderately tolerant to bacterial leaf blight, leaf blast, sheath rot and leaf spots
Average yield : 5.5 - 6.0 t ha^{-1}

Salient features: High yielding flood tolerant rice variety, possesses two weeks seed dormancy, Suitable for Odisha and Andhra Pradesh

GROUNDNUT

Variety : TCGS 1157
Parentage : TAG 24 × Jyothi
Duration : 110 days
Season : Early *Kharif*, *Kharif* and *rabi*
Reaction to pests, diseases and abiotic stresses : Tolerant to sucking insect pests
Average yield : 25 q ha^{-1}

Salient features : A short-statured, water use efficient Spanish bunch culture with profuse branching with high yield potential and fresh seed dormancy and higher frequency of three seeded pods. Oil content is 50%. It is an alternative to TAG 24. Identified and released for Zone III (Maharashtra and Madhya Pradesh) by the central varietal release committee.

GROUNDNUT

Variety : Kadiri Chitravati (K1719)
Parentage : Kadiri 7 Bold x TAG 24
Duration : 110-120 days
Season : *Rabi*
Reaction to pests, diseases and abiotic stresses: Tolerant to thrips, PSND, PBND and leaf spot
Average yield : 30-35 q ha^{-1}
Salient features:
Possesses 49% oil content with 100 kernel weight of 50-60 gm and has 70 % shelling potential. Released for Zone IIIb (Andhra Pradesh, Tamilnadu and Telangana) at National level.

SUGARCANE

Variety : 2005A128 (Srimukhi)
Parentage : 80 R 41 GC
Group : Early (10 months)
Suitability : Suitable for irrigated, ID and rainfed conditions
Reaction to pests, diseases and abiotic stresses: Resistant to red rot. Moderately tolerant to Early shoot borer and scale insect.
Average cane yield : 120.00 t ha^{-1}
Juice Sucrose (%) : 18.00
Sugar yield : 16.6 t ha^{-1}
Jaggery yield : 14 t ha^{-1}
Salient features:
Good ratooner and good jaggery yielding variety. Alternative to Viswamitra (87A298)

Cultures completed three years of minikit testing and ready for release

RICE

Variety : **NLR 4001**
Duration : 140-145 days
Season : *Kharif*
Reaction to pests, diseases and abiotic stresses: Tolerance to blast and BPH
Average yield : 7-7.5 t ha^{-1}
Salient features: Fine grain rice culture. Strong culm, non-lodging

RICE

Variety : MCM 103 (IET 23407)

Parentage : BPT 5204 x MTU 487

Duration : 140-145 days

Season : *Kharif*

Reaction to pests, diseases and abiotic stresses : Tolerance to BPH

Average grain yield : 6.5 t ha^{-1}

Salient features:

Semi Dwarf, non-lodging, straw glume and medium slender grain with salinity tolerance, possesses dormancy for three weeks

REDGRAM

Variety : TRG-59

Parentage : ICP7035x ICPL-87119

Reaction to pests, diseases and abiotic stresses : Tolerant to wilt and SMD

Average yield : 20-21 q ha^{-1}

Salient features :Orange red round bold seed

CEREALS AND MILLETS

APRRI & RARS, Maruteru

In a Multi Location Trial under very low salinity condition (EC-0.40), 14 entries along with two parents and two checks were evaluated. Five genotypes *viz.*, DST38^{-1}5-3^{-1} (8.21 t ha^{-1}), DST6-96^{-1}6 (7.57 t ha^{-1}), DST39-3^{-1-1} (7.31 t ha^{-1}), DST8-4-4(7.08 t ha^{-1}) and BST33 (7.05 t ha^{-1}) recorded significantly superior yield over the best check, MTU 1153 (6.61 t ha^{-1}).

In a Multi Location Trial under very high salinity condition (EC-7.50 ds m^{-1}), 14 entries along with two parents and two checks were evaluated. All entries recorded significantly superior yield than the recurrent parent MTU1010 (1.59 t ha^{-1}) while three entries *viz.,* DST9^{-1}57-6 (3.63 t ha^{-1}), DST6-96-16(3.63 t ha^{-1}) and DST8-4-4(3.46 t ha^{-1}) recorded significantly superior yield over the best check MTU1156 (2.95 t ha^{-1}).

Medium

In Advanced Yield Trial (Medium), the entries MTU 2414-5-1-1-1-1 (7.12 t/ha^{-1}), MTU 2347-156-2-1-1-1 (7.01 t ha^{-1}), MTU 2493-3-3-2 (6.98 t ha^{-1}) and MTU 2347-160-3-1-1-1 (6.93 t ha^{-1}) recorded significantly higher yield in comparison with local check MTU 1001 (6.16 t ha^{-1}).

In Multi Location Trial (Medium), MTU 1238 (6.86 t ha-1), MTU 2347-158-3-1-1 (6.85 t ha^{-1}), MTU 2284-103-1-7 (6.60 t ha^{-1}), MTU 2404-25-2 (6.31 t ha^{-1}) and MTU 2347-87-1-1-1 (6.10 t ha^{-1}) recorded significantly higher grain yield in comparison with local check MTU 1075 (5.38 t ha^{-1}).

In Multi Location Trial - Early, out of 24 entries tested, the entry MTU 2344-60-2-1-1 recorded highest grain yield of 6.59 t ha^{-1} followed by MTU 2456-37-1 (6.37 t ha^{-1}), MTU 2347-45-1-1 (6.18 t ha^{-1}). The checks MTU 1121 and MTU 1010 recorded 5.68 t ha^{-1} and 5.54 t ha^{-1} respectively.

Out of 35 entries (including check) evaluated in Advanced Yield Trial -Early, the entry MTU 2385-187-1-1-1 recorded highest grain yield of 5.84 t ha^{-1} followed by MTU 2455-1-3 (5.81 t ha^{-1}) and MTU 2331-45-1-1-2 (5.76 t ha^{-1}), where as the local checks MTU 1121 and MTU 1010 recorded 5.37 t ha^{-1}and 5.23 t ha^{-1} grain yield respectively.

In Multi Location Trial (Slender Grain), 26 entries were evaluated with checks, MTU 1224, BPT 5204, NDLR 7 and NLR 34449 and the results revealed that the entries *viz.,* MTU 2142-9-2^{-1} (7.21 t ha^{-1}) and MTU 2411-74-1-1-1 (7.10 t ha^{-1}) have recorded significantly superior yield compared to the best check, BPT 5204 (6.03 t ha^{-1}).

Three entries MTU 2244-39-20-4 (5.04 t ha^{-1}), MTU 2243-35-1-1 (4.69 t ha^{-1}), MTU 2426-3-2-2 (4.65 t ha^{-1}) found to be significantly superior than the best check MTU 1140 (4.36 t ha^{-1}) in Advanced Yield Trial -SDW.

In Multi Location Trial (submergence) under stagnant flooding of 50 cm water depth, MTU 1231 (5.16 t ha^{-1}), MTU 1232 (4.93 t ha^{-1}) performed well compared to recurring parent MTU 1075 (2.79 t ha^{-1}) and best check MTU 1140 (4.32 t ha^{-1}).

In Multi Location Trial (submergence) under complete submergence for 2 weeks at 21 DAT followed by stagnant flooding of 30-50 cm water depth, the genotype MTU 1232 expressed higher yield of 3.29 t ha^{-1} followed by MTU 1231 (2.26 t ha^{-1}) than recurring parent MTU 1075 (0.10 t ha^{-1}) and best check MTU 1140 (2.11 t ha^{-1}).

In Multi Location Trial (submergence) under normal condition at Maruteru, three entries found to be significantly superior than best check MTU 1064 (4.84 t ha^{-1}) and MTU 1233 (5.68 t ha^{-1}) expressed higher yield and Sub1 introgressed lines of MTU 1075 MTU 1231, MTU 1232 exhibited on par yield with recurring parent, MTU 1075.

In Multi Location Trial non saline condition (normal conditions) during *rabi*, among 12 entries along with two parents and two checks were evaluated. Eight genotypes recorded significantly superior yield than the best check MTU1156 (7.17 t ha^{-1}). The entry DST-38-15-3-1 recorded highest yield.

In Multi Location Trial under very high salinity condition (EC-7.50), 12 entries along with two parents and two checks were evaluated. Thirteen entries recorded significantly superior yield than the recurrent parent MTU1010 (5.02 t ha^{-1}) while five entries *viz.*, DST38-15-3-1 (6.66 t ha^{-1}), DST36-108-1 (6.55 t ha^{-1}), DST8-4-4(6.38 t ha^{-1}), DST 35-4-3-1 (6.29 t ha^{-1}) and DSS46-97-2 (6.19 t ha^{-1}) recorded significantly superior yield than the best check MTU1153 (6.01 t ha^{-1}).

In Advanced Yield Trial (M) during *rabi* 2017-18, the entries MTU 2613-25-1-1 (8.15 t ha^{-1}), MTU 2491-70-2-1-1 (7.71 t ha^{-1}) and MTU 2462-31-2-1-2 (7.58 t ha^{-1}) recorded highest grain yield in comparison with check MTU 1121 (7.43 t ha^{-1}).

In Advanced Yield Trial - Early, during *rabi* 2017-18, all the entries have shown significant differences for grain yield. Among the 22 entries tested (including 2 local checks), the entry MTU 2513-11-5-1-1 (BE 630) recorded highest grain yield of 7.56 t ha-1 followed by MTU 2578-56-1 (BE 629) and MTU 2514-23-1-2-1 (BE 638) with 7.52 t ha^{-1} and 7.51 t ha^{-1} respectively. The check entries MTU 1156 and MTU 1121 recorded 6.61 and 7.15 t ha^{-1} respectively.

In Multi Location Trial-Early, among the 24 entries tested (including 2 local checks), the entry MTU 2344-60-2-1-1 recorded highest grain yield of 7.62 t ha^{-1} followed by MTU 2274-8-1-1, MTU 2435-66-2-1, and MTU 2261-11-3-1-2 with 7.44 t ha^{-1}, 7.43 t ha^{-1} and 7.38 t ha^{-1} respectively. The check entries MTU 1156 and MTU 1121 recorded 6.54 and 6.88 t ha^{-1} respectively

In Advanced Varietal Trial-1(Late), PNP9557 (5.77 t ha^{-1}) had recorded significantly superior yield than the national check, MTU7029 (5.12 t ha^{-1}).

In Advanced Varietal Trial 1 (Irrigated Medium), the entries MTU 1237 (6.17 t ha^{-1}), OR 2573-15 (6.14 t ha^{-1}) and WGL 697 (6.13 t ha^{-1}) recorded significantly superior grain yield in comparison with the local check MTU 1075 (5.41 t ha^{-1}).

In Advanced Varietal Trial 2 (Irrigated Medium), the entries MR 8333 (Hybrid) (5.44 t ha^{-1}) and WGL 739 (5.35 t ha^{-1}) recorded higher grain yield in comparison with the local check MTU 1075 (5.25 t ha^{-1}).

In Advanced Varietal Trial 2-IME, out of 12 entries (along with checks) tested, the entry KPH-484 (Hybrid) recorded highest grain yield of 5.48 t ha^{-1} followed by JGL 24423, RCPR 32-HHZ5-DT 20-DT 3-Y2 and local check (MTU1121) with 5.16, 5.08 and 5.01 t ha^{-1} respectively.

In Advanced Varietal Trial 1-Biofortification, the entry CR 2830-PLS^{-1}56 recorded highest grain yield (6.68 t ha^{-1}) than yield check BPT 5204 (5083 t ha^{-1}).

In Advanced Varietal Trial 2-Biofort, the entry R-RHZ-R 56 recorded highest grain yield of 5.91 t ha^{-1} compared to yield check IR 64 (5,18 t ha^{-1}).

In Multi Location Trial (Hybrids), the hybrid check HRI-174 (6.29 t ha^{-1}) recorded superior yield than any other test hybrid.

Identified six genotypes *viz.,* Swarna, MTU 1229, MTU 1190, MTU 2546A-12-13-3-10, NLR 22999, MTU 1031 expressing positive alleles for both nitrogen and phosphorous use efficiency.

Sixteen genotypes viz., BPT 2231, NLR 20104 BPT 1768, NLR 30491, NLR 34449, NLR 40024, NLR 33892, NLR 3238, NLR 40054, NLR 20084, MTU 1006, MTU 1031 BCP2, BCP5, BCP 5 expressed positive alleles for two phosphorous use efficiency gene linked markers. Out of 48 genotypes screened using 6 markers, nine genotypes namely MTU 1032, NLR 28523, NLR 22999, NLR 20084, BPT 2295, MTU 1031, MTU 5182, BCP1 exhibited positive alleles for nitrogen use efficiency out of 48 genotypes using 4 NUE linked markers.

DNA finger printing of 64 released rice varieties and 25 pre released rice cultures of ANGRAU was completed.

Rice Research Unit, Bapatla

In Advanced Yield Trial - Late, among 16 entries along with one check evaluated the entry BPT 2871 (6.58 t ha^{-1}) followed by BPT 2846 (6.20 t ha^{-1}) and BPT 2841(5.97 t ha^{-1}) recorded significantly high grain yield when compared with the local check BPT 5204 recorded 4.70 t ha^{-1} grain yield.

In Advanced Yield Trial - Medium, evaluation of 13 entries along with two checks indicated that the entry BPT 2901 (7.69 t ha^{-1}), BPT 2892 (6.29 t ha^{-1}) and BPT 2895 (5.94 t ha^{-1}) recorded significantly superior yield over MTU 1001 (4.84 t ha^{-1}).

In Multi Location Trial (Late), out of 38 entries tested, the entry NLR 3186 recorded significantly high grain yield of 7.99 t ha^{-1} followed by MTU 2244-39-20-4 (7.70 t ha^{-1}) and HRL 7 (7.66 t ha^{-1}) over the local check BPT 5204 (5.79 t ha^{-1}).

In Multi Location Trial (Medium), 32 entries were evaluated against the check MTU 1075. Out of which, the entries HR M5 (8.14 t ha^{-1}), HRL 4 (7.82 t ha^{-1}), and MTU 2336-62-25-39-16 (7.81 t ha^{-1}) recorded significantly superior yield over the common check MTU 1075 (5.70 t ha^{-1}).

Three entries were significantly excelled over the common check BPT 5204 in Multi Location Trial (Slender grain). Among the 26 entries tested, the entry NLR 3217 (7.52 t ha^{-1}) followed by NLR 34449 (7.45 t ha-1) and MTU 2341-59-2-2-1-1 (7.22 t ha^{-1}) have recorded superior yield than the check BPT 5204 (6.37 t ha^{-1}).

Out of 21 entries studied in Multi Location Trial- Direct sowing - Medium, four entries were found significantly superior than common check MTU 1121 (4.20 t ha^{-1}). Among these, RM 152-54-3-1-1 (6.21 t ha^{-1}) followed by MTU 2344-25-2-2-2 (5.90 t ha^{-1}) and E2 (5.85 t ha^{-1}) recorded significantly higher yields than the check MTU 1121(4.20 t ha^{-1}).

In estimation of the RDS, SDS, RS among the seven brown rice varieties, the variety BPT 2776 recorded maximum RDS (65.97) followed by BPT 2595 (64.46) and BPT 2782 (60.69). The maximum value for slowly digestible starch (SDS) was manifested by BPT 2270 (42.84) followed by BPT 2660 (41.14) and BPT 5204 (41.02) which is desirable. BPT 2595 recorded the maximum resistant starch (RS) (3.21) followed by BPT 2295 (2.84) and BPT 2776 (4.92). BPT 5204 recorded low glycemic index (GI) (54.44) value and the other genotypes which manifested low GI include BPT 2270 and BPT 2660.

Agricultural Research Station, Machilipatnam

In Advanced Yield Trial, among seventeen promising cultures evaluated with MCM 100, MCM 101, MCM 103, MCM 110, BPT 5204 and MTU 1061as checks. The culture OYT 93 (MCM 218-5-1-1-1) recorded superior grain yield of 6.45 t ha-1 followed by OYT 74 (MCM 58-1-1-2) with 6.30 t ha^{-1}, OYT 88 (MCM 203-12-1-1) (6.07 t ha^{-1}), OYT 87 (MCM 216 - 6 - 2 - 1) (5.31 t ha^{-1}), OYT 99 (MCM 223 - 5 - 1 - 1) (4.86 t ha^{-1}), as against the check MCM 103 (3.86 t ha^{-1}).

Multi Location Trial was conducted with 9 saline tolerant rice cultures and MTU 1061 as check. Results indicated that the variety MCM 103 (6.08 t ha^{-1}) recorded highest yield over the other entries MCM 100 (5.86 t ha^{-1}) and MCM 101 (5.09 t ha^{-1}) and the chek MTU 1061 (4.92 t ha^{-1}).

In Multi Location Trial with 25 early duration test entries including MTU 1010 and MCM 101 as checks, the culture E 489 significantly recorded higher grain yield (4.99 t ha^{-1}) followed by E 483 with 4.96 t ha^{-1} while check MTU 1010 recorded 1.59 t ha^{-1}.

In the Multi Location Trial with 25 medium duration test entries including MCM 100 and MTU 1001, as checks, the culture M 518 recorded 5.25 t ha^{-1} of grain yield followed by M 520 with 5.21 t ha^{-1} while check MTU 1001 recorded 2.56 t ha^{-1}.

Multi Location Trial was laid out with 36 late duration test entries including MTU 1061 and MTU

7029 as checks. The grain yield differences were statistically significant. The culture L 544 recorded significantly superior grain yield of 5.87 t ha^{-1} followed by L 564 with 5.31 t ha^{-1} against the check MTU 1061 (1.85 t ha^{-1}).

In Advanced Varietal Trial (CSTVT), out of 34 test entries evaluated (with MTU 1061 as check), the culture 2407 recorded significantly higher grain yield of 5.50 t ha^{-1} followed by 2401 with 5.29 t ha^{-1} while the check MTU 1061 recorded 2.99 t $ha^{-1}$of grain yield.

In Advanced Varietal Trial (CSTVT), out of 31 test entries evaluated (with MTU 1061 as check), the culture 2302 recorded significantly higher grain yield of 5.17 t ha^{-1} followed by 2308 with 4.40 t ha^{-1} while the check MTU 1061 recorded 2.08 t ha^{-1} of grain yield.

Regional Agricultural Research Station, Nandyal

NDLR 7 (Nandyal Sona) was released during 2016 for Andhra Pradesh and was notified in 2017 by Central Sub Committee on Crop Standards, notification and release of varieties.

In short duration Multi Location Trial, E 503 (9.60 t ha^{-1}), E 515 (9.56 t ha^{-1}) E 507 (9.53 t ha^{-1}), E 517 (9.50 t ha^{-1}), E 509 (9.46 t ha^{-1}), E 505 (9.39 t ha^{-1}) and E 511 (9.29 t ha^{-1}) recorded higher grain yields over check entry MTU 1010 (7.73 t ha^{-1}).

In rice, Multi Location Trial (medium duration), M 547 (10.73 t ha^{-1}), M 553 (9.92 t ha^{-1}) and M 545 (9.64 t ha^{-1}) recorded higher grain yields over check entry NDLR 8 (7.17 t ha^{-1}).

In rice Multi Location Trial (long duration), only entry, L 572 (10.73 t ha^{-1}) recorded higher grain yield over check MTU 7029 (7.41 t ha^{-1}).

In rice Multi Location Trial (slender grain), SG 342 (9.84 t ha^{-1}), SG 340, SG 364 (9.15 t ha^{-1}), SG 345, SG 336 (8.87 t ha^{-1}) recorded higher grain yields over check entry NDLR 7 (6.76 t ha^{-1}).

Agricultural Research Station, Jangamaheswarapuram

In Preliminary variety trial, out of eleven entries tested against one check, the entry JMP 193 (6.53 t ha^{-1}), JMP 187 (6.46 t ha^{-1}) recorded significantly superior yield over the check BPT 5204 (4.79 t ha^{-1}). Five entries were promoted to AYT, based on grain type and yield performance over the check.

In Advanced Variety trial, among twelve entries tested against one check, the entries JMP 153 (6.72 t ha^{-1}), JMP 178 (6.68 t ha^{-1}), JMP 132 (6.44 t ha^{-1}) and JMP 124 (6.34 t ha^{-1}) recorded significantly superior yield over the check, BPT 5204 (5.01 t ha^{-1}).

Agricultural Research Station, Nellore

In Advanced Variety Trial-Late, fifteen entries were evaluated against three checks. None of the entries were found to be significantly superior over the check NLR 33892 (5.97 t ha^{-1}). The cultures *viz.,* 5809-52-2-1-1-3 (6.61 t ha^{-1}), 5809-52-1-1-1-2 (6.49 t ha^{-1}) and 5831-1-1-1-1-1 (6.43 t ha^{-1}) were on par over best check NLR 33892.

Twelve entries were tested in Advanced Variety trial (medium) against 3 checks, out of which, none of the entries recorded significantly superior yield over check BPT 5204 (7.14 t ha^{-1}). However, the entries, 5742-6-1-1 (7.18 t ha^{-1}) and 5709-78-2-1 (7.14 t ha^{-1}) recorded on par performance with the best check.

In Advanced Variety trial (Early), among 16 entries tested against 3 checks, none of the entries recorded significantly superior yield over the best check NLR 30491 (6.41 t ha^{-1}). The entries, NLR3460 (6.87 t ha^{-1}), NLR3452 (6.84 t ha^{-1}) and NLR 3451 (6.59 t ha^{-1}) recorded were on par with the best check NLR 30491.

About 350 germplasm accessions were collected from Maruteru, Jagtial, DRR, ARI, CRRI Warangal, IRRI and elite lines developed from ARS, Nellore were maintained at the Research Station.

Thirty seven entries were evaluated against local check NLR 33892 in Multilocation Variety Trial (Late). The culture L602 (6.32 t ha^{-1}) has recorded significantly superior yield over the best check NLR 33892 (5.17 t ha^{-1}).

In Multilocation variety trial (slender group), twenty four entries were tested against the local check NLR 34449. Out of which three cultures viz., SG 364 (5.92 t ha^{-1}), SG 349 (5.31 t ha^{-1}) and SG 340 (5.07 t ha^{-1}) recorded significantly superior yield over the check, NLR 34449 (3.95 t ha^{-1})

Twenty three entries were evaluated against the check NLR 34449 (Local check) in Multilocation variety trial (Early). None of the entries recorded significantly superior grain yield over the local check (E 519) (5.37 t ha^{-1}). However the best three entries were E 522 (6.74 t ha^{-1}), E 511 (6.65 t ha^{-1}) and E 515 (6.53 t ha^{-1}).

Research Station, Utukur

In an Advanced varietal trial (Long duration), out of seven entries tested against two checks, two entries UTR 187 (9.23 t ha^{-1}) and UTR 117 (8.72 t ha^{-1}) have recorded significantly higher grain yield over the best check NDLR 7 (7.79 t ha^{-1}).

Out of thirty seven entries tested in Multi Location Trial (long duration), five entries *viz*., NLR (9.80 t ha^{-1}), MTU 2404-52-3 (9.62 t ha^{-1}), MTU 2197-12-1 (9.49 t ha^{-1}), HR L7 (9.42 t ha^{-1}) and MTU 2101-30-2-1-1 (9.40 t ha^{-1}) have recorded significantly superior yield against check MTU 106 (8.73 t ha^{-1}).

In Advanced varietal trial (long duration), out of five entries tested against two checks, two entries UTR 181 (8.77 t ha^{-1}) and UTR 161 (8.61 t ha^{-1}) have recorded significantly higher grain yield than the best check NDLR 8 (7.04 t ha^{-1}). The performance of these two entries was observed to be very consistent and they will be nominated for multilocation testing for *Kharif,* 2018.

Out of thirty two entries tested in Multi Location Trial (medium duration), none of the entries was found to be significantly superior against check NDLR 7 (7.53 t ha^{-1}). BPT 2789 (8.325 t ha^{-1}) followed by MTU 2331-216-1-1 (8.08 t ha^{-1}) and MTU 2347-87-1-1-1 (8.03 t ha^{-1}) were on par with the check NDLR 7.

In Multilocation trial (slender grain), out of twenty five entries tested, five entries MTU 2331-19-1-1-2 (9.41 t ha^{-1}), MTU 2411-74-1-1-1 (8.49 t ha^{-1}), MTU 2341-59-2-2-1-1 (8.22 t ha^{-1}), MTU 2347-87-1-1-1 (7.96 t ha^{-1}) and MTU 2142-9-2-1 (7.73 t ha^{-1}) were observed to be significantly superior over the best check NDLR 7 (6.61 t ha^{-1}).

Agricultural Research Station, Ragolu

In Multilocation yield trial (Late) during *kharif* 2017, thirty eight entries were tested including one check. Among test entries, two entries *viz.,* L 568 (8.40 t ha^{-1}) and L 592 (8.33 t ha^{-1}) numerically out yielded the check RGL 2537 (8.21 t ha^{-1}).

In Multilocation yield trial(Medium) during kharif 2017, among thirty two entries tested including local check, five entries *viz.,* M 553 (8.74 t ha^{-1}), M 564 (7.93 t ha^{-1}), M 551 (7.84 t ha^{-1}), M 555 (7.83 t ha^{-1}) and M 547 (7.80 t ha^{-1}) were significantly out yielded the local check MTU 1001 (5.83 t ha^{-1}).

In *kharif* 2017, twenty four entries including local check were tested in Multi Location Yield Trial (Early). Among the entries tested, thirteen entries *viz.,* E 515, E 511, E 505, E 506, E 517, E 499, E 509, E 503, E 507, E 522, E 513, E 504 and E 521were significantly superior over the local check MTU 1001. The entry E 515 stood first with an yield potential of 7.96 t ha^{-1}while the local check (MTU 1010) has recorded 4.15 t ha^{-1}.

In Multilocation yield trial (Direct sown-late) during *kharif* 2017, a total of 19 entries including local check were tested. Among the test entries, the entry *viz.,* DSL 69 has recorded highest yield potential of 4.42 t ha^{-1} while the local check RGL 11414 has recorded 2.71 t ha^{-1}. A total of twelve entries *viz.,* DSL 69, DSL 82, DSL 73, DSL 74, DSL 81, DSL 78, DSL 71, DSL 77, DSL 68, DSL 72, DSL 76 and DSL 83 significantly out yielded the local check RGL 11414.

In Multi-location Yield Trial (Direct sown Medium), twenty one entries including local check were tested during *kharif* 2017. Among the entries tested, eighteen entries were statistically out yielded the standard RGL 2538. The entry, DSM 89 registered highest yield potential of 6.09 t ha^{-1} as against the local check, RGL 2538 (3.19 t ha^{-1}).

In Multilocation Yield Trial –Slender grain, out of twenty six entries tested against local check (RNR 15048), the entry SG 361 recorded an yield potential of 7.93 t ha^{-1} as against the local check RNR 15048 (3.63 t ha^{-1}. Twelve entries *viz.,* SG 361, SG 363, SG 340, SG 362, SG 342, SG 349, SG 344, SG 353, SG 345, SG 359, SG 348 and SG 356 have recorded significantly superior yield over the local check.

In Advanced Variety Trial-I(Irrigated Medium), 20 entries including local check were studied. Among the entries tested, the entry 4116 has recorded significantly superior yield of 5.58 t ha^{-1} followed by the entry *viz.,* 4126 (5.43 t ha^{-1}) over the the local check, MTU 1001 (4,70 t ha^{-1}).

In Advanced Variety Trial-2 (Irrigated Medium), out of 12 entries tested, the entries *viz.,* 4010 (7.09 t ha^{-1}) and 4001 (6.84 t ha^{-1}) have recorded higher yield than the local check, MTU 1001 (6.75 t ha^{-1}).

APRRI & RARS, Maruteru

Different varieties were evaluated during *kharif,* 2017 for their response to nutrients and grain yield at RARS, Maruteru under three recommended doses of fertilizer (50%, 100%,150%). Nutrient response was higher at 100% RDF compared to 150% RDF. Variety Gotra Vidhan-3 gave higher yield (4.97 t ha^{-1}) where as testing variety IET 24797 gave 4.46 t ha^{-1} only.

Among crop establishment methods studied durng *rabi* 2017, modified SRI method was found superior (with a mean grain yield of 5.38 t ha^{-1}) over conventional transplanting and direct wet seeded system (5.26 & 4.99 t ha^{-1}). Among the weed management practices, mechanical weeding three times at 10 days interval and pre-emergence herbicide application followed by post-emergence herbicide application were found promising in reducing weed problem with grain yields of 5.69 t ha^{-1} and 5.36 t ha^{-1} respectively.

Studies on identification and establishment of paddy-paddy-pulse cropping system (Integrated Farming System) using selective mechanization during *Kharif,* 2017 season revealed that, the machine transplanting was recorded significantly higher grain yield of 6.02 t ha^{-1} compared to normal line transplanting (5.50 t ha^{-1}) and farmers practice (4.93 t ha^{-1}). Straw yields also followed similar trend.

Evaluation of different weed management practices under organic cultivation during *Kharif,* 2017 revealed that, location specific green leaf manure incorporation recorded higher yield of 3.68 t ha^{-1} followed by locally available weed mulch + one hand weeding (3.61 t ha^{-1}) were significantly superior than two hand weedings (3.24 t ha^{-1}) and mechanical and hand weeding once (3.27 t ha^{-1}). Where as reduced spacing (up to 25%) + mulching with previous crop residue + one hand weeding recorded least grain yield of 3.14 t ha^{-1} among all the treatment combinations of organic weed control methods.

Studies on identification of cropping systems module for different farming systems revealed that, cropping system involving pulses to meet house hold nutrition recorded highest grain yield of 5.30 t ha^{-1} followed by ecological cropping system involving pulses for improving soil health (5.13 t ha^{-1}) when compared to predominant cropping system (4.27 t ha^{-1}) during *Kharif*, 2017.

During *rabi*, 2017-18, highest rice equivalent yields were recorded with blackgram with 3.64 t ha^{-1} where as system productivity was highest (8.61 t ha^{-1}) with cropping system involving pulses to meet household nutrition followed by cropping system involving green manure (7.83 t ha^{-1}).

Net work experiment on Natural Farming during *Kharif*, 2017 revealed that, plant root length was superior in ICM plot with a root length of 13.0 cm at the time of planting and 17.9 cm at harvest when compared to Natural Farming with the corresponding values for treatment as 8.2 cm and 15.5 cm at the time of planting and harvest respectively. Similarly higher number of tillers, panicle count, panicle length, panicle weight and higher grain yield was recorded in ICM plot compared to Natural Farming plot. The magnitude of increase in grain under ICM practice was 23.4 % compared to Natural Farming.

Agricultural Research Station, Ragolu

During *kharif* 2017, a grain yield of 6.96 t ha^{-1} was recorded with application of NPK @ 120-60-50 kg ha^{-1} + $ZnSo_4$ @ 50 kg ha^{-1} with the variety Srikurma (RGL 2332) where as organic production practices gave 5.80 t ha^{-1} and green manuring + application of NPK @ 80-60-50 kg ha^{-1} (INM approach) recorded 6.48 t ha^{-1} than the control (no fertilizer or manurial application; 4.27 t ha^{-1}).

Studies on the effectiveness of neem coated urea (NCU) with and without organic manures in rice during *kharif* 2017 revealed that, there was no significant difference in growth parameters, yield attributes, yield and economics either among nutrient sources or with levels of neem coated urea.

During 2017-`18, in *rabi* season, there was a progressive decline in seed/grain yields of rice fallow crops, with increased duration in *kharif* rice respectively. Among different fallow crops tried, sweet corn performed superior over other crops regardless of time of sowing. Rice equivalent yields showed that sweet corn and sunhemp seed production were impressive after short duration rice grown in *kharif,* whereas sunhemp and sweet corn crops were better after medium duration rice grown in *kharif* and sweet corn crop was better after long duration rice grown in *kharif* .

During *rabi*, 2017-`18, in rice fallow, there was a progressive decline in both greengram and blackgram seed yield with delay in sowing from November 3rd week to December 1st week and December 3rd week respectively. Among blackgram varieties, LBG 752 and LBG 787 performed better when sown early and LBG 752 and PU 31 under late sown conditions. While among greengram varieties, LGG 460 and IPM 2-14 under early sown conditions and LGG 460 and WGG 42 when sown under late conditions were found to perform better and were found suitable for different rice fallow situations of North Coastal

Zone.

Agricultural Research Station, Nellore

Highest mean grain yield (2016 & 2017) was observed with test variety NLR 40024 (Swetha, 6.30 t ha^{-1}) which was on par with pre release culture NLR 3242 (6.25 t ha^{-1}). Among the four nitrogen levels tested highest grain yield was recorded with 160 kg N ha^{-1}. (6.05 t ha^{-1}) but found on par with 120 kg N ha^{-1}. (6.01 t ha^{-1}). Hence 120 kg N ha^{-1} was found to be optimum for k*harif*.

The *rabi,* 2016 & 2017 results revealed that the highest mean grain yield (7.34 t ha^{-1}) was recorded with test variety Swetha (NLR 40024) which was superior to NLR 3217 (6.58 t ha^{-1}) and NLR 3242 (6.55 t ha^{-1}) which inturn were onpar with each other. Among the four nitrogen levels tested, there was no significant yield increase from 120 -200 kg N ha^{-1}. Hence, 120 kg N ha^{-1} wa found to be optimum for *rabi*.

Pooled mean of *kharif* yields for three years (2015, 2016 & 2017) revealed that highest grain yield (6.42 t ha^{-1}) was recorded with NLR 3328 and was superior to NLR 4001(5.45 t ha^{-1}), 3513 (5.38 t ha-1) and 3186 (5.12 t ha^{-1}). Among the four nitrogen levels tested, highest grain yield was recorded with 160 kg N ha^{-1}.and was onpar with 80 &120 kg N ha^{-1}. Hence for kharif 80 kg N ha^{-1} is found to be optimum.

In organic farming trial, mean data for three years (early *Kharif*, 2015, 2016 & 2017) revealed that grain yield was low in organic plot (5.95 t ha^{-1}) when compared to inorganic plot (6.64 t ha^{-1}) and there was 10.3% yield reduction in organic cultivation. Among the varieties tested, highest grain yield was obtained with NLR 40024 (6.78 t ha^{-1}) followed by NLR 34449 (6.34 t ha^{-1}) and NLR 30491 (6.31 t ha^{-1}) which were inturn on par with each other.

The yields were still reduced in organic plot during *rabi*. Pooled mean for three years (*rabi,* 2015, 2016 & 2017) revealed that, highest grain yield of 6.32 t ha^{-1} was recorded in inorganic cultivation compared to the organic cultivation (3.69 t ha^{-1}). There was 41.2% yield reduction in organic cultivation. Among the varieties tested highest grain yield was obtained with NLR 34449 (5.94 t ha^{-1}) followed by NLR 40024 (5.55 t ha^{-1}) and NLR 30491 (5.01 t ha^{-1}).

Highest grain yield was realised with application of nitrogen @160 kg N ha^{-1} (6.04 t ha^{-1}) during early *kharif* (2017) which was on par with 120 kg N ha^{-1}. (5.90 t ha^{-1}). Phosphorous @ 30 kg P_2O_5 ha^{-1} (5.93 t ha^{-1}) which was on par with no phosphorus (5.80 t ha^{-1}). Highest grain yield of 6.65 t ha^{-1} was obtained when N: P_2O_5:K_2O was applied @ 160:30:60 t ha^{-1} during early *kharif* (*Edagaru/summer*) season.

Zero budget natural farming during early *Kharif*, 2017, recorded grain yield of 5.12 t ha^{-1} compared to inorganic farming (5.56 t ha^{-1}) with 7.96 % reduction in grain yield. The cost benefit ratio was 1:1.59 under ZBNF where as 1:1.96 in inorganic farming.

During *rabi*, 2017, highest grain yield was recorded with NLR 34449 (6.15 t ha^{-1}) followed by MTU 1010 (5.25 t ha^{-1}) and the lowest grain yield was recorded in BPT 5204 (4.11 t ha^{-1}) under machine transplantation. Among the different age seedlings transplanted, highest grain yield was obtained when transplanted at the age of 25 days (5.64 t ha^{-1}) followed by 20 days (5.27 t ha^{-1}) & 30 days (5.11 t ha^{-1}) when compared to 15 days aged seedlings (4.66 t ha^{-1}).

Regional Agricultural Research Station,

Nandyal

In organic farming research, rice grown in vertisols under K.C. canal ayacut, organic practice recorded a grain yield of 4.70 t ha^{-1} where as inorganic rice cultivation method had recorded an yield of 6.61 t ha^{-1}. The yield in organic practice was 28.8 % less over inorganic rice. The net returns in organic rice practice were Rs 71,000/- ha^{-1} as against Rs 86,196/- in inorganic rice practices. C:B ratio was 1:0.86 with organic practices and 1:1.4 in inorganic practice.

Agricultural Research Station, Utukur.

The variety BPT-5204 recorded significantly higher grain yield compared to NDLR-7. Among the nitrogen levels tested, though improvement in yield was observed up to 200 kg N ha^{-1}, it was on par with 120 kg N ha^{-1}. Interaction indicated that, BPT-5204 responded up to 200 kg N and NDLR - 7 responded up to 160 kg N ha^{-1}

Agricultural Research Station, Bapatla

The procedures for estimation of Rapidly Digestible Starch (RDS), Slowly Digestible Starch (SDS) and Resistant Starch (RS) were standardized during the period under report. The RDS, SDS and RS were estimated in brown rice of seven released varieties and advanced cultures. Among these, BPT 2776 recorded maximum RDS (65.97) followed by BPT 2595 (64.46) and BPT 2782 (60.69). The maximum value for Slowly Digestible Starch, a desirable character was manifested by BPT 2270 (42.84) followed by BPT 2660 (41.14) and BPT 5204 (41.02). BPT 2595 recorded the maximum Resistant Starch (3.21) followed by BPT 2295 (2.84) and BPT 2776 (4.92). BPT 5204 recorded low glycemic index (54.44) value and the other genotypes which manifested low GI include BPT 2270 and BPT 2660. All these three cultures which manifested low GI also recorded low values for RDS and high values for SDS and RS.

Crop Protection

Insect Pest Management

Rice Research Unit, Bapatla

In light trap catches, yellow stem borer was very low. Highest catches of leaf folder (765 No.) in 44th stnd week , brown plant hopper (6202 No.) in 47th stnd week, white backed brown plant hopper (353 No.) in 48th stnd week zigzag leaf hopper (421 No.) in 52nd stnd week and green leaf hopper (1106 No.) in 42nd stnd week were recorded. Maximum of 38222 mirid bug population was recorded in 46th stnd week. All the pests are negatively correlated with the rain fall, except green leaf hopper. Leaf folder shows positive correlation with temperature and negative correlation with relative humidity and rainfall. Brown plant hopper shows positive correlation with temperature and negative correlation with relative humidity and rain fall.

Among the combinations tested, spinetoram 6% + methoxyfenozide 30% was found effective (4.86 t ha^{-1}) followed by DPX-RAB 55 + hexaconazole (4.51 t ha^{-1}). spinetoram 6% + methoxyfenozide 30% was also found effective with low leaf folder damage (5.7%) and DPX-RAB 55 + hexaconazole combination was found effective with low population of white backed brown plant hopper (2.4 hill^{-1}) and brown plant hopper (2.7 hill^{-1}).

Dinotefuron treatment was effective in control of white backed brown plant hopper and brown plant hopper with 45.0 and 36.8 per cent reduction of pest after treatment respectively. In case of leaf folder, lemon grass oil and neem oil were found to be effective with 72.3 and 69.8 per cent reduction of damage respectively. In case of yield, both the chemical treatments, dinotefuron and rynaxypyr recorded highest yields i.e 4.20 t ha^{-1} and 4.14 t ha^{-1} respectively.

APRRI & RARS, Maruteru

Out of 743 NSN 2 entries screened against mixed population of plant hoppers during *kharif,* 2017, 147 entries were found promising. Out of which, 73 entries recorded '1' score (NSN 2), 25 entries recorded "3" and 49 entries recorded "5" score on 0-9 SES scale.

Out of the 25 entries screened against planthoppers under multiple resistance screening trial (MRST) during *kharif,* 2017, 2 entries recorded "1" score, 2 entries recorded "3" score and 1 entry recorded "5" score on 0-9 SES scale.

Out of the 25 entries screened against planthoppers under Multiple Resistance Screening Trial (MRST) during *rabi* 2017, none of the entries was found promising against plant hoppers.

Among 60 entries screened against gall midge during *kharif* 2017, 5 entries have recorded '0' score on 0-9 SES scale.

About 17 differentials were tested during *Kharif* 2017 to know the reaction against gall midge, but all were damaged by gall midge. Hence it was difficult to judge which bio type exists at Maruteru centre.

Out of 56 entries screened against stem borer during *rabi,* 2017-18, 12 entries found promising.

Among different combinations of insecticides and fungicides tested during *kharif* 2017, triflumezopyrim @ 0.48 ml l^{-1} + hexaconazole @ 2.0 ml l^{-1} was found effective against plant hoppers and sheath blight and recorded higher grain yield.

In *rabi* 2017-`18, among different combinations of insecticides and fungicides tested, triflumezopyrim @ 0.48 ml + tricyclazole @ 0.6 g l^{-1} was found effective against plant hoppers and blast and recorded highest grain yield of 5.77 t ha^{-1}.

In population dynamics studies during *kharif* 2017, the yellow stemborer was found more active during 43rd and 44th SW. In 44th SW, YSB catches were highest (1572 + 1392). Gallmidge peak catches (4710) were recorded in 42nd SW. The LF, BPH and WBPH catches were more in 44th SW.where as yellow stem borer, gall midge and plant hoppers were the major insect pests during *rabi*, 2017-18. Peak catches of gall midge and stem borer was observed during 16th standard week. Activity of plant hoppers was highest from 10th March, 2018 to 20th April.

In the evaluation of some ecological methods to manage plant hoppers during *rabi,* 2017-`18, plant hoppers population was significantly more in EE plots compared to FP plots at 75 DAT and 90 DAT. EE plot recorded highest grain yield of 5.34 t ha^{-1} even though BPH population was more, which might be due to more number of panicle bearing tillers due to wider spacing adopted (20 cm X 20 cm) in EEPM compared to recommended spacing of 15 cm X 15 cm in farmers practice (FP).

In Network project on natural farming in rice during *kharif,* 2017, the percent hispa damaged leaves were significantly more in natural farming at 35, 45, and 55 days after transplanting (DAS) and the percent leaf damage by leaf folder was more in Natural farming (NF) compared to integrated crop management plot at 75 and 90 DAT.where as the percent silver shoots were significantly more in integrated crop management plot (ICM) at 45, 65 DATand BPH population was more in ICM plot (128.2 $hills^{-10}$) compared to NF(68 $hills^{-10}$) at 45 DAT.There was no significant difference between Natural farming and integrated crop management plot with regard to dead hearts at 35, 45, 55 and 65 DAT. However, significant difference was observed in case of white ears (ICM-4.26% and NF-10.42%).Grain yields were more (5.37 t ha^{-1}) in ICM plot compared to natural farming plot (4.11 kg ha^{-1}).

Agricultural Research Station, Nellore

Efficacy studies of zinc and chelated zinc alongwith pesticides during *rabi* revealed that, the treatment with chelated zinc and spinosad was effective against leaf folder. The per cent reduction of damage due to leaf folder was highest in chelated zinc and spinosad (76.77) followed by zinc and spinosad (69.74) and, zinc and flubendiamide (69.36). Pooled data of yield during 2016-17 and 2017-`18 revealed that, highest yield was recorded in acephate @ 1.5g l^{-1} and chelated zinc (4.76 t ha^{-1}) compared to chelated zinc (3.64 t ha^{-1}) alone.

Brown Plant Hopper population collected from farmers' fields of Nellore district recorded 1.24 folds of resistance for buprofezin during 2017-18. Imidacloprid, monocrotophos, thiomethoxam and acephate have recorded 0.85, 1.19, 0.425, 1.17 folds of resistance, respectively against BPH.

Peak yellow stem borer catches (66 moths) were recorded during 36^{th} std week. Peak gall midge catches (1062) were recorded at 12^{th} std week. Peak green leaf hopper catches (66) were recorded at 9^{th} std week. Peak brown plant hopper catches (4000) and white backed plant hopper catches (4450) were recorded at 45^{th} std week. Peak leaf folder catches (151) were recorded at 46^{th} std week.

Correlation analysis of light trap catches revealed that stem borer, leaf folder, gall midge and BPH had significant negative correlation with maximum temperature. Stem borer had significant negative correlation with minimum temperature (-0.4395) and significant positive correlation with relative humidity (0.3933 & 0.3335). Leaf folder and WBPH also exhibited significant positive correlation with relative humidity.

Two rodent species *Bandicota bengalensis* and *Mus budooga* were identified at Agricultural Research Station rice fields. The average sex ratio of male and female of *B. bengalensis* was 1:1.25 during *kharif*, 1.16:1 during rabi; sex ratio of male and female of *M. budooga* was 1.13:1 during *kharif* and 1:1.65 during *rabi*. Per cent damage ranged from 8.4 to 33.3 during *kharif* and *rabi.*

Potassium silicate as foliar spray twice followed by application of *B. bassiana* was found to be effective in controlling the leaf folder incidence compared to *B. bassiana* spray alone. Maximum reduction (42.8 %) in leaf folder incidence was found with spraying of Si @ 80 mg l^{-1} at 2 weeks after transplantation and at active tillering stage followed by *Beauveria bassiana* @ 1.3 x 106 conidia ml^{-1} compared to *B. bassiana* spraying (17.55 %).

All the cow based extracts were inefficient when the incidence of the pest is severe. The treatment with acephate @ 1.5 g l^{-1} is efficient in reducing the damage due to leaf folder in rice crop and recorded the least per cent leaf folder damage of 6.85%, followed by NSKE with the percent leaf damage of 12.42 at 7 days after spraying. Percent damage due to gallmidge at 7 DAS revealed that, all the treatments including chemical control was ineffective to manage rice gallmidge.

Neemastram was ineffective in controlling the mite. Maximum of 92.1% damage was recorded due to mite incidence during early *kharif*, 2017. Yield recorded was 5.12 t ha^{-1}. In inorganic plot, the per cent damage due to leaf mite was 6.43. Yield in ANGRAU Practice was 5564 t ha^{-1} and yield reduction in natural farming was 7.91%.

Agricultural Research Station, Ragolu

In multiple resistance screening trial, the entries, CO 50, Dhan Rasi, DRR Dhan 43, IR 65482-7-216-1-2-B, Ranjeet, Shobini and Varalu were found resistant to stemborer during reproductive stage.

The entries NSN-182, 314,332 and 353 were found resistant to stemborer at both vegetative and reproductive stage in National Screening Nursery.

During 2017, the peak yellow stem borer population was observed during 43rd std week. Both BPH and WBPH peak observed during 39th SW and these shown significant positive relation with maximum and minimum temperature. The peak GLH population was observed during 40th SW and shown significant positive relation with evening relative humidity. The gallmidge adult peak catch was observed two times, once during 4th SW (270 no.s) and at 44th SW (195 no.s).

Highest reduction of BPH was observed in triflumezopyrim 0.48 ml l^{-1} + hexaconazole 2.0 ml l^{-1} and in DPX-RAB 55 (triflumezopyrim) 0.48 ml l^{-1}. Highest sheath blight reduction was observed in Contaf Plus (Hexaconazole) 2.0 ml l^{-1} followed by spinetoram 6% w/v (5.66% w/w) + methoxyfenoxide 30% w/c (28.3% w/w) SC 0.75ml l^{-1}. + hexaconazole 2.0 ml l^{-1}. Lowest neck blast recorded in Tricyclazole 0.6 g l^{-1} followed by spinetoram 6% w/v (5.66% w/w) + methoxyfenoxide 30% w/c (28.3%w/w) SC 0.75 ml l^{-1}. + tricyclazole 0.6 g l^{-1}. Highest yield was recorded in triflumezopyrim 0.48 ml l^{-1} + tricyclazole 0.6 g l^{-1} with 6.95 t ha^{-1}.

During *kharif* 2017, dinotefuran 20 SG 0.5 g l^{-1} followed by lemongrass oil 2 ml l^{-1} significantly reduced the BPH population. At pre harvest stage rynaxypyr 0.3 ml l^{-1}. (2.15% WE) followed by neemazal 5 ml l^{-1} (2.28% WE) significantly reduced the stem borer incidence.

Pooled data of three years shows that, diafenthiuron 50% WP 1 g l^{-1} followed by thiomethaxame 25 WG 0.2 g l^{-1} were the best in managing flea beetle damage in rice fallow greengram. Imidacloprid 17.8% SL 0.4 ml l^{-1} followed by acephate 75% SP @ 1 g l^{-1} were the best treatments in managing leaf miner damage in rice fallow greengram. Regarding yield, diafenthiuron 50% WP 1 g l^{-1} , profenophos 50 EC 2 ml l^{-1} and imidacloprid 17.8% SL 0.4 ml l^{-1} were best treatments.

During *rabi*, 2017-18 at 30 DAT, 50 DAT and at preharvest stage spinetoram 6% w/v (5.66% w/w) + methoxyfenoxide 30% w/c (28.3% w/w) SC 0.75 ml l^{-1} and its combination with hexaconazole 2.0 ml l^{-1} and Tricyclazole 0.6 g l^{-1} significantly reduced the stem borer incidence. Spaying of Tricyclazole 0.6 g l^{-1} and its combination with triflumezopyrim at 0.48 ml l^{-1} and spinetoram 6% w/v (5.66% w/w) + methoxyfenoxide 30% w/c (28.3% w/w) SC 0.75 ml l^{-1} at 75 DAT significantly reduced the leaf blast incidence. For neck blast, Tricyclazole @ 0.6 g l^{-1} alone significantly reduced the incidence.

Spraying DPX-RAB 55 237.5 ml ha^{-1}, spinetoram 6% w/v (5.66% w/w) + methoxyfenoxide 30% w/c (28.3% w/w) SC 400 ml ha^{-1}., flubemdamide 480 SC, 50 ml/ha^{-1}, acephate 526 g ha^{-1} and rynaxypyr 150 ml ha^{-1} at 56 DAT significantly reduced the incidence of stem borer (3.21, 3.25, 3.46, 3.5, 3.75 % DH respectively). For gallmidge at 56 DAT, flubemdamide 480 SC significantly reduced the incidence (7.83% SS) followed by dinetofuran 200 g ha^{-1} (9.62% SS) and at 80 DAT flubemdamide 480 SC alone reduced the incidence (20.5% SS).

Agricultural Research Station, Jangamaheswarapuram

Among the pre-harvest sprays on the

incidence of Angoumois grain moth, (*Sitotroga cerelella)* in long term seed storage, malathion was found to be effective as pre harvest spray followed by spinosad, cypermethrin, neem oil and NSKE. chlorpyriphos, dichlorvas were found to be least effective when compared to the control as pre harvest spray in controlling *Sitotroga*. Malathion registered lowest per cent weight loss (0.53) followed by spinosad (0.75), cypermethrin (1.29) and NSKE (1.40) compared to 7.03 in control.

Agricultural Research Station, Utukur

Studies on seasonal incidence and population dynamics of insect pests of rice during *kharif,* 2017 revealed that, in first date transplanted rice (02.08.17), peak per cent damage of gall midge (7.75) was observed in 42nd standard week and cut worm larvae per hill was 0.6 at harvesting stage. In second date transplanted rice (24.08.17), peak per cent damage of gall midge (12.62) was noticed in 45th standard week and cut worm larvae per hill was 0.53 at harvesting stage in 49th standard week. In third date transplanted rice (27.09.17), peak per cent damage of gall midge (21.72) was in 46th standard week and no incidence of cut worm was observed.

Agricultural Research Station, Seethampeta

During *Kharif* 2017, in light trap catches, peak incidence of yellow stem borer adult moth population (1.7 No.) in 46th std. week (12th to 18th November), plant hoppers (BPH/WBPH) population per week (57.3 No.) in 42nd std. week (15th to 21st October), leaf hopper population per week (69.6 No.) in 43rd std. week (22nd to 28th October) were found and the incidence was reduced there after. In case of natural enemies mirid bug population higher (20.3 No.) in 46th std. week (12th to 18th November) was recorded. Maximum temperature, minimum and maximum relative humidity had significant positive influence on yellow stem borer, leaf folder and gross hopper. The incidence of plant hoppers was a significantly positively correlated with the maximum temperature.

Disease Management

APRRI & RARS, Maruteru

Among the 2464 entries screened for leaf blast resistance during *rabi*, entries WGL-697 CRR 708-1-B-2-B-B-1 and CR 2439-B-18-1-1-1-1 were found to show resistant reaction of 1 and 2 respectively under NSN 1; while, seven entries Br. entry no. CU 1748, NLR 3415, CB 14536, HUR 17-1, CSR-TPB-99, AUK-1150-1, CSR-TPB-31 have recorded resistant reaction of 1 under NSN-2. Two entries *viz.,* IHRT E-9 and IHRT ME-1 have shown resistant reaction of 1 under NHSN.

Out of 354 entries screened under NSN 1 for neck blast resistance (*rabi*), nine entries *viz.,* CB 12 122, AD 10202, MTU 1184 (MTU 20601-1-1-1-1), Sonagathi, MEPH-126 (Hybrid), CR 2830-PLS-17, Swarnadhan, Tetep and CR 3932-9 were found resistant by recording zero score. Out of 743 entries screened under NSN-2, 14 entries *i.e.* OR 2413-2, OR 2749 (SBP-213), MTU 1248, CR 3075-2-1-1-1-1, OR 2411-6, CR 4044-1-2-1-1-1, OR (CZ) -47, OR (T)-27, TTB 938-4-8, OR 2434-4, KAU-CUL 5, PAU 3391-41-5-1-1-1-2-2-2, RP 6165-GSY-28 and MTU 1262 were found resistant by recording zero score. Out of the previous resistant cultures, two entries i.e. BL383 and CE 455 were found resistant with neck blast incidence <5%.

Among 2024 entries screened for sheath blight resistance (*kharif*), five entries under NSN 1 *viz.,* ORJ-1161 (IR 84678-25-5-B), OR 2494-2, MTU 1213 (MTU 2260-12-2-1), OR 2437-11 and

CST 7-1), five entries under NSN 2 (RP 5934-78, RP 5695-121-18-3-2-1-1, Improved Dokra- Dokri, PAU 3991-40-3-1-1-1-1-3-1 and Improved Kali Kamod) and two entries under DSN (HWR 16 and HWR 33) were found to show resistant reaction of 3.

A total of 354 entries screened under NSN 1 for sheath rot resistance (*kharif*),of which 257 entries have shown immune reaction, while 68 entries out of 90 have shown immune reaction in DSN.

Out of 2162 entries screened for bacterial leaf blight resistance (*kharif*), eight entries viz., NK-5251 Plus (Hybrid), PAU 2K 10-23-54-14-52-107-0-1, PHI-16107 (Hybrid), RP 5898-101-3-2-1-1, CR 3933-17, RP-6113-Patho BB-9 (GSY-BB-IPB-2-9), improved samba mahsuri, RP-6113-Patho-BB-17 (GSY-BB-IPB-3-17) recorded three score under NSN 1. Of the 69 previous resistant cultures collected, two entries viz., IBT-11 and PAU 2K 10-23-54-14-52-107-0-1 recorded one score.

Among the new fungicides tested for sheath blight (*kharif* & *rabi*), azoxystrobin 11% + tebuconazole 18.3% (Custodia) @ 1.5 ml l-1 was found effective in controlling the sheath blight incidence and severity (3.29% & 6.47%) followed by flusilazole 12.5% + carbendazim 25% (Lusture)- 37.5% SE @ 1.0 ml l-1 (9.41% & 12.78%) compared to the control plot (44.87% & 49.54%).

Integrated Disease Management of sheath blight, bacterial leaf blight and blast (*kharif* & *rabi*) studies indicated low sheath blight severity and incidence (16.38 % & 10.72%) with the incorporation of FYM in nursery plot, seed treatment, application DAP, FYM + Trichoderma in the main field along with recommended dose of fertilizers, granular insecticide application and need based fungicide spray compared to the control plot (40.66% & 36.67%).

In studies on the etiology and management of red stripe disease on rice, fresh isolations were carried out using PDA, Leaf extract media (MTU 1187, MTU 1156, PLA 1100) for isolations. ITS-PCR using ITS1 and ITS4 primers was carried out with DNA isolated from infected and healthy leaf samples of MTU 3626 and MTU 1075 varieties. Results revealed that 700 bp band was found in infected leaf samples in both varieties but 800 bp band was observed in healthy leaf samples. Among the new fungicides tested for efficacy, carbendazim @ 1.0g l^{-1}, propiconazole 25% EC @ 1.0 ml l^{-1} and tebuconazole 25.9% SC @ 2.0 ml l^{-1} were found better against red stripe diseases.

Presence of Pi1 blast resistance gene was detected (*kharif* & *rabi*) in MTU 2077, MTU 1064, improved samba mahsuri, NLR 28600, MTU 1217, MTU 1239, MTU 1006, MCM 101, Swarna sub1, MTU 1231, MTU 1190, BPT 2231, BPT 1768, NLR 33641, NLR 3041, NLR 40024, NLR 40054, NLR 20084 and NLR 40058 varieties/cultures through SSR marker with primer RM224 (157 bp). Attempts to detect the presence of Pi2 (Piz-5) blast resistance gene were made with SSR primer RM 527. It was not found in tested varieties.

Presence of PiKh (Pi54) blast resistance gene was detected in NLR 3513, MTU 1231, BPT 2231, BPT 2411, BM 71, NLR 145 and MCM 103 through SSR marker with primer RM206 (147 bp). Presence of Pi5 (t) blast resistance gene was detected in NLR 28600, MTU 1217, NLR 3513, MTU 1031, BPT 2411, NLR 9672, NLR 9674, NLR 30491, NLR 145, NLR 3041 and NLR 40024 through SSR marker with primer RM21 (157 bp).

Attempts have been made to detect the presence of Piks blast resistance gene with SSR primer RM144. An amplified fragment at 254 bp was detected in MTU 2077, MTU 1211, MTU 1232, NLR 3242, MTU 5182 and NLR 3513.

Presence of *Pi15* blast resistance gene was detected in NLR 3513, BPT 2411, BM 71, NLR 9672, NLR 33641, NLR 30491, NLR 3041, NLR 40054 and MCM 103 through SSR marker with primer RM316 (192 bp).

Management of stem rot of rice caused by *Sclerotium oryzae* (*kharif* & *rabi*), soil application of poultry manure @ 2 t ha^{-1} + spray application of tebuconazole @ 0.15% at 30 and 60 DAT resulted in significantly low stem rot incidence (36.29%) compared to control (87.65%) under pot culture conditions.

Studies on microflora associated with grain discolouration in rice (*kharif* & *rabi*) revealed that, the per cent discolouration was increased with increase in storage period. The percent discoluration was minimum in MTU 1061 (5.7%), MTU 1064 (6.6%), MTU 1156, PLA 1100 (6.8%), MTU 1121 (7.4%) and swarna (non-lodged) (7.7%), respectively at one month after harvest. The percent discoluration was minimum in MTU 1156 (7.1%), PLA 1100 (7.2%), MTU 1064 (7.3%), MTU 1061 (7.4%) and MTU 1121 (7.7%), respectively at three months after storage.

Agricultural Research Station, Nellore

Among 577 ANGRAU rice cultures screened against rice diseases during late *kharif*, 36 cultures were found resistant and 208 cultures were moderately resistant to sheath rot; 115 cultures were found resistant and 86 cultures were moderately resistant to neck blast; 58 cultures were resistant and 124 cultures were moderately resistant to bacterial leaf blight.

A total of 577 entries were screened against leaf blast disease during *rabi*. Of which, 8 entries (UB8, NLR3186, 3152, 3412 OK42, PE7, AE7, OM5, NLR34449X white ponni-5897-10-3) were found to be resistant and 65 entries were found to be moderately resistant to the disease.

Evaluation of biocontrol agents against rice blast disease (*rabi*) for three years revealed that, four sprays with *P. fluorescens* @ 10 g l^{-1} at 15, 30, 45 and 60 DAT recorded lowest per cent (28.07) of leaf blast and was at par with other treatments.

Evaluation of fungicidal formulations for three years against stem rot disease management revealed that, among the treatments carbendazim 50% WP 1 g l^{-1} recorded least per cent of stem rot (31.15%) and was at par with tebuconazole 25.9% EC 1.5 ml l^{-1} (32.17) and propiconazole 25 EC 1 ml l^{-1} in. Propiconazole 1 ml l^{-1} recorded highest yield (6.66 t ha^{-1}) and is at par with tebuconazole 25.9% EC @ 1.5 ml l^{-1}.

Evaluation of fungicidal formulations for post flowering disease management (over 3 years) revealed that, among the treatments, tryfloxystrobin 25%+ tebuconazole 50% WG @ 0.8 g l^{-1} low recorded significantly sheath rot per cent of 7.88, where as kasugamycin 3 l @ 2.5 ml l^{-1} + propiconazole @ 1ml l^{-1} recorded least grain discolration. Propiconazole 25 EC 2.5 ml treatment recorded highest yield (5.63 t ha^{-1}) .

Agricultural Research Station, Utukur

Survey was conducted in major paddy growing areas of different mandals of the Kadapah district during *kharif* 2017. The major diseases recorded were sheath blight, bacterial leaf blight in which the disease severity of sheath blight ranged from 20-30 %, bacterial leaf blight of 15 – 30 % and sheath rot of 20% and leaf blast of 25 %.

1.2 Maize

Crop Improvement

Maize Research Centre, Vijayarai

Among 15 CIMMYT entries evaluated for their performance during *rabi*, 2017, the entries VH131391, VH131378, AH113948, KH15544, VH131019, VH15257, VH171256, VH16213, VH131306 and VH15607 recorded high yield potential ranging between 9.4 to 11.24 t ha^{-1}. The entry VH131391 recorded highest fresh weight (14. 06 t ha^{-1}) and grain weight (11.24 t ha^{-1}).

Among fifteen CIMMYT entries tested during *rabi*, 2017, the entries VH171213, VH112670, VH113012, VH123050 and VH16224 registered high grain yield potential ranging between 6.9 to 8.9 t ha^{-1}. The entry VH171213 recorded highest fresh weight (11.16 t ha^{-1}) and grain weight (8.9 t ha^{-1}).

Crop Production

Maize Research Centre, Vijayarai

Studies on response of maize hybrids to different levels of nitrogen application during *rabi* 2017, indicated that, the entry DKC 9120 regitered higher grain yield of 9.52 t ha^{-1} followed by other hybrids/varities than the entry P 3396 (8.8 t ha^{-1}). Application of 320 Kg N ha^{-1} (9.72 t ha^{-1}) or 240 Kg N ha^{-1} (9.29 t ha^{-1}) realised significantly higher grain yield as compared to application of 160 Kg N ha^{-1}.

Influence of weather parameters on growth and yield of *rabi* maize indicated that, sowing of maize during first FN of November gave significantly higher grain yield of 9.0 t ha^{-1} as compared to second FN of December sowings (7.2 t ha^{-1}) or sowings of first FN of January (5.9 t ha^{-1}) and was on par with sowing of maize during second FN of November (8.7 t ha^{-1}) or first FN of December (8.6 t ha^{-1}). There was significant yield reduction in maize when maize was sown beyond first FN of December.

Regional Agricultural Research Station, Chintapalle

The performance of maize crop during kharif was very poor under natural farming compared to integrated crop management (with recommended dose of fertilizers). Grain and stover yields of maize were 31.1% and 30.9% higher in ICM practice than natural farming package. Many of the cobs were found without grains in natural farming practice. The ICM package recorded grain yield of 7.64 t ha^{-1} as against 5.26 t ha^{-1} in natural farming package.

Agricultural Research Station, Vizianagaram

Studies on “Cumulative effect of green manures and inorganic fertilizers on maize” recorded significantly higher grain yield (6.27 t ha^{-1}) with 100% RDF N,P,K + dhaincha incorporation and found on par with 100% RDF N,P,K + sunhemp incorporation (6.12 t ha^{-1}) and 100% RDF N,P,K + green gram incorporation (6.06 t ha^{-1}). Reduction in yield was observed at 50 % RDF N,P,K fertilizers application and incorporating green manures (sunhemp @ 50 kg ha^{-1}/diancha @ 30 kg ha^{-1} / greengram @ 20 kg ha^{-1}) with grain yield of 4.79, 5.11 and 4.59 t ha^{-1}, respectively, compared to 100% RDF N,P,K fertilizers application alone (5.49 t ha^{-1}). However, dhaincha green manure incorporation at 75 % RDF N,P,K fertilizers recorded significantly higher grain yield (6.19 t ha^{-1}) over that of 100 % RDF N,P,K fertilizers alone (5.49 t ha^{-1}).

Regional Agricultural Research Station, Tirupati

Production potential of inter cropping systems of fodder maize with legumes under limited irrigation revealed that, highest maize yield (37 t ha^{-1}) was recorded when inter-cropped with sunhemp in 2:2 and 26 t ha^{-1} was recorded when inter-cropped with rice bean in 1:2. Among all the legumes, cowpea recorded highest green fodder yield of 18.2 t ha^{-1} in 1:2 ratio and 13.4 t ha^{-1} in 2:2 ratio. As a whole system, maize intercropped with cowpea either in 2:2 or 1:2 ratio recorded significantly highest green fodder yield (47.8 & 42.9 t ha^{-1} respectively) followed by maize intercropped with sunhemp, rice bean and horsegram.

Among the crop geometries tried under optimization of crop geometry and nutrient requirement for higher yield of sweet corn under fertigation, 75 cm x 20 cm with 66,666 plants ha^{-1} resulted in significantly improved plant growth stature as taller plants (278 cm), higher number of leaves $plant^{-1}$ (12.3 leaves $plant^{-1}$), green cob weight (268 g), cob length, girth and higher number of kernels cob^{-1} (632), whereas the crop geometry of 60 cm x 20 cm recorded higher dry matter production ha^{-1} and green cob yield (19.45 t ha^{-1}), which might be due to more number of plants per unit area. The crop geometry of 60 cm x 20 cm further resulted in higher net returns and B:C ratio compared to other geometries tested. Application of 250 - 90 - 60 kg N, P_2O_5 & K_2O ha^{-1} through fertigation produced tallest plants, more no. of leaves $plant^{-1}$ and dry matter production, green cob weight, cob stature with higher number of kernels cob^{-1}, green cob yield (19.20 t ha^{-1}) and green fodder yield (37.38 t ha^{-1}). Further higher net returns and B:C ratio were noticed, which were on par with 200 – 80 – 55 kg N, P_2O_5 & K_2O ha^{-1}. Production potential of maize and legume based intercropping systems during *rabi* revealed that, the highest maize yield was recorded with maize + soybean (2:2) (4.47 t ha^{-1}) which was on par with maize + greengram (2:2) (4.33 t ha^{-1}) and these two were on par with sole maize under normal planting at 60 cm x 20 cm. The highest net returns and B:C ratio were realized with sole maize (60 cm x 20 cm). Among the intercropping systems, higher net returns were realized with maize + groundnut (2:2) followed by maize + greengram (2:2).

Crop protection

Insect Pest Management

Maize Research Centre, Vijayarai

Effect of seed treatment against stem borers in maize revealed that higher grain yield of 8.14 t ha^{-1} was recorded when seed was treated with thiamethoxam 30 FS @ 8.0 ml kg^{-1} seed followed by imidacloprid 600 FS @ 8.0 ml kg^{-1} seed (7.56 t ha^{-1}) during *rabi*, 2018.

In insecticidal evaluation studies against stem borers of maize during *rabi,* 2018, indicated that, highest yields were recorded in chlorantraniliprole @ 0.3 ml l^{-1} followed by carbofuran 3G @ 3 kg ac^{-1} (8.6 t ha^{-1}) compared to other insecticides.

Under different dates of sowings of maize and unprotected conditions (without insecticidal spray), the results revealed that lowest per cent infestation of stem borers was in 1st F.N of December (9.07) followed by 2nd F.N of December (11.98). First fortnight December sowings recorded significantly highest grain yield (7.13 t ha^{-1}) under unprotected conditions compared to other treatments and sowings in 1st F.N of January, 2018 (4.16 t ha^{-1}).

The lowest per cent infestation was noticed in chlorantranilprole @ 0.3 ml l^{-1} (chemical check) i.e, 1.26 and 3.17 at 7 and 15 days after 2nd spary respectively, which was significantly different from cow based organics and NSKE treatments. Chlorantranilprole @ 0.3 ml l^{-1} (7.78 t ha^{-1}) registered significantly highest yields compared to other treatments.

Regional Agricultural Research Station, Anakapalle

Maize stem borer, *Chilopartellus* damage was low in chlorantranilprole spraying (1.67% DH) followed *by Trichogramma chilonis* release (1.87% DH) and whorl application of carbofuran granules (3.32% DH) compared to monocrotophos sprayed plot (13.19% DH) at Singavaram village, Denkada mandal, Vizianagaram district. *Trichogramma chilonis* released plot recorded zero incidence of stem borer in maize compared to monocrotophos spray (2.1% DH) and untreated control (13.97% DH) at Chollangipeta village, Denkada mandal, Vizianagaram district. Similarly maize stem borer, *Chilopartellus* damage was recorded low in *Trichogramma chilonis* release (1.67% DH) and chlorantraniliprole sprayed plots (2.67% DH) followed by whorl application of carbofuran granules (3.85% DH) at Padmanabham village, Padmanabham mandal, Visakhapatnam district.

Studies on the incidence of pink stem borer, *Sesamia inferens* revealed that all the insecticidal treatments reduced significantly the incidence of *Sesamia inferens* and had positive effect on maize yield. Among the treatments, chlorfluazuron 5.4EC @ 3 ml l^{-1} at 15 DAS + carbofuran 3G @ 3 kg ac^{-1} (0.18%) at 25-30 DAS and novaluran 10EC @ 1ml l^{-1} at 15 DAS + carbofuran 3G @ 3 kg ac^{-1} at 25-30 DAS (0.71%) have reduced the incidence pink stem borer significantly compared to untreated control (5.36%). Data on green cobs revealed more number of green cobs were recorded in chlorantraniliprole 20 SC @ 0.3 ml l^{-1} at 15 DAS + carbofuran 3G @ 3.0 kg ac^{-1} at 25 DAS (71,643 cobs ha^{-1}) compared to 61,111 cobs ha^{-1} in untreated control.

Regional Agricultural Research Station, Chintapalle

Hundred percent reduction in population of corn worm and stem borer wa recorded in ICM Package during *Kharif* 2017, after 2nd whorl application of carbofuran 3G granules where as it was 86% in natural farming package. The grain yield recorded in ICM package was 7.64 t ha^{-1} against 5.26 t ha^{-1} in natural farming package.

Disease Management

Maize Research Centre, Vijayarai

Studies on fungicide management of Turcicum leaf blight (*Exserohilum turcicum*) in maize (*Zea mays*) revelaed that, lowest disease incidence was found in trifloxystrobin + tebuconazole 75WG (Nativo) and carbendazim 50 WP (Bavistin).

1.3 Sorghum

Crop Improvement

Regional Agricultural Research Station, Nandyal

During *rabi* 2017, AICRP on Sorghum scheme was shifted from Agricultural College farm, Bapatla to RARS, Nandyal and started functioning from *maghi*, 2017 onwards.

Two sorghum cultures, NJ 2647 (white grain sorghum) and NJ 2446 (yellow grain sorghum) have completed three years of minikit testing in farmers fields and the release proposals of these promising entries were submitted to State Varietal Release Committee of Andhra Pradesh.

In Advanced Yield trial, the entries NJ-2659 and NJ-2647 recorded higher grain yield (4.17 t ha^{-1}) and fodder yield (6.88 t ha^{-1} and 7.32 t ha^{-1}) over check variety, NTJ-2 (3025 t ha^{-1} and 6.029 t ha^{-1}), indicating their potentiality for both grain and fodder.

Agricultural Research Station, Perumallapalli

Twenty one sweet sorghum entries were evaluated including checks for their performance during *kharif*, 2017. Entry 8008 recorded highest fresh biomass yield (60.64 t ha^{-1}) and the entry 8061 recorded highest millable cane weight (55.48 t ha^{-1}) among the tested entries. Entries highest juice yield (27790 l ha^{-1}) was recorded in entry 8014, highest grain yield and was recorded in entry 8113 (3.43 t ha^{-1}).

Agricultural Research Station, Podalakur

In Multi Locaion Varietal trial, among 6 entries evaluated during 2017-`18, the entry NJ-2647 recorded the highest grain yield of 3.59 t ha^{-1} followed by NJ-2446 (2.60 t ha^{-1}) compared to check NTJ 4 (2.58 t ha^{-1}).

Crop Production

Regional Agricultural Research Station, Nandyal

Studies on fertilizers enriched organics revealed that, significantly higher grain yield (3.58 t ha^{-1}) in *rabi* grain sorghum was recorded with 100 % RDF with enriched Vermicompost 4 [50 kg vermicompost ha^{-1} + 15 kg $ZnSO_4$ ha^{-1}] as compared to 100 % RDF (2.94 t ha^{-1}). High net returns (Rs. 32203 ha^{-1}) were realized with 100 % RDF + enriched FYM 4 [(100 kg FYM ha^{-1} + 15 kg $ZnSo_4$ + 15 kg $Feso_4$ ha^{-1})] compared to 100 % RDF with enriched Vermicompost 4 (Rs. 31902 ha^{-1}) and 100 % RDF (Rs. 24202 ha^{-1}) because of low cost of FYM compared to vermicompost.

In a study on response of pre-release varieties of sorghum (NJ-2647 and NJ-2446) to different levels of fertilization under rainfed conditions, higher grain yield (4.35 t ha^{-1}) and net returns (Rs. 45911 ha^{-1}) were recorded with NJ-2647 with 125 % recommended dose of fertilizers.

Pre emergence application of herbicide atrazine @ 0.5 kg a.i ha^{-1} and post-emergence application of atrazine @ 0.5 kg a.i ha^{-1} at 25 days after sowing reduced weeds during *rabi* season and recorded higher yield (0.39 t ha^{-1}) compared to metsulfuron methyl + chlorimuron ethyl treatment.

Regional Agricultural Research Station, Tirupati

Performance of fodder sorghum varieties under varied nutrient levels indicated that, significantly higher green fodder yield of 26.1 t ha^{-1} was recorded with CSV 21F variety followed by PC-6 (24.5 t ha^{-1}) and MP Chari (23.2 t ha^{-1}). Among the fertilizer levels, application of nutrients at 125% RDF recorded significantly higher green fodder yield of 27.2 t ha^{-1} followed by with 100 % RDF (25.2 t ha^{-1}) and 75% RDF(21.4 t ha^{-1}).

Among the different multi cut fodder varieties evaluated at varied nitrogen levels, CSH 24 MF variety recorded highest green fodder yield of 51.6 t ha^{-1} and 28.5 t ha^{-1} during its first cut and 2nd cut respectively which was significantly superior over other varieties followed by variety Pant Chari-6 (45.0 t ha^{-1} and 27.2 t ha^{-1}) compared to SSG 59-3 (42.6 t ha^{-1} and 23.5 t ha^{-1}). With respect to levels of nitrogen application, N @ 125 kg ha^{-1} and 150 kg ha^{-1} were found on par in respect of fodder yield during first and 2nd cuts (48.4, 46.9 and 27.8, 26.7 t ha^{-1} respectively). But as a whole response to nitrogen application was found only up to 125 kg ha^{-1} and further increase in levels of nitrogen did not show any significant improvement in yield.

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Nandyal

Among different insecticides tested to control sorghum stem borer, spinosad 45 SC @ 60 ml $acre^{-1}$ (5.8%), flubendiamide 48 SC @ 40 ml $acre^{-1}$ (7.0%) and whorl application of carbofuran 3G granules @ 4 kg $acre^{-1}$ (7.3%) effectively controlled the stem borer.

1.4 Pearlmillet (*Bajra*)

Crop Improvement

Agricultural Research Station, Vizianagaram

In Advanced Hybrid Trial (Medium), among seven entries tested, the national check, B6M01 (3.68 t ha^{-1}) has gave highest yield, while local check, Pittaganti recorded 1.04 t ha^{-1} grain yield.

Among seven entries including one local check, Pittaganti tested in Advanced Hybrid Trial (Late) during *kharif* 2017, the entry MH 2155 (3.79 t ha^{-1}) recorded highest yield compared to other cultures and national check, B6 M86 (3.47 t ha^{-1}).

In Multi Location Trial, twelve entries were evaluated along with local check, Pittaganti. All the entries tested were significantly superior to local check for grain yield. The national check, Dhanshakti (3.32 t ha^{-1}) gave highest yield compared to other cultures.

Agricultural Research Station, Perumallapalle

During *rabi*, 2017 - `18, a total of 275 Pearl millet lines (germplasm) collected from ICRISAT are being maintained at the Research Station for identifying best lines which can be utilized in the development of composites / varieties.

Among thirty nine entries tested in Initial Hybrid Trial (medium) including three checks during 2017-`18, entries PB 1853 (5.28 t ha^{-1}), 86 M 20 (4.98 t ha^{-1}), PUSA 1712 (4.81 t ha^{-1}), KBH 4756 (4.79 t ha^{-1}), GHB 1221 (4.77 t ha^{-1}) and GHB 1233 (4.70 t ha^{-1}) recorded significantly higher grain yields compared to the check, 86 M 01 (4.08 t ha^{-1}).

Ten entries were tested in Multi Location Trial including three checks. Among the tested entries, ABH 11 (4.34 t ha^{-1}) and ABV 06 (4.26 t ha^{-1}) recorded higher grain yields compared to the check PHB 3 (4.19 t ha^{-1}) but were statically on par with the check.

Agricultural Research Station, Ananthapuram

In Advance Hybrid Trial (Medium), the entry AHT 403 (PAC 909) recorded significantly high grain yield (5.05 t ha^{-1}) followed by AHT 406 (Pratap) (4.49 t ha^{-1}) and AHT 404 (4.19 t ha^{-1}).

The grain yield differences between the entries in Advance Hybrid Trial (Late) were found to be statistically significant. The results indicated that, the entry AHT 506 (Pratap) recorded highest grain yield (3.71 t ha^{-1}) followed by AHT 502 (NBH 5767) (3.70 t ha^{-1}) and AHT 504 (KBH 4252) (3.53 t ha^{-1}).

Released Hybrid and Varietal Trial results indicated that, the hybrid 86 M 01 recorded significantly highest grain yield (5.41 t ha^{-1}) followed by GHB 558 (4.13 t ha^{-1}) and Kaveri Super Boss (4.01 t ha^{-1}).

Multi-Location Trial of Pearl Millet Hybrids and Varieties conducted at four centers in Andhra Pradesh indicated that among five hybrids tested, none of the hybrids showed significant grain yield superiority over the check PHB-3. Among the six varieties / populations tested, the variety ABV 06 recorded highest grain yield (3.87 t ha^{-1}) followed by ABV 05 (3.56 t ha^{-1}) compared to the check ICMV 155 (2.77 t ha^{-1}).

Ananthapuramu Bajra Hybrid 06 (ABH 06) was tested in third year minikit trials in six districts (Ananthapuramu, Chittoor, Prakasam, Kurnool, Vizianagaram and Vishakhapatnam) of Andhra Pradesh. The average grain yield of the hybrid obtained from six districts was recorded as 1.78 t ha^{-1} with 44.2% increase in grain yield over the local check.

Crop Production

Regional Agricultural Research Station, Lam

Pre emergence application of atrazine @ 0.5 kg ha^{-1} followed by hand weeding @ 20 DAS

(3.92 t ha^{-1}) and atrazine @ 0.5 kg ha^{-1} as pre emergence followed by metsulfuron methyl (10%) + chlorimuron ethyl (10%) @ 0.0015 kg ha^{-1} as post emergence (3.71 t ha^{-1}) recorded high grain yield and found on par with that of two hand weedings at 20 and 30 DAS (4.12 t ha^{-1}) in respect of grain yield during *kharif,* 2017.

Regional Agricultural Research Station, Tirupati

Weed management studies in pearlmillet during *Kharif* showed that hand weeding twice at 20 and 40 DAS recorded lowest weed density and dry weight as well as the highest weed control efficiency and higher grain and straw yield, which was on par with pre-emergence application of atrazine @ 750 g a.i ha^{-1} + one hand weeding at 30 DAS. Higher net returns (Rs,22038 ha^{-1}) and B:C ratio (2.33) were obtained with pre-emergence application of atrazine @ 750 g a.i ha^{-1} + one hand weeding at 30 DAS (2.33) followed by POE of chlorimuron ethyl + metsulfuron-methyl @ 4 g a.i. ha^{-1} (Rs.18534 ha^{-1} and 2.21 respectively).

1.5 Fingermillet (*Ragi*)

Crop Improvement

Agricultural Research Station, Perumallapalle

A total of 295 finger millet germplasm lines collected from NBPGR, ICRISAT, ARS, Vizianagaram and ARS, Peddapuram were sown during Rabi, 2017-18 for maintenance.

Thirteen entries were tested in Preliminary Yield Trial including check, Vakuladuring *kharif* 2017. Entries, PPR 1082 (5.24 t ha^{-1}) and PPR 1088 (4.90 t ha^{-1}) recorded significantly higher grain yields as compared to the check, Vakula (4.68 t ha^{-1}).

In Advanced Yield Trial during rabi 2017-`18, out of thirteen entries tested including check, Vakula, the entries PPR 1082 (4.30 t ha^{-1}), PPR 1091 (4.30 t ha^{-1}), PPR 1090 (4.26 t ha^{-1}) and PPR 1092 (4.14 t ha^{-1}) recorded significantly higher grain yield compared to the check Vakula (3.67 t ha^{-1}).

Thirteen entries were tested in Multi Location Ttrial during *Kharif* 2017 including four checks (Vakula, Godavari, Srichaitanya and BR 36). None of the tested entries were superior to the tested checks. Check BR 36 (6.32 t ha^{-1}) was the highest grain yielder which was significantly superior to the test entries followed by Godavari (4.14 t ha^{-1}).

In Multi Location Trial (Rabi 2017-18), among thirteen entries tested including four checks (Vakula, Godavari, Srichaitanya and BR 36), the entries PR -15-11 (3.89 t ha^{-1}), VR 1081 (3.89 t ha^{-1}) and VR 1101 (3.73 t ha^{-1}) recorded higher grain yields than the check Godavari (3.69 t ha^{-1}).

Out of five entries tested in Advanced Varietal Trial I & II against five checks, none of the tested entry recorded higher grain yields than local check, Vakula (4.28 t ha^{-1}) followed by PR 10-35 (3.93 t ha^{-1}).

DNA finger printing of fingermillet varieties, PPR1012 and four check varieties *viz.*, Vakula, GPU67, Godavari and Saptagiri carried out with RAPD markers revealed that, out of 15 RAPD markers, eleven markers (OPR4, OPS7, OPC20, OPF16, OPT5, OPC9, OPB8, OPF9, OPN4, OPN10 and OPJ6) were polymorphic in the five varieties of fingermillet. Based on OPR4, OPC20, OPC9, OPF9, OPN4 markers, the variety PPR1012 and four check varieties *viz.*, Vakula, GPU67, Godavari and Saptagiri displayed distinct allelic differences.

Agricultural Research Station, Vizianagaram

In Advanced Varietal Trial I & II (South Zone), nine entries including one local check, Sri Chaitanya (VR-847) were tested during *kharif,*

2017. Among them, National check, GPU 67 recorded highest grain yield of 3.51 t ha^{-1} followed by PR 10-35 (3.20 t ha^{-1}) which was on par with the check, Sri Chaitanya VR-847 (3.08 t ha^{-1}).

Among sixteen entries tested in Preliminary Yield Trial against two local checks, Sri Chaitanya (VR 847) and Vakula, the entry VR 1118 (4.22 t ha^{-1}) recorded significantly high grain yield followed by VR 1110 (3.76 t ha^{-1}) and VR 1112 (3.53 t ha^{-1}) over local checks, Sri Chaitanya (3.34 t ha^{-1}) and Vakula (2.70 t ha^{-1}).

In Advanced Yield Trial, significant differences were observed for grain yield among ten entries evaluated. The entry VR 1110 (3.85 t ha^{-1}) significantly out yielded the local check, Sri Chaitanya (3.02 t ha^{-1}), followed by VR 1118 (3.51 t ha^{-1}), VR 1101(3.37 t ha^{-1}), VR 1112 (3.23 t ha^{-1}) and VR 1099 (3.17 t ha^{-1}).

In Multi Location Trial, out of thirteen cultures tested against local check Godavari, the check, Godavari recorded significantly higher grain yield (3.58 t ha^{-1}) over other entries under test.

Agricultural Research Station, Peddapuram

One hundred and eighty three (183) fingermillet germplasm lines were evaluated and maintained during *kharif* 2017.

The culture, PR 10-45 a promising, non lodging & high yielding finger millet culture was proposed for varietal identification by State Varietal Release Committee. It showed 13.9% increase in yield over the check PR 202 in addition to lodging tolerance.

Two cultures *viz.,* PR 1507 (DM-7/PR202) & PR 1511 (PR 10-45/PR 202) were nominated for national level multi location testing under AICRP on small millets during *kharif* 2017 in which PR 1511 (3.08 t ha^{-1}) ranked first in south zone (12 locations) with an yield advantage of 9.23% over the check PR 202 (2.82 t ha^{-1}).

Entry PR 10-35 was evaluated in the AVT II (Long Duration) under AICRP on small millets, where it ranked second in the south zone over 12 locations.

In Advanced Varietal Trial-I & II (Early and medium), none of the entries showed superior performance over the best check PR 202 (3.40 t ha^{-1}).

In Multi Location Trial, out of thirteen entries tested, the entries VR 1101 (4.21 t ha^{-1}) and VR 1060 (3.94 t ha^{-1}) were found superior in yield compared to the check Sri Chaitanya (3.70 t ha^{-1}).

Among seven promising entries evaluated in Advanced Yield Trial for yield and lodging resistance, the entries PR 1535 (3.87 t ha^{-1}) and PR 1511 (3.77 t ha^{-1}) performed superior over better check GPU 67 (3.43 t ha^{-1}).

Crop Production

Agricultural Research Station, Vizianagaram

Studies on response of pre released finger millet varieties to different levels of fertilizer doses under rainfed conditions during *kharif* 2017 revealed that grain (2.27 t ha^{-1}) and straw (6.84 t ha^{-1}) yield were significantly higher in 125% RDF compared to 100% and 75% RDF. Among the varieties, the variety VL - 386 registered significantly high grain yield (2.34 t ha^{-1}) compared to national checks VL 352 and GPU 45 and local check VR 708.

Results of three years pooled analysis on intercropping in finger millet revealed that, the sole crop recorded significantly high growth, yield attributing characters and grain yield (3.12 t ha^{-1}) compared to other combinations. Among different inter crops, finger millet equivalent yield (6.58 t ha^{-1}) was significantly high in Finger millet + Bhendi (8:2) system and also registered high net returns

(Rs.110021) and B:C ratio (3.65), closely followed by Finger millet + Pigeon pea (8:2) system.

Results of chemical weed control during *kharif*, 2017 showed highest weed control efficiency (96.4%) with pre emergence application of Isoproturon @ 0.5 kg a.i ha^{-1} at 40DAS + one inter cultivation at 25-30 DAS and found on par with two inter cultivations at 20DAS and 40 DAS (96.2%). Grain yield (2.38 t ha^{-1}) and straw yield (6.40 t ha^{-1}) was significantly high in two inter cultivations at 20 and 40 DAS but on par with all five pre emergence herbicide applications along with one inter cultivation.

Evaluation of different methods of crop establishment on growth and yield of Finger millet under irrigated conditions during *rabi*, 2017-`18, revealed that all the direct sown treatments had matured 10 - 15 days earlier than transplanted treatments. However significantly high grain yield was recorded in square planting at 30 cm (3.59 t ha^{-1}) followed by square planting at 22.5 cm (3.39 t ha^{-1}) and SRI method of transplanting (3.26 t ha^{-1}). Further the square planting at 30 cm (2.20), recorded higher B:C ratio followed by direct sowing through broadcasting (2.16) and sowing through seed drill (2.10).

Agricultural Research Station, Perumallapalle

Among different weed management practices evaluated in finger millet during *kharif,* hand weeding at 20 and 40 days after planting recorded higher grain yield (3.42 t ha^{-1}) followed by pre emergence applicationof pendimethalin @ 0.5 kg a.i ha^{-1} + one hand weeding at 20 DAP (3.18 t ha^{-1}) and pre- emergence application of pendimethalin @ 0.5 kg a.i ha^{-1} + post emergence of 2,4- D sodium salt @ 0.8 kg a.i ha^{-1} at 20 days after planting (3.14 t ha^{-1}) compared to control (2.36 t ha^{-1}).

Crop Protection

Disease Management

Agricultural Research Station, Perumallapalle

Screening of finger millet entries in Multi Location Trial for blast resistance indicated that, PPR 1080 showed least incidence of neck blast (13.71 %) and finger blast (19.95 %).

In Preliminary Yield Trial, the entry PPR 1085 showed least incidence of neck (9.20 %) and finger blast (22.9 %) compared to the susceptible check Champavathi (58.25 % neck blast and 59.49 % finger blast).

Agricultural Research Station, Vizianagaram

Survey for important diseases of finger millet and other small millets in three districts (Srikakulam, Vizianagaram and Visakhapatnam) of North Coastal Zone during October showed that all three forms of blast were present. Highest neck blast (9.54%) was recorded at Rambilli followed by S. Kota (8.69%) and Sukraput (8.46%) compared to low neck blast (4.52%) incidence at Denkada. Where as Ranastalam registered high finger blast incidence (14.52%) compared to lowest finger blast incidence (4.08%) at Vepada and Damaku.

In Advanced Varietal Trial (Early & Medium duration), eight entries were screened against the check VR 708. Among the 8 enries, the entry PR 202 recorded lowest intensity of neck blast (51.33%) and finger blast (26.38%) compared to the check VR 708.

The results of eco-friendly management of banded blight revealed that lowest sheath blight severity (6.67%) and highest grain yield (1.65 t ha^{-1}) and fodder yield (4.20 t ha^{-1}) were recorded in soil application of value added *P. flourescens* + *T. asperellum* + *B. subtilis* (one kg each talc formulation mixed in 25 kg FYM or vermicompost, incubated for 15 days) treatment.

1.6 Foxtail Millet (*Korra*)

Crop Improvement

Regional Agricultural Research Station, Nandyal

Foxtail millet variety Suryanandi (SiA 3088) was **notified during 2017.**

SiA 3222 release proposal was submitted to SVRC, Andhra Pradesh. It matures in 60 days with average grain yield is 1.5 to 2.0 t ha^{-1} and of suitable for cropping systems and machine harvest.

In Multi Location Trial, 3 entries (SiA 3222, SiA 3223 & PPSS 7) were tested against 4 checks SiA 3085, SiA 3156, Suryanandi and SiA 3156 .The entry SiA 3223 recorded the highest grain yield of 3.67 t ha^{-1} followed by check SiA 3156 (3.61 t ha^{-1}).

In Advanced Varietal Trial, out of 10 entries tested against check SiA 3156, the entry SiA 3159 recorded highest grain yield (4.18 t ha^{-1}) and fodder yield (10.28 t ha^{-1}) followed by SiA 3274 (3.56 t ha^{-1} grain yield; 9.73 t ha^{-1} fodder yield) compared to the check SiA 3156 (3.47 t ha^{-1} grain yield and 9.01 t ha^{-1} fodder yield).

Agricultural Research Station, Perumallapalle

Seven entries were tested including checks in Multi Location Trial . Highest grain yield was recorded by SiA 3085 (5.89 t ha^{-1}) followed by Si A 3156 (5.02 t ha^{-1}).

In Initial and Advanced varietal trial, out of sixteen entries tested including checks during *kharif*, 2017, the entry, DHFT 35-3 (5.87 t ha^{-1}) recorded higher grain yield than the high yielding check, Prasad (5.77 t ha^{-1}).

Agricultural Research Station, Vizianagaram

Sixteen entries including one check, SiA 3085 were tested in Initial and Advanced varietal trial (FIAVT) during *kharif,* 2017. Out of 16 entries, TNSi 345 (2.85 t ha^{-1}) and DHFT 2-5-3 (26.7 t ha^{-1}) recorded significantly higher yield compared to local check SiA 3085 (2.12 t ha^{-1}), while national check, SiA 3156 recorded 2.45 t ha^{-1} grain yield.

In Multi Location Trial, eight entries were tested against one local check, SiA 3085. Significantly high grain yield was recorded by the entry SiA 3223 (2.89 t ha^{-1}) compared to the check, SiA 3085 (2.84 t ha^{-1}).

Crop Production

Regional Agricultural Research Station, Nandyal

Response of pre-release foxtail millet varieties (DHFT 5-6, SIA 3179 and SiA 3156) to different levels of fertilization under rainfed conditions indicated that, application of 125 % RDF recorded the highest grain yield (2.10t ha^{-1}) compared to 75% RDF (1.90 t ha^{-1}). Similarly pre release variety of foxtail millet SiA 3156 has recorded the highest grain yield of 2.18 t ha^{-1} followed by SiA 3179 (2.02 t ha^{-1}) and DHFTM-5-6 (1.95 t ha^{-1}) compared to SiA 326 (1.84 t ha^{-1}).

In organic farming research, INM practice gave higher grain yield (1.98 t ha^{-1}) and straw yield (2.73 t ha^{-1}) with B: C ratio of 2.33 compared to 100 % RDF (grain yield – 1.94 t ha^{-1}, straw yield - 2.57 t ha^{-1} and B:C ratio of 2.15).

In inter cropping studies, the *Setaria* grain equivalent yield (5.27 t ha^{-1}) and net returns (Rs 42174 ha^{-1}) were found to be higher with Foxtail millet + Red gram in 5:1 ratio followed by Foxtail millet + Black gram 4:4 ratio (2.89 t ha^{-1} and Rs 26447 ha^{-1}).

Crop protection

Pest Management

Regional Agricultural Research Station, Nandyal

In management *of Helicoverpa armigera* in foxtail millet, sprayng monocrotophos 36 SL @ 1.6 ml l^{-1} at 10 days after sowing has given 88.75 % reduction of larval population followed by chlorpyriphos 20 EC @ 2.5 ml l^{-1}. High yield was recorded in chlorpyriphos 20 EC (2.28 t ha^{-1}) with incremental Benefit Cost Ratio of 7.0.

Disease Management

Regional Agricultural Research Station, Nandyal

In advanced varietal trial, lower incidence of cercospora leaf spot incidence was noticed in SiA 3163 (20%) compared to SiA 3164 (76.3%).

In Donor Screening Nursery –I (DSN-1) against major diseases, highest incidence of cercospora leaf spot was significantly low in SiA 2657 (21.3%) followed by ISC 74 A (26%) and GS 889 (27.3%).

The occurence of cercospora leaf spot was not severe in the crop sown during 2nd FN of June. Maximum incidence (grade 9) of Cercospora Leaf Spot was noticed in the crop sown during August 2nd FN and September 1st FN.

Maximum incidence of rust (grade 9) was is noticed in the crop sown during 2nd FN of September and 1st FN of October.

Agricultural Research Station, Vizianagaram

Eleven entries were screened for sheath blight along with the check SiA 3208 in donor screening nursery. Among them, lowest disease intensity was recorded in SiA 2863 (24.00%) followed by ISC 74A (32.00%) compared to the check SiA 3208 (70.67%).

Among 16 entries tested in Initial and Advanced varietal trial, the entries DHFT 77-3 and SiA 3212 recorded lowest disease severity (66.67%) as against 85.33% recorded in TNSi 337, DHFT 35-3 and SiA 326.The check recorded 96.00% disease severity.

Eco-friendly management of banded blight indicated that, significantly low sheath blight severity (45.33 %) and high grain yield and fodder yield (1.52 t ha^{-1} & (2.47 t ha^{-1} respectively) were recorded with soil application of value added *P. flourescens* + *T. asperellum* + *B. subtilis* (one kg each talc formulation mixed in 25 kg FYM or vermicompost, incubated for 15 days) applied at the time of sowing.

1.7 Little Millet (*Sama*)

Crop Improvement

Agricultural Research Station, Perumallapalle

Fifteen entries were tested against three checks Little millet Advanced Varietal Trial. Among them, the entry, DLM 95 (2.28 t ha^{-1}) recorded higest yield followed by WV 126 (2.00 t ha^{-1}), WV 125 (1.80 q ha^{-1}), IIMR LM 7162 (1.44 t ha^{-1}), WV 167 (1.40 t ha^{-1}), IIMR LM 7012 (1.39 t ha^{-1}) and OLM 217 (1.34 t ha^{-1}) which were significantly superior to the high yielding check, BL 6 (1.06 t ha^{-1}).

Agricultural Research Station, Vizianagaram

In Little millet Initial and Advanced Varietal Trial, eighteen entries were evaluated along with one local check, OLM 203. Out of 19 entries, WV 126 was significantly superior in recording high grain yield (1.99 t ha^{-1}) followed by GPUL 4 (1.66 t ha^{-1}) compared to the local check, OLM 203 (1.30 t $ha^{-1}$and national check, BL 6 (1.37 t ha^{-1}).

Among twenty entries evaluated along with one local check, OLM 203 for genetic improvement,the entries, VS 13 and VS 6 were significantly high grain yielders (1.27 & 1.24 t ha^{-1} respectively) compared to the local check, OLM 203 (1.00 t ha^{-1}).

Regional Agricultural Research Station, Nandyal

Among 18 entries evaluated in Initial Advanced Varietal Trial, the entry GPUL 4 registered highest grain yield (2.53 t ha^{-1}) as against 2.38 t ha^{-1} in OLM 217. With regard to fodder yield the entry OLM 203 realised maximum fodder yield (17.28 t ha^{-1}) compared to 5.86 t ha^{-1} in RLM 367 entry.

Crop Protecion

Disease Management

Agricultural Research Station, Vizianagaram

A total of twenty seven entries were screened in Donor screening nursery for sheath blight severity against the check OLM 203. Among them the entry BL 8 recorded highest disease severity (88%) followed by RLM 209 (84%) and DSN RLM 224 (84%),where as the check OLM 203 recorded 92% disease severity.

Among 19 entries screened against sheath blight in Initial and Advanced varietal trial, the lowest disease intensity was recorded in BL 6 (58.67%) compared to the entry WV 126 (84.00%) and check OLM 203 (93.33%).

Among the different eco-friendly management practices tested, the lowest sheath blight severity (50.67 %) maximum grain yield and fodder yield (1.23 t ha^{-1} and (3.51 t ha^{-1}) were recorded with soil application of value added *P. flourescens* + *T. asperellum* + *B. subtilis* (one kg each talc formulation mixed in 25 kg FYM or vermicompost, incubated for 15 days applied over an area) of one acre at the time of sowing.

1.8 Barnyard millet (Ooda)

Crop Improvement

Agricultural Research Station, Vizianagaram

In Barnyard millet (BIAVT) (AICRP-Plan), among nine entries evaluated in Initial and Advanced Varietal Trial along with one check, the entries VMBC 331 and TNEf 204 recorded significantly higher grain yield (2.03 t ha^{-1}) compared to the local check (1.49 t ha^{-1}), while it was on par with the national check, VL 207 (1.83 t ha^{-1}).

1.9 Proso millet

Agricultural Research Station, Vizianagaram

Crop production

Results of the Integrated Approach for enhancing seed yield and quality studies indicated that, application of organic and inorganic fertilizers in combination realised significantly high grain yield (1.07 t ha^{-1}) compared to no fertilizer application (0.66 t ha^{-1}) and either organic (0.82 t ha^{-1}) or inorganic (0.91 t ha^{-1}) nutrient management practices.

Among the seed priming methods, on par grain yield was obtained in seed priming with 2% KH_2PO_4 for 6 hrs by adopting seed to solution ratio of 1:1(and then mixing in 2.5 - 3.0 g kg^{-1} of carbendazim with the seeds and leaving the mixture for 24 hrs before sowing) and seed priming with 20% Liquid *Pseudomonas fluorescence* for 6 hrs by adopting seed to solution ratio of 1:1(and then mixing in 2.5-3.0 g kg^{-1} of carbendazim with the seeds and leaving the mixture for 24 hrs before sowing) (0.91 t ha^{-1} and 0.87 t ha^{-1} respectively). Seed qualitative parameters viz., germination percent and vigour index were significantly affected by application of organic and inorganic fertilizers in combination and seed priming with 20% liquid *Pseudomonas fluorescence* and 2% KH_2PO_4.

Crop Protection

Among 11 entries screened against sheath blight along with the check in donor screening nursery of Proso millet. Sheath blight intensity was lowest (56%) in TNPm 298 followed by TNPm 302 (72 %).

In Initial and Advanced varietal trial, out of eight entries screened for sheath blight, the lowest disease intensity was recorded in TNPm 247 (64%) followed by GPUP 21 (68%) while it was 94.67% in the check (CO-5).

In Eco-friendly management of banded blight, among the practices tested, significantly lowest sheath blight severity (50.67 %) and high grain yield (1.57 t ha^{-1}) and fodder yield (3.04 t ha^{-1}) were recorded with soil application of value added *P. flourescens* + *T. asperellum* + *B. subtilis* (one kg each talc formulation mixed in 25 kg FYM or vermicompost, incubated for 15 days) at the time of sowing.

2.0 Kodo millet

Crop Protection

In Initial and Advanced varietal trial, among 11 entries screened for sheath blight, the lowest disease incidence of 53.33% was recorded in TNAU 86 and BK 48 compared to 92% in check CO-3.

Among the eco-friendly management treatments tested, significantly the lowest sheath blight severity (49.33%) and highest grain yield (1.27 t ha^{-1}) were recorded in treatment of soil application of value added *P. flourescens* + *T. asperellum* + *B. subtilis* (one kg each talc formulation mixed in 25 kg FYM or vermicompost, incubated for 15 days) applied at the time of sowing.

2. Pulses

2.1 Redgram

Crop Improvement

Regional Agricultural Research Station, Lam

Among 16 entries tested under Multi Location Trial, the entry LRG 223 recorded highest yield (2.97 t ha^{-1}) followed by LRG 134 (2.74 t ha^{-1}) against check LRG 52 (2.59 t ha^{-1}).

Out of 15 entries evaluated in Advanced Varietal Trial, the entry LRG 229 recorded significantly superior yield (2.54 t ha^{-1}) over check LRG 52 (2.17 t ha^{-1}). Entries LRG 333 (2.42 t ha^{-1}), LRG 231 (2.39 t ha^{-1}) and LRG 224 (2.39 t ha^{-1}) recorded numerically superior yields over the check.

A total of 15 entries were evaluated in Preliminary Varietal Trial, out of which, the entries LRG 244 (2.14 t ha^{-1}), LRG 323 (2.07 t ha^{-1}), WRGE 92 (2.02 t ha^{-1}), LRG 312 (1.99 t ha^{-1}), LRG 275 (1.96 t ha^{-1}) and LRG 251 (1.96 t ha^{-1}) recorded superior yields against check LRG 52 (1.93 t ha^{-1}).

Among ten entries tested under Advanced Evaluation Trial 1(medium early), the entry, RVSA 16-1 recorded significantly superior yield (2.28 t ha^{-1}) over the check CO-6 (2.06 t ha^{-1}).

Agricultural Research Station, Darsi

Sixteen Genotypes were evaluated during *Kharif*, 2017. Out of sixteen varieties, the entry LRG -187 (1.58 t ha^{-1}) followed by LRG- 134 (1.05 t ha^{-1}) and LRG-223 (1.01 t ha^{-1}) have recorded significantly superior seed yield over LRG 20338 (0.12 t ha^{-1}).

Regional Agricultural Research Station, Tirupati

In two years of Multi Location testing, the culture, TRG-87, which was tolerant to wilt and

SMD gave average seed yield of 1.23 t ha^{-1}, whereas LRG-41 (C) gave seed yield of 1.21 t ha^{-1}

In Advanced Varietal Trial, among 10 entries tested,.TRG 108 and TRG- 111, realised higher seed yield of 1.55 t ha^{-1} and 1.36 t ha^{-1} respectively over early check ICPL8863 (1.18 t ha^{-1} in 160 days.)

In Multi Location Trial, thirteen lines were tested with check LRG-41 during *Kharif*, 2017. The entry LRG-250 gave significantly higher seed yield of 1.52 t ha^{-1} than the check LRG-41 (1.26 t ha^{-1}).

Among ten lines evaluated along with check LRG-41in Advanced Varietal Trial (Medium), the entry LRG 712 recorded highest seed yield of 1.61 t ha^{-1} followed by LRG 707 (1.54 t ha^{-1}) against check LRG-41 (1.32 t ha^{-1}).

Agricultural Research Station, Anantapuramu

In *kharif* 2017, sixteen entries along with one check were evaluated for seed yield in Multi Location Trial. Among them the entries MLTR-5 (0.58 t ha^{-1}) followed by MLTR-6 (0.48 t ha^{-1}) MLTR-3 (0.44 t ha^{-1}) had recorded higher yield than the check PRG-176 (0.29 t ha^{-1})

Agricultural Research Station, Utukuru

Significant differences were found among the entries tested in Multi Location Trial for seed yield. Among the thirteen entries tested, LRG 187 (1.88 t ha^{-1}) recorded significantly higher seed yield than the check TRG 59 (1.54 t ha^{-1}).

Agricultural Research Station, Ragolu

In OFT of redgram, in tribal areas, variety RGL-52 recorded an average yield of 1.20 t ha^{-1} over farmer`s practice of local konda kandhi variety (0.95 t ha^{-1}).

Agricultural Research Station, Vizianagaram

In Multi Location Trial, a total of 14 red gram entries were tested along with local check, LRG 41. Check variety, LRG 52 (1.43 t ha^{-1}) gave higher seed yield followed by LRG 139 (1.26 t ha^{-1}).

Crop Production

Agricultural Research Station, Anantapuramu

Among subsoiling treatments on growth and yield of dryland crops, higher pigeonpea equivalent yield was obtained with subsoiling at 1 m distance (0.67 t ha^{-1}) which was on par with subsoiling at 2 m distance (0.62 t ha^{-1}) and significantly superior to no subsoiling. Among crops tested, castor produced higher pigeonpea equivalent yield (0.91 t ha^{-1}) which was significantly superior to other crops. Whereas, subsoiling at 1 m distance produced higher net returns and among crops, castor produced higher net returns.

Insitu moisture conservation through conservation furrows in groundnut + pigeonpea (8:1) intercropping system revealed that, formation of conservation furrows after every row of groundnut at 25 DAS produced more number of filled pods per plant, test weight, total groundnut equivalent yield (3.14 t ha^{-1}) which in turn found on par with formation of conservation furrow after every 2nd row (2.94 t ha^{-1}) and significantly superior to formation of conservation furrow after every 8th and 12th row of groundnut.

Formation of conservation furrows in pigeonpea and groundnut resulted in 20.8 and 15.3 per cent yield increase respectively over farmer`s, practice.

Sowing pigeonpea + bajra in 1:1 ratio has recorded 28.7 per cent yield decrease over farmers, practice (groundnut + pigeonpea in 14:1 ratio).

Deep tillage with chisel plough in pigeonpea recorded 17.1 % yield increase over farmer's practice.

In groundnut + pigeonpea intercropping (8:1), among various supplemental irrigation levels, higher groundnut equivalent yield (2.82 t ha^{-1}) and net returns (Rs. 81239 ha^{-1}) were recorded with groundnut+pigeonpea inter cropping system (8:1) with one irrigation (20 mm) to groundnut at flowering stage through micro sprinklers and two irrigations (20 mm each) given to pigeonpea at flowering and pod filling stages through furrow method.

Among three intercropping systems, foxtail millet + pigeonpea, bajra + pigeonpea and groundnut + pigeonpea evaluated during 2017, highest pigeonpea equivalent yield of 1.24 t ha^{-1} was recorded by groundnut + pigeonpea intercropping with maximum net returns of Rs. 35,215 ha^{-1} and 2.12 B:C ratio. *In-situ* moisture conservation with conservation furrows resulted in 11.7 to 15.0 per cent yield increase in all intercropping systems.

Regional Agricultural Research Station, Tirupati

In rain water management in redgram based cropping system for climate resilience during *kharif* & *rabi,* ground nut + red gram in 7:1 recorded the highest redgram equivalent yield of 1.63 t ha^{-1} with higher net returns of Rs 89,189 ha^{-1} followed by inter cropping cluster bean + redgram in 5:1 ratio, (redgram equivalent yield of 1.66 t ha^{-1} and net returns Rs 54,122 ha^{-1}), cowpea + redgram in 5:1 ratio (redgram equivalent yield of 934 kg ha^{-1} and net returns Rs 44,920 ha^{-1}) while lowest was recorded with tomato + redgram in 5:1 ratio (redgram equivalent yield of 0.92 t ha^{-1} with net returns of Rs. 5,352 ha^{-1}).

Identification of remunerative redgram – based intercropping system under mechanization for rainfed alfisols revealed that, among different redgram based intercropping systems evaluated, sowing with nine tined seed drill, Redgram : Fieldbean (1:8) recorded deflated stature of plant growth, yield attributes and yield of redgram and resulted in the lowest LER of 0.90. However, the highest net returns were obtained with redgram/groundnut (1:8) followed by redgram/clusterbean (1:8). The highest benefit and cost ratio (2.69) was obtained with redgram/groundnut (1:8) followed by redgram/clusterbean (2.50).

Regional Agricultural Research Station, Lam

The highest grain yield was recorded in LRG160 (1.46 t ha^{-1}) and it was significantly superior to LRG 187 (1.25 t ha^{-1}) but was on par with LRG1105 (1.32 t ha^{-1}) irrespective of the spacings tested. The maximum grain yield (1.42 t ha^{-1}) was registered at a spacing of 180 x 40 cm and it was significantly higher than that of 180 x 20 cm spacing (1.25 t ha^{-1}) and found on par with a spacing of 180 x 30 cm (1.37 t ha^{-1}).

During various drought management practices tested, maximum grain yield (2.94 t ha^{-1}) was registered with application of VAM @ 12.5 Kg ha^{-1} + crop residue mulching @ 5 t ha^{-1} + P 100% and it was closely followed by VAM+100% P (2.89 t ha^{-1}) and Phosphorus^{-1}00 % (2.72 t ha^{-1}) compared to control (1.90 t ha^{-1}).

Among different spacings tested, spacing of 180 cm × 30 cm recorded the highest grain yield of pigeon pea and it was at par with 150 cm × 30 cm spacing. Nipping at 45 DAS registered significantly highest grain yield (1.44 t ha^{-1}), while the lowest yield was recorded with no nipping (1.18 t ha^{-1}). Nipping at 45 DAS improved seed yield by 22.7% over no nipping practice.

Agricultural Research Station, Utukuru

Studies on contingent crop planning for rainfed alfisols indicated that redgram sole cropping recorded higher net returns (Rs 41,880, Rs 32,000, Rs 19,320) during II fortnight of August, I and II fortnight of September respectively followed by cowpea as vegetable (Rs 35,660, Rs 19,440, Rs 13,080) during the above period.

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Lam

Among different AVT-1 & AVT-2 entries tested, the entry CORG 2012-25 (AVT-2 entry) recorded significantly low pod damage due to pod borer complex (19.6%), followed by TDRG 58 (25%), LRG 133-33 (26%), WRP 1 (26.7%) and LRG 52 (29.1%). The entry, CRG 2012-25 has recorded comparatively higher yield (1.88 t ha^{-1}).

Among different AMT entries, the pod damage due to pod borer complex was distinctly low in UPAS 120 (14.9%), followed by DA 322 (15.8%), LRG 52 (18%), Gulyal local (Red) (18.3%) and ICP 11957 (19.5%) and were significantly superior to other test entries. The genotype, ICPHaRL 4985^{-1}0 (1.96 t ha^{-1}) has recorded significantly highest yield.

Among different pigeonpea hybrids, the entry ICPH 7933 recorded low pod damage due to pod borer complex (14.7%), followed by GRPH 3477 (15.8%), IPH 15-03 (16.2%), PAU 881 (16.3%) ICPH 3933 (17.0%), ICPH 2740 (18.0%), ICPH 2700 (18.1%) and ICPH 2671 (18.1%) and were significantly superior to other tested entries. The hybrid, ICPH 7933 (1.85 t ha^{-1}) has recorded highest yield.

The peak adult population of *H. armigera* and *S. litura* in pigeonpea was observed during 46th (Nov. 12-18) and 45th SMW (Nov. 5-11) with 3.6 and 123.6 moths/trap/week, respectively. Though, the larval population of *H. armigera*, *M. vitrata* and *S. litura* appeared in 31st, 44th and 31st SMW, respectively, the peak population was observed during 46th, 49th and 32th SMW with 5.2, 3.2 and 1.6 larvae plant^{-1}, respectively.

The insecticidal schedule consisting of chlorantraniliprole18.5 SC @ 30 g a.i ha^{-1} (0.3 ml l^{-1}), followed by flubendiamide 480 SC @ 73 g a.i ha^{-1} (0. 2 ml l^{-1}) and dimethoate 30 EC @ 300 g a.i ha^{-1} (2.0 ml l^{-1}) at 10 days interval starting from 50% flowering was proved to be effective in reducing larval population and pod damage due to pod borer complex (5.3%) with highyield (2.26 t ha^{-1}) and ICBR (8.92).

Pooled results (2015-16 to 2017-18) revealed that the insecticidal schedule consisting of chlorantraniliprole 18.5 SC @ 30 g a.i ha^{-1} (0.3 ml l^{-1}), followed by flubendiamide 480 SC @ 73 g a.i ha^{-1} (0.2 ml l^{-1}) and dimethoate 30 EC @ 300 g a.i ha^{-1} (2.0 ml l^{-1}) at 10 days interval starting from 50% flowering was highly effective against pod borers and corresponding pod damage (15.2%) with high yield (1974 t ha^{-1}) and ICBR (11.63).

The recommended insecticidal schedule (RIS) *i.e.,* spraying of neem formulation 1500 ppm @ 5ml l^{-1} at 50% flowering, followed by Coragen @ 0.3 ml l^{-1} and flubendiamide @ 0.2 ml l^{-1} at 10 days interval, followed by chemical check (chlorpyriphos 20 EC @ 250 g a.i ha^{-1}) had recorded less pod damage due to pod borer complex (4.3 and 6.8%, respectively) with highest yield (1.96 and 1.59 t ha^{-1}, respectively), highest net returns (Rs. 49012/- and 33182/-, respectively) and highest ICBR (7.04 and 12.64, respectively).

Among different cow based organic mixtures, organic mixture 3 (*Agniastra*), followed by 2 (*Brahmastra*), 4 and 1(*Neemastra*) respectively recorded net returns of Rs. 20907/-, 20744/-, 18096/- and 13368/-. The organic check *i.e.,* NSKE 5% registered net returns of Rs. 18185/- with ICBR of 3.46. It was also found that there was no significant difference between the treatments with regard to yield.

Regional Agricultural Research Station, Tirupati

Management of pod fly with rynaxypyr @ 0.3 ml l^{-1} (6.31%), monocrotophos + dichlorvas @ 1.6 ml + 1ml l^{-1} (8.79%) followed by monocrotophos 1.6 ml l^{-1} (8.92%) and novaluron (9.33%) recorded high per cent reduction of podfly over untreated control (21.94%).

Pod borers management indicated that, cyantraniliprole 0.3 ml l^{-1} at flowering (6.66% and 5.64%) and chloranthriniliprole 0.3 ml at flowering (8.38% and 6.82%) recorded low pod damage due to *Maruca vitrata* and *Helicoverpa armigera* compared to untreated control (21.38 and 16.67 per cent, respectively).

Agricultural Research Station, Utukur

In population dynamics of pod feeding insect pests of pigeonpea in LRG-41, TRG-59 and TRG-87 varieties, highest number of *Helicoverpa* larvae per plant was observed during second week of January in TRG-87 (3.90) followed by TRG-59 (1.80) and LRG-41 (0.65) in August II FN sown crop. *Maruca* spotted pod borer incidence was high during second week of January (2nd std week) in TRG-87 (17.90 larvae plant^{-1}) followed by LRG-41 (13.05) and TRG-59(2.98) in August II FN sown crop.Pod fly maggots and pupae were high during last week of January (4th std week) in LRG-41 followed by TRG-87 TRG-59 in August II FN sown crop.

Agricultural Research Station, Darsi

During *kharif,* 2017, the population dynamics studies indicated that, leaf hopper population reached a peak (1.40 hoppers plant^{-1}) during 36th standard week and peak occurrence of ash weevils (1.47 larvae plant^{-1}) during 31st standard week. Leaf webber population recorded its peak on 44th standard week with 1.44 larvae plant^{-1}. *M. vitrata* and *H. armigera* peak incidence was recorded during 48th and 49th standard week with 0.87 and 1.13 larvae plant^{-1}, respectively. The male moth catches of *H. armigera* was maximum during 49th standard week with a mean catch of 2.7 males trap week^{-1}.

There was no significant difference between the Bt and insecticidal check plots in recording larval population of *H. armigera* (0.65 and 0.50), where as it was significant in M. vitrata (0.58 and 0.4). Per cent pod damage of 5.70 was recorded in NBAII BG4 and 3.8% in chemical check. Higher grain yield of 0.88 t ha^{-1} was realised in chemical check compared to NBAII BTG 4 Bt (0.80 t ha^{-1}).

Agricultural Research Station, Garikapadu

Comparative efficacy of certain insecticides against pigeonpea pod borer complex, flubendamide 20 WG and chlorantraniliprole 20 SC recorded lowest gram pod borer and spotted pod borer incidence compared to other insecticides tested.

2.2 Blackgram

Crop Improvement

Regional Agricultural Research Station, Lam

Among the entries tested for Yellow Mosaic Virus and Leaf Curl Virus resistant blackgram genotypes during *rabi*, 2017, the entry, LBG 904 recorded highest seed yield of 1.61 t ha^{-1}followed by LBG 932 (1.58 t ha^{-1}) compared to the best check LBG 787 (1.19 t ha^{-1}).

The entry LBG 884 recorded significantly by higher seed yield of 1.20 t ha^{-1} followed by VBG 13-003 (1.13 t ha^{-1}) compared to the best check LBG 787 (1.02 t ha^{-1}) and PU 31 (0.95 t ha^{-1}) in Initial Varietal Trial during *rabi*, 2017-18.

In Advanced Varietal Trial, the entry VBG 12-034 recorded highest seed yield of 1.27 t ha^{-1} compared to the best check LBG 787 (1.17 t ha^{-1})

The entries *viz*., PU 31, Pant U-19, TU 94-2, LBG 752, PDU 3, P 205, P1051, P 1075, LBG 787, LBG 808 and LBG 806 for YMV; LBG 17 for powdery mildew; LBG 400, LBG 697, WBG 26, LBG 726 for sympodial bearing; CKM, LBG 613, LBG 685, LBG 676, LBG 787 for main stem bearing; BM, LBG 611, LBG 402, LBG 648, LBG 22, LBG 685, LBG 645, LBG 708, LBG 752 for wilt; IPU 981, IPU 982, TU 94-2 for leaf curl virus were identified as source of resistance.

DNA finger printing of Blackgram prerelease culture GBG1 and four check varieties *viz*., LBG752, LBG623, IPU2-43, and PU 31 was carried out with both SSR and RAPD markers. The SSR markers resulted in monomorphic banding pattern and fingerprint profiles were developed RAPD markers which distinguished the varieties under testing. The distinct allelic differences were displayed by OPS7, OPF16, OPC9, OPF9, OPN10 and OPN8.

Agricultural Research Station, Podalakur

During *rabi,* 2017-2018, fifteen entries were tested in preliminary varietal trial. Among entries tested, PBG 32-2 recorded the highest seed yield of 1.53 kg ha^{-1} followed by PBG 276 (1.51 t ha^{-1}) and PBG 32^{-1} (1.51 t ha^{-1}) compared to check LBG 752 (1.24 t ha^{-1}).

In Multi Location Varietal Trial, among 18 entries tested, none of the entries recorded highest seed yield than the check LBG 787(1.87 t ha^{-1}). However, LBG 818 and GBG 47 recorded seed yield of 1.82 t ha^{-1}and 1.79 t ha^{-1}, respectively.

Agricultural Research Station, Ghantasala

A total of 160 blackgram germplasm lines were maintained at the research station.

Among thirteen entries tested against two checks in Advanced Varietal Trial during *rabi*, 2017, the entry GBG 81 recorded highest yield of 1.32 t ha^{-1}followed by GBG 58 (1.27 t ha^{-1}) and check variety LBG 645 (1.25 t ha^{-1}).

In Multi Location Trial, eighteen entries were tested during *rabi,* 2017-18. Out of them, the entry TBG129 recorded highest yield of 1.39 t ha^{-1} followed by GBG 12 (1.30 t ha^{-1} and LBG 828 of 1.40 t ha^{-1}).

GBG 12

A Blackgram entry developed at ARS, Ghantasala station is under second year of minikit testing. It is a cross derivative of (1) LBG 17 X TU 94-2 (2) Resistant to MYMV (3) Seeds are medium bold, shiny black in colour (4) Days to maturity 75-80 days (5) Yield potential: 20-22 q/ ha.(6) Suitable for mechanical harvesting

Fourteen entries were tested against two checks in rice fallow Urdbean Initial Varietal Trial during *rabi*, 2017. The check variety LBG 645 recorded highest yield of 1.25 t ha^{-1}followed by RFU 17-12 (1.01 t ha^{-1}) and RFU 17-11 (0.93 t ha^{-1}).

In rice fallow urdbean Advanced Varietal Trial, among seven entries tested against two checks during *rabi*, 2017, the check variety LBG 645 recorded highest yield of 0.99 t ha^{-1} followed by RFU 17-6A (0.80 t ha^{-1}) and check variety LBG 752 (0.71 t ha^{-1}).

Agricultural Research Station, Darsi

Evaluation of suitable blackgram genotypes for rainfed conditions of Prakasam district revealed that, there was a significant difference among treatments in plant height, TDM, SCMR, RWC and yield and yield components in blackgram. Maximum seed yield was recorded in GBG1 (0.82 t ha^{-1}) followed by PU 31 (0.73 t ha^{-1}) and the lowest was recorded in LBG 752 (0.57 t ha^{-1}).

Regional Agricultural Research Station, Tirupati

In Multi Location Trial, out of 18 lines tested ,TBG129 and ABFBG-03 gave significantly higher seed yield of 0.86 and 0.83 t ha^{-1} respectively in 85-90 days, and TBG104 of 75 duration days had recorded 0.73 t ha^{-1}.

In Advanced Varietal Trial , among 8 entries studied during *rabi* 2017, the entries RU17-22 , RU17-28, 26 and 23 gave significantly higher seed yield of 0.92, 0.91, 0.91and 0.84 t ha^{-1} respectively, over TBG104 (0.73 t ha^{-1}).

In Initial Varietal Trial, out of 17 entries tested , entries RU17-35 ,17-38 and 17-33 gave highest seed yield of 1.12, 8.99 and 0.87 t ha^{-1} respectively, where as check, TBG104 gave 0.75 t ha^{-1}.

Agricultural Research Station, Podalakur

During *rabi,* 2017-2018, fifteen entries were tested in preliminary varietal trial. Among entries tested, PBG 32-2 recorded the highest seed yield of 1.53 t ha^{-1}. The next best entries PBG 276 (1.51 t ha^{-1}.) and PBG 32-1 (1.51) recorded the highest seed yields compared to check LBG 752 (1.24 t ha^{-1}). In multilocation varietal trial, among 18 entries tested, none of the entry recorded highest seed yield than check LBG 787(1.87 t ha^{-1}). However LBG 818 and GBG 47 recorded highest seed yields of 1.82 t ha^{-1} and 1.79 t ha^{-1} respectively

Crop Production

Regional Agricultural Research Station, Lam

Among different land configuration practices broad bed furrow method recorded the highest grain yield (1.52 t ha^{-1}). Significantly highest grain yield of blackgram was registered with sequential application of pendimethalin 30 EC @ 1.0 Kg ha^{-1} as pre emergence followed by imazethapyr 10% SL @ 55 g ha^{-1} at 15-20 DAS (1.74 t ha^{-1}) compared to untreated check (1.05 t ha^{-1}).

Two manual weedings at 20 and 35-40 DAS registered highest grain yield (1.18 t ha^{-1}) and was at par with pendimethalin 30 EC + imazethapyr 2 EC @ 1.0 Kg/ha^{-1} - PE (1.18 t ha^{-1}), clodinofop propargy 8% + acefluorfen sodium 16.5 % @125 g a.i. ha^{-1} at 25-30 DAS (1.10 t ha^{-1}) and clodinafop propargyl 8% + acefluorfen sodium 16.5 % @

187.5 g a.i ha^{-1} at 25-30 DAS (1.07 t ha^{-1}).

Highest grain yield was registered with 125% RDF (1.24 t ha^{-1}) which remained statistically at par with 150% (1.24 t ha^{-1}) and 100% RDF (1.20 t ha^{-1}). Plants applied with FYM @ 5 t ha^{-1} recorded significantly the highest grain yield (1.23 t ha^{-1}).

Among the varieties tested, the maximum grain yield was recorded with GBG1 (1.29 t ha^{-1}) and it was significantly superior to LBG752 and LBG787 and on par with TBG104 (1.25 t ha^{-1}). The optimum sowing time for *rabi* balckgram is from 1st to 15th October.

Regional Agricultural Research Station, Lam

Physiological evaluation of black gram germplasm for heat and drought stress revealed that among the 60 genotypes studied for high temperature stress tolerance through TIR technique in lab, 15 genotypes showed low per cent of root and shoot reduction at high temperatures. From the TIR technique, 12 genotypes *viz*., OBG-38, TJU-103, VBG-12-111, DKU-95, TBG-104, GBG-1, TBG-125, TBG-129, TBG-130, PU-31, VBG-12-111-1 and KPU 12-213were selected and further sown in the field to screen under field condition for high temperature stress tolerance.

Bio-efficacy of post-emergence herbicides against weeds and their effect on blackgram revealed that hand weeding twice at 15 and 30 DAS recorded the lowest weed density, dry weight and highest weed control efficiency (87.7%) and yield (0.74 t ha^{-1}) which was on par with post-emergence application of Clodinafop-propargyl 8% EC + Na-acifluorfen 16.5% SL @ 80 + 160 g a.i. ha^{-1} (0.69 t ha^{-1}) and 60 + 120 g a.i ha^{-1} (0.65 t ha^{-1}) at 2 – 4 leaf stage of weeds. Post-emergence application of Clodinafop-propargyl 8% EC + Na-acifluorfen 16.5% SL either @ 80 + 160 g a.i. ha^{-1} or 60 + 120 g a.i ha^{-1} at 2 – 4 leaf stage of weeds effectively controlled the grasses, sedges and broad leaved weeds without any phytotoxicity on the blackgram.

Agricultural Research Station, Ragolu

During kharif, 2017-18 rice fallow, there was a progressive decline in both greengram and blackgram seed yield with delay in sowing from November 3rd week to December 1st week and December 3rd week respectively. In blackgram LBG 752 under normal sowing and PU 31 under delayed sowings performed better over rest of the varieties. The mean data of three years, revealed that among blackgram varieties, LBG 752 and LBG 787 performed better when sown early and LBG 752 and PU 31 under late sown conditions and were found suitable for different rice fallow situations of North Coastal Zone.

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Lam

Out of 19 entries tested, the entry IPU 12-10 (1.94 t ha^{-1}) was found promising with low incidence of sucking pests coupled with high seed yield during *rabi*, 2017-`18.

The newer insecticides namely, diafenthiuron 50 % WP @ 1.25 ml l^{-1} and spiromesifen 240 SC @ 1.0 ml l^{-1} were found effective against both the thrips and whiteflies in urdbean.

Seed treatment with thiamethoxam 35 FS @ 5 g kg^{-1} and spraying of thiamethoxam 25 % WG @ 0.2 g l^{-1} at 20-25 DAS was effective in reducing the YMV and leaf curl viral diseases in urdbean.

Though the incidence of both thrips and whiteflies was higher in IPM, the cost of cultivation was less in IPM due to less plant protection cost, thus realizing the higher CB ratio of 1:2.84 in IPM module when compared to 1: 1.44 in farmers practice in blackgram.

Agricultural Research Station, Utukur

Novel insecticide`s efficacy was evaluated against sucking pests in blackgram. Spinetoram 0.6 ml l^{-1} was effective with lower thrips population per plant (0.59) and recorded highest yield (1.22 t ha^{-1}) followed by spinosad (1.07) and cyantraniliprole (1.31). Spiromesifen 1 ml l^{-1} effectively reduced whitefly population (0.76) followed by diafenthiuron (1.22) and spinetoram (1.84).

Disease Management

Regional Agricultural Research Station, Lam

In urdbean, among the entries screened, 34 entries *viz*., TPU 4, RBU 12-02, IPU 2-43, KU 96-3, KPU 1720-140, TU94-2, PU 31, PU 14-28, PU 10-23, NUL 242, VBG 12-034, KUG 791, KUG 479, IPU 12-30, LBG 884, IPU 10-27, IPU 12-10., OBG 41, OBG 43, PU 1518, PU 1520, PU 1531, PU 1515, VBG 12-62, OBG 35, KPU 129-104, IPU 11-01, KUG 479, IPU 10-33, ADT 5, IPU 11-01, IPU 10-33, COBG 11-02, KPU 524-65 were found resistant to MYMV.

Seed treatment with imidacloprid @ 5ml kg-1 + foliar spray of difenconazole @ 1 ml l^{-1}, three sprays at 15 days interval recorded the lowest PDI (22.17) of Alternaria leaf spot during *rabi*, 2017-18.

Seed treatment with imidacloprid @ 5ml kg-1 + foliar spray of tebuconazole @ 1 ml l^{-1} recorded the lowest PDI (9.37) of powdery mildew on blackgram during *rabi*, 2017-18.

During *kharif* season, early sown (1^{st} June - 30^{th} June) blackgram was completely free from viral diseases. During *rabi* season early sown (25^{th} Sept - 10^{th} Oct.) blackgram and greengram were completely free from viral diseases. In rice fallows 1^{st} Dec. - 10^{th} Dec. sown blackgram and greengram were free from viral diseases.

Regional Agricultural Research Station, Tirupati

Screened 45 blackgram genotypes by agroinoculation and identified several genotypes resistant to both species of begomoviruses or single species

Both the species of begamoviruses (MYMIV and MYMV) were present in samples received from 8 MuLLARP centres (Akola, Badnapur, Dholi, Pantnagar, Jalgoan, Berhampur, Lam, Coimbatore)

Agricultural Research Station, Utukur

Management of viral diseases indicated that seed treatment with imidacloprid 600 FS @ 5 ml kg^{-1} seed + 4 border rows of jowar + removal of virus infected plants + yellow sticky traps @ 4 ac^{-1} + spraying of diafenthiuron @ 1.25 g l^{-1} was found to be effective with low per cent disease incidence of bud necrosis (3.11%) and YMV disease (3.19%) and recorded highest yield (1.29 t ha^{-1}).

2.3 Greengram

Crop Improvement

Regional Agricultural Research Station, Lam

In preliminary yield trial, the entries LGG 649 recorded significant seed yield of 2.08 t ha^{-1} followed by LGG 645 (2.06 t ha^{-1}), LGG 606 (1.94 t ha^{-1}) compared to local check LGG 460 (1.66 t ha^{-1}). The entries LGG 649 and LGG 645 were found to be early maturing genotypes and resistant to MYMV.

Among the entries tested in Advanced Yield Trial, the entry LGG 630 recorded significant superior seed yield of 2.16 t ha^{-1} compared to local check LGG 460 (1.70 t ha^{-1}) and found to be resistant to MYMV and tolerant to Leaf Curl Virus.

The entry LGG 607 recorded significantly superior seed yield of 1.97 t ha^{-1} compared to local check LGG 460 (1.58 t ha^{-1}) in Multi Location Trial.

In Initial Varietal Trial, the entry COGG 13-39 recorded significantly higher seed yield of 1.63 t ha^{-1} followed by LGG 607 (1.56 t ha^{-1}) compared to the best check Co 6 (1.46 t ha^{-1}).

In Advanced Varietal Trial, the entry VGG 15-30 recorded significantly superior yield of 2.81 t ha^{-1} compared to the best check Co 6 (1.93 t ha^{-1}).

The greengram entries *viz*., LGG 407, ML 267, PDM 54, WGG 37, UPM 79-5-4, LGG 460. PM 115, PM 112, PM 110, PM 103, LGG 574 , WGG 42, IPM 2-14, IPM 409-4, SM 1815, MH 421, KM 2241, IPM 410-4, LGG 607 and LGG 630 for YMV, JRUM 1, TARM 22 and TM 96-2 for powdery mildew; PIMS 3, PIMS 4 and LGG 407 for Angular black leaf spot; D12/295, RMG 2 75, PDM 54 and WGG 42 for drought; JRUM 1 and LGG 460 for sucking pests; LGG 450 for pre-harvest sprouting were identified as source of resistance.

Agricultural Research Station, Ghantasala

The check variety LGG 460 recorded highest yield of 1.84 t ha^{-1} followed by LGG 607 (1.29 t ha^{-1}) and LGG 609 (1.0 t ha^{-1}) in Multi Location Trial.

In Rice fallow mungbean Initial Varietal Trial during *rabi,* 2017, the entry RFM 17-01 recorded highest yield of 1.36 t ha^{-1}followed by TM 96-2 (1.22 t ha^{-1}) and LGG 460 (1.15 t ha^{-1}).

Agricultural Research Station, Podalakur

During *rabi* 2017-18, eleven entries of greengram were evaluated under multilocation varietal trial. Out of 11 entries tested, the entry Pusha Vishal recorded the highest seed yield of 1.72 t ha^{-1} followed by GGG 1(1.71 t ha^{-1}) and LGG 588 (1.62 t ha^{-1}) compared to check WGG 42 (1.50 t ha^{-1}).

Regional Agricultural Research Station, Tirupati

Among six mungbean entries tested in Advanced Varietal Trial during *rabi* 2017, the entries RM17-3, RM-16-4 and RM-16-5 gave significantly higher seed yield of 1.49, 1.36 and 1.31 t ha^{-1} as against best check LGG 460 (1.16 t ha^{-1})

In Initial Varietal Trial, out of fifteen entries evaluated during *rabi* 2017, two entries found significantly superior over best check LGG 460. Highest seed yield of 1.48 t ha^{-1} recorded by RM 17-16 followed by RM 17-11 (1.28 t ha^{-1}) where as check LGG460 gave 1.14 t ha^{-1}.

Crop Production

Regional Agricultural Research Station, Lam

Manual weeding twice at 20 and 35 - 40 DAS registered highest grain yield (0.79 t ha^{-1}) and was at par with imazethapyr 10% SL @ 55 g a.i. ha^{-1} as post emergence at 15-20 DAS (0.71 t ha^{-1}). The yield reduction in *kharif* greengram due to weed competition was to the extent of 39%.

Application of higher doses of RDN and 100% RDN were found significantly superior than 75% RDN. The highest grain yield was registered with 150% RDN (0.99 t ha^{-1}) which was at par with 125% (0.93 t ha^{-1}) and 100% RDN (0.93 t ha^{-1}).

Plants applied with FYM @ 5 t ha^{-1} not only recorded significantly high grain yield (0.98 t ha^{-1}) but also improved the grain yield to the extent of 14.5% when compared to no FYM applied plots.

Among different land configuration practices tested, broad bed and furrow method recorded the highest grain yield (0.89 t ha^{-1}). Significantly superior grain yield of greengram was recorded from sequential application of pendimethalin 30 EC @ 1.0 Kg ha^{-1} as pre emegence followed by imazethapyr 10% SL @ 55 g ha^{-1} at 15-20 DAS (1.02 t ha^{-1}) as against untreated check (0.65 t ha^{-1}). The yield reduction in *kharif* greengram due to weed competition was to the extent of 36.2%.

The highest grain yield was recorded with foliar spray with urea 2%+ salycilic acid 75 ppm at initiation of flowering, recorded highest grain yield (1.06 t ha^{-1}) compared to the control (0.69 t ha^{-1}).

During *kharif*, 2017, short duration greengram variety GGG 1, recorded a weed contol efficiency of 83.8% with pre emergence followed by post emergence herbicide application as against hand weeded check (94.8%), where as in other varieties *viz*., LGG 574, TM 96-2, LGG 460 the weed contol efficiency was 80.6, 73.7 and 72.9% as against the respective hand weeded treatments (96.8, 93.8, 95.5%).

Crop Protection

Disease Management

Regional Agricultural Research Station, Lam

Based on natural field screening, the genotypes *viz*., LGG 607, VGG 16-055, VGG 16-036, RMG 1087, SML 1907, ML 2495, VGG 15-030, MGG 385, OBGG 58, TARM 1, Pant M 12-12, MH 560A, COGG 11-02, SHIM 14-4 were found resistant to MYMV.

Seed treatment with imidacloprid @ 5 ml kg^{-1} + foliar spray of azoxystrobin @ 0.75 ml l^{-1} three sprays at 15 days interval recorded the lowest PDI (21.27) of Cercospora leaf spot and powdery mildew PDI (9.60) during *kharif*, 2017.

During *kharif*, 2017, early sown (1st June-30th June) crop was completely free from viral diseases. During *rabi* also, early sown (25th Sept-10th Oct.) crop was completely free from viral diseases. In rice fallows 1st Dec.-10th Dec. sown greengram was free from viral diseases.

2.4 Bengalgram

Crop Improvement

Regional Agricultural Research Station, Lam

The entry, C 1993 recorded highest seed yield of 2.74 t ha^{-1} followed by C 1975 (2.71 t ha^{-1}), C 1988 (2.67 t ha^{-1}), C 1990 (2.33 t ha^{-1}), and C 1989 (2.22 t ha^{-1}). In Initial Varietal Trial, desi genotypes are formed suitable for mechanical harvesting.

In Advanced Varietal Trial (desi genotypes), the entry C 1735 recorded highest seed yield of 2.81 t ha^{-1} followed by C 1739 (2.73 t ha^{-1}), C 1737 (2.69 t ha^{-1}) and C 1736 (2.45 t ha^{-1}).

The entry C 1804 recorded highest seed yield of 2.40 t ha^{-1} followed by C 1803 (2.18 t ha^{-1}) and C 1801 (2.02 t ha^{-1}) in Advanced Varietal Trial (desi genotypes) for rain fed situation.

In Advance Varietal Trial on Kabuli genotypes, the entry C 1915 recorded highest seed yield of 2.38 t ha^{-1} followed by C 1917 (2.15 t ha^{-1}) and C 391 (1.41 t ha^{-1}).

In Multilocation Trial on desi chickpea genotypes, the entry BeG-17-2 recorded highest seed yield of 2.63 t ha^{-1} followed by BeG-17-7 (2.56 t ha^{-1}).

In Multilocation Trial on kabuli chickpea genotypes, the entry BeG-17-18 recorded highest seed yield of 3.21 t ha^{-1} followed by BeG-17- 14 (2.58 t ha^{-1}).

Regional Agricultural Research Station, Nandyal

The entry NBeG 399 is a high yielding extra-large seeded (>40 g/100 seed) *kabuli* chickpea. In AICRP trials of 2014-2017, NBeG 399 recorded average yield of 1.77 t ha^{-1} with a yield advantage of 24.4%, 25.8%, 15.8%, respectively over checks.

In large scale demonstrations, in farmers holdings during 2014-`15 and 2016-`17, NBeG 399 exhibited yield advantage of 20.8% (1.38 t ha^{-1}) over *kabuli* varieties (1.11 t ha^{-1}).

The entry NBeG 452, a high yielding *desi* chickpea line is in second year minikit testing. It recorded 20 % higher yield (1.41 t ha^{-1}) over JG 11 (1.20 t ha^{-1}) in first year minikit testing.

The entry NBeG 458, a high yielding bold seeded *kabuli* chickpea entry is in second year minikit testing. It recorded 18 % higher yield (1.11 t ha^{-1}) over KAK2 (0.94 t ha^{-1}) in first year minikit testing.

Eight promising entries *viz.,* NBeG 776 (advanced varietal trial 1 *Desi* (NEPZ), 738 (advanced varietal trial 1 *Desi*) NBeG 779 (advanced varietal trial Rainfed), NBeG 806, (advanced varietal trial 1 *Desi* (Late sown), NBeG 440 (advanced varietal trial 1 *Kabuli*) and NBeG 506, NBeG 786 and NBeG 1004 (advanced varietal trial 1 DTIL)) were promoted to advance yield trials during 2017-'18.

Pooled data of MLT Bengalgram (Desi) from four locations viz., Lam, Darsi, Podalkur and Nandyal revealed that NBeG 779 (1.93 t ha^{-1}) and NBeG 776 (1.88 t ha^{-1}) registered high yield and were on par with best check JG11 (1.85 t ha^{-1}).

Bengalgram (extra-large seeded kabuli) Multi Location Trial, pooled data from four locations indicated that, the entry NBeG 833 was superior (1.74 t ha^{-1}) followed by NBeG 837 (1.70 t ha^{-1}) and N BeG 829 (1.67 t ha^{-1}). These entries recorded 16.4, 11.5 and 9.8 per cent higher yield respectively than the large seeded check MNK 1 (1.52 t ha^{-1}).

In advanced yield trial II desi, based on pooled data of 2015-`16 and 2017-`18, six entries NBeG 699 (1.75 t ha^{-1}), NBeG 873 (1.70 t ha^{-1}), NBeG 698 (1.66 t ha^{-1}), NBeG 816 (1.66 t ha^{-1}), NBeG 690 (1.66 t ha^{-1}), NBeG 817 (1.64 t ha^{-1}) were found promising with yield advantage of 11.2 to 18.5 per cent over JG 11 (1.48 t ha^{-1}).

Agricultural Research Station, Utukur

In Multi Location Trial, significant differences were found for seed yield and test weight in both kabuli and desi types. In desi types l, out of the six entries tested, three entries NBeG 857 (0.80 t ha^{-1}), NBeG 785 (0.80 t ha^{-1}) and NBeG 776 (0.67 t ha^{-1}) recorded significantly higher seed yield against best check NBeG 49 (0.53 t ha^{-1}). In kabuli type trial, out of 10 entries tested, none of the entry was found to be significantly superior against the best check KAK -2 (0.60 t ha^{-1}).

Agricultural Research Station, Podalakur

Multi Location Trial on Desi types was conducted during rabi 2017-2018. Among eight entries tested, the entry NBeG-620 recorded the highest seed yield of 2.26 t ha^{-1} followed by NBeG 779 (2.17 t ha^{-1}) compared to check JG 11 (1.77 t ha^{-1}).

Among the kabuli types tested in Multi Location Trial, the entry NBeG-829 recorded the highest seed yield of 2.49 t ha^{-1}followed by NBeG 810 (2.31 t ha^{-1}) whereas check MNK 1 recorded 1.91 t ha^{-1}.

Crop Production

Regional Agricultural Research Station, Nandyal

In post-emergence herbicides evaluation for weed control in kabuli chickpea during *rabi,* 2017-`18, hand weeding at 20 and 40 DAS recorded higher yield (Yield: 2.23 t ha^{-1}) and weed control efficiency (88%) than post emergence application of acifluorfen sodium + clodinafop propargyl at 140 + 70 g a.i. ha^{-1} and 160 + 80 g a.i. ha^{-1} at 20 of DAS which recorded grain yield of 2.12 and 2.08

t ha^{-1}, respectively and weed control efficiency of 68 and 69%, respectively.

Among fifty four genotypes of chickpea evaluated for their protein content of the seed, two *desi* breeding lines NBeG 507 (24.9%), NBeG 506 (23.8%) and three *kabuli* genotypes NBeG 399 (24.7%), NBeG 458 (23.4%) NBeG 724 (23.5%) have registered significantly higher protein content than the checks JG 11 and KAK 2 in *desi* and *kabuli* groups, respectively (20%).

Among *desi* genotypes, the highest iron content was observed in NBeG 47 (14.6 mg g^{-100}) followed by NBeG 49 (13.2 mg). In *kabuli* highest iron content was observed in genotypes, KAK 2 (11.8 mg g^{-100}) and Vihar (11.6 mg g^{-100}) and also highest zinc concentration of 7.4 mg in Vihar and 6.9 mg in KAK 2.

Regional Agricultural Research Station, Lam

Application of recommended dose of fertilizer and foxtail millet crop residue along with 5 t ha^{-1} of FYM recorded highest seed yield (3.19 t ha^{-1}) of bengalgram which was at par with other nutrient combinations except where 50% RDF along with foxtail millet crop residue and bio-fertilizer consortia was applied (2.53 t ha^{-1}).

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Nandyal

Among twenty one chickpea advanced breeding lines tested for *Helicoverpa armigera*, the lowest pod damage was recorded in NBeG - 529 (5.63%) followed by 5.66 % in NBeG -810 and 5.8% in NBeG -833. The entry NBeG -810 recorded high yield (2.88 t ha^{-1}).

Phenology based insecticide application for the management of gram pod borer *(Helicoverpa armigera*) in chickpea revealed that spray of azadirachtin 300 ppm @ 2.5 l ha^{-1}, emamectin benzoate 5 SG @ 220 g ha^{-1} and Flubendiamide 39.35 SC @ 63.5 g ha^{-1} at vegetative, flowering and pod formation stages respectively had effectively controlled the insect with low pod damage of 2.66 percent and yield of 1.85 t ha^{-1}.

Disease Management

Regional Agricultural Research Station, Nandyal

A total of 211 entries were screened against *Fusarium* wilt in wilt sick plot and 118 entries recorded resistant reaction (less than 10% incidence) at 30 and 60 DAS.

Out of 20 chickpea advanced breeding material screened against *Fusarium* wilt, the entries NBeG-844, NBeG-789, NBeG-779, NBeG-801, NBeG-798, NBeG-837, NBeG-829, JG-11, NBeG-810, NBeG-776, NBeG-119, NBeG-857, NBeG-529, NBeG-49, NBeG-785 and NBeG-620 exhibited resistant reaction.

Among 10 *Trichoderma* isolates screened, CPRT-8 *Trichoderma* isolate had recorded 72.50 percent inhibition against *S. rolfsii* virulent isolate (CSR 2) when tested with dual culture technique. Vitavax power (carboxin 37.5% + thiram 37.5%) and tebeuconazole 250 EC were found to be effective at 250 ppm concentration and recorded 100 percent inhibition of mycelia growth of the *S. rolfsii* in poison food technique.

2.5 Cowpea

Crop Improvement

Regional Agricultural Research Station, Tirupati

In an advanced varietal trial, among fourteen entries tested, CP-13, CP10 and CP15 gave significantly higher seed yield of 1.27, 1.20 and 1.16 t ha^{-1} as against 0.96 t ha^{-1} in TPTC-29.

Agricultural Research Station, Anantapuramu

Out of 14 entries evaluated in Initial Varietal Trial during *kharif*, 2017, the entry CP-26 recorded highest seed yield of 0.75 t ha^{-1} compared to all entries under test.

Crop Production

Regional Agricultural Research Station, Tirupati

In evaluation of fodder cowpea varieties under varied phosphorus levels in rainfed conditions, significantly highest green fodder yield of 32.0 t ha^{-1} was recorded with APFC10-1 followed by Co-8 (31.7 t ha^{-1}) and EC-4216 (31.6 t ha^{-1}) and found significantly superior over MFC 8-14 (29.2 t ha^{-1}). Among the different levels of P_2O_5, higher green fodder yield (32.5 t ha^{-1}) was recorded with 60 kg ha^{-1} compared to 40 kg ha^{-1} (32.1 t ha^{-1}). Further increasing levels of P_2O_5 did not increased the fodder yield.

Among the quality parameters, highest crude protein (12.15%) was recorded with APFC 10-1 which was comparable with Ec-4216 and application of all levels of P had significant effect over control.

2.6 Horsegram

Crop Improvement

Agricultural Research Station, Anantapuramu

During *Kharif,* 2017, thirteen entries were evaluated for seed yield in Advanced Varietal Trial. Out of thirteen entries, the entry HG-9 (1.09 t ha^{-1}) recorded significantly highest seed yield followed by HG-13 (0.98 t ha^{-1}) and HG-1 (0.84 t ha^{-1}) compared to pre-released variety of ATPHG-11 (0.75 t ha^{-1}).

2.7 Clusterbean

Crop Improvement

Agricultural Research Station, Anantapuramu

During *Kharif*, 2017, a total of 13 guar gum entries along with the check entry RGC-936 were evaluated for seed yield. Among 13 entries, the entry GR-8 recorded highest seed yield of 0.94 t ha^{-1} followed by GR-1 (0.84 t ha^{-1}) compred to check, RGC-936 (0.70 t ha^{-1}).

2.8 Rajmash

Regional Agricultural Research Station, Chintapalle

Crop Improvement

Among six varieties evaluated, the entry Utkarsh (1.16 t ha^{-1}) recorded higher yield followed by Arun (1.14 t ha^{-1}) compared to local variety CTPL Red (0.48 t ha^{-1}).

Crop Production

Regional Agricultural Research Station, Chintapalle

Among seven Rajmash varieties tested at RARS, Chintapalli during *rabi* under different sowing windows from August second fortnight to September second fortnight, Arun (0.89 t ha^{-1}) and Utkarsh (0.89 t ha^{-1}) varieties performed well when sown during August second fortnight.

3. Oilseeds

3.1 Groundnut

Crop Improvement

Regional Agricultural Research Station, Tirupati

TCGS 1073, a water-use efficient Spanish bunch culture with high yield potential suitable for cultivation in irrigated situation both in *kharif* and *rabi* seasons is ready for release with mean pod yield of 2.37 t ha^{-1} in *kharif* and with 3.44 t ha^{-1} in *rabi* season, matures in $105^{-1}10$ days. This is proposed for release at state level.

TCGS 1157, a short statured Spanish culture with high yield potential and fresh seed dormancy and higher frequency of three seeded pods maturing in 110 days recorded mean pod yield of 2.56 t ha^{-1} in *kharif* season and 3.08 t ha^{-1} in *rabi* season. This is identified for release for Zone III (Maharashtra and Madhya Pradesh).

TCGS 894, a short statured short duration culture was proposed for identification for Zone III b consisting of Andhra Pradesh, Telangana and Tamilnadu for *rabi* season.

In advanced varietal trial I, out of 9 genotypes tested against three check varieties, three genotypes, TCGS 1775 (3.71 t ha^{-1}), TCGS 1769 (3.18 t ha^{-1}) and TCGS 1779 (2.92 t ha^{-1}) recorded significantly higher pod yield with 52 %, 31 % and 20% increase over the check Dharani (2.44 t ha^{-1}). Highest shelling out-turn of 77% was recorded in Dharani followed by TCGS 1779 (73 %).

In advanced varietal trial II, out of 6 genotypes tested against three check varieties, only one genotype, TCGS 1707 (pod yield-3.69 t ha^{-1}, kernel yield-2.61 t ha^{-1}) recorded significantly higher pod and kernel yield with 50 % and 37 % increase over the check, Dharani (pod yield - 2,45 t ha^{-1}, kernel yield^{-1}.90 t ha^{-1}). Highest shelling out-turn of 78 % was recorded in TCGS 1711 followed by Dharani (77 %).

In advanced varietal trial (Early *Kharif*), out of 10 genotypes evaluated against five check varieties, two genotypes *viz.* TCGS 1694 (2.98 t ha^{-1}) and TCGS 1630 (2.68 t ha^{-1}) recorded significantly higher pod yield over the best check variety, Rohini (2.19 t ha^{-1}) with 36 % and 22 % higher yield respectively.

During *rabi* 2017^{-1}8, among the test entries in advanced varietal trial, TCGS 1779 recorded numerically higher pod yield of 2.32 t ha^{-1} that was higher by 8 % over TAG 24. Incidence of PBND/PSND was lower in Dharani (8 %), TCGS 1779 (7 %), TCGS 1750, 1775 and TAG 24 (9 %).

In advanced varietal trial-II (drought), out of 20 genotypes tested against three check varieties, four genotypes TCGS-1877 (2.93 t ha^{-1}), TCGS-1872 (2.86 t ha^{-1}), TCGS-1855 (2.77 t ha^{-1}) and TCGS-1838 (2.76 t ha^{-1}) recorded significantly higher pod yield with 41% , 38%, 33% and 33% increase over the best check Greeshma (2.08 t ha^{-1}).With respect to kernel yield, only one entry TCGS-1877 (1.89 t ha^{-1}) recorded significantly higher yield (28% higher) over Greeshma (1.49 t ha^{-1}).

In advanced varietal trial-III (drought), out of 20 genotypes tested against three checks varieties, TCGS-1826 (2.31 t ha^{-1}), TCGS-1823 (2.31 t ha^{-1}), TCGS-1809 (2.28 t ha^{-1}), TCGS-1814 (2.24 t ha^{-1}) and TCGS-1805 (2.23 t ha^{-1}) gave higher pod yield over the best check Dharani. With respect to kernel yield TCGS-1809 (1.70 t ha^{-1}) TCGS-1823 (1.66 t ha^{-1}), TCGS-1805 (1.62 t ha^{-1}) and TCGS-1826 (1.61 t ha^{-1}) recorded higher kernel yield over Dharani (1,58 t ha^{-1}).

In advanced varietal trial-1st year (drought), out of 16 genotypes tested against three checks varieties, TCGS-1884 (3.80 t ha^{-1}), TCGS-1882 (3.39 t ha^{-1}), TCGS-1894 (3.39 t ha^{-1}), TCGS-1895 (3.35 t ha^{-1}), TCGS-1892 (3.31 t ha^{-1}), TCGS-1881 (2.95 t ha^{-1}), TCGS-1888 (2.43 t ha^{-1}), TCGS-1886 (2.41 t ha^{-1}) and TCGS-1898 (2.15 t ha^{-1}) gave significantly higher pod yield over the best check Dharani.

In Advanced varietal trial (1st year), out of 18 genotypes evaluated against three check varieties, TCGS-1915 (pod-1.97 t ha^{-1}, kernel -1.38

t ha^{-1}), TCGS-1923 (pod-1.79 t ha^{-1}, kernel-1.34 t ha^{-1}), TCGS-1916 (pod-1.79 t ha^{-1}, kernel-1.27 t ha^{-1}), TCGS-1907 (pod-1.73 t ha^{-1}, kernel-1.28 t ha^{-1}), TCGS-1899 (pod-1.64 t ha^{-1}, kernel-1.23 t ha^{-1}) and TCGS-1905 (pod-1.57 t ha^{-1}, kernel-1.20 t ha^{-1}) gave significantly high pod and kernel yields over the best check variety Dharani (pod-1.11 t ha^{-1}and kernel - 0.842 t ha^{-1}).

In economic improvement of small and marginal farmers through identification of climate resilient groundnut genotypes under climate change (DST project), out of 43 entries evaluated during *rabi* 2017-18, the entries viz., TCGS-1819 (pod- 4.12 t ha^{-1}, kernel - 2.92 t ha^{-1}), TCGS-1809 (pod-3.88 t ha^{-1}, kernel-2.52 t ha^{-1}), TCGS-1845 (pod-3.87 t ha^{-1}, kernel- 2.67 t ha^{-1}), TCGS-1816 (pod- 3.58 t ha^{-1}, kernel-2.33 t ha^{-1}), TCGS-1838 (pod-3.56 t ha^{-1}, kernel - 3.56 t ha^{-1}), TCGS-1814 (pod-3.41 t ha^{-1}, kernel - 2.42 t ha^{-1}) TCGS-1872 (pod-3.04 t ha^{-1}, kernel-2.01 t ha^{-1}), TCGS-1815 (pod -2.93 t ha^{-1}, kernel-1.84 t ha^{-1}), TCGS-1839 (pod - 2.78 t ha^{-1}, kernel-1.83 t ha^{-1}), TCGS-1855 (pod - 2.62 t ha^{-1}, kernel -1730 t ha^{-1}), ICGV-07262 (pod-2.57 t ha^{-1}, kernel^{-1}.64 t ha^{-1}), and TCGS-1824 (pod-2.37 t ha^{-1}, kernel- 1.71 t ha^{-1}) gave significantly higher pod and kernel yields over Dharani (pod-1.61 t ha^{-1}, kernel-1.13 t ha^{-1}).

In Multi Location Trail of Spanish bunch, out of 13 genotypes evaluated against three checks, the entry MLTG-02 (pod- 2.86 t ha^{-1} and kernel-1.79 t ha^{-1}) recorded significantly superior pod and kernel yield with increase of 59% pod and 36 % kernel yield over the best check variety Dharani (pod -1.80 t ha^{-1} kernel -1.32 t ha^{-1}). The other entries, MLTG-03 (2.55 t ha^{-1}) MLTG-06 (2.53 t ha^{-1}) and MLTG-09 (2.40 t ha^{-1}) gave significantly higher pod yield over the check variety Dharani.

In advanced varietal trial (SB) during *kharif*, 2017, out of five genotypes evaluated, three genotypes *viz.,* JL 1085 (4.07 t ha^{-1}) followed by VG 9816 (3.00 t ha^{-1}) and GPBD 4 (2.98 t ha^{-1}) registered higher pod yield.

Among the test genotypes during *rabi*, 2017-18, the genotype INS-I-2017-13 recorded higher pod yield of 2.31 t ha^{-1} followed by INS-I-2017-11 (2.07 t ha^{-1}) and INS-I-2017-27 (2.02 t ha^{-1}). PBND/PSND incidence was low in INS-I-2017-11 (9 %), INS-I-2017-27 (9%) and INS-I-2017-6 (10%)

In groundnut, development of SCAR markers for *Achromobacter* spp., the potential bacterial endophyte against stem rot of groundnut, the culture GSE4 (*Achromobacter Spp*) was sub-cultured. The antagonistic activity of GSE2, GSE4 and GSE 5 strains of *Achromobacter* Spp. in dual culture technique against *Sclerotium ralfsii* was found to be as effective as 50% only.

Introgression of PBND/PSND resistance gene(s) into promising groundnut genotype through marker-assisted breeding genotypes having different degree of tolerance to PBND were selected based on the disease incidence during *Rabi* 2016-17. The DNA from these genotypes were isolated for validation of putative SSR markers linked to PBND tolerance.

DNA fingerprinting of groundnut varieties TCGS 1157, TCGS1622, TCGS894, TCGS 1616 and TCGS1694 with three check varieties Narayani, Greeshma and Tirupati 3 was carried out to facilitate the varietal release. Narayani, Greeshma and Tirupati 3 as a reference set were profiled with 15 RAPD markers. Nine markers (OPC10, OPC7, OPB6, OPA19, OPA4, OPA3, OPC5, OPD11 and OPC4) were polymorphic in the eight varieties of groundnut. The highly polymorphic markers *viz.,* OPC10, OPA4, OPC7, OPB6, OPA19 markers clearly distinguished the varieties, TCGS 1157, TCGS1622, TCGS894, TCGS 1616 and TCGS1694 and displayed distinct allelic differences and groundnut varieties can be uniquely identified.

Under development of gene based markers for MAS of drought tolerance in groundnut, cDNA-RAPD profiles were developesd with 35 RAPD markers in three regimes of moisture stress i.e., 60, 70 and 80 DAS. The transcript profile data revealed that drought stress induces the expression of many drought responsive transcripts and prolonged moisture stress has enormous impact on gene expression pattern.

Identification of groundnut genotypes with water saving and drought resistance traits for rainfed conditions during *Kharif*, 2017 revealed that, TCGS 1425 recorded high WUE, with low transpiration rate and highest drought adaptive traits (SCMR, Chlorophyll content, SLA) whereas TCGS 1694 showed high drought adaptive traits and highest photosynthetic rate, high transpiration rate with moderate WUE. TCGS 1694 recorded highest shelling %, 100 kernel wt., HI, pod yields and oil %.

Physiological and biochemical basis of iron chlorosis tolerance in groundnut genotypes indicated that, the mean Chlorophyll a and b, total carotenoids, IRGA parameters and yield traits recorded higher in Fe sufficient compared to Fe deficient soils. The entries TCGS 1621, TCGS 1623, K-6 and TCGS 1522 showed high SCMR, high chlorophyll content, high total carotenoids, high total iron and high active iron in soil. TCGS 1624 showed highest active iron content followed by TCGS 1623. Peroxidase activity recorded highest in TCGS 1621 followed by TCGS 1522. Pod yields recorded highest in TCGS 1511 followed by K-6, TCGS 1621 and TCGS 1623.

Physiological and biochemical traits related to fresh seed dormancy in groundnut germplasm studies revealed that, among the twenty genotypes tested for their fresh seed dormancy, the genotype kadiri 7 was found to show fresh seed dormancy for a period of 10 days and remaining genotypes were germinated within three days when kept for germination.

Genotypic variability for changes in kernel chemical composition with storage time of groundnut varieties under ambient storage condition revealed that, total soluble sugars and total free amino acids were found to increase when it was stored in air tight polythene cover whereas, for oil and protein content, there was no significant difference with storage up to 60 days after harvest.

Agricultural Research Station, Kadiri

A total of 2194 germplasm collections were maintained at the station during *kharif* 2017.

In Initial Evaluation Trial during *kharif* 2017, genotypes K2348 (4.23 t ha^{-1}), K2352 (4.20 t ha^{-1}), K2350 (4.17 t ha^{-1}) and K2351 (3.88 t ha^{-1}) significantly out yielded the best check variety Kadiri Amaravathi (2.73 t ha^{-1}). The percent increase of pod yield ranged from 22.9 to 54.8.

In Multi Location Varietal Trial during *kharif* 2017, genotype MLTG 2017-2 (3.71 t ha^{-1}) had significantly out yielded the general mean yield (2.93 t ha^{-1}). The percent increase of pod yield ranged from 38.1 to 70.9.

Agricultural Research Station, Anantapuramu

In Multi - Location Trial on Groundnut (SB) during *Kharif*, 2017, among thirteen genotypes evaluated for their performance, the entry MLTG -17- 6 had recorded significantly higher dry pod yield (1.19 t ha^{-1}) followed by MLTG 17-8 (1.04 t ha^{-1}) and MLTG 17-3 (9.65 t ha^{-1}).

Pooled data for Identification of most suitable drought resistant groundnut varieties for drought affected areas of Ananthapuramu for three years (2014 to 2016) indicated that genotype K 1809 recorded highest yield (1.14 t ha^{-1}) followed by K 1535 (1.08 t ha^{-1}) and K 1802 (1.02 t ha^{-1}).

Agricultural Research Station, Peddapuram

In Multi Location Trial (SB), out of 14 entries tested against the check, Kadiri 9 recorded highest yield (2.07 t ha^{-1}) followed by TCGS1611 (2.05 t ha^{-1}) and Kadiri Harithandra (2.00 t ha^{-1}) compared to check Kadiri 6 (1.51 t ha^{-1}).

Agricultural Research Station, Utukur

A total of 13 entries were tested against two checks in Multi Location Trial. Out of them, the entry MLTG-2 (5.03 t ha^{-1}) registered significantly superior pod yield followed by MLTG -7 (3.54 t ha^{-1}), MLTG 3 (3.45 t ha^{-1}) and MLTG-6 (3.24 t ha^{-1}) compared to the best check Dharani (2.44 t ha^{-1}).

Agricultural Research Station, Yelamanchili

Out of 13 cultures tested in Multi Location Trial (SB) during *kharif*, 2017, the cultures MLTG-13 (2.17 t ha^{-1}), MLTG -9 (1.83 t ha^{-1}) and MLTG-4 (1.74 t ha^{-1}) were found promising in respect of pod yield.

Agricultural Research Station, Amadalavalasa

Among thirteen entries evaluated during *kharif*, 2017 (including six check varieties) in Multilocation Trial of Groundnut (SB), the entry K-1789 (1.82 t ha^{-1}) recorded highest pod yield over all the other entries including best check variety, ICGV 03057 (1.68 t ha^{-1}). Based on pooled mean (three years) data, the check entry ICGV 03057 (2.53 t ha^{-1}) recorded highest pod yield followed by the test entry K-1789 (2.48 t ha^{-1}).

In Multi Location Trial of Groundnut (VB), nine entries were evaluated during *kharif*, 2017 (including two check varieties) for third year and among them, the test entry K-1789 (2.13 t ha^{-1}) was significantly superior to all the other entries including check varieties. Based on pooled mean (three years) data, the test entry K-1789 (3.45 t ha^{-1}) recorded highest pod yield followed by K-1813 (3.42 t ha^{-1}) and K-1811 (3.33 t ha^{-1}).

Agricultural Research Station, Vizianagaram

In Multi Location Trial on Groundnut (Spanish bunch), among 14 entries tested in *kharif* -2017, the check variety Kadiri 9 (2.02 t ha^{-1}) had given highest pod yield compared to all other entries followed by K1812 (2.00 t ha^{-1}).

Crop Production

Regional Agricultural Research Station, Tirupati

Performance of groundnut cultivars under irrigated condition during summer/early *kharif* revealed that, among the varieties TCGS 1157 recorded significantly higher pod yield of 1.89 t ha^{-1} compared to *Dharani* (1.72 t ha^{-1}). Among different dates of sowing, April 16th sown groundnut recorded significantly highest pod yield (2.59 t ha^{-1}) followed by March 1st sown groundnut (2.10 t ha^{-1}). Interaction between varieties and time of sowing found significant, April 16th sown groundnut variety TCGS-1157 recorded highest pod yield of 3.11 t ha^{-1} while Dharani recorded 2.06 t ha^{-1}.

In Identification of alternate *rabi* crops suitable for coastal sands of Nellore, among the different crops, groundnut crop was found superior compared to other crops tried in coastal sands during *rabi* 2017-18. The highest net return of Rs 1,87,688 ha^{-1} was recorded by groundnut followed by water melon Rs 1,64,615 ha^{-1}, closely followed by potato which recorded a net return of Rs 1,45,100 ha^{-1}. The lowest net returns of Rs 7,840 ha^{-1} were recorded in Onion.

Studies on influence of natural farming on soil properties, crop protection and production of quality produce (natural farming network) during *kharif*, 2017 indicated that average pod yields recorded for ICM and Natural farming were 1.62 t ha^{-1} and 1.52 t ha^{-1} respectively. During *rabi,* 2017, the results revealed that growth performance, yield attributes (except 100 kernel weight), and pod yield of groundnut were not significantly influenced by the ICM and natural farming practices.

Pooled data of three years (*Kharif* - 2015,2016 and 2017) on tank mix application of early post-emergence herbicides for efficient weed control in groundnut, indicated that, significantly highest pod yield (2.46 t ha^{-1}), kernel yield (1.92 t ha^{-1}), haulm yield (4.72 t ha^{-1}) was recorded with weed free plot, over all other weed management practices but was at par with pre emergence application of Pendimethalin followed by post emergence application of Imazethapyr 10% S.L.@ 75 g a.i/ha (2.29 t ha^{-1}, 1.77 t ha^{-1} and 4.53 t ha^{-1} of pod, kernel and haulm yield respectively).

Significantly highest weed control efficiency of 98.4 and lowest weed index of 6.0 was recorded with the pre emergence application of pendimethalin followed by post emergence application of imazethapyr 10% S.L.@ 75 g a.i ha^{-1} (97.4) at 45 DAS and 65 DAS respectively and significantly highest net monetary returns per hectare (Rs 73,010) and B:C ratio (3.22) was recorded with pre emergence application of pendimethalin followed by post emergence application of imazethapyr @ 75 g a.i ha^{-1} over all other treatments.

Pre emergence application of Pendimethalin followed by post emergence tank mix application of Imazethapyr and Quizalofop-p-ethyl in ratios of 60:40, 50:50 and 40:60 controlled weeds and produced higher pod, kernel and haulm yields as compared to only post emergence tank mix application of Imazethapyr and Quizalofop-p-ethyl in ratios of 60:40, 50:50 and 40:60.

Pooled data of three years (*Kharif* - 2015, 2016 and 2017) in economizing Phosphorus use in groundnut production with seed inoculation of Directorate of Groundnut Research cultures (DGRC) indicated that, significantly highest per hectare dry pod yield of 2.42 t ha^{-1} was recorded with FYM 5 t ha^{-1} + 100% P + DGRC2 (2.42 kg) and it was statistically at par with FYM 5 t ha^{-1} + 100% P + DGRC1 (2.37 t ha^{-1}), FYM 5 t ha^{-1} + 100% P (2.32 t ha^{-1}), FYM 5 t ha^{-1} + 50% P + DGRC2 (2.23 t ha^{-1}) and FYM 5 t ha^{-1} + 50% P + DGRC1 (2.23 t ha^{-1}) and significantly superior over other phosphorus management treatments.

Compatibility of post-emergence herbicides (imazethapyr and quizalofop-p-ethyl) with insecticides (monocrotophos and imidachloprid) in groundnut, indicated that, both the herbicides and the insecticides were highly compatible with one another at the recommended doses. No phyto toxicity was observed on groundnut crop.

In evaluation of DAPG-producing fluorescent Pseudomonads for enhancing nutrient use efficiency, bio control of soil-borne diseases and yield of *rabi* groundnut, the results revealed that seed inoculation with DAPG-2 recorded significantly higher per hectare pod yield (2.97 t ha^{-1}) and haulm yield (5.43 t ha^{-1}) and was at par with DAPG-4 and superior over other treatments. Significantly highest gross monetary returns (Rs.1,33,706 ha^{-1}), net monetary returns (Rs.88,706 ha^{-1}) were realized with DAPG-2 and was at par with DAPG-4.

In economizing Phosphorus use in *rabi* groundnut production by exploiting phosphorus build up in soil, significantly highest per hectare dry pod yield of 2.68 t ha^{-1} was recorded with the application of FYM 5 t ha^{-1} + 100% P + DGRC2 which was significantly superior over control (1.86 t ha^{-1}), FYM 5 t ha^{-1} (1.96 t ha^{-1}), FYM 5 t ha^{-1} + DGRC1 (1.97 t ha^{-1}), FYM 5 t ha^{-1} + DGRC2 (2.09 t ha^{-1}) and found to be statistically at par with the treatments of FYM 5 t ha^{-1} + 100% P + DGRC1 (2.68 t ha^{-1}), FYM 5 t ha^{-1} + 100% P (2.54 t ha^{-1}), FYM 5 t/ha^{-1}+ 50% P + DGRC2 (2.47 t ha^{-1}) and FYM 5 t ha^{-1} + 50% P + DGRC1 (2.39 t ha^{-1}).

Agricultural Research Station, Kadiri

Application of different levels of phosphorous in combination with FYM and phosphorous solubilising bacteria significantly influenced the yield and yield attributes of rainfed groundnut. Maximum pod yield (3.18 t ha^{-1}), was recorded with the application of FYM @ 5 t ha^{-1}+ 100% P + DGRC2 but was on par with 100 % P application, FYM @ 5 t ha^{-1} + 50% P + DGRC1 and FYM @ 5 t ha^{-1} + 50% P + DGRC2. Net returns and beneft cost ratio were higher with FYM @ 5 t ha^{-1} + 50% P + DGRC2.

Maximum pod yield (2.72 t ha^{-1}) and kernel yield (2.07 t ha^{-1}) were recorded with the application of 100% RDF but was at par with 75% RDF and significantly superior over 25% RDF and 50% RDF. Regarding the effect of bio formulations, maximum pod (2.63 t ha^{-1}) and kernel yields (1.97 t ha^{-1}) were recorded with the application of Bio grow as seed treatment but was on par with the application of NPK liquid formulation + Zinc formulation and significantly superior over the control (no bio formulations).

Among twelve crops evaluated for delayed sowings starting from August 2nd FN to Sep 2nd FN, groundnut showed negative returns. Highest groundnut pod equivalent yield was recorded with clusterbean for vegetable purpose in both the dates of sowing followed by horsegram, cowpea, pigeon pea and greengram. While, considering the cost of cultivation, highest net returns were recorded with clusterbean (Rs.1,01840, Rs. 86020 and Rs. 71,280 ha^{-1}) followed by cowpea (Rs. 43180, Rs.32502 and Rs.24332 ha^{-1}) and horsegram (Rs.35,485, Rs.27,575 and Rs.23,200 ha^{-1}).

Among the four varieties sown under different dates of sowing, highest pod yield was recorded with Kadiri-9 with July 1st fortnight sowing and was on par with the same variety and Kadiri Harithandra sown during June 1st and 2nd fortnight.

Agricultural Research Station, Anantapuramu

By providing supplemental irrigation (10 mm depth) from farm pond water, the pod yield of groundnut crop was increased by 18.1, 16.0 and 14.6 per cent in K-6, K-9 and Dharani varieties respectively, when compared to control. Higher net returns and BC ratio were recorded with K-6 variety under supplemental irrigation.

In groundnut + pigeonpea intercropping (8:1), among various supplemental irrigations tested, higher groundnut equivalent yield (2.82 t ha^{-1}) and net returns (Rs. 81239 ha^{-1}) were recorded with groundnut + pigeonpea inter cropping system (8:1) with one irrigation (20 mm) to groundnut at flowering stage through micro sprinklers and two irrigations (20 mm each) were given to pigeonpea at flowering and pod filling stages through furrow method.

Among different crops sown in the month of June, groundnut had recorded highest pod yield of 0.95 t ha^{-1} with higher net returns (Rs. 15714 ha^{-1}) and B: C ratio of 1.54.

Among different crops sown in the month of August, groundnut had recorded higher pod yield of 1.67 t ha^{-1} compared to other crops. Higher net returns of Rs. 48317 ha^{-1} and B: C ratio of 2.68

was recorded with groundnut.

Long term application of manure and fertilizers in groundnut indicated that, application of HRFD along with FYM @ 4 t ha^{-1} recorded higher pod yield (2.20 t ha^{-1}), followed by recommended dose of fertilizers (20-40-40 N, P_2O_5, K_2O kg ha^{-1}) (2.05 t ha^{-1}) and other treatments. Higher soil available phosphorous (95 kg ha^{-1}) was recorded in recommended dose of fertilizer alone followed by recommended dose of fertilizer along with application of $ZnSo_4$ (50 kg ha^{-1}).

Integration of both organics (FYM @ 4 t ha^{-1}) and inorganics (half RDF @ 10-20-20 N-P_2O_5-K_2O kg ha^{-1}) over 33 years recorded an average yield of 0.99 t ha^{-1} over full RDF @ 20-40-40 N-P_2O_5- K_2O kg ha^{-1} (0.96 t ha^{-1}). However, the control recoded 749 t ha^{-1} of groundnut pod yield. Application of half the recommended dose of fertilizer (10:20:20 kg NP_2O_5, K_2O) along with FYM @ 4 t ha^{-1} recorded higher soil organic carbon (13.45 mg ha^{-1}) and microbial biomass carbon (1035 µg g^{-1}) at surface soil depth.

Satellite experiment on the effect of Integrated Nutrient Management (INM) and STBF on productivity of rainfed groundnut in alfisols indicated that, significant groundnut pod yields were recorded with application of recommended dose of fertilizers (20-40-40 N, P_2O_5, K_2O kg/ha^{-1}) (1.83 t ha^{-1}) followed by soil test based fertilizer application (1.76 t ha^{-1}) and HRFD along with FYM @ 4 t ha^{-1} (1.75 t ha^{-1}).

Evaluation of the effects of nanoparticulate delivery of zinc on the productivity of rainfed groundnut in alfisols revealed that, significant groundnut pod yields were recorded with RDF + Foliar application of nanoscale Zn O @ 2 g l^{-15} at 25 and 45 DAS (2.58 t ha^{-1}) followed by RDF along with soil application of $ZnSO_4$ @ 50 kg ha^{-1} recorded groundnut pod yield of 2.55 t ha^{-1}.

Agricultural Research Station, Kadapa

Geometry alterations to maximize yield in rabi groundnut indicated that, sowing groundnut at 15 cm x 10 cm spacing recorded significantly higher grain yield of 3.33 t $ha^{-1.}$ which was on par with 15 cm x 8 cm (3.28 t $ha^{-1.}$) and 17.5 cm x 8 cm (3.26 t $ha^{-1.}$) than recommended spacing of 22.5 cm x 10 cm (2.64 t ha^{-1}).

Complete weed free plot recorded higher pod yield of 4.55 t $ha^{-1.}$ and was on par with hand weeding twice at 20 and 40 DAS (4.12 t $ha^{-1.}$) in herbicide application on rice – fallow groundnut. Application of pendimethalin as pre emergence and imazethapyr as post emergence at 20 DAS effectively controlled both broad leaved and grassy weeds along with previous paddy and recorded 3.92 t ha^{-1} pod yield.

Among the fertilizer levels, application of 100 % RDF + rhizobium recorded significantly higher pod yield (4.12 t ha^{-1}) and was on par with 100 % RDF, 125 % RDF either alone or in combination with rhizobium.

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Tirupati

The studies on incidence of groundnut insect pests through light trap catches revealed that, more number of adults (45 $trap^{-1}$) were noticed during June month only, i.e. during 25^{th} std week (18-24, June, 2017). Similarly the leafhopper catches were high during 34^{th} standard week (646 $trap^{-1}$) which coincide with 20-26^{th} August, 2017.

Effect of weather factors on light trap catches indicated that maximum temperature (+ 0.50), minimum temperature + 0.57 and wind speed (+

0.45) showed positive influence and relative humidity showed significant negative association (- 0.47, - 0.57) on root grub collection in light trap.

Monitoring of insect pests through pheromone traps indicated that, *Spodoptera litura* catches were high from 23rd sw (2-8, July, 2017) and continued till end of the season in a more or less severe form.

Among 105 entries with 3 checks screened under IET and AVT trials, seven entries IET 1839 - 6.99%, IET 1841 - (7.32%), IET 1829 - (8.06%), TCGS1741 (3.13%), TCGS1715(3.33%), TCGS1729 (4.55%), TCGS1633(4.76%) recorded lowest foliar damage due to leafhopper as against 23.33% in TCGS-1771 19.83% in IET-1840, 18.18% in IET-1815. Similarly, TCGS1775 (14.04%) and IET 1824 recorded lowest foliar damage due to thrips (13.21%) as against highest foliar damage of 53.37% in TCGS-1633. The cultures which showed tolerant or resistant reaction were observed with dark green, thick and leathery.

Evaluation of insecticides for the management of resistant larval population of *S.litura* in groundnut indicated that, rynaxypyr @ 0.3 ml l^{-1} (11.16%) was effective in controlling *S.litura* damage followed by thiodicarb @ 1g l^{-1} (12.03%), indoxacarb @ 1ml l^{-1} (11.37%) which were on par against untreated control (22.15%).

In development of female sex pheromone based indigenous control strategy for red hairy caterpillar, *Amsacta albistriga* Walker (Lepidoptera: Arctiidae) in groundnut, developed synthetic pheromone for red hairy caterpillar and blend 1 with all four components was found effective in attracting male red hairy caterpillar moths. Studies revealed that, a dose of 5 mg was optimum for capturing moths till 10 days and among two dispensers tested silica septa was effective than plastic septa.

Evaluation of cow based organics for non-insecticidal pest management in groundnut indicated that, the foliar damage was low in standard chemical check *i.e.,* monocrotophos @ 1.6 ml l^{-1}, recorded highest per cent control of 43.14 and 25.04 per cent thrips damage at 7 and 14 days after spray respectively, followed by NSKE 5%. Highest pod yield of 2.11 t ha^{-1} was recorded with monocrotophos @ 1.6 ml l^{-1} spray as against 1.69 t ha^{-1} in untreated control.

Studies on compatibility of insecticides, fungicides and nutrients as foliar spray indicated that, a combination of monocrotophos @ 1.6 ml/l^{-1}, hexaconazole @ 2 ml l^{-1} and 19-19-19 sprayable formulation was found effective in reducing foliar damage caused by thrips (58.22%) as well as low incidence of leaf spot (2 score) and recorded high pod yield of 2.95 t ha^{-1} compared to untreated control (29.10%, 6.67and 1.84 t ha^{-1}).

Among the different insecticides tested for their efficacy against root feeders, the root grub incidence was low in furrow application of carbofuran 3 G @ 33 kg ha^{-1} before sowing followed by soil drenching with urea (1 kg) + phorate 10 G (1 kg l^{-10}) of water when incidence crosses ETL (1 grub/m^2). Similarly, the plant mortality was zero per cent in furrow application of carbofuran 3 G @ 33 kg ha^{-1} before sowing compared to untreated control (plant mortality was 5.0 per cent and larval count was 4.3/m^2). Highest pod yield of 1.26 t ha^{-1} was recorded in furrow application of carbofuran 3 G @ 33 kg ha^{-1} before sowing and furrow application of quinalphos 1.5 DP @ 25 kg ha^{-1} before sowing which were on par with each other as against 0.97 t ha^{-1} in untreated control.

Agricultural Research Station, Kadiri

Outbreak of miner pests, grey weevil (15 No.

& 11.43%), bud borer (13 -32 No. & 24-68% bud damage) and Maruca (3-12 No. & 0-5%) were noticed in groundnut during *kharif*, 2017 both at ARS farm and in farmer fields at Anantapuramu District.

In monitoring of pests through pheromone traps, highest male moth catches of *Spodoptera* (43.20 to 78.77) was recorded at 45^{th} to 47^{th} std weeks and *Helicoverpa* (24.60 to 43.60) at 48^{th} to 51^{st} std weeks and leaf miner (4.70 to 8.50) at 35th to 51^{st} std. weeks which coincided with weather perameters (minimum, maximum temperatures of 19.20^{0}C to 35.20^{0}C and relative humidity 39.10% to 99.30%).

Similarly, under light trap, maximum white grub adult catches (8 to 16) were recorded at 33^{rd} to 41^{st} std.weeks and leaf miner adult catches (8 - 18) at 35^{th} to 44^{th} std.weeks. Whereas the highest number of thrips (10 to 100.26) and leaf hoppers (12 to 89.25) catches were recorded on sticky traps from 31^{st} to 51^{st} std.weeks at minimum, maximum temperatures (19.30^{O}c to 35.30^{O}c) and relative humidity (39 to 99 %).

Weather factors like temperature, relative humidity and rainfall havd influenced for highest activity of leaf miner, *Spodoptera, Helicoverpa,* white grub, thrips, leaf hopper and white flies populations to an extent of 19.8%, 98.1%, 75.7%, 87.5%, 68.5%, 47.8%, 84.7%, 78.3%, 0.78.5% (R^2 = 0.198, 0.981, 0.757, 0.875, 0.685, 0.478, 0.847, 0.783, 0.785) and leaf damage 86.8%, 98.4%, 78.9%, 89.8%, 73.8% and 87.1% respectively (R^2 0.868, 0.984, 0.789,0.898,0.738, 0.871).

Among different new insecticide formulations tested for their efficacy during *kharif*, 2017, clothianidin 50WDG @ 2 g kg^{-1} seed and gaucho 600 FS @ 1.2 g a.i kg^{-1} seed were found significantly superior and effective against white grub, termite pests and protected groundnut crop up to 30 days after germination. At later stages, furrow application of carbofuran 3 G before sowing @ 33 kg ha^{-1}, soil drenching with chlorpyriphos 20 EC @ 8 ml l^{-10} of water and soil drenching with urea + phorate 10 G @ 1 kg + 1 kg l^{-10} of water when incidence crosses ETL, protected groundnut crop up to harvest.

Results of overall efficacy of botanicals and chemical insecticides against defoliators during *kharif* 2016 and 2017 indicated that, novaluron10% EC @ 1.0 ml l^{-1} and quinalphos 25% EC @ 2.0 ml l^{-1} were found effective against groundnut *Spodoptera* (17.90% & 19.41%), *Helicoverpa* (15.24% & 17.19%), leaf miner (16.90% & 20.09%) and obtained highest pod yield (2.09 & 1.97 t ha^{-1}) and ICBR compared to rest of the treatments.

Among different IPM modules evaluated in groundnut, module 2 (Seed treatment with *Trichoderma* @ 4 g kg^{-1} seed + Need based spray of imidacloprid 17.8 SL @ 0.3 ml l^{-1} + Need based spray of novaluron 10 EC @ 1 ml l^{-1} for defoliator at 50-70 DAS + Need based spray of tebuconazole 25.9 EC @ 1.5 ml l^{-1} at 50-70 DAS) and module 4 (Seed treatment with carbendazim + mancozeb @ 2 g kg^{-1} seed + Need based spray of dimethoate 30 EC @ 1.5 ml l^{-1} + Need based Spray of quinalphos 25 EC @ 2 ml l^{-1} for defoliator at 50-70DAS + Need based spray of propiconazole 25EC @ 1ml l^{-1} at 50-70 DAS) were effective in reducing leaf damage by thrips(17.70 & 21.61%), leaf hopper (20.47 & 22.12%), *Spodoptera*(26.91 & 30.13%), *Helicoverpa*(12.62 & 13.61%), leaf miner (21.92 & 22.61%) and lowest diseases of stem rot (7.0 %), dry root rot (6.6 %) early leaf spot (45.0 PDI), rust (26.0 % PDI), Alternaria blight (17.0 % PDI) with higher pod (1.55 t ha^{-1}), haulm yield (2.23 t ha^{-1}) and ICBR of 4.0.

Agricultural Research Station, Utukur

Population dynamics studies of leaf hoppers, thrips and leaf miner during *kharif* 2017 revealed that peak foliar damage of leaf hopper (16.33) and thrips (14.12) was observed in 33rd standard week.

Among 57 entries screened against insect pest resistance, the entry TCGS 1777 showed less thrips incidence of 3.29 per cent followed by TCGSB 1738 (3.35%) and TCGS 1605 (3.65 %) and lowest leaf hopper incidence was observed in TCGS 1738 (2.61 %) followed by TCGS 1748 (7.34 %) and TCGS 1769 (7.40 %).

Management of insect pests of groundnut with cow based organics revealed that spraying of imidacloprid @ 0.4 ml l^{-1} was found to be effective at seven days after spraying against leaf hopper (6.49 %) and thrips (4.39 %) followed by neemastra 20 ml l^{-1} (14.87% and 10.72 %) and NSKE 5% (13.83 % and 11.56 %). Agniastra 20 ml l^{-1} found to be effective against spodoptera (2.70 %) followed by bramhastra 20 ml l^{-1} (4.71%) and neemastra (5.34 %).

Agricultural Research Station, Darsi

During *kharif*, 2017, in the early sown crop, leaf miner larval incidence reached a peak during 35th standard week with 2.0 larvae $plant^{-1}$. Per cent damage due to thrips and jassids observed peak during the 27th and 37th standard week. Whereas, per cent foliage damage due to *Spodoptera litura* was peek on 39th standard week.

In the late sown crop, the larval incidence was peek during the 36th standard week with 1.60 larvae $plant^{-1}$. Thrips and jassids damage was highest during 31st and 37th standard week. Incidence of *Spodoptera litura* was higher during the season and maximum was observed on 44th standard week.

Overall the damage due to *Spodoptera litura* was more in the late sown crop and the incidence of sucking pests was more in the early sown crop.

Agricultural Research Station, Anantapuramu

The pheromone trap studies revealed that highest catch of *Helicoverpa armigera* was observed in 31st Std.week (4.95), where as the highest trap catch of Spodoptera litura (46.12 moths $trap^{-1}$) was observed in 26th Std.week followed by 44 moths $trap^{-1}$ in 25th Std.week. The GLM trap catches were ranged from 0 to10.12 moths $trap^{-1}$ and the highest trap catch was observed in 38th Std.week and 39th Std.week.

Effect of carbon dioxide (CO_2) treatment on the control of storage insect pests and the seed quality indicated that CO_2 concentartion of 20 and above were fatal to C. *serratus* while 10% CO_2 controlled the pest immediately after treatment.

Disease Management

Agricultural Research Station, Kadiri

The antibiotic diacetylphloroglucinol (2,4 DAPG), a product of different isolates of the beneficial bacterium *Pseudomonas fluorescens* was tested in groundnut for its efficacy on disease incidence and yield. Among them, $DAPG^{-2}$ had recorded significantly higher pod yield (2.01 t ha^{-1}) over control and FP-98 but on par with all other consortia. Least incidence of soil borne diseases namely collar rot, dryt root rot and stem rot was recorded with DAPG-2 producing *Psuedomonas flourescens* but found on par with DAPG-4 and FP-86.

Among 60 elite and pre release cultures screened against peanut stem necrosis disease (PSND), under artificial epiphytotics using Parthenium hysterophorus infector border, significantly least incidence (3.3 %) of PSND was recorded in K-2304 SB (FDR). But was at par with K-1811, K-1909 (FDR), K-2195 (DR), K-2281 (FDR), K-2304 SB (FDR), K-2306 SB (FDR), K-2329 SB (HY), ICGV-00005, ICGV-02411, ICGV-03057, ICGV-05097, ICGV-06138, ICGV-06144, ICGV-06145, ICGV-06146, ICGV-06149, ICGV-06150, ICGV-07086, ICGV-14396, ICGV-91284 and Kadiri 6. K-2308 VG (LLS), K-2311 VG (LLS), K-2312 VG (LLS), K-2318 VG (LLS), K-2319 VG (LLS), K-2320 VG (LLS), K-2321 VG (LLS), K-2324 VG (PSND), K-2325 VG (DT), K-2335 VG (LS), K-2336 VG (LS), K-2337 VG (LS), K-2338 VG (LS), K-2339 VG (LS), K-2340 VG (LS) and Kadiri 3.

Evaluation of efficacy of different chemicals against peanut stem necrosis disease (PSND) for 3 years indicated that, significant reduction of PSND and highest pod yield (896 t ha^{-1}) was recorded by treating the seed with imidacloprid 600 FS @ 1 ml kg^{-1} seed (1ml chemical: 6ml water) + foliar spray with imidacloprid 17.8 SL @ 0.3 ml l^{-1} at 20 DAS with highest ICBR of 3.9.

In evaluation of different concentrations of nano zinc oxide particles against PSND in greenhouse condition, maximum incubation period of TSV (local: 6 DPI; Systemic: 12 DPI) coupled with less per cent incidence of PSND (38.0 %) and virus titer (0.14 O.D) at 21 days post inoculation (DPI) was recorded by spraying nano zinc oxide particles @ 1000 ppm and it was at par with spraying nano zinc oxide particles @ 800 ppm and 600 ppm.

Among 70 IVT and AVT stage I genotypes screened against major diseases under natural conditions, the genotype ASK-2017-2 recorded resistant reaction against early leaf spot. Similarly, the genotypes *viz*., ISK-I-2017-8, 14; ASK-2017-2 recorded resistant reaction against rust disease.

Among 63 IVT and AVT stage II genotypes, screened against major diseases under natural conditions, the genotype ASK-I-2016-5 was free from collar rot consistently for two years. Similarly, the genotype ISK-I-2016 was recorded low incidence of PSND consistently for two years.

Studies on development of technologies for management of soil borne diseases of groundnut for 3 years indicated , numerically less incidence of collar rot (2.0 %), dry root rot (3.8 %) and stem rot (3.5 %) with significantly high pod (1.39 t ha^{-1}) and haulm yield (2.28 t ha^{-1}) with ICBR of 5.1 was recorded by summer ploughing with mould board plough + soil application of Trichoderma asperellum @ 4 kg ha^{-1} enriched in 250 kg FYM at sowing + seed treatment with tebuconazole 2 DS @ 1.5 g kg^{-1} seed followed by combination of *Pseudomonas fluorescens* @ 10 g kg^{-1} seed + soil application of Trichoderma asperellum @ 4 kg ha^{-1} enriched in 250 kg FYM at 30 and 60 DAS.

In management of major insect-pest and diseases in groundnut through different IPM modules, significantly less incidence of stem rot (7.7 %), collar rot (0.9%), dry root rot (3.7 %), early leaf spot 45.0 % PDI), rust (26.0 % PDI), less damage of thrips (23.97%), leaf hopper (19.80%), Spodoptera (17.35%), Helicoverpa (13.06 %), leaf miner (11.23%) and high pod (2.41 t ha^{-1}) and haulm yield (3.10 t ha^{-1}) were obtained by seed treatment with Trichoderma asperellum @ 4 g kg^{-1} seed + foliar spray of imidacloprid 17.8 SL @ 0.3 ml l^{-1} at 20-30 DAS + foliar spray of novaluran 10 EC @ 1ml l^{-1} at 50-70 DAS + foliar spray of febuconazole 25.9 EC @ 1.5 ml l^{-1} at 50-70 DAS.

In management of peanut bud necrosis disease, high reduction of both PBND (4.3 %) and thrips damage (38.0 %) and high pod (2.05 t ha^{-1}) and haulm yield (2.46 t ha^{-1}) were recorded by adopting practices of border crop with bajra (4 rows) + seed treatment with imidacloprid 600 FS @ 1 ml kg^{-1} seed + foliar sprays using thiocloprid 480 SC @ 150 ml ha^{-1} at 20 - 25 DAS followed by Fipronil 5 SC @ 2 ml l^{-1} @ 40 DAS and Acetamiprid 20 SP @ 100 g ha^{-1} at 35-40 DAS.

Regional Agricultural Research Station, Tirupati

Among the forty advanced genotypes screened for various diseases, the genotypes *viz.,*TCGS-1838,TCGS-1844,TCGS-1855, TCGS-1857, TCGS-1862,TCGS-1864 recorded low incidence of early leaf spot, TCGS-1838,TCGS-1844,TCGS-1855, TCGS-1857, TCGS-1862,TCGS-1864 recorded low incidence of late leaf spot and TCGS-1838,TCGS-1844, TCGS-1855, TCGS-1857, TCGS-1862,TCGS-1864 recorded low incidence of rust.

In the management of soil borne diseases, adoption of deep summer ploughing with MB plough + soil application of Trichoderma @ 4 kg ha^{-1} enriched in 250 kg FYM ha^{-1} + seed treatment with tebuconazole @ 1.5 g kg^{-1} of seed followed by seed treatment with PGPR @ 625 g ha^{-1} of seed + soil application of Trichoderma @ 4 kg ha^{-1} enriched in 250 kg FYM ha^{-1} at 35 and 80 DAS found effective for the management of soil borne diseases.

Studies on management of foliar diseases revealed that, spraying with combination fungicide of tebuconazole 50 % + trifloxystrobin 25 % WG @ 1.32 g l^{-1} (0.035%) at 40 and 65DAS was found effective in controlling of early leaf spot and rust.

Among the forty genotypes screened for viral diseases during *rabi* season, the genotypes TCGS-1426, TCGS-1517, TCGS-1544, TCGS-1809, TCGS-1844, TCGS-1862, TCGS-1864 have recorded lowest incidence of PSND and PBND.

Among the three different Modules evaluated for the management of PBND and PSND, Module.II i.e., border crop with bajra (4 rows) + seed treatment with Gaucho 600 FS @ 1 ml kg^{-1} of seed + foliar of thiocloprid 480 SC @ 0.3 ml l^{-1} at 20-25 DAS followed by fironil 5 SC @ 1 ml l^{-1} @ 40 DAS and acetamaprid 20SP @ 0.2 g l^{-1} at 60 DAS recorded lowest incidence of PSND (6.1%) which was on par with Module.I and signicantly superior over Module.III.

Agricultural Research Station, Vizianagaram

Survey was conducted in farmers fields of Vizianagaram, Srikakulam and Visakhapatnamm districts monitoring of major diseases of groundnut in which early leaf spot (ELS) was observed from 30 DAS. In case of late leaf spot (LLS), except Kottavalasa, Vizianagaram district there was no incidence of LLS at 30 DAS.

In management of major foliar diseases of groundnut, significantly less PDI of early and late leaf spot were recorded in Tebuconazole 50% + trifloxystrobin 25% WG @ 1.32 g l^{-1} (0.035%) at 40 and 65 DAS followed by Tebuconazole @ 1 ml l^{-1} (0.0259%) at 40 and 65 DAS and Pyraclostrobin 5% + Metiram 55% WG @ 2 g l^{-1} (0.12%) at 40 and 65 DAS. Significantly less PDI of rust was recorded in carbendazim 12% + mancozeb 63% @ 2 g l^{-1} at 40 and 65 DAS and significantly highest pod and haulm yield was recorded in tebuconazole 50% + trifloxystrobin 25% WG @ 1.32 g l^{-1} (0.035%) at 40 and 65 DAS and highest ICBR ratio (30.05) was obtained in tebuconazole 2 DS @ 1.5 g kg^{-1} seed followed by Carbendazim 12% + Mancozeb 63% @ 2 g l^{-1} at 40 and 65 DAS (29.74).

Development of technologies for management of soil borne diseases of groundnut for 3 years indicated , significantly less incidence of stem rot (1.35 %), with significantly high pod

(1670t ha^{-1}) and haulm yield (1914 t ha^{-1}) was recorded by deep summer ploughing with mould board plough + soil application of *Trichoderma* @ 4 kg ha^{-1} enriched in 250 kg FYM ha^{-1} + seed treatment with tebuconazole 2DS 1.5 g kg^{-1} seed followed by PGPR @ 625 g ha^{-1} of seed + soil application of *Trichoderma* @ 4 kg ha^{-1} enriched in 250 kg FYM ha^{-1} at 35 and 70 DAS + seed treatment with tebuconazole 2 DS @ 1.5 g kg^{-1} seed.

3.2 Sunflower

Crop Improvement

Regional Agricultural Research Station, Nandyal

In advance hybrid trial during *kharif* 2017, the entries SH 2379 (2.14 t ha^{-1}) and SH 2380 (2.02 t ha^{-1}) recorded significantly higher seed yield with 35.68 % and 28.51 % higher than the check NDSH 1012 (1.58 t ha^{-1}) respectively.

In *rabi* 2017-18, the entries, SH 2199 (2.43 t ha^{-1}) and SH 2227 (2.40 t ha^{-1}) recorded significantly higher seed yield with 25.25 % and 24.0 % increae over the check NDSH 1012 (1.98 t ha^{-1}) in Advance hybrid trial.

Crop Production

Regional Agricultural Research Station, Nandyal

Broad bed and furrow, paired row spacing (45 x 30 cm) method during *Kharif* recorded higher sunflower grain yield of 1.65 t ha^{-1} compared to flat bed (60 x 30 cm) method of planting (0.87 t ha^{-1}).

Under technology validation programme in sunflower cropping system, soil test based fertilizers along with blackgram crop mulching and application of *Trichoderma viride* recorded higher grain yield of 1.76 t ha^{-1} in comparision with site specific application of NPK+ Sulphur + Zinc (1.70 t ha^{-1}).

Soil and water conservation practices, ridge and furrow method of planting, thinning, boron spray @ 0.2% at sunflower ray floret stage as good agricultural practices, recorded higher seed yield (2.13 t ha^{-1}) than farmers, practice (1.65 t ha^{-1}).

Pest Management

In sunflower, spraying of fipronil 5 SC @ 2.0 ml l^{-1} effectively controlled jassids with 93.98 percent reduction of population over control and was on par with flonicamide 50 WG @ 0.3 g l^{-1}, acephate 75 SP @ 1.5 g l^{-1}, trizophos 40 EC @ 2 ml l^{-1} and acetamprid 20 SP @ 0, 2 g l^{-1} with 91.67, 89.07, 86.54 and 81.44 percent reduction in thrips popualtion, respectively.

Whitefly population was effectively controlled with diafenthiuron 50WP @ 1.25 g. There was 75.29 percent reduction of population over control followed by flonicamide 50 WG @ 0.3 g l^{-1} (70.2), spiromesifem 240 SC @ 0.3 ml l^{-1} (66.29) and trizophos 40 Ec @ 2.0 ml l^{-1} (58.47) in sunflower.

Disease Management

Regional Agricultural Research Station, Nandyal

Percent disease index of *Alternaria* leaf spot was more in September 1st FN sown crop compared with July 2nd FN and August 1st FN sown crop in sunflower crop sown during *kharif*.

Seed treatment with carbendazim 12% + mancozeb 63% WP @ 2 g kg^{-1} seed followed by two foliar sprays with trifloxystrobin 25% + tebuconazole 50% (Nativo 75WG) @ 0.25 g l^{-1} had effectively reduced Alternaria leaf spot disease (47.05%) over control.

Management of virus disease with new insecticides during *rabi*, revealed that seed treatment with imidachloprid 600FS @ 5 ml kg^{-1}, seed and foliar spray with triazophos 40 EC @ 2 ml l^{-1} at 30, 45 and 60 days after sowing and also seed treatment with imidacloprid 600 FS @ 5 ml kg^{-1} seed + foliar spray with diafenthiuron 50 wp @ 1.25 gm l^{-1} at 30, 45 and 60 days after sowing and seed treatment with imidacloprid 600 FS @ 5 ml kg^{-1} seed + foliar spray with flonicamid 50WG @ 0.25 g l^{-1} at 30, 45 and 60 days after sowing, were effective in managing the disease.

3.3 Sesamum

Crop Improvement

Agricultural Research Station, Yelamanchili

During *Kharif* 2017, out of seven entries tested against the check YLM-66 in Multi Location Trial, the entry YLM-146 registered significantly superior yield (0.78 t ha^{-1}) compared to the check, YLM-66 (0.68 t ha^{-1}). The culture YLM-146 recorded 88 days duration while the check matured in 87 days.

In Multi Location Trial during rabi, 2017, out of seven entries tested against the check YLM-66, the entry YLM-146 (0.83 t ha^{-1}) was found significantly superior to the check YLM-66 (0.63 t ha^{-1}) in respect of seed yield.

Compiled data of seed yield from 3 centres (ARS Utukur, ARS Amudalavalasa & ARS Ragolu), indicated that, the entries YLM-142 (1.02 t ha^{-1}) and YLM-146 (1.03 t ha^{-1}) had recorded higher seed yield compared to the check YLM-66 (0.93 t ha^{-1}).

In Advanced Varietal Trial (White Seed),during *Kharif,* 2017, out of nine entries tested against white seeded national check TKG-22 and local check YLM-66, the entries YLM-151 (MT.10.23.3) (0.62 t ha^{-1}), YLM-153 (PT-10) (0.54 t ha^{-1}) and YLM-154 (LT-10) (0.52 t ha^{-1}) were found significantly superior in yield to the national check TKG -22 (0.43 t ha^{-1}) but not to the local check YLM-66 (0.64 t ha^{-1}).

During *rabi,* 2017, out of nine entries tested against the white seeded national check TKG-22 and brown seeded local check YLM-66, the entries YLMW-152 (0.61 t ha^{-1}), YLMW-153 (0.58 t ha^{-1}) & YLMW-149 (0.51 t ha^{-1}) were found significantly superior to the national check TKG-22 (0.41 t ha^{-1}) in respect of seed yield. However, none of the entries were found significantly superior to the brown seeded local check YLM-66.

Morphological characterization of sesame germplasm comprising of 109 entries was studied for 20 characters. Among the entries, VZM-15 (7.07 g), SKL-1 (6.12 g), VZM-12 (6.08 g) recorded highest yield per plant, despite the incidence of *Macrophomina* wilt.

Agricultural Research Station, Utukur

In Multi Location Trial during *rabi,*2017-18, out of eight entries tested, only one entry YLM 142 (2.16 t ha^{-1}) recorded higher seed yield against the best check YLM 66 (1.70 t ha^{-1}).

Crop Production

Agricultural Research Station, Yelamanchili

Results on effect of sulphur on seed yield and oil content during *rabi,* 2017-18 showed that, application of sulphur at 45 kg ha^{-1} through gypsum recorded significantly higher seed yield (0.59 t ha^{-1}), higher net returns (Rs. 33,693) and B: C ratio (2.49).

Among the different organic sources tested, application of farm yard manure @ 10 t ha^{-1} recorded significantly higher seed yield (3.56 t ha^{-1}) followed by press mud cake @ 12.5 t ha^{-1}. Among the different nitrogen levels, application of 150 % recommended dose of nitrogen (RDN) gave significantly higher seed yield (3.75 t ha^{-1}) than at lower levels. However, it was at par with application of 125 % RDN. Among all the organic sources, the highest gross (Rs. 31,690) and net returns (Rs. 11,390) were obtained with application of FYM 10 t ha^{-1} + 150 % RDN. However, the highest BCR (2.01) was recorded under application of press mud cake @ 12.5 t ha^{-1} + 125 % RDN.

Sequential application of pre and post emergence herbicides for weed management revealed that, two hand weedings at 15 and 30 DAS significantly reduced weed population and weed dry weight at 30 & 50 DAS over rest of the treatments and it was on par with pendimethalin @ 0.5 kg a.i ha^{-1} and quizalofop-ethyl @ 40 g a.i ha^{-1} at 20 DAS.

In organic farming studies of sesamum, the inorganic plot recorded more seed yield (0.59 t ha^{-1}) than the organic plot (0.44 t ha^{-1}).

The results of foliar nutrition on growth, yield and quality of rainfed sesame revealed that 100% RDF + Urea @ 2 % foliar spray at flowering and capsule formation resulted in more plant height (100.1 cm), higher number of branches $plant^{-1}$ (4.97), higher number of capsules $plant^{-1}$(96.2) and also higher yield (0.59 t ha^{-1}) with higher BC ratio (2.43).

Agricultural Research Station, Reddipalli

Seed yield of sesame was significantly influenced by dates of sowing only. Highest seed yield was recorded (1.43 t ha^{-1}) with November 1^{st} sowing followed by October 16^{th} date of sowing (1.26 t ha^{-1}). Sesame can be taken up from October 16^{th} to November 16^{th} or onJanuary 1^{st} to record higher productivity and returns of sesame.

Water use efficiency of sesame was maximum with January 1^{st} date of sowing and lowest water use efficiency was recorded with December 1^{st} date of sowing.

Crop Protection

Pest Management

Agricultural Research Station, Yelamanchili

In studies on seasonal incidence of insect pests of sesame in relation to biotic and abiotic factors, peak incidence of thrips observed at 8^{th} std week, leaf hoppers at 11^{th} std week, whiteflies at 12^{th} std week and aphids at 12^{th} std week.

Disease Management

Agricultural Research Station, Yelamanchili

In *rabi*, 2017-18, out of eight treatments tested compared with the control, seed treatment with Th4dsc @ 2 ml kg^{-1}), resulted in less incidence of macrophomina root rot disease followed by carbendizum + mancozeb-2 g Kg^{-1}, but the yield recorded was low in both the treatments 0.72 t ha^{-1} and 0.67 t ha^{-1} respectively.

Agricultural Research Station, Darsi

The experimental results of influence of sowing dates and insecticide spray on the incidence of phyllody and vector leaf hopper indicated that, spraying alone had no significant effect on the incidence of phyllody infestation. Whereas, date of sowing had significant effect on the incidence of phyllody. Early date of sowing (Dec 15^{th}) coupled with spraying recorded low leafhopper population (0.49 hoppers $leaf^{-1}$) with no disease incidence and higher seed yield of 0.31 t ha^{-1} compared to last date of sowing (Feb 17^{th}) without insecticide spray (1.63 hoppers $leaf^{-1}$, 1.91% disease incidence and 0.14 t ha^{-1} yield).

3.4 Castor

Crop Improvement

Agricultural Research Station, Anantapuramu

During *Kharif* 2017, eighteen castor entries (IVHT) were evaluated in Initial Varietal/ Hybrid Trial for seed yield. Out of them the entry IVHT-8 (0.73 t ha^{-1}) recorded significantly higher yield followed by IVHT -2 (0.68 t ha^{-1}) and IVHT-12 (0.66 t ha^{-1}).

Among 9 + 1 entries evaluated in Castor Advanced Varietal / Hybrid Trial, the entry AVHT-7 recorded significantly higher (0.64 t ha^{-1}) seed yield compared to check PCH-111 (0.54 t ha^{-1}).

Mustard

Agricultural Research Station, Reddipalli

Seed yield of mustard was significantly influenced by dates of sowing. The sowings beyond November 16th significantly reduced the seed yield. Significantly higher seed yield was obtained with November 1st sowing date. The study proved that mustard sowing between October 16th to November 16th results in higher productivity. Benefit cost ratio was higher (4.33) with October 16th sowing.

Biofumigation of mustard reduced the viability of *R. solani* and viability decreased as the dose of biofumigant increased under greenhouse conditions. Mustard crop incorporation to soil @ 180 g was the best in reducing viability of *Rhizoctonia solani* population after 3 days (72.33) and 50 days (69.67).

4. Commercial Crops

4.1 Cotton

Crop Improvement

Regional Agricultural Research Station, Lam

The entry HS298 tested under Bro 3(a) PVT was found to be promising with highest seed cotton yield of 2.31 t ha^{-1} with highest number of bolls per plant (52).

Out of six entries under Bro 4(a) CVT, the genotypes Sakthi Sulan (2.24 t ha^{-1}) and BGDS1033 (1.98 t ha^{-1}) recorded significantly superior seed cotton yield ha^{-1} compared to Suraj (Zonal check) which recorded seed cotton yield of 1.71 t ha^{-1}.

The hybrids tested under Br. 05 (a) CHT, *viz*., RAHH1702 (2.68 t ha^{-1}) recorded highest seed cotton yield ha^{-1} followed by SHH818 (2.66 t ha^{-1}), RAHH1701 (2.52 t ha^{-1}) and KSCH 115(2.18 t ha^{-1}). The hybrid RAHH 1702 also recorded highest lint yield of 1000 ha^{-1}.

Inter-specific cotton hybrids *viz*., RHB1002 (2.92 t ha^{-1}) and DHB1701 (2.70 t ha^{-1}) and 536 (3.14 t ha^{-1}) tested under Br. 15 (a) Preliminary Hybrid Trial were found significantly superior to check hybrid Phule Dhara (2.19 t ha^{-1}).

Out of ten inter-specific cotton hybrids, tested under Br. 15 (a) Co-ordinated Hybrid Trial, DHB 1501 (1.73 t ha^{-1}) followed by LAHB1(1.67 t ha^{-1}) recorded significantly superior performance while the check recorded 1.48 t ha^{-1}.

Out of 10 entries tested under Br.06 (a) Preliminary Evaluation Trial of Compact Genotypes, LHDP1 (1.79 t ha^{-1}) followed by GISV 298 (1.68 t ha^{-1}) and RAHC 1017 (1.62 t ha^{-1}) recorded significantly superior seed cotton yield, while the check entry NDLH 1938 recorded 1.33 t ha^{-1}.

Seven out of nine entries tested under Advanced Yield Trial, the entries *viz.,* L 1533 (2.10 t ha^{-1}), L 1536 (1.90 t ha^{-1}), L 1515 (1.88 t ha^{-1}) followed by L 1539 (1.86 t ha^{-1}) recorded significant yield over the checks NDLH 1938 (1.42 t ha^{-1}) and L 604 (1.27 t ha^{-1}).

Four out of 12 entries *viz*., L 1384 (2.09 t ha^{-1}), L 1534 (1.96 t ha^{-1}), NDLH 2051^{-1} (1.93 t ha^{-1}) and L 1516 (1.81 t ha^{-1}) tested under Multi Location Varietal Trial, recorded significant yield over the checks NDLH 1938 (1.39 t ha^{-1}), NA 1325 (1.29 t ha^{-1}) and L 604 (1.21 t ha^{-1}).

Three entries, 222 BGI (1.81 t ha^{-1}), LHDP 1 (1.79 t ha^{-1}) and LHDP 2 (1.74 t ha^{-1}) out of six entries tested under Multi Location Varietal Trial (HDP) recorded significant yield over the checks NDLH 1938 (1.01 t ha^{-1}) and Jadoo BGII (1.37 t ha^{-1}).

Out of 27 hybrids tested, SCS 1207 x DB 11 (3.57 t ha^{-1}), CNH 292 x DB 11 (3.47 t ha^{-1}), PBH 13 x DB 11 (3.40 t ha^{-1}), CNH 292 x CCB 51 (3.31 t ha^{-1}), Sakthisulan x RHCB 104 (3.12 t ha^{-1}) followed by PBH 13 x CCB 51 (3.07 t ha^{-1}) recorded higher seed cotton yield than the check hybrid Bahubali (2.98 t ha^{-1}).

Regional Agricultural Research Station, Nandyal

Among the 19 entries tested in Preliminary varietal trial, the entries NDLH-2050-2 (2.04 t ha^{-1}) followed by NDLH - 2056- 4 (1.90 t ha^{-1}) and NDLH - 2057- 1 (1.80 t ha^{-1}) recorded significant seed cotton yield over the check, Sri Rama (0.75 t ha^{-1}).

In Advanced varietal, trial 11 entries were tested against the check Sri Rama, the seed entries i.e. NDLH-2051^{-1} (2.08 t ha^{-1}) followed by NDLH -2051-3 (2.01 t ha^{-1}) and NDLH -2035-5 (1.92 t ha^{-1}) recorded significantly high yield compared to the check Sri Rama (0.95 t ha^{-1}).

In Multi-location Varietal trial of *G. hirsutum* cotton, 15 varieties were tested from different centers of ANGRAU. Among the entries tested, the entry NDLH-2005-4 (1.53 t ha^{-1}) recorded highest seed cotton yield followed by NDLH-2051^{-1} (1.38 t ha^{-1}) and L^{-1}532 (1.38 t ha^{-1}) compared to check Sri Rama (1.160 t ha^{-1}). The yield differences were found to be significant.

In Multi-location trial (HDPS) of *G. hirsutum* cotton, out of 8 varieties tested from different centers of ANGRAU, the entry Jaadoo BG II (2.44 t ha^{-1}) recorded significantly highest seed cotton yield followed by 222 BGI (2.43 t ha^{-1}) and LHDP 1 (0.19 t ha^{-1}) compared to check Sri Rama (0.95 t ha^{-1}).

During the year 2017 – 18, a total of 426 germplasm lines of *G.hirsutum* cotton were maintained and promising entries were utilized in hybridization.

In Preliminary varietal trial nine entries were studied along with check yaganti. Among the entries tested three entries are found statistically significant i.e., NDLA –3116-3 (0.16 t ha^{-1}), NDLA –3111-5 (1511 t ha^{-1}) and NDLA – 3111 (1.39 t ha^{-1}) were found statistically significant in respect of seed cotton yield over local check yaganti (1.04 t ha^{-1}).

In Advanced varietal trial, among twelve entries studied along with check yaganti, the entries i.e., NDLA-3113 (1.47 t ha^{-1}), NDLA – 3116-4 (1.37 t ha^{-1}) and NDLA – 3115-2 (1.23 t ha^{-1}) recorded significantly higher seed cotton yield over local check yaganti (0.76 kg ha^{-1}).

In Advance Hybrid Trial, eighteen hybrids were tested against the check NDLHH-240. Among the hybrids, the hybrid NDLHH-481 (1.95 t ha^{-1} followed by NDLHH – 461 (1.59 t ha^{-1}) and NDLHH – 486 (1.57 t ha^{-1}) registered significantly highest yield compared to the check NDLHH – 240 (0.80 t ha^{-1}).

In Multi-location Hybrid trial of *G. hirsutum* cotton, seven hybrids were tested from different centers of ANGRAU. Among the entries tested, ATM BG II (1.09 t ha^{-1}) recorded highest seed cotton yield followed by RACH BG II (0.92 t ha^{-1}) and LAHH-31 (0.82 t ha^{-1}) compared to General mean (0.71 t ha^{-1}). The yield differences were found to be significant.

Among seven colour cotton entries (G.h)(RF) tested, the local check Sri Rama (0.96 t ha^{-1}) recorded highest seed cotton yield followed by 16301DB (0.84 t ha^{-1}), and LHCC-2 (0.76 t ha^{-1}).

Out of eight colour cotton (G.a) (RF) entries evaluated, highest cotton yield was recorded by 16378 LB-A (0.66 t ha^{-1}) followed by Zonal check DLSa 17 (0.60 t ha^{-1}) compared to local check Yaganti (0.57 t ha^{-1}).

Crop Production

Regional Agricultural Research Station, Lam

Agronomic evaluation of pre released hirsutum cotton varieties (AICCIP) indicated that significantly superior seed cotton yield was recorded in TSH04/115 (3.07 t ha^{-1}) and HS 292 (2.86 t ha^{-1}) compared to CCH-13-2 (1.30 t ha^{-1}). Application of fertilizers at 125% RDF recorded significantly higher seed cotton yield and was on a par with 150% RDF.

In agronomic evaluation of pre released hirsutum cotton hybrids (AICCIP), the entry SHH 818 (3.45 t ha^{-1}) recorded highest seed cotton yield followed by RHH 1007 (3.11 t ha^{-1}) and lowest was recorded in BGDHH 821 (1.67 t ha^{-1}).

Among 24 Bt cotton varieties (G.hirsutum) evaluated under HDPS with popular BG II hybrid Jaadoo as check with normal spacing, the entries 219 (3.56 t ha^{-1}),222 (3.34 t ha^{-1}) recorded significantly superior yield over the check entry Jaadoo (2.76 t ha^{-1}).

Out of 12 Arboreum cotton varieties (*G.arboreum*) under HDPS evaluation with popular BG II hybrid Jaadoo as check with normal spacing, the entries Phule Dhanwantari (4.28 t ha^{-1}), PA 528 (4.09 t ha^{-1}) and PA 255 (3.96 t ha^{-1}) recorded similar yield with check entry Jaadoo (4.01 t ha^{-1}).

Under organic cotton production, highest seed cotton yield of 2.21 t ha^{-1} and 2.17 t ha^{-1} was recorded with recommended dose (RD) of nutrient through organic based P equivalent and RD of nutrient through organic based N equivalent respectively and was on par with raising of sunhemp in rows and incorporated before flowering.

Regional Agricultural Research Station, Nandyal

Compact culture (ANGC 1452) under High Density Planting System registered high cotton yield (2.95 t ha^{-1}) compared to normal planting with 60 cm x 10 cm spacing which was found on par with 60 cm x 15 cm (2.92 t ha^{-1}) and 45 cm x 10 cm (2.57 t ha^{-1}).

Application of glyphosate @ 5 ml l^{-1} as directed spray at 2 - 4 weed leaf stage along with one hoeing recorded higher yield (2.78 t ha^{-1}) compared to other chemical methods (0.22 t ha^{-1}).

Studies on enhancing nitrogen use efficiency in Bt cotton resulted in higher seed cotton yield (3.33 t ha^{-1}) with 100 % RDN (band application of neem coated urea in two splits at basal and flowering) and on par with 75 % RDN (2.89 t ha^{-1}).

In vertisols, highest seed cotton yield of 2.57 t ha^{-1} was recorded with 150% RDF + FYM @ 5 t ha^{-1} + Gypsum @ 500 kg ha^{-1} + $ZnSO_4$ @ 50 kg ha^{-1} followed by 150 % RDF + FYM @ 5 t ha^{-1} (2.52 t ha^{-1}) in long-term fertilizer application compared to control (1.23 t ha^{-1})

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Lam

Eleven *hirsutum* varieties out of 123 entries tested under different national trials for resistance to insect pests under unprotected conditions were found resistant to jassids along with higher yield.

Under advanced screening, the entries *viz*., NDLH 2010, RAH 1070 and TSH 0499 were found tolerant to jassids with grade I and II.

Among the various insect pests recorded on cotton, leafhopper was the major pest and above ETL during the major part of the crop growth period. Severe incidence of pink bollworm was observed (4 to 75.2 larvae^{-20} green bolls).Peak incidence was observed during 51st standard week (3rd week of December).

Bioefficacy of insecticides against cotton pest complex revealed that spinetoram 10% + sulfoxaflor 30% WG @ 120 g ai ha^{-1} recorded significantly lowest jassid population per three leaves (3.80) over control (10.13) and other treatments except spinetoram 10% + sulfoxaflor 30% WG @ 140 g a.i ha^{-1}and sulfoxaflor 24% SC @ 105 g a.i ha^{-1}.

Evaluation of pheromone traps for monitoring purpose of pink bollworm, clearly indicated that the sleeve traps performed better than delta traps and funnel trap for trapping the adult moths. Among the two trap densities, the trap density of 8 traps/ acre^{-1} is most effective for monitoring of pink bollworm.

Application of cypermethrin 25 EC, bifenthrin10 EC, profenophos 50 EC, thiodicarb 75 WP and quinolphos 25 EC recorded lowest open locule damage by pink bollworm and superior to rest of the treatments and also recorded highest yield in cypermethrin 25 EC bifenthrin 10 EC , profenophos 40 EC and thiodicarb 75 WP.

Maximum per cent reduction of 35% over control was recorded in acephate 75% SP @ 1.5 g l^{-1} treated plot for jassids. Lowest incidence of whitefly was recorded in the water spray treated plot and it was on par with *neemastra* 20 ml l^{-1}, NSKE 5% and *agniastra* 20 ml l^{-1} in cow based organics evaluation against pest complex of cotton.

Regional Agricultural Research Station, Nandyal

Under normal planting, leafhoppers population attained peak during September first week (22.60 leafhoppers leaves^{-3}) and September last week (22.90 leaves^{-3}). Pink bollworm moth catches had crossed ETL from November first fortnight onwards and continued to be above ETL till end of the crop.

Leafhoppers population was peak during August first fortnight (16.20 leafhoppers leaves-3), whereas pink bollworm moth catches were above ETL from November second fortnight and continued to be above ETL till end of the crop in high density planting.

Among several new chemicals tested, spinetoram + sulfoxaflor @ 350 ml ha^{-1}, sulfoxaflor @ 437.5 ml ha^{-1}, pymetrozine @ 300 g ha^{-1}, flonicamid @ 150 g ha^{-1}and dinotefuron @ 150 g ha^{-1} have controlled leafhoppers effectively.

Disease Management

Regional Agricultural Research Station, Lam

Alernaria leaf spot, grey mildew and rust were major diseases during *kharif*, 2017.

Minimum temperature, morning RH, number of rainy days and evaporation significantly influenced the progress and intensity of Alernaria leaf spot causing variability to the tune of 80%.

Minimum temperature, morning RH, evaporation and wind speed significantly influenced the progress and intensity of grey mildew causing variability up to 98%.

Minimum temperature, wind speed, and evaporation significantly influenced the progress and intensity of rust causing variability to an extent of 98%.

The incidence of tobacco streak virus disease in different Bt cotton hybrids varied from 0% to 0.88% in farmers' fields.

Compatibility studies (2015-17) revealed that seed treatment fungicides *viz*., thiram @ 3g kg^{-1}, carbendazim @ 2g kg^{-1}, streptocyclin @ 100 ppm, trifloxystrobin @ 1 ml kg^{-1}, captan @ 3g kg^{-1}, carboxin @ 2g kg^{-1}, mancozeb @ 3g kg^{-1}and penflufen @ 2 ml kg^{-1} were compatible with imidacloprid treatment of Bt cotton seed in terms of germination, seedling vigour without phytotoxicity. All the fungicides effectively reduced Alernaria leaf spot at seedling stage without sucking pest incidence up to 28 days.

Intensity of Alernaria leaf spot, grey mildew and rust intensity was relatively more in ZBNF than that in ICM package.

4.2 Mesta

Crop Improvement

Agricultural Research Station, Amadalavalasa

Fifty accessions were evaluated during *kharif*, 2017 including two check varieties. Four accessions *viz*., RIN-21 (9.73 g), RIN-20 (9.13 g), RIN-9 (8.80 g) and RIN-18 (8.40 g) recorded fibre yield more than 8 g plant^{-1} and were significantly superior over the best check AMV-5 (5.40).

In Preliminary Yield Trial (*Hibiscus sabdariffa* L.) eleven entries were evaluated during *kharif*, 2017 including two check varieties. Among them, the entries *viz*., AHS-321 (2.25 t ha^{-1}), AHS-319 (1.94 t ha^{-1}) and AHS-311 (1.85 t ha^{-1}) were significantly superior over the other entries and the check varieties AMV-5 (1.50 t ha^{-1}) and HS 4288 (1.43 t ha^{-1}).

Seven entries were evaluated during *kharif*, 2017 including two check varieties in the Initial Evaluation Trial with roselle for calyx. Among them, the entries AHC-2 (1.10 t ha^{-1}), AHC-1 (1.07 t ha^{-1}), HSLC-1 (0.93 t ha^{-1}) and HSLC-2 (0.88 t ha^{-1}) were found to be on par with each other and highly significant over the best check variety, AMV-5 (0.32 t ha^{-1}).

Among six entries evaluated during *kharif*, 2017 including two check varieties in the Advanced Varietal Trial - I of *Hibiscus sabdariffa* L, the entries, viz., JRHS-5 (1.32 t ha^{-1}) and AHS-286 (1.19 t ha^{-1}) had reorded significantly superior yield over the other entries and the best check variety HS-4288 (0.90 t ha^{-1}).

In Advanced Varietal Trial - II (*Hibiscus sabdariffa* L.), out of five entries evaluated during *kharif*, 2017 including two check varieties, the entry JRR-2014-1 (1.55 t ha^{-1}) was found to be highly significant over all the other entries including check varieties.

Six entries were evaluated during *kharif*, 2017 including two checks in Advanced Varietal Trial – I (*Hibiscus cannabinus* L.) and found no significant difference between the entries, whereas, the check variety, AMC-108 (1.81 t ha^{-1}) recorded high fibre yield.

In Advanced Varietal Trial - II (*Hibiscus cannabinus* L.) five entries were evaluated during *kharif*, 2017 including two check varieties and among them, the check entry HC-583 (1.67 t ha^{-1}) recorded numerically high fibre yield over the other entries.

Crop Production

Agricultural Research Station, Amadalavalasa

Integrated weed management in Mesta revealed that application of pretilachlore 50 EC @ 900 ml ha^{-1} with one hand weeding recorded highest mesta fibre yield along with maximum weed control and was on par with two hand weedings treatment and significantly superior over all other treatments.

The results of performance of new roselle genotypes under different fertilizer management schedule revealed that the entry HS 255 recorded significantly higher fibre yield (1.54 t ha^{-1}) over other genotypes and check.

The study on the effect of sowing time and spacing of Kenaf on seed yield as influenced by topping management practices revealed that sowing kenaf on 1st july recorded significantly higher number of yield attributes and seed yield (0.72 t ha^{-1}) over other dates of sowing and a decline trend in seed yield was observed with further delay in sowing of the crop. Higher seed yield recorded with 45 x 10 cm spacing (0.82 t ha^{-1}) and topping at 45 DAS recorded (0.57 t ha^{-1}).

Observational trial conducted on mesta mechanisation revealed that total mechanization i.e., sowing with seed drill, weed management with Pretilachlore followed by nail weeder and harvesting with reaper recorded higher B:C ratio when compared to farmers, practice and recommended practice.

Among new Mesta (Kenaf) varieties, JRK 2013-2 recorded highest fibre yield (3.64 q ha^{-1}) at higher fertilizers level (80:40:40 kg ha^{-1} NPK) followed by check varieties HC 583 (3.02 t ha^{-1}) and AMC 108 (2.94 t ha^{-1}).

Among the varieties, JRS – 2013 - 14 recorded highest fibre yield 9.57 t ha^{-1} followed by SANAI-12 (0.79 t ha^{-1}) at fertilizer level 20: 60: 60 (N: P: K, kg ha^{-1}) and it was found to be superior to other varieties at all fertilizer levels. Successive increase in fertilizer levels from 0:0:0 kg ha^{-1} (N: P: K) to 20:60:60 kg ha^{-1} (N: P: K) resulted in successive increase in fibre yield in all three varieties.

In Mesta based inter cropping system, Mesta + Maize sown at 2:1 ratio recorded highest equivalent fibre yield 9.0 t ha^{-1}followed by Mesta + cluster bean at 3:4 ratio (2.78 t ha^{-1}) compared to Sole mesta recorded equivalent fibre yield of 2.57 t ha^{-1}.

Effect of different sourses of manures on mesta yield revealed that, application of poultry manure @ 3 t ha^{-1} recorded fibre yield of 1.74 t ha^{-1}, which is on par with RDF. Highest seed yield (0.53 t ha^{-1}) was recorded with application of Vermicompost @ 5 t ha^{-1}.

Crop Protection

Insect Pest Management

Agricultural Research Station, Amadalavalasa

Among 48 *Hibiscus sabdariffa* germplasm accessions screened against insect pests incidence, entries AS-80-12 and R-107 against aphids (0%), AR-16, AR-20, ER-47 and R-16 against whiteflies (0.10 to 0.20 No./top 3 leaves), AR-46 against mealybug (0.29% incidence) and R-77, R-88, R-96 and R-191 against semiloopers (< 3% leaf damage) were found tolerant. According to scale, 34 entries were found resistant against leafhoppers.

Among the six entries tested in AVT-I, JRHS-5 was tolerant to aphids, leaf hoppers and whiteflies with highest fiber yield of 1.32 t ha^{-1}.

Among the five entries tested in AVT-II, significantly low infestation of mealybug (0.68%) and semilooper (16.39 % leaf damage) recorded in check variety (HS-4288). However, highest (1.55 t ha^{-1}) fiber yield was recorded in JRR-2014-15 variety.

Management of mesta sucking pests through eco-friendly insecticides revealed that NSKE 5%, Azadirachtin (1500 ppm) @ 5 ml l^{-1} and *Lecanicillium lecani* @ 6 g l^{-1} were found significantly superior over control by recording lowest population of sucking pests and were on par with each other.

Appication of FYM @ 10 t ha^{-1}, vermicompost @ 5 t ha^{-1}, neem cake @ 1.5 t ha^{-1}, poultry manure @ 3 t ha^{-1}, bio-char @ 5 t ha^{-1} recorded significantly lowest population of aphids (3.71 to 5.66 No plant^{-1}), leaf hoppers (0.16 to 0.27 No plant^{-1}) and mealybug (0.31 to 0.70 per cent) compared to RDF (60N:30P:30K) and were on par with each other. Application of RDF (60N:30P:30K) recorded significantly highest fiber yield of 1.92 t ha^{-1} followed by poultry manure @ 3 t ha^{-1} (1.74 t ha^{-1}) and biochar @ 5 t ha^{-1} (1.71 t ha^{-1}) and were on par with each other.

Disease Management

Agricultural Research Station, Amadalavalasa

Six advanced varieties in AVT-I were tested for foot and stem rot disease incidence. Among them, the tested varieties, JRHS-5 and AHS-303 were found with least incidence of disease (35.8% and 37.2%) and gave high fibre yield of 13.17 q ha^{-1} and 11.50 q ha^{-1} respectively compared to check variety, AMV 5, where in disease incidence was 61.6%

Among the five advanced varieties in AVT-II tested for foot and stem rot disease incidence, the entry JRR 2014-15 performance was good with least disease incidence of 23.4% (moderately susceptible) coupled with high fibre yield (15.47 q ha^{-1}) compared to the check variety, AMV 5 (57.3%).

Seasonal incidence of major diseases of mesta revealed that, foot and stem rot disease was noticed from 37th standard week with 4.0% incidence. However, peak incidence of disease was noticed during 43rd standard week (65.2%). Correlation studies indicated that minimum temperature was negatively correlated (-0.949) and morning relative humidity was positively correlated (0.805) with foot and stem rot disease.

4.3 Sugarcane

Crop Improvement

Regional Agricultural Research Station, Anakapalle

A total of 207 selections were done under seedling nursery based on desirable morphological characters, HR brix percent, cane length, cane diameter and single cane weight. Maximum number of genotypes were selected in Co8371 X CoH70 (56), CoS87216 X CoH70 (21), Co89036 X CoS88216 (19) CoA11324 X Co62198 (11) and BO91 X Co62198 (11).

Six promising clones were evaluated in comparison with two standards under Main Yield Trial (Early). Clone 2013A102 recorded significantly superior cane yield (134.66 t ha^{-1}), CCS yield (18.51 t ha^{-1}) and jaggery yield (15.56 t ha^{-1}) followed by 2013 A177 (131.00 t ha^{-1}, 18.88 t ha^{-1} and 15.50 t ha^{-1} respectively) and were found to be significantly superior over the best standard 87 A 298 (126.00 t ha^{-1}, 17.87 t ha^{-1} and 14.88 t ha^{-1} respectively.

Six clones were studied against three standards under Main Yield Trial (Early) - II Plant crop, out of which the clone 2012A145 had significantly out yielded the best standard and recorded maximum cane yield (139.66 t ha^{-1}), CCS yield (18.44 t ha^{-1}) and jaggery yield (16.00 t ha^{-1}) and was found to be significantly superior over the best standard 2003V46 (126.00 t ha^{-1}, 17.52 t ha^{-1} and 14.00 t ha^{-1} respectively.

Under Main Yield Trial (Early) - Ratoon crop, six clones were tested against three standards, out of which the clone 2012A279 recorded maximum cane yield (114.97 t ha^{-1}) CCS yield

(14.40 t ha^{-1}) and juice sucrose per cent (20.53) and was superior over the best standard CoC01061 (85.65 t ha^{-1}, 14.23 t ha^{-1}and 20.33 respectively).

In the Main Yield Trial (Midlate) ratoon crop, the clone 2012A335 was found to be superior for NMC (66.53 000's ha^{-1}) cane yield (72.33 t ha^{-1}), CCS yield (9.79 t ha^{-1}) and found to be superior over the best standard 83V15 (60.67 000's ha^{-1}, 56.67 t ha^{-1} and 7.49 t ha^{-1} respectively).

Ten entries along with a standard 87A298 were evaluated for multi ratoonability during 2017-18. The clone 2009A107 recorded significantly higher cane yield (141.53 t ha^{-1}, and CCS yield (18.37 t ha^{-1}) followed by 2005A128 (135.33 t ha^{-1} and 17.82 t ha^{-1}) and 2003A255 (125.00 t ha^{-1}and 16.25 t ha^{-1}) when compared to best standard 87A298 (123.67 t ha^{-1}and 16.13 t ha^{-1} respectively). For percent Juice Sucrose, the clones 2009A107 (20.08) and 2003A255 (20.30) were found to be on par with the best standard 87A298 (13.87) recorded lower fibre percent, while the clone 2006A102 (16.28) recorded higher fibre percent at the time of harvest.

Among eighteen entries along with two standards 87A 298 and 2001A 63 evaluated for drought situation during 2017-18, the entry, 2000A225 recorded highest cane yield (80.67 t ha^{-1}) and CCS yield (11.40t ha^{-1}) followed by 2006A223 (86.67 t ha^{-1}, 11.40 t ha^{-1}, 19.40%) and significantly superior over the standard, 87A298 (72.33 t ha^{-1},10.64 t ha^{-1}and 19.10%). The clone 2004A107 recorded higher SPAD values (42.80 and 53.60) and Leaf Area Index (2.26 and 4.46) at 120 and 240 days after planting.

Among 29 genotypes selected for their suitability for mechanical harvesting, the genotypes 2016 A 385 (94.0 thousand ha^{-1}), followed by 2016 A 395 (96.00 t ha^{-1}) and 2016 A 382 (93.0 t ha^{-1}) recorded maximum NMC and cane yield compared to standard 87 A 298 (92.00 thousands ha^{-1}, 92.00 t ha^{-1}).

A total of 12968 tissue culture seedlings of 87A298, 2009A107 and 2003V46 were produced under micro propagation, out of which 11868 were planted in various fields for experimental purpose. 1100 seedlings of 87A298 were sold to Sankili sugar factory and progressive farmers from Guntur. A total of 33878 seedlings are in different stages of multiplication (M1-Rooting). 4664 seedlings are in hardening stage and ready to plant in field.

On Farm Research on rainfed sugarcane at P.Dharmavaram liaison Farm M/S Etikoppaka Sugar Factory Area**:** The clone *viz.* 2006 A223 recorded maximum cane yield (90.00 t ha^{-1}), CCS Yield (13.12 t ha^{-1}) and per cent juice sucrose (19.50) followed by 2003A255 (88.00 t ha^{-1}, 12.88 t ha^{-1} and 19.62%) and found to be superior over the best standard 87A298 (86.00 t ha^{-1}, 12.70 t ha^{-1} and 19.50%) when tested in the trial.

Among three clones tested against two standards in Advanced Varietal Trial (Early) I Plant crop during 2017-`18, the clone CoA 14321 recorded higher cane yield (109.54 t ha^{-1}), per cent juice sucrose (18.88%) and CCS yield (14.48 t ha^{-1}) over the best standard Co A 92081 (98.06 t ha^{-1}, 18.68% and 12.79 t ha^{-1}).

In Advanced Varietal Trial Second plant crop five clones were tested against two standards during 2017-18. Out of three clone, the clone CoA 13322 (99.79 t ha^{-1} and 11.53%) followed by CoC 13336 (89.54 t ha^{-1}; 19.37%) and CoC 13337 (88.35 t ha^{-1}) have recorded higher cane yield and per cent juice sucrose over the best standard CoA 92081 (84.09 t ha^{-1}).

Five clones were tested against two standards under Advanced Varietal Trial (Early) Ratoon crop during 2017-18. The clone, CoA 13322 (104.96 t ha^{-1}) recorded higher cane yield and found to be superior over the best standard CoA 92081 (92.75 t ha^{-1}) for cane yield. The clone CoA 13323 (18.55) and CoV 13356 (18.54) recorded higher per cent juice sucrose when compared to best standard CoC 01061 (18.08).

Six clones were tested against two standards under Advanced Varietal Trial (Midlate) first plant crop during 2017-18.Out of which the clone CoA 14323 (115.57 t ha^{-1} and 19.70%) recorded higher cane yield and juice sucrose followed by Co 13028 (111.29 t ha^{-1}; 19.38%), PI 14377 (106.60 t ha^{-1}; 18.98) and found to be superior over the standard Co 86249 (103.90 t ha^{-1}; 18.60).

Four clones were tested against two standards under Advanced Varietal Trial (Midlate) second plant crop during 2017-18. The clone CoC 13339 recorded higher cane yield (108.16 t ha^{-1}) and CCS yield (13.54 t ha^{-1}) over other entries and best standard CoV 92102 (87.47 t ha^{-1}, 10.96 t ha^{-1}).

Four clones were tested against two standards under Advanced Varietal Trial (Midlate) ratoon crop during 2017-18. The clone CoC 13339 recorded higher cane yield (107.65 t ha^{-1}) and CCS yield (12.57 t ha^{-1}) followed by CoOr 13346 (94.85 t ha^{-1}and 0.42 t ha^{-1}) over other entries and best standard Co 86249 (93.98 t ha^{-1} and 9.82 t ha^{-1}). The clone CoA12324 recorded higher per cent juice sucrose (18.14) over the standard CoV 92102 (17.54).

Studies on Evaluation and identification of climate resilient ISH and IGH genetic stocks for drought tolerance in plant crop reaveled that, in normal condition the clone CYM 07-986 registered higher cane yield of 110.24 t ha^{-1} followed by AS 04-635 (109.12 t ha^{-1}), AS 04-245 (106.48 t ha^{-1}). In drought condition the clone BM 1010168 showed higher cane yield of 67.37 t ha$^{-1.}$ Among the entries the clone BM 1003143 showed higher juice sucrose of 19.20% and 18.05% under normal and drought condition and it was on par with standard clone CoA 92081 (19.36 and 18.22) in both the conditions.

In performance of sugarcane clones / varieties under limited irrigated conditions (early plating) among 15 sugarcane clones / varieties tested, sugarcane clones 2009A 252 (74.81 t ha^{-1}), 2006A 102 (73.86 t ha^{-1}), 2011A 294 (74.49 t ha^{-1}) in mid-late group and 2011A 175 (60.3 t ha^{-1}), 2009A 107 (81.3 t ha^{-1}) in early group performed well under moisture stress conditions. These clones recorded higher shoot population, milleable canes, high SPAD/ SCMR values, higher SOD and leaf proline content at formative stage.

Among 13 sugarcane clones screened under rainfed conditions (June planting), the clones *viz*., 2007A 81 (77.09 t ha^{-1}), 2005A 128 (70.25 t ha^{-1}), 2006A 223 (76.15 t ha^{-1}), 2009A 107 (67.12 t ha^{-1}), 2000A 56 (65.80 t ha^{-1}), 2001A 70 (72.90 t ha^{-1} performed well and recorded higher, NMC, SPAD (SCMR), SOD and leaf proline content (drought tolerance efficiency).

Among 15 sugarcane clones tested for their cane quality deterioration over 72 hours after cane harvest in January, the clone 2011A 260 (10.12%) recorded more than 10% cane weight loss and was on par with 83V 15 standard over 76 hours after harvest. Among early clones, quality deterioration in terms of cane weight loss, all clones recorded on par with standard 87A 298 (less than 10%).

Dextran content in juice which is an indicator of cane quality deterioration increased to an extent of 136% and 135% in sugarcane clones 2011A 262 and 2011A 102 over other clones tested in February harvest. Whereas it was increased to an extent of 211% at 76 hrs in 2011A 319 which was on par with standard 83V 15 (216%) in January harvest.

The cane quality deterioration in terms of per cent sucrose loss, increased reducing sugars, increased dextran content and cane weight loss is more in March harvest over 76 hrs than January harvest.

In study on evapo transpiration of wider planted sugarcane by using gravimetric lysimeter, estimated ET / EP was 0.54 and water use efficiency was at 28.2 kg / ha^{-1} / mm.

Agricultural Research Station, Perumallapalle

The variety, 2005 T 16 (Co T 10367) was proposed for release to the state of Andhra Pradesh.

The genotype, 2012 T 58 (Co T 17366) was promoted for testing in All India Co-ordinated trials.

A total of 159 germplasm lines were maintained at ARS, Perumallapalle. Out of which 48 accessions were from Perumallapalle, 30 from Anakapalle, 32 from Vuyyur, 26 from Rudrur and 29 from All India Coordinated trials.

Seven clones were tested against three checks in Main Yield Trial (early) plant crop I during 2017-18. Out of seven clones, two clones *viz.*, 13T113 (15.6 t ha^{-1} CCS yield, 121.8 t ha^{-1} cane yield and 17.7% sucrose) and 13T124 (15.3 t ha^{-1} CCS yield, 121.8 t ha^{-1} cane yield and 19.6% sucrose) significantly recorded more cane yield and 18% increase CCS yield than the best check, Co94008 (12.9 t ha^{-1} CCS yield, 115 t ha^{-1} cane yield and 16.4% sucrose).

In Main yield trial (early) Plant crop II, among nine clones and four checks evaluated, only one clone, 12T183 recorded significantly superior CCS yield (16.9 t ha^{-1}) and 21.8% increase over the best check, Co94008 (13.9 t ha^{-1}CCS yield).

Only one clone out of nine clones tested in Main Yield Trial (early) ratoon, recorded significantly superior cane yield (117.4 t ha^{-1}) and CCS yield of 11.7 t ha^{-1}which was 20.4% increase over the best check, 2003V46 (9.7 t ha^{-1}).

The results of Main yield trial (midlate) with seven clones and two checks during 2017-18 revealed that two clones *viz.*,, 13T82 (19.2 t ha^{-1} CCS yield, 145.3 t ha^{-1} cane yield and 19.95% sucrose) and 13T106 (19.1 t ha^{-1} CCS yield, 136.9 t ha^{-1} cane yield and 19.92% sucrose) recorded significantly superior CCS yield with more than 26% increase over the best check, Co86032 (15.1 t ha^{-1} CCS yield, 114.7 t ha^{-1} cane yield and 18.8% sucrose).

Eight early and midlate clones along with three checks were evaluated in Advanced varietal Trial I during 2017-18. The entry Co12007 though not significant, recorded the highest cane yield of 144.5 t ha^{-1}, 19.8 t ha^{-1} CCS yield and 19.5% sucrose. 6% sucrose compared to the best check, Co C 671 (122.6 t ha^{-1}cane yield, 17.4 t ha^{-1}CCS yield and 19% surose).

Six early entries with three checks were evaluated for ratoon performance in advanced varietal trial (Early) during 2017-18. The check variety, Co 85004 recorded the highest cane yield (108.1 t ha^{-1}), CCS yield (11.7 t ha^{-1}) with 15.2% sucrose.

Six midlate clones were evaluated against two checks in Advanced Varietal Trial (Midlate) Plant crop II during 2017-18. Three clones, Co M 11085 (128.6 t ha^{-1} cane yield, 17.7 t ha^{-1} CCS yield and 19.2% sucrose), Co 11012 (130.2 t ha^{-1} cane yield, CCS yield (15.8 t ha^{-1}) and 17.3% sucrose) and Co 11007 (133 t ha^{-1} cane yield, CCS yield 15.1 t ha^{-1} and sucrose 16.7%) recorded significant superiority over the best check, Co 99004 (117.8 t ha^{-1} cane yield, 12.9 t ha^{-1} CCS yield and 17% sucrose).

In Advanced Varietal Trial (Midlate) ratoon, six midlate entries with two checks were evaluated for their ratoon performance during 2017-18. Out of 6 clones, two clones *viz.*, CoM 11085(13 t ha^{-1} CCS yield, 129 t ha^{-1} Cane yield and 15.1% juice sucrose) and CoM11086 (11.6 t ha^{-1} CCS yield, 111.6 t ha^{-1}Cane yield) were significantly superior for CCS yield over the best check, Co 86032 (10.7 t ha^{-1} CCS yield, 89.3 t ha^{-1} cane yield and 17% sucrose).

A total of 1950 micropropagated and YLD free seedlings of 2003V46, 2005T16, 2003T121, Co 86032, 87A298 and CoT8201 were transplanted in the field and are in tillering stage. A separate set of 2005T16, 2003T121, 2006T3, 2009T5, 2005T50, CoC671, Co7219 and 2003V46 are in shoot multiplication stage.

Agricultural Research Station, Vuyyuru

In Seedling nursery (2017-18), a total of 552 g of fluff from 26 Station Crosses, 7 GCs and 7 PCs was sown, out of which 6,263 seedlings were obtained. 3,288 seedlings were survived in the main field with an average survival per cent of 52.50.

In Main Yield Trial (Early) – First Plant crop (2017-18), the clone 2013 V 122 recorded higher cane yield of 120.37 t ha^{-1} followed by 2013 V 126 with 120.14 t/ ha^{-1} cane yield while the standard 87 A 298 recorded 115.97 t ha^{-1} cane yield and clone 2013 V 131 recorded high juice sucrose (20.13%) and CCS yield (17.41 t ha^{-1}) followed by 2013 V 126 (19.51% and 17.25 t ha^{-1}) compared to the standard 2003 V 46 recorded 19.57 per cent juice sucrose and 16.59 t ha^{-1} CCS yield.

In Main Yield Trial (Early) – Second Plant crop (2017-18), the clone 2012 V 67 recorded higher cane yield of 129.43 t ha^{-1} followed by 2012 V 31(126.04 t ha^{-1}), 2012 V 19 (125.00 t ha^{-1}) and 2012 V 123 (123.18 t ha^{-1}) while the standard Co 6907 recorded 113.02 t ha^{-1} cane yield. The clone 2012 V 123 recorded significantly higher per cent juice sucrose of 21.71 followed by 2012 V 41(19.55) and 2012 V 67 (19.13) compard to the standard 2003 V 46 (19.07% sucrose).

In Main Yield Trial (Early) – Ratoon crop (2017-18), the standard 2003 V 46 recorded higher cane (101.04 t ha^{-1}) and CCS (14.38 t ha^{-1}) yields followed by the clone 2012 V 67 (99.48 t ha^{-1} cane and 14.17 CCS yields). Higher per cent juice sucrose of 19.75 was recorded by 2012 V 123 followed by the clone 2012 V 67 (19.35) while the standard 2003 V 46 recorded 19.30 per cent juice sucrose.

In Main Yield Trial (Mid-late)- first plant crop (2017-18), the clone 2013 V 92 recorded higher cane yield of 115.10 t ha^{-1} while the standard Co 7219 recorded 109.72 t ha^{-1}. Significantly higher per cent juice sucrose of 21.47 was recorded by 2013 V 53 compared to the standard 83 V 15 (20.11%). The clones 2013 V 53 (18.08 t ha^{-1}), 2013 V 46 (17.21 t ha^{-1}) and 2013 V 81 (17.01 t/ ha^{-1}) recorded higher CCS yield while the standard 83 V 15 recorded 16.07 t ha^{-1}.

In Advanced Varietal Trial (Early) – I plant (2017-18), the clone Co C 14-336 recorded significantly higher per cent juice sucrose of 20.71 comared to the standard Co C 01-061(19.34%).

In Advanced Varietal Trial (Early) - II plant (2017-18), the clone Co V 13-356 (2006 V 41) recorded higher per cent juice sucrose of 18.97 while the standard Co C 01-061 recorded 17.87 percent juice sucrose. Where as the clone Co C 13-337 recorded higher cane yield of 105.35 t ha^{-1} than the standard Co C 01-061 (101.13 t ha^{-1}).

In Advanced Varietal Trial (Early) - Ratoon (2017-18), the clone Co C 13-336 recorded significantly higher per cent juice sucrose of 17.26 while the standard Co C 01-061 recorded 16.44% at 270 days after ratooning. Where as the other standard Co A 92081 recorded higher cane yield of 95.06 t ha^{-1}.

In Advanced Varietal Trial (Mid-late) - I Plant (2017-18), the clone Co A 14-323 recorded significantly higher percent juice sucrose (20.69) at 12th month and higher CCS yield (19.41 t ha^{-1}) while the standard Co V 92102 recorded 19.64% juice sucrose and 15.81 t ha^{-1} CCS yield. On the other hand, the clones Co A 14-323(126.23 t ha^{-1}), Co 13029 (125.93 t ha^{-1}) and PI 14-377 (124.18 t ha^{-1}) recorded higher cane yield compared to standard Co 86249 (110.19 t ha^{-1}).

In Advanced Varietal Trial (Mid-late) - II Plant (2017-18), the standard Co V 92102 recorded higher percent juice sucrose (19.72) at 12th month followed by the clone Co A 12-324 with 18.94% sucrose. Where as the clone Co A 12-324 recorded higher cane yield (108.33 t ha^{-1}) and CCS yield (14.76 t ha^{-1}) than the standard Co V 92102 (101.16 t ha^{-1} cane yield and 14.62 t ha^{-1} CCS yield).

In Advanced Varietal Trial (Mid-late) - ratoon (2017-18), the standard Co V 92102 recorded higher percent juice sucrose of 19.80 at 12th month. The clone Co Or 13-346 recorded higher cane yield of 97.84 t ha^{-1}while the standard Co 86249 recorded 84.26 t ha^{-1} cane yield.

Among twenty seven clones studied along with three standards for climate resilience, the standard Co V 09-356 (2003 V 46) recorded higher per cent juice sucrose of 21.00 at 12th month. The clone AS 14-1689 recorded higher cane yield of 136.57 t ha^{-1} whereas the standard Co V 09-356 recorded 125.00 t ha^{-1} cane yield.

During 2017-18, the clone 2011 V 226 recorded higher cane yield of 127.78 t ha^{-1} than the standard 2003 V 46 (126.97 t ha^{-1}) under waterlogged conditions. The clone 2012 V 67 recorded higher per cent juice sucrose of 21.13 than the standard 2003 V 46 (19.40%).

Performance of mid-late clones under waterlogged conditions (2017-18) revealed that, the clone 2011 V 102 recorded higher cane yield of 126.27 t ha^{-1} than the standard Co 7219 (90.39 t ha^{-1}). The clone 2012 V 25 recorded higher per cent juice sucrose of 19.34 while the standard Co 7219 recorded 18.42 per cent juice sucrose.

The clone 2011 V 226 recorded higher cane yield of 106.01 t ha^{-1} under moisture stress conditions compared to the standard Co 6907 (95.02 t ha^{-1}). The clone 2009 V 127 recorded significantly higher per cent juice sucrose of 21.70 at 300 DAP than the standard Co 6907 (16.77%).

Performance of mid-late clones under moisture stress conditions during 2017-'18 indicated that, the clone 2009 V 80 recorded higher cane yield (98.08 t ha^{-1}) than the standard Co 7219 (79.28 t ha^{-1}). The clone 2010 V 146 recorded significantly higher per cent juice sucrose (20.70) at 360 DAP where as the standard Co 7219 recorded 19.88%.

During 2017-18, the clone 2010 V 32 had shown less reduction in per cent juice sucrose (0.05) at 48 hours after harvest in evaluation and identification of clones with tolerance for post harvest deterioration where as the clones, 2009 V127, 2010 V 32, 2011 V 226 and 2009 V 89 maintained quality up to 48 hours after harvesting.

Screening of sugarcane clones for salt tolerance, during 2017-18 indicated that, among the clones tested, 2009 V89 (89.0 t ha^{-1}), 2008 V 52 (84.89 t ha^{-1}) and 2009 V 127 (83.72 t ha^{-1}) recorded higher cane yield and were found to be tolerant to salt stress. All clones recorded higher per cent juice sucrose and were on par with the standards 2003 V 46 and 83 V 15.

Crop Production

Regional Agricultural Research Station, Anakapalle

Planting of 30 days aged seedlings (74.5 t ha^{-1}) or 45 days aged seedlings (74.2 t ha^{-1}) registered significantly higher cane yield when compared to 60 days aged seedlings (67.7 t ha^{-1}). Population density of 24,700 seedlings ha^{-1} registered significantly higher cane yield of 74.3 t ha^{-1} than higher population density of 37,000 seedling/ha (69.4 t ha^{-1}) but found on par with 18,500 seedling ha^{-1} (72.6 t ha^{-1}).

Under late planted conditions, seedlings responded to 100% recommended level of nitrogen + Bio fertilizers (Azospirillum + PSB) + trash mulching @ 3.0 t ha^{-1} and gave higher cane yield of 65.4 t ha^{-1} than 100% recommended dose of nitrogen only (57.9 t ha^{-1}) but found more or less similar to 100% RDN + Pressmud @ 12 t ha^{-1} (62.6 t ha^{-1}) or 150% recommended dose of nitrogen (62.4 t ha^{-1}).

Among different tillage systems, sugarcane planted in conventional tillage registered higher cane yield of 72.7 t ha^{-1} when compared to zero tillage (67.8 t ha^{-1}) or minimum tillage (66.0 t ha^{-1}). Among different types of seed material, three bud setts registered significant higher cane yield of 70.3 t ha^{-1} when compared to single node seedlings (66.9 t ha^{-1}).

Weed management in sugarcane under seedling cultivation indicated that manual weeding at 30, 60, 90 DAS recorded a cane yield of 102.6 t ha^{-1} followed by post emergence application of halosulfuran @ 107 g ha^{-1} + metribuzin @ 300g ha^{-1} in 500 lts of water at 40-45 DAP (90.0 t ha^{-1}) as against 69.9 t ha^{-1} in control.

Cultivation of sugarcane with sugarcane seedlings, pocketing of recommended nitrogen and potash in four splits at the time of planting, 30,60 and 90 days after planting recorded a cane yield of 92.6 t ha^{-1} whereas 83.45 t ha^{-1} cane yield was recorded with N in two splits (45 & 90 DAP) and entire potash at the time of planting.

Adoption of natural farming practices recorded a cane yield of 58.4 t ha^{-1} while adoption of ICM practices recorded a cane yield of 92.1 t ha^{-1}. The quality parameters namely brix and sucrose were also lower in natural farming treatment compared to ICM. The jaggery recovery was also low (7.48%) under natural farming compared to ICM (9.36%).

Improved practices (Chisel plough at 1m interval followed by MB plough, lime water dipping, mulching and spraying of urea and MOP in post monsoon season, water harvesting through farm pond and providing supplemental irrigation) recorded an average cane yield of 46.86 t ha^{-1} with an increase of 7.45% when compared to farmers practice (43.61 t ha^{-1}).

Integrated application of organics and inorganics in improving soil health and sugarcane productivity indicated that, application of FYM @ 10 t ha^{-1} + Biofertilizer + 100% inorganic nutrient (87.6 t ha^{-1}) or application of FYM @ 10 t ha^{-1} + Biofertilizer + inorganic nutrient application based on soil test results registered significantly higher cane yield (86.9 t ha^{-1}). Where as application of trash at 10 t ha^{-1} + 50% RDF registered lowest cane yield of 69.7 t ha^{-1}.

Studies on impact of integrated application of organics and inorganics in improving soil health and sugarcane productivity in plant crop revealed that application of FYM @ 20 t ha^{-1} + inorganic nutrient application based on soil test results registered significantly higher cane yield of 83.3 t ha^{-1} as compared to application of 50 % RDF (63.5 t ha^{-1}) or application of chemical fertilizers

@ 100% RDF (70.5 t ha^{-1}) but found on par with application of FYM @ 10 t ha^{-1} + Biofertilizer + Soil test based fertilizer application (82.5 t ha^{-1}) or FYM @ 10 t ha^{-1} + Biofertilizer + 100% RDF (81.1 t ha^{-1}).

Pooled mean data (2015-17) on use of plant growth regulators (PGRs) for enhanced yield and quality of sugarcane indicated that highest number of milleable canes (69,728 ha^{-1}) and cane yield (75.3 t ha^{-1}) was noticed with planting of setts after over night soaking in 100 ppm ethrel solution + GA3 Spray (35 ppm) at 90,120 and 150 DAP.

Significantly higher cane yield (85.0 t ha^{-1}) was recorded in scheduling irrigations at frequent intervals at 1.0 IW/CPE as compared to scheduling irrigations at longer intervals at 0.6 IW/CPE (74.0 t ha^{-1}) and on par with scheduling irrigation at IW/CPE of 0.8 (79.5 t ha^{-1}) treatments.

Revisiting of Fertilizer doses for important crops in North Coastal Zone revealed that the highest cane (87.68 t ha^{-1}) and sugar yields (11.32 t ha^{-1}) of sugarcane plant crop (II year) was recorded with 150% RDN and 100 RDPK + 25 % of recommended dose of zinc and sulphur with farm yard manure @ 10 t/ha^{-1} compared to recommended dose of chemical fertilizers (84.07 t ha^{-1} and 10.05 t ha^{-1}).

Nutrient management under sugarcane multi ratooning (5th ratoon) revealed that, significantly higher cane yields (72.35 t ha^{-1}) were recorded with 200 % RDN + 100 % RDPK and it was on par with 150 % RDN + 100 % PK fertilizers (69.38 t ha^{-1}). However, significant improvement in organic carbon and microbial population (Azospirillum, Azatobacter and phosphorus solubilizing bacteria) was observed under multiratooning over initial status and there was not much difference in soil physical properties.

In organic farming, the cane and sugar yields recorded after 7 years were 76.14 and 9.96 t ha^{-1}, respectively, where as in 100 % chemical fertilizer treatment it was 72.52 and 9.39 t ha^{-1}, respectively. Results of post harvest soil analysis showed that organic carbon status was raised to 0.78 %, where as in 100 % chemical fertilizer treatment the organic carbon status was increased to 0.69 % from its initial value of 0.52 %. Significant improvement in soil available micronutrient status and soil micro flora with improved physical properties were observed in organic farming plot over 100 % chemical fertilizer plot.

A total of 20,645 kg of different biofertilizers i.e., Rhizobium (35 kg), Azospirillum (12,135 kg), Azotobacter (1,300 kg) and PSB (7,175 kg) were produced during the period under report and supplied 19,837 kg of biofertilizes to farmers through Department of Agriculture.

Agricultural Research Station, Perumallapalle

Among two pre- release early varieties and one check variety tested for nitrogen response, the varieties 2009 T 10 (94.6 t ha^{-1}), 2009 T 5 (93.8 t ha^{-1}) recorded higher average cane yields than check variety, 2003 V 46 (83.4 t ha^{-1}). With regard to nitrogen levels 125% RDN recorded higher average cane yield of 104.3 t ha^{-1} compared to no nitrogen (68.7 t ha^{-1}). The interaction between varieties and nitrogen levels was significant.

Among five sugarcane promising mid late varieties, the vaieties 2011 T 70 (101.2 t ha^{-1}), 2011 T 51 (100.6 t ha^{-1}) 2011 T 140 (97.2 t ha^{-1}) recorded higher average cane yields, than the check variety, 83V15 (80.4 t ha^{-1}). Among different nitrogen doses, 150% RDN recorded higher average cane yield of 102.4 t ha^{-1}. The interaction between varieties and nitrogen doses were significant.

Under wider row planting (150 cm), varieties 2009 T 10 (77.6 t ha^{-1}), 2009 T 5 (73.7 t ha^{-1}) and 2010 T 188 (66.4 t ha^{-1}), recorded highest average cane yield compared to check variety 2003 V 46 (56.7 t ha^{-1}).

Among three different clipping times i.e., 30, 45, 60 DAP, clipping at 45 days after planting recorded high number of millable canes (77606 ha^{-1}) and cane yield (93.5 t/ha). Among nitrogen doses, 125% RDN at 30,60,90,120 and 150 DAP recorded the highest number of millable canes (74258 ha^{-1}) and cane yield (89.6 t ha^{-1}).

Among fertigation levels, 125% RDN + 125 % RDK in 12 equal splits through drip from 30-150 DAP (days after planting) recorded the highest cane yield (107 t ha^{-1}) followed by 100% RDN + 100 % RDK in 12 equal splits through drip from 30-150 DAP (99.8 t ha^{-1}) but were on par with application of 75% RDN + 75 % RDK in 12 equal splits through drip from 30-150 DAP (95.2 t ha^{-1}).

Application of trash by trash shredder registered higher cane yield (121.6 t ha^{-1}), sucrose (18.93%) and CCS (13.33%) and it was at par with application of trash as mulch (116.2 t ha^{-1}of cane yield, 18.72% of sucrose and 13.30% of CCS).

The entries, 2011 T 62 (early), 2009 T 10 (early), 2011 T 188 (early), 2011 T 70 (midlate) were found suitable for delayed harvesting. The entries 2011 T 188 (early) and 2011 T 70 (midlate) showed tolerance to post harvest deterioration.

Agricultural Research Station, Vuyyuru

Among the four clones, 2003V 46 (check) recorded higher cane yield (120.6 t/ha) at 12th month where as 2009 V 127 recorded higher percent juice sucrose (22.4) at 12th month harvesting.

Among the four cones harvested in 9th, 10th and 11th month in ratoon crop, the clones 2009 V 127 (92.8 t ha^{-1}) and 2003 V 46 (94.3 t ha^{-1}) were at par and recorded significantly higher cane yield as compared to 2008 V 337 (85.8 t ha^{-1}) and 2008 V 347 (74.8 t ha^{-1}).

Among the new clones harvested at 10th, 11th and 12th month in plant crop, the clones 2010 V 32 (116.2 t ha^{-1}) and 2010 V 57 (115.9 t ha^{-1}) were at par and recorded significantly higher cane yield over 2010 V 58 (105.2 t ha^{-1}).

Among the herbicides applied as post emergence at 30 DAP, topramezone tembotrione and halosulfuron methyl alone or topramezone + halosulfurn and tembotrione + halosulfuron recorded significantly higher yield as compared to atrazin and metribuzine as pre-emergnce in sugarcane.

Evaluation of liquid bio-fertilizers on yield and quality of sugarcane (Plant-I) indicated that highest yield was recorded in 75% RDF + liquid bio-fertilizers as basal & at 45 DAP + FYM @ 10 t ha^{-1} (172.7 t ha^{-1}) followed by 75% RDF + liquid bio-fertilizers as basal & at 45 DAP.

In Organic Farming research in sugarcane (Ratoon**),** more shoot population at different stages of crop growth, yield, were recorded in inorganic plot (43.10 t ha^{-1}) than organic plot (38.50 t ha^{-1}). Quality and nutrient availability in post harvest soils were more in organic plot during the seventh year.

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Tirupati

The moth catches of sugarcane borer pests in pheromone traps during 2016-17, indicated that, early shoot borer catches were high in 3rd SMW (13.4 No./trap/week). In case of internode borer, the catches were high in 33rd SMW. The moth catches of top borer were high in 1st SMW (20 No./trap/week).

Among the 40 IVT clones, clone CoTL14112 recorded lowest dead hearts (0.43%), followed by CoN14072 (0.48%), CoN14061 (0.52%), PI.14.131 (0.54%), Co13021 (0.59%), Co14016 (0.62%), PI 14.132 (0.68%) as against 15 per cent in Co14003.

Regional Agricultural Research Station, Anakapalle

Cumulative incidence of early shoot borer (4.51 to 12.65 % DH) and intensity of internode borer (4.71 to 7.46 %) was low in temperature tolerant *Trichogramma chilonis* release for 8 + 4 times with higher cane yield (105.83 t ha^{-1}) compared to farmer's practice of spraying of chlorpyriphos for four times (21.66 % DH, 7.49 % and 96.68 t ha^{-1}) .

Temperature tolerant strain *T. chilonis* release (8 + 4 times) in March ratoon crop recorded low early shoot borer incidence upto 120 days (3.42 % DH) and internode borer incidence (20.73 %) and registered high cane yield (84.47 t ha^{-1}). While normal strain *T. chilonis* release (6+4 times) recorded low early shoot borer incidence (16.04 %) and internode borer intensity (5.81%) compared to farmer's practice with early shoot borer incidence (42.16%) and internode borer intensity (4.61%).

Entomopathogenicne matode, *Heterorhabditis indica* was found significantly effective in reducing white grub damage (79.86 % reduction) and resulted in high yield (39.1 %) compared to entomofungus *Metarhizium anisopliae* 67.74% reduction and 35.24 % yield increase).

Among 19 zonal varieties tested under ratoon, all the entries showed least susceptible reaction towards early shoot borer and moderate to high susceptible reaction towards internode borer and scale insect.

Among three IVT, nine AVT-I and four AVT-II entries, the clones Co C 14337 (22.39%), Co 13029 (25.26%), PI 14377 (26.44%), Co Or 13346 (27.36%), Co C 13339 (28.67%), Co C 14336 (29.04%) and Co A 14321 (29.43%) showed moderate susceptible reaction towards early shoot borer.

The entries *viz*., Co 13028 (27.41%), Co A 12324 (29.90%), PI 15 376 (29.09%), Co C 14336 (34.85%), Co 13029 (37.68%) and Co A 14321(38.18%) recorded moderate incidence of internode borer compared to susceptible checks, 93 A 145 (60.49%) and 87 A 298 (82.13%) and found promising against internode borer.

The entries *viz*., Co A 14321 (3.03%), Co V 15 356 (6.06%), PI 14 377(6.06%), Co 13029 (6.36%), Co 13023 (6.60%) and Co A 14323 (6.67%) recorded less incidence of scale insect and found promising against scale insect compared to susceptible checks, 87 A 298 (68.25%) and 93 A 145 (47.89%).

Management of early shoot borer, *Chilo infuscatellus* Snellen in transplanted sugarcane (single node seedlings) revealed that, sett treatment with imidacloprid 600 FS @ 1ml l^{-1} + spray of chlorantraniliprole 18.5 SC @ 375 ml ha^{-1} before transplanting of seedlings and 60 days after transplanting (4.8%; 93.23 t ha^{-1}) was found effective against early shoot borer.

Pooled datd for three years under IPM module in sugarcane indicated that sett treatment with imidacloprid 600FS @ 1ml l^{-1} + soil application of chlorantraniliprole 0.4G @ 22.5 kg ha^{-1} at planting and at 60 days after planting (6.57 %; 102.82 t ha^{-1}); sett treatment with imidacloprid 600FS @ 1ml l^{-1} + soil application of fipronil 0.3G @ 25 kg ha^{-1} at the time of transplanting and 60 days after transplanting (8.78%; 99.29 t ha^{-1}) and sett treatment with imidacloprid 600 FS @ 1 ml l^{-1} + spray of chlorantraniliprole 18.5SC @ 375 ml ha^{-1} before transplanting of seedlings and 60 days after transplanting (10.31%; 97.60 t ha^{-1}) was found effective against early shoot borer and recorded superior cane yield and benefit cost ratio of 1.26, 1.25 & 1.24, respectively compared to untreated control (30.47%; 77.22 t ha^{-1}).

Results of rodent control for two years (2016-17 & 2017-18) revealed that bromodilone poison bait for two times at 15 days interval reduced the incidence of rodent damage to an extent of 86.64% over control and found effective for the management of rodents in sugarcane eco-system.

Monitoring insect pests of sugarcane using light traps revealed high moth catch was observed during 5^{th} std. week (17.5 moths $trap^{-1}$) which coincides with maximum temperature of 31.9^0c, minimum temperature of 18.3^0c, relative humidity as 96% & 48% (max & min). In 18^{th} std. week coincides with maximum temperature 36.70c, minimum temperature 24.7^0c, relative humidity as 81% & 52% (max & min) and rainfall of 10.2 mm with 2 rainy days, 17 months $trap^{-1}$ were recorded Regression values indicated low R^2 (0.386) in predicting early shoot borer moth catch.

Agricultural Research Station, Vuyyuru

Out of fifty genotypes screened during the year 2017-`18, thirty six genotypes recorded < 15 per cent incidence of early shoot borer, eleven genotypes recorded < five per cent intensity of internode borer and intensity of scale insect was below fifty per cent in all genotypes.

Application of ferterra 0.4 G @ 20 kg ha^{-1} as basal, 120 DAP and 180 DAP recorded lowest incidence of early shoot borer followed by application of fipronil 0.3 G @ 25 kg ha^{-1} as basal 120 DAP and 180 DAP.

Sett treatment with imidaclorid 600 FS @ 1 ml l^{-1} + soil application of chlorantraniliprole 0.4 G @ 20 Kg ha^{-1} at the time of transplanting and 60 days after transplanting recorded lowest incidence of early shoot borer (6.02%) followed by 9.38% in sett treatment with imidaclorid 600 FS @ 1 ml l^{-1} + soil application of fipronil 0.3 G @ 25 Kg ha^{-1} at the time of transplanting and 60 days after transplanting.

Disease Management

Regional Agricultural Research Station, Anakapalle

Among 50 entries evaluated against smut under artificially inoculated conditions during 2017-18, six entries *viz.*, Co 13031, Co 13023, Co 13028, 2014A 122, 2014A 142 and 2013A 177 exhibited moderately resistant reaction and the remaining entries were either moderately susceptible or susceptible or highly susceptible.

Out of 50 entries screened for red rot resistance in plug method of inoculation, Co 13028 and CoA 14321 exhibited resistant reaction to the established pathotypes (Cf 419, Cf 671 and Cf 997) of red rot fungus. The genotypes, viz., Co C 15336, Co C 13339 and 2013A 217 showed variable reaction (R to MR) to various pathotypes of red rot fungus. The rest of the entries showed susceptible to highly susceptible reaction to red rot.

In cotton swab method of inoculation, except PI 14377, all the isolates were found to be resistant to red rot fungus. The entries showing resistant reaction under plug method of inoculation may be used as donors for development of red rot resistant varieties.

Among 50 entries evaluated against *Fusarium sacchari* under artificially inoculated conditions, eleven entries viz., PI 15377, CoV 15356, CoC 13339, Co A 12324, Co Or 13346, Co 13031, Co C 01061, Co A 14321, Co 13029, 2014A

68, and 2014A 164 exhibited resistant reaction.

Out of 50 varieties / genotypes screened against YLD under natural conditions 31 entries were found to be disease free during the year 2017-18.

High incidence of Yellow leaf disease was observed in sugarcane growing regions of Visakhapatnam district compared to Vizianagaram and Srikakulam districts of Andhra Pradesh.

Among seven fungicides tested, least disease incidence was observed in setts treated with azoxystrobin + tebuconazole (4.62%) which was at par with trifloxystrobin + tebuconazole (6.18%), propiconazole (6.28%) and tebuconazole (7.54%) followed by difenaconazole (10.81%) and hexaconazole (14.91%) application compared to untreated control (66.46%).

Hot water treatment at 50^0C for 20 min or 52^0C for 10 min of virus infected single noded setts followed by carbendazim sett treatment (0.1%) enhanced the germination percentage in sugarcane.

The setts and seedlings treated with endophytic bacteria and carbendazim were inoculated with *C. falcatum* under field conditions by plug and cotton swab methods of inoculation revealed that all the canes in various treatments inoculated with *C. falcatum* by plug method produced susceptible to highly susceptible reaction. However, differential reaction was observed in cotton swab method of inoculation.

Agricultural Research Station, Perumallapalle

Among the 47 sugarcane entries tested for red rot reaction against four pathotypes (Cf 261, Cf 419, Cf 671 and Cf 997) 2011T 88, 2012T58, 2013T16, 2013T54 and 2013T59 showed resistant to moderately resistant reaction to four pathotypes in plug method and resistant reaction in cotton swab method.

Among the 47 sugarcane entries tested for smut resistance almost all the entries showed resistant to moderately resistant reaction while the entry 2014 T 73 showed moderately susceptible reaction.

In the biological control of red rot disease, two biocontrol agents i.e., *Trichoderma* isolate - 16 and *Pseudomonas* isolate - 15 were identified as potential against red rot pathogen,*Colletotrichum falcatum* and talc formulations of these agents were prepared for evaluation under field conditions.

Agricultural Research Station, Vuyyuru

Out of 42 varieties were evaluated for red rot reaction, 28 varieties identified as resistant to red rot disease. Among which the varieties 2011 V 226, 2011 V 127, 2012 V 123, 2012 V67 were also agronomically promising in yield and quality with additional advantage of horizontal resistance to all red rot pathotypes.

Beneficial antagonistic organisms *viz.*, *Trichoderma Spp* and *Pseudomonas Sp* were present in rhizosphere and internal stalk tissues of sugarcane respectively. The isolates showed maximum inhibition in mycelia growth of *Colletorichum falcatum*.

The fungicides *viz.*, propiconazole @ 0.1 % or hexaconazole 0.2 %, tebuconazole @ 0.1 % were found effective in elimination of sett – borne infection of smut and also effective in ratoon crop where thorough spraying of the fungicide on stubbles immediately after ratooning and another spray at 20-25 days after ratooning was taken up.

All the fungicides tested were found not effective in control of internally sett –borne infection of red rot disease.

4.4 Tobacco

Crop Improvement

Regional Agricultural Research Station, Nandyal

Bidi tobacco cultures NyBTH 124 (1.84 t ha^{-1}) and NyBD 60 (1.79 t ha^{-1}) performed well and were promoted for testing in All India Coordinated trials.

In Initial Hybrid Trial of bidi tobacco, the entry NyBTH 124 (1.99 t ha^{-1}) had recorded significantly higher cured leaf yield compared to the checks MRGTH1 (1.54 t ha^{-1}), A 119 (1.55 t ha^{-1}) and Ndl.Pog 1(1.62 t ha^{-1}).

In Advanced Varietal Trial I of bidi tobacco, 3 entries ABD145 (2.13 t ha^{-1}) and ABD163 (2.03 t ha^{-1}) recorded significantly higher cured leaf yield compared to the checks Ndl.Pog 1 (1.69 t ha^{-1}) and A 119 (1.50 t ha^{-1}).

In Advanced Varietal Trial II of bidi tobacco, the entry NBD 290 (2.17 t ha^{-1}) had recorded significantly higher cured leaf yield when compared to the checks Ndl.Pog 1 (1.52 t ha^{-1}) and A 119 (1.16 t ha^{-1}).

In On-farm Trial of bidi tobacco, ABD132 (1.98 t ha^{-1}) recorded higher cured leaf yield compared to the check Ndl.Pog 1 (1.45 t ha^{-1}).

The bidi tobacco entries, NyBTH-168 (2.17 t ha^{-1}), NyBTH-163 (2.10 t ha^{-1}), NyBTH-167 (2.07 t ha^{-1}) and NyBTH-166 (2.02 t ha^{-1}) recorded significantly higher cured leaf yield compared to the checks MRGTH-1 (1.65 t ha^{-1}), Ndl.Pog1 (1.65 t ha^{-1}) and A 119 (1.55 t ha^{-1}) in Hybrid Trial- I.

Among bidi tobacco entries tested in Station Hybrid Trial –II, the entries NyBTH-155 (2.09 t ha^{-1}), NyBTH-157 (2.06 t ha^{-1}) and NyBTH-152 (1.91 t ha^{-1}) recorded significantly higher cured leaf yield when compared to the check MRGTH1 (1.55 t ha^{-1}).

Crop Production

Regional Agricultural Research Station, Nandyal

Among different planting methods tested to avoid water logging and higher cured leaf yield in bidi tobacco, ridge planting method recorded significantly higher cured leaf yield (1.55 t ha^{-1}) against flat bed planting method (1.36 t ha^{-1}).

Studies on foliar application of K at different intervals on leaf quality and cured leaf yield revealed that higher cured leaf yield (1.71 t ha^{-1}) of bidi tobacco was recorded with foliar application of KNO_3 @ 2.5 % twice at 45 and 60 days after transplanting.

Crop Protection

Insect Pest Management

Regional Agricultural Research Station, Nandyal

Spodoptera litura population was observed from 39th std week to 2nd std week, peak number of larva was noticed during 39th std. week (8.4 larvae plants^{-10} in 5 locations).

Sucking pests like aphids were noticed from 4th std week to harvesting stage. Mealy bug incidence was noticed from 49th standard week to harvesting stage and the population gradually increased. Among the natural enemies, spiders and reduviid bugs played a dominant role and were observed from 42nd standard week to 7th standard week and 42nd standard week to 4th standard week, respectively.

In Station Hybrid Trial II, *Spodoptera litura* infestation was less (17.09%) in NyBTH 162 and

NBD 119 compared to NYBTH 152 (21.50). In case of mealy bug. maximum incidence (1-2) was recorded in NyBTH 155,156,160,161 and MRGTH 1.

B. DISCIPLINE ORIENTED RESEARCH

1. Agronomic Research

Cropping Systems and Farming Systems

Agricultural Research station, Utukur

Among the treatments tested in rice, farmers practice i.e. application of 150-60-40 kg NPK ha^{-1} recorded higher grain yield of 5.06 t ha^{-1} which was on par with application of recommended dose of fertilizers + 25 % N with vermicompost (4.94 t ha^{-1}), RDF + 50 % N supplementation with vermicompost (4.70 t ha^{-1}) and RDF alone (80-60-40 kg NPK ha^{-1}) which recorded 4.60 t ha^{-1} under in rice-groundnut cropping system. The effect of residual treatments of rice on succeeding groundnut crop was not significant. Regarding direct fertilization to groundnut, application of 100 % RDF recorded higher pod yield (2.94 t ha^{-1}) but it was on par with 50 % RDF (2.91 t ha^{-1}).

Integrated Farming Systems, Vizianagram

In rice-maize cropping system,NPK + Zn recorded significantly higher grain yield (5.80 t ha^{-1} & 7.37 t ha^{-1}) over other treatments and on par with recommended dose of NPK applicationn (5.59 t ha^{-1} & 7.07 t ha^{-1}) respectively. NPK + Zn recorded higher system Net Returns (Rs 119023 ha^{-1}) followed by recommended dose of NPK application and farmer practice. Benefit Cost Ratio was higher in case of NPK+ Zn (1.57) followed by NPK (1.56) and farmer practice (1.33).

The result of the experiments conducted at 24 locations during 2017-2018 revealed that net benefit due to cropping system diversification, livestock diversification and product diversification were Rs.11850, Rs. 7099 and Rs. 5363 with diversification cost of Rs. 2625, Rs. 2300 and Rs. 1000 respectively. The total systems net income increased due to different diversification from Rs.47076 to Rs. 69568 with total intervention cost of Rs. 5925.

The result of the experiments conducted at 12 locations with three farming systems during 2017-18 revealed that, net income of crop – dairy farming system increased due to different modules from Rs.65,700 to Rs. 93,910 with B: C ratio 3.26, crop – poultry farming system net income increased due to different modules from Rs.58750 to Rs. 82445 with B: C ratio 3.23 and crop - dairy -poultry farming system net income increased due to different modules from Rs.73,450 to Rs. 1,04,900 with B: C ratio 3.44.

Integrated Farming System, Maruteru

Studies on identification and establishment of paddy-paddy-pulse cropping system using selective mechanization during *Kharif*, 2017 revealed that machine transplanting was recorded significantly higher average grain yield of 6.02 t ha^{-1} compared to normal line transplanting (5.50 t ha^{-1}) and farmers` practice (4.93 t ha^{-1}) and straw yields also followed similar trend.

Identification of cropping systems module for different farming systems revealed that, highest grain yield of 5.30 t ha^{-1} was recorded with cropping system involving pulses to meet house hold nutrition followed by 5.13 t ha^{-1} with ecological cropping system involving pulses for improving soil health compared to predominant cropping system (4.27 t ha^{-1}) during *Kharif*, 2017.

During *Rabi*, 2017-18, highest rice equivalent yields were recorded with blackgram treatment with 3.64 t ha^{-1} whereas system productivity was highest with 8.61 t ha^{-1} with cropping system involving pulses to meet household nutrition treatment followed by cropping system involving green manure recorded 7.83 t ha^{-1} system yield.

1.2 Agro-Forestry

Agricultural Research Station, Kavali

Collection, maintenance and evaluation of *eucalyptus* clones revealed that eleven clones *viz.*, BCM-2169, 571, 23, 128, 03, 2202, 2069, 147, 2153, 2253 and BCM – 2154 were significantly superior in yield with 26% increase over mean.

Effect of different spacings and nitrogen levels on growth and yield of eucalyptus clones revealed that a spacing of 3 x 1.5 m and application of 300 g N $plant^{-1}$ recorded higher girth of 29.2 cm followed by 200g N $plant^{-1}$.

1.3 Saline Water Management, Bapatla

Soil Science

Effect of sea water intrusion on ground water quality in coastal belt of Krishna Zone. A P

Sea Water Intrusion (SWI) was observed upto a distance of 30 km from the sea. However, certain samples located at the same distance from sea are showing different ionic ratios. Likewise, the Ca^{2+}/Mg^{2+} ratio was higher near the sea coast than inlands contradicting the higher Mg^{2+} content of sea water. The observed pattern of compositional change suggests that cation exchange reactions are taking place when salt water intrusion occurs coupled with silicate weathering and ion exchange process which governs the geochemistry of coastal ground water/aquifers.

Delineation and mapping of salt affected soils of Andhra Pradesh (Kurnool district)

The pH of the surface soils ranged from moderately acidic to strongly alkali, while EC from normal to highly saline (0.3 to 33 dS m^{-1}) with a mean of 4.42 dS m^{-1}; When SAR is considered, 32% of surface soils and 23% of sub surface soils were having SAR>10. The mean ionic composition of surface soils is higher than sub surface soils with HCo_3^-, Cl^-, SO_4^{-2}, Ca^{2+}, Mg^{2+}, Na^+ and K^+ contents of 11.8, 23.5, 5.36, 7.73, 3.67, 29.6 and 0.82 me l^{-1} respectively as against the corresponding mean contents of 0.8, 16.2, 4.34, 4.4, 2.93, 21.1 and 0.72 me l^{-1} at 25-50 cm depth.The organic carbon content of surface soil ranged from 0.01 to 0.91 per cent (ave. 0.3%) against 0.01 to 0.52 (ave. 0.19%) per cent in the sub soil. Soil fertility status of surface soils was higher than sub surface soils.

Studies at bench mark locations in Guntur district to monitor the changes in ground water quality and soil properties

Among the bench mark soils, Kankatapalem showed higher ECe of 13.4 dS m^{-1}, with Ca^{2+}, Mg^{2+}, Na^+ and Cl^- contents of 26.4, 26.4, 78.1 and 107.2 me l^{-1}. While the lowest were seen with Adavi soil showing a pH of 6.1 and ECe of 0.7 dS m^{-1}, Mg^{2+}, Na^+, HCO_3^- and Cl^- contents of 1.2, 1.7, 1.2 and 2 me l^{-1}. Of the soils tested, 36 per cent were non saline in nature (< 2 dS m^{-1}), 64 per cent were saline. Soils contained mean Ca^{2+}, Na^+ and Cl^- contents of 1.6, 2.0 and 2.0; 1.7, 1.4 and 1.2; 1.6, 2.0 and 2.4; 1.2, 0.8 and 0.4 me l^{-1} respectively at 0-15, 15-30 and 30-60 cm depths.

Screening of Newly released rice varieties for salinity tolerance

Among the varieties tested for salt tolerance, CS 36 was significantly superior over other varieties, the grain and straw yields being 6.40 and 7.46 t ha^{-1}, while, BPT 2615 realized a significantly lower corresponding yields of 5.27 and 6.24 t ha^{-1}.

Reclamation of abandoned aqua ponds

A ORP was carried out in three farmers' fields (abandoned aqua ponds) having a high EC of 10.5, 9.1 and 8.2 dS m^{-1}. Due to adoption of reclamation technology, there was 27.7, 23.6 and 26.3 per cent yield enhancement over check yield of 4800 kg ha^{-1}. The EC of the soils showed a decline to 4.2, 3.4 and 3.1 dS m^{-1} respectively.

Effect of neem coated urea on performance of rice crop

Application of neem coated urea at 150% RDFN in two splits significantly recorded higher grain (5.92 t ha^{-1}) and straw yields (6.69 t ha^{-1}). Application of 150% RDFN either in single split or two splits resulted in a significantly higher organic carbon content of soil (0.6%).

Soil quality and crop productivity under different nutrient management systems in salt affected soils

Significantly higher growth parameters were observed with 100% NPK + Org. + Natural farming practices with grain and straw yields of 5867 and 7267 kg ha^{-1} respectively. Also resulted in a significantly higher soil organic carbon of 0.46 per cent against 0.37% with 100% NPK.

Agronomy

Studies on performance of safflower in alkali soils with different agronomic management practices

Among all the treatments, gypsum + FYM + 25% extra nitrogen treated plot recorded the highest seed yield (1.43 t ha^{-1}) and was superior to farmers practice and it was followed by gypsum + 25% extra nitrogen application treatment (1.03 t ha^{-1}). The lowest seed yield was recorded in farmers practice (0.48 t ha^{-1}).

Influence of silicon on alleviation of salinity effect on rice

Among different sources of silicon nutrient, potassium silicate treatment recorded significantly higher grain yield (6.27 t ha^{-1}) and straw yield (7.35 t ha^{-1}**)** when compared to control in grain (5.13 t ha^{-1}) and straw yields (6.28 t ha^{-1}**)** and it was on par with calcium silicate application treatment in both grain and straw of paddy.

Studies on performance of fodder crops in salt affected soils

This experiment was conducted at Bhavanamvari Palem farmer's field with different fodder crops like cowpea, stylo, lucerne, alfalfa, CoFS-29, panthchari-6, and sweet sudan grass on a soil with a PH and EC of 8.5 & 2.9 dS m^{-1} respectively. The highest green fodder yield was obtained (44.8 t ha^{-1}) with sweet sudan grass followed by Panthchari-6 (38.6 t ha^{-1}).

Agril. Engineering:

Micro (Drip) Irrigation system with saline water for different vegetable crops in coastal sandy soils.

Salt tolerance of crops and threshold EC levels were tested in three crops *viz.*, cabbage, cauliflower and moringa grown with micro irrigation of waters having different salinity levels of BAW, 2, 4, 6 and 8 dS m^{-1}. Yield of cabbage showed a reduction from 40.08 to 11.78 t ha^{-1} when salinity rose from 0.6 to 8 dS m^{-1}. Similarly, the yields of cauliflower decreased from 18.67 to 6.12 ha^{-1} with yield reduction being 2.14 to 67.22 per cent. While, the yield reduction was higher in case of moringa realizing 95.87 per cent reduced yields at 8 dS m^{-1}, and 75% yield reduction was observed even at 4 dS m^{-1}.

Use of saline water in shadenets for different vegetable crops in Krishna Western Delta

Salt tolerance of crops and threshold EC levels were tested under shadenets with two crops viz., cabbage and cauliflower grown with micro irrigation of waters having different salinity levels of BAW, 2, 4, 6 and 8 dS m^{-1}. The 90%, 75% and 50% yield levels of cabbage and cauliflower in shadenets was found to be at 1.71, 3.23 and 5.76 dS m-1 and 2.01, 3.56 and 6.13 dS m^{-1} respectively. The yield of cabbage and cauliflower grown in shadenet was found to be 37 % and 35% more than the yields obtained in open field at all the salinity levels.

Investigation, design, installation and evaluation of mole drainage systems in black soils of Andhra Pradesh for control of waterlogging

The results of evaluation of mole drainage systems in black soils revealed that, the temporarily waterlogged soils can be reclaimed with low cost mole drainage systems.

2. Agricultural Engineering

Agricultural Research Station, Anantapuramu

Among all treatments the bamboo mat material was found effective in preventing evaporation losses and among chemicals, cetyl alcohol was found effective in minimizing evaporation losses followed by stearyl alcohol, silicon oil and neem oil.

The seed metering device was designed and developed as per the recommendations and tested in the actual field conditions to evaluate the performance parameters *viz.*, width of operation, depth of operation, theoretical field capacity, actual field capacity, field efficiency, seed rate, fuel consumption and energy requirement and the results were recorded as 240 cm, 6 cm, 1.12 ha^{-1}, 0.77 ha^{-1}, 68%, 24 kg ha^{-1}, 3 l ha^{-1} and 453.82 MJ ha^{-1}.

Mini tractor drawn ‘Ananta Planter’ and ‘Kissan Planter’ were designed and developed with suitable seed metering devices for sowing groundnut. From the calibration results of these two planters, it is summarized that the seed rate of Kissan Planter is less than that of Ananta Planter.

The Ananta Planter was modified by allowing the spacing of 45 cm for every 4 rows to facilitate favourable conditions for the intercultivation without replacing the tires with slim tires and tested in the actual field conditions. Among the various treatments, the pod yield and haulm yield for control track mechanism with conservation furrow were recorded as 2.77 t ha^{-1} and 4.31 t ha^{-1} followed by 30 cm spacing with conservation furrow for every 2 rows. The gross returns, net returns and B: C ratio of the recommended system were recorded as Rs. 1,30,980/-, Rs. 1,07,005/- and 5.5:1, respectively.

AICRP on Farm Implements and Machinery, College of Agricultural Engineering

Design and development of chilli harvestor suitable for multiple pickings

Prototype model of harvestor for determining the chilli fruit detachment force was developed and tested. It was found that fruit detachment force for Guntur sannam chilli fruit pedicel was 0.26 kgf.

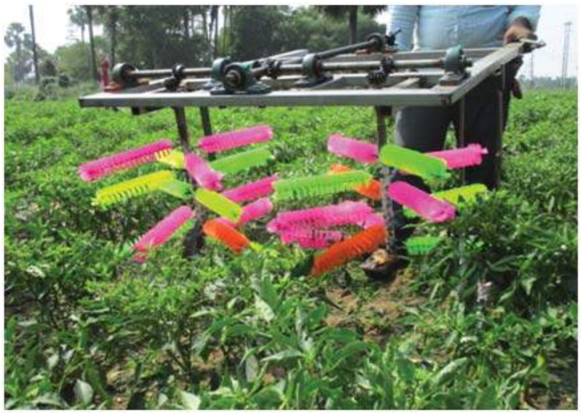


Fig: Prototype model for Chilli fruit detaching mechanism for estimation of fruit pedicel detachment force

Feasibility testing of Drone sprayer for spraying pesticide and application of bio fertilisers

Hexacopter is a remote controlled flying device which has six propellers with rc motor on 6 axis multirotor hexacopter frame. They are arranged in a circular shape above the main body of the hexacopter. The six propellers provide craft more manoeuvrability and flying power. This craft can fly higher altitudes upto 200 m because of more lifting power. The material used for the manufacturing of the drone is “carbon fibre”.

Fig: 5 lt and 15 lt drones

Development of drone sprayer tank:

The 5 l semi circular tank with cone bottom was fabricated with fibre plastic as per design and tested for air pressure and thrust. It was found that the tank having 260g weight was suitbale for attachement to drone.

Regional Agricultural Research Station, Tirupati

Fesabilty studies conducted for complete mechanization of groundnut with small tractor revealed usefulness for farmers with less than 5 acres of land. Cost of operation was found to be Rs.400/- hour and fuel consumption for ploughing with cultivator is only 1 lt hr^{-1}.

In studies on effect of leaf shredding and incorporation using machines in sugarcane cultivation as soil health improvement programme, trash spreading by trash shredder has recorded highest yield of 121 t ha^{-1} and sucrose content of 18.9%.

Feasibility testing of wet pod groundnut thresher and development of combine harvester revealed threshing efficiency 95%, cleaning efficiency of 94% and percent pod loss observed to be less than 5. The machine was most useful for groundnut farmers.

Regional Agricultural Research Station, Anakapalli

The use of cutter planter and budchip planter could reduce drudgery with saving of 52-56% labour cost, 58% time and 68-75% seed cost over conventional planting.

With the use of trash shredder for removal of trash in the field, there was saving of 58% labour cost and 75% time compared to conventional trash shredding.

The use of ratoon management device in sugarcane field could save 69% labour cost and 75% time compared to conventional method of ratoon management.

4. Agrometeorology

Regional Agricultural Research Station, Tirupati

During 2017-18, a total of 105 weather based Agro-Advisory bulletins covering various aspects on different crops were prepared and disseminated to farmers of Chittor, Kadapa and Nellore districts through phone, local newspapers like Eenadu, Vaartha, Andhrajyothi, Saakshi; through e-mails to DAATTC and KVK's and different NGO's and all these bulletins were uploaded in the National website of IMD, ANGRAU, RARS and the information is being included in NAAS bulletin and broadcasted through National DD channel, All India Radio, Tirupati and Kadapa.. Weather information through SMS alerts were sent to farmers of southern zone through Farmers Portal, Kisan Portal and Whatsapp groups.

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 67%, whereas during North-East monsoon period, it was 62%. Thirty three percent of the forecasts during South-West monsoon period and 38% of the forecasts during North east monsoon period were under unusable range. So far, 6,52,811 farmers were registered and 2,73,93,289 farmers benefitted through SMS portal by receiving agro-advisory through SMS.

Groundnut varieties (Narayani, Dharani, K6, K9, TCGS1073, TCGS-1157 and TCGS-1416) sown during second fortnight of June (1.78 t ha^{-1}) performed well compared to the crop sown during first fortnight of July (1,30 t ha^{-1}) and second fortnight of July (0.95 t ha^{-1}). Among the varieties Dharani (1.75 t ha^{-1}) recorded highest yield followed by TCGS-1157 (1.44 t ha^{-1}) and TCGS-1416 (1.43 t ha^{-1}) compared to K6 (0.88 t ha^{-1})

Among different water use efficient groundnut varieties under different irrigation regimes studied, the performance of K-9 was significantly superior with highest yield (1.44 t ha^{-1}) compared to K-6 (0.31 t ha^{-1}) and other varieties. Among different irrigation regimes studied, IW/CPE ratio of 1 gave highest yield of 1.06 t ha^{-1} followed by IW/CPE ratio of 0.8 (0.87 t ha^{-1}).With decrease of IW/CPE ratio from 1 to 0.4, there was gradual decrease in the yield in all the varieties.

Under Micro level crop planning to mitigate climate change effects for southern zone of A.P, rainfall occurrence at different incomplete gama probability levels (10-90%) during 20th to 45th Standard weeks were worked out for all the mandals of southern zone. Length of growing period of all the mandals was worked out and classified into different duration groups.

Crop weather relationship studies of sesamum during *rabi* 2017-18 revealed that, sesamum varieties sown during 1st F.N of January gave higher yield (0.78 t ha^{-1}) which was on par with the crop sown during 2nd F.N of December (6.82 t ha^{-1}). The lowest yield (0.52 t ha^{-1}) was recorded with 1st F.N of December sown crop. There is no significant difference between varieties.

Under Crop Weather Relationship in Rainfed Maize, CERES-Maize Model was validated in Southern Zone of A.P, during 2017, *Kharif*. Among different dates of sowing, June 2nd FN sown crop has given highest yield of 2.17 t ha^{-1} followed by July 1st FN sown crop (1.88 t ha^{-1}) compared to August sown crop (1.27 t ha^{-1}). Among different hybrids, pinnacle hybrid gave highest yield of 1.93 t ha^{-1} followed by Cargil 900 M (1.73 t ha^{-1}). June 2nd FN and August 1st FN crop has taken 99 days and 98 days duration whereas July 1st & 2nd FN sown crop has taken 104 & 102 days respectively for physiological maturity.

Regional Agricultural Research Station, Anakapalle

A total of 105 Agro – Advisory bulletins were prepared district wise and communicated to farmers of Visakhapatnam, Viziangaram and Srikakulam and also communicated to the JDAs, Programme Coordinators of KVKs and Coordinators of DAATTC of respective districts for further dissemination to the farmers and local News papers viz., Eenadu, Sakshi, Vartha, Andhra Bhoomi and Praja Shakti and AIR. Weather forecast was disseminated through m-kisan portal also and uploaded the advisory bulletins in IMD website. During the period from April 2017 to March 2018, weather forecast was received for all the 365 days.

The rainfall prediction for the period from April, 2017 to March, 2018 was correct to the tune of 40.0 % while the prediction was correct to the tune of 52.1 % during South West monsoon. Organized Farmers Awareness Programme on Weather based agro advisories to the farmers on 28.2.2018 at RARS, Anakapalle.

Highest cane yield of 71.43 t ha^{-1} was observed with February planting which was significantly superior over March (63.4 t ha^{-1}) and April planting (50.9 t ha^{-1}). Among the varieties tested, variety 2003V46 recorded significantly highest cane yield of 69.4 t ha^{-1} and on par with 87A298 (66.4 t ha^{-1}compared to the variety 2003A255 (55.4 t ha^{-1}) and 2001A63 (56.1 t ha^{-1}).

Intercropping of six crops *viz.*, maize, bhendi, ragi, korra, greengram and groundnut with redgram in strips gave gross returns of Rs. 1,23,921/- whereas sole redgram gave gross returns of Rs. 85020/- Highest gross returns (Rs. 1,35,720/-) were recorded with Bhendi-horsegram sequence.

Agricultural Research Station, Anantapuramu

Under agro-climatic characterization, mandal wise MAI (Moisture Adequacy Index) was calculated for entire Andhra Pradesh at 15 days interval starting from June 2017 to February 2018 and submitted to the Govt. of Andhra Pradesh for consideration in drought declaration during *Kharif* 2017.

Prepared crop weather calendar for Chickpea for Ananthapuramu district and compiled information for preparation of dynamic crop weather calendars for groundnut and chickpea. Developed rules for prediction of sowing dates and phenology based on soil properties, soil moisture, weather and crop data. Validated the sowing date and phenology prediction.

In Crop-Weather relationship studies, crop sown during 2nd FN of July (2.62 t ha^{-1}) gave significantly higher yield compared to 1st FN of July (2.30 t ha^{-1}) and 1st FN of August (1.77 t ha^{-1}). Among four varieties, Kadiri Harithandra (2.37 t ha^{-1}) gave significantly highest pod yield over other three varieties.

Estimation of actual evapotranspiration and crop coefficients for groundnut indicated that crop sown during 1st FN of July produced significantly highest pod yield (3.06 t ha^{-1}) than the crop sown during 2nd FN of July (2.42 t ha^{-1}) and 1st FN of August (1.70 t ha^{-1}). There was no significant difference in pod yield with irrigation scheduling at 0.6, 0.8 and 1.0 IW/CPE ratio. The interaction effect was also non-significant.

The highest pod yield (2.79 t ha^{-1}) of groundnut was recorded with inter plot rain water harvesting at 10 m interval + deep ploughing with 5 row duck foot cultivator, which was at par with inter plot rain water harvesting at 10 m interval + Chisel plough at 2 m interval. Inter plot rain water harvesting at 10 m interval, deep ploughing with 5 row duck foot cultivator (1.95 t ha^{-1}) recorded highest net returns.

Crop-Weather relationship in chickpea indicated that seed yield of chickpea varieties JG 11, NBeG 3 and NBeG 49 was not significantly influenced by sowing environment. The crop sown during 1st FN of November recorded higher seed yield of (1.31 t ha^{-1}) followed by 2nd FN of October

(1.17 t ha^{-1}) and 2nd FN of November (1.14 t ha^{-1}). Among the three varieties JG 11 (1.27 t ha^{-1}) and NBeG 3 (1.22 t ha^{-1}) recorded on par and significantly higher yield over NBeG 49 (1.13 t ha^{-1}).

During 2017-18, a total of 102 weather based agro-advisory bulletins were issued to the farmers through mass media (Newspaper and Radio), ATP channel, Project Director, Velugu, District Collector, NGOs and extension agencies and feedback from the farmers was collected. Agro-Advisory through SMS was also sent to farmers, JDA, ADA's, MAO's, Adarsha rythulu and scientific groups of Anantapur and Kurnool districts. About 660 SMS agro advisories were communicated by using m-KISAN portal of Govt. of India to 98,015 farmers of scarce rainfall zone.

5. Post-Harvest Technology

Post-Harvest Technology Centre, Bapatla

A mechanical compaction cum bagging machine for dried chillies was designed and developed. It was evaluated in laboratory as well as in farmer's field. The capacity of the machine was worked out to be 20 bags h^{-1}. The cost of bagging using the machine was worked out to be Rs. 18.30 per bag while in conventional method, it was Rs. 30 bag^{-1}. There was a saving of Rs. 11.70 bag^{-1}by using machine for compaction and bagging. Productivity of machine was 150% more than the conventional process.

Fig. Chili compaction cum bagging unit

Design and fabrication of 2.5 ton capacity Microprocessor Controlled On-Farm Aeration Bin for paddy was completed. Evaluation of the aeration bin is under progress.

Fig: Micro processor controlled on-farm aeration bin

Chilly calyx removal machine (capacity :20 kg batch^{-1}) was fabricated and tested

Fig: Chilli calyx removal machine

Centrifugal dehuller for finger millet, Kodo millet (*Arikelu*), Proso millet (*variga*), little millet (*saama*) and foxtail millet (*korra*) with the Capacity of 100-150 kg h^{-1} was fabricated and it is under evaluation.

A protocol for determination of Glycemic Index (GI) - *in vitro* was standardized and it was found to be very economical compared to the existing protocol. GI values were estimated for some popular paddy (ANGRAU) varieties (52.6 - 87.2) and traditional varieties including red rice (52.4 - 67.7) and black rice (50.0 -72.8).

The protocol for the determination of total anti oxidant activity which is a feasible parameter for differentiating organic and non organic rice samples was standardized.

The Trombay blackgram variety, TU 68 with small sized grain (100 grain weight of 3.48 g) showed resistant reaction to pulse bruchid with less oviposition (2.33 eggs grain^{-100}) and adult emergence (no emergence of adults even 80 days after release of insects) compared to the other varieties under both no choice and multi choice tests.

Blackgram varieties; PU 31 and LBG 891 recorded less emergence of adults (11.0 and 33.50 respectively) under no choice conditions. Under free choice condition, PU 31 recorded 16.50 adult emergence and 16.25% grain damage.

Among the greengram varieties screened, the variety LGG 596, recorded significantly less emergence of adults (40.67 and 15.75) with less grain damage (39.0 and 10.75%) under both no choice and free choice conditions respectively.

The Redgram variety, LRG 281 though received maximum oviposition (34.25 eggs / 100 grain), resulted in emergence of the less number of adults (27.75) and grain damage (30.50%) under free choice condition. Under no choice condition, there was no adult emergence from LRG 281 and significantly less adult emergence (50.67) and grain damage (13.0%) was observed in LRG 280 compared to other varieties.

Among the 16 varieties of bengalgram, NBeG 511, JAKI 9218 and JG 11 showed non preference reaction for oviposition by pulse bruchids recording very less number of eggs under free choice condition (3.33, 3.67 and 6.0/100 seeds) and resulted in negligible emergence of adults (1.33, 0.33 and 1.0 per 100 seeds respectively).

Among the plant powders tested, clove (8.0 adults), sweet flag rhizome (6.0 adults), pepper (9.67 adults) and tobacco leaf powders (16.67 adults) were found effective as grain mixing at 0.4% for controlling pulse bruchid in blackgram compared to untreated control (301.33 adults).

Keeping sand layer of 3 cm over pulses seed such as redgram, blackgram and greengram while filling the inter grain spaces successfully prevented bruchid infestation when stored in slightly modified plastic bins (50 l capacity) without any deleterious effect on germination even after nine months.

Among millet grains (bajra, jowar, ragi and korra) tested against *Tribolium* under multi choice conditions, bajra was the most preferred grain as many as 39.67 insects moved in to grain followed by sorghum (10.67 insects). The population buildup in 120 days was more in bajra (146.33) compared to other millets. The population in ragi and korra were negligible.

There was no population buildup of pulse bruchid in camphor and ash mixed blackgram during six months, while 3261.33 insects emerged from the untreated control inflicting 61.67 per cent damage.

Regional Agricultural Research Station, Anakapalle

Standardized the process technology for the preparation of value added products from jaggery *viz.*, jaggery-pineapple jellies using liquid jaggery and granular jaggery, jaggery rasgulla and pineapple-jaggery leather, pumpkin halwa using pumpkin pulp and granular jaggery and nutrient rich jaggery based infant food.

The fabrication of juice filtration system, vibrosiever, preheater, juice clarifier, evaporator, vacuum pan and open pan concentrator was completed as a part of modernization of jaggery industry.

In initial evaluation of briquetting machine, briquettes of 4 cm diameter and 25 cm length were produced using sugarcane bagasse without any binder. The physical properties of the briquettes i.e., moisture content and bulk density of the sugarcane briquettes were determined as 4.54 (wb %) and 1217.79 kg/ m^3 respectively.

6. Seed Research

Seed Technology Research and Production Center, Thangadancha, Kurnool

The Newly released varieties Dheera at 150% recommended seed rate, Nandyala gram 49 and Nandyala Sanaga 1 at 125% seed rate recorded significantly higher seed yield.

Effect of seed priming on seedling vigor, crop growth and yield of rainfed groundnut during *Kharif*-2017 revealed that, significantly highest seed yield (4.82 t ha^{-1}) was recorded with hydration with $CaCl_2$ (2%) received for 6 hr and was on par with hydration with $CaCl_2$ (1%) received for 6 hr.

Studies on influence of foliar nutrient application on drought mitigation in bengalgram under rainfed vertisols indicated that highest seed yield of 2.74 t ha^{-1} was recorded with foliar spray of KNO_3 @ 1% at 35-40 and 55-60 DAS along with STBF followed by spraying of 19:19:19 along with STBF (2.55 t ha^{-1}) and D.A.P @ 2% along with STBF(2.52 t ha^{-1}) compared to basal application of N, P and S and no spray (1.93 t ha^{-1}).

Studies on influence of zinc and iron on yield and yield attributes of bengalgram under rainfed vertisols revealed that highest seed yield of 1.95 t ha^{-1} was recorded with foliar spray of Zn and Fe at 35-40 DAS along with basal appilcation of N,P and S followed by 1.91 t ha^{-1} recorded with foliar spray of formula 4 at 35-40 DAS along with basal application of N,P and S as against 1.48 t ha^{-1} in basal application of N, P and S.

Seed Production

A quantity of 15,100 quintals of breeder seed was produced during 2017-18 against the target of 11,419 quintals. Large quantity of breeder seed (3,599 q) was produced in rice particularly in five varieties *viz.*, BPT 5204, MTU 1001, MTU 1010, MTU 7029 and NLR 34449. Groundnut breeder seed of 9246 quintals was also produced during 2017-18 against the target of 7,271 quintals. In addition, 12, 856 quintals of foundation seed was produced in different crops during the year 2017-18.

7. Agricultural Statistics

Regional Agricultural Research Station, Tirupati

A programme in MS-Excel was developed to compute PIC (Polymorphic Information Content) for various markers with several varieties/ lines in which one can get PIC value in a single cell and that can be simply dragged over markers to get PIC s for all markers simultaneously.

One day training programmes at research stations *viz.*, ARS, KVK, DAATC Nellore, ARS, KVK, Kadapa, ARS Perumallapalle, RAAS KVK, DAATC, Chittoor, Kadapa, Perumallapalle, KVK, Kadapa was conducted for Scientists, Senior Scientists and Principal Scientists including heads of research stations and discussed various topics of statistics in scientific research,.

Under Advancement of Optimization Techniques in Agricultural Experiments, an optimum model was formulated and worked with very powerful Central Composite Rotatable Design (CCRD).

Insilco characterization and comparative analysis of SSR markers in groundnut (*Arachishypogaea* L.) through bioinformatic approach revealed a short cut way to construct a linkage map developed using macros in excel as well as using SPSS code.

8. Agricultural Biotechnology

Regional Agricultural Research Station, Tirupati

In molecular breeding of rice (*Oryza sativa* L.) for heat tolerance, the genotypes Konark, FR13A and Swarna Sub1 were identified as prominent heat tolerant genotypes. Two informative marker regions were identified among heat tolerant genotypes in comparison to checks *viz.* N22, Dular and Nipponbare, which could be used as donors in rice heat tolerance improvement programme through marker assisted breeding.

In development of rice varieties with early vigour suitable to direct seeding under rainfed ecosystems, among 40 diverse genotypes were screened for seedling vigour index I and II, highest seedling vigor index was noticed in BPT 5204 (5.76) followed by MTU 3626, NLR 40024, MTU 1010, NLR 3276 and RPBIO1248 (in the range of 3.94 - 3.50) compared to NLR 30491 (1.154).

Introgression of PBND/PSND resistance gene(s) into promising groundnut genotype through marker-assisted breeding genotypes having different degree of tolerance to PBND has been selected based on the disease incidence during *Rabi* 2016-17.

DNA fingerprinting of groundnut varieties TCGS 1157, TCGS 1622, TCGS 894, TCGS 1616 and TCGS1694 with three check varieties Narayani, Greeshma and Tirupati 3 was carried out to facilitate the varietal release. Narayani, Greeshma and Tirupati 3 as a reference set were profiled with 15 RAPD markers. The highly polymorphic markers *viz.*, OPC10, OPA4, OPC7, OPB6, OPA19 clearly distinguished the varieties, TCGS 1157, TCGS1622, TCGS 894, TCGS 1616 and TCGS1694 and displayed distinct allelic differences and groundnut varieties could be uniquely identified.

In development of high yielding, drought tolerant, disease resistant groundnut varieties using mutation breeding, the pure seeds of groundnut varieties Kadiri 6, Kadiri 7, narayani and TAG 24 were subjected to gamma radiation (250 Gy dose) in Gamma Cell 220 irradiator at BARC, Mumbai. The seeds of M_0 were grown and were characterized for plant characteristics and yield attributes

Molecular tagging of bruchid resistance in groundnut and greengram revealed that, among the 19 groundnut genotypes screened for bruchid tolerance, the genotype AVT-I 1525 showed tolerance even after three months after artificial release of groundnut bruchids.

In blackgram, prerelease culture GBG1 and four check varieties *viz.*, LBG752, LBG623, IPU2-43, and PU 31 was carried out for DNA finger printing with both SSR and RAPD markers was carried out. The SSR markers resulted in monomorphic banding pattern and fingerprint profiles were developed RAPD markers which distinguished the varieties under testing.

In Molecular mapping of Yellow Mosaic Virus Tolerance in mungbean (*Vigna radiata* L.), population by reciprocal crossings were done between the parents TM 96-2 (YMV Susceptible) and EC396117-1 (YMV Tolerant) genotypes.

DNA finger printing of finger millet varieties PPR1012 and four check varieties *viz.*, Vakula, GPU67, Godavari and Saptagiri was carried out with RAPD markers revealed that, eleven markers (OPR4, OPS7, OPC20, OPF16, OPT5, OPC9, OPB8, OPF9, OPN4, OPN10 and OPJ6) out of 15 RAPD markers were polymorphic in the five varieties of fingermillet.

9. NANO TECHNOLOGY

Different nanoscale materials including nano ZnO, nanoscale CaO, nanoscale MgO, nano iron oxide were prepared using sol-gel method. The average size of all the prepared nanoparticles was found to be 25 nm.

The percent incidence of PSND at different days of pest incubation (7,14,21 days respectively) significantly reduced with the application of nanoscale ZnO @ 1000 ppm (12%, 27% & 38% at 7 DPI, 14 DPI & 21 DPI respectively) compared to all other treatments.

During *kharif* season, application of nanoscale ZnO @ 2g l^{-15} lit at 25 & 40 DAS along with RDF recorded significantly higher yield (0.99 t ha^{-1}) compared to control (0.69 t ha^{-1}), RDF (0.81 t ha^{-1}) and RDF + foliar application of $ZnSO_4$ @ 2 g l^{-1} at 25 & 40 DAS (0.83 t ha^{-1}). During *rabi* season also, same trend was observed by recording significantly by higher yields (0.46 t ha^{-1}) with application of nanoscale ZnO @ 2g l^{-15} lit at 25 & 40 DAS along with RDF compared to all other treatments.

Significantly higher grain yield (1.92 t ha^{-1} in *kharif* , 2017) was recorded in the treatment which received RDF along with the foliar application of nanoscale zinc oxide @ 2 g l^{-10} at 25 & 40 DAS followed by RDF+ foliar application of nanoscale ZnO 1 g l^{-10} at 25 & 40DAS (1.68 t ha^{-1}).

10. APICULTURE

Agricultural Research Station, Vijayarai.

In Cucumber, *Apis mellifera* was found to be the dominant insect pollinator at 9.00am (8.60 min^{-2}) and visited highest number of flowers (7.65 min^{-2}) among all the pollinators during the month. Highest yield was recorded in bee pollination (59.64 q ha^{-1}.) followed by open pollination (56.30 q ha^{-1}.). Lowest yield was recorded in pollinators exclusion (44.90 q ha^{-1}.).

In survey and surveillance for bee diseases and enemies, highest mite incidence was observed in colony no:9 (50.50) and lowest mite incidence was observed in colony no:6 (3.00), where as no European foul brood disease was observed in colony no:19 (0.00%) and highest incidence was observed in colony no:14 (27.50%) during the period under report.

Carpenter bees (*Xylocopa fenestrata*) preferred 0.56 cm to 2.12cm one foot length bamboo poles in front open poles of one year old bamboo. In rear side of the poles preference ranged between 0.12 cm to 2.60 cm in different months of the year for rearing their young ones and preserved the dough (pollen mixed with nectar).

Highest *Tetragonula* workers with pollen loads were recorded at 9.00am (4.97 min^{-5}) and highest nectar loads were recorded at 3.00pm (23.95 min^{-5}) The number of out going forages were highest at 11.00 am (17.72 min^{-5}).

Highest brood rearing was recorded in Bamboo node (2195.19 cm^3) followed by *A.cerana* brood chamber (676.46 cm^3). Pot hive has recorded highest pollen pots among all the colonies (407.66 cm^3) during the year.

Out of twenty eight plants visited by different pollinators at Agricultural Research Station, Vijayarai, *A.mellifera* was found to be the dominant pollinator on seventeen plants.In three plants (Tamarind, Portulaca & Duranta) *Nomia* sp. on two plants (Teak & Seemarouba) *Tetragonula irridipennis*. on sunhemp (Yellow butterflies) and on mango black ants (*Monomorium* sp.) on mango were dominant visitors recorded.

Highest sealed brood and highest percentage of food consumed by honey bees was recorded in P.A.U pollen substitute fed colonies (1410.09 cm^2 and 61.21%)) followed by sugar syrup fed colonies (1397.81 cm^2 and 59.30%). Highest sealed nectar was recorded in sugar syrup fed colonies (1576.22 cm^2) followed by P.A.U pollen substitute fed colonies (492.27 cm^2).

11. Agro-Economic Research

Regional Agricultural Research Station, Anakapalle

Cost of cultivation (per hectare) for important crops in North Coastal Zone were worked out such as sugarcane (irrigated- plant crop Rs. 242787; rainfed 1,27,499), sugarcane ratoon crop (irrigated Rs.1,97,909: rainfed Rs.1,25,394), rice (transplanted Rs.1,14,943; direct sown Rs.99,262; Drum Seeder sowing Rs.1,00,366), maize (Rs. 89,992) ragi (Rs.67,181), blackgram (Rs. 15,262), greengram (Rs. 14,721), redgram (Rs.33.044), groundnut (Rs. 74,338), sesamum (Rs. 21,824) and mesta (Rs. 67,671).

Forecast of month wise prices for the period April, 2018 to March, 2019 and monthly prices (per quintal) of jaggery at Anakapalle market for the period 1990-91 to 2017-18 were analyzed. The forecasted prices of jaggery (per quintal) from April 2018 to March 2019 arrived are Rs. 2,632 to 2,996, Rs. 2,745 to 3,118, Rs. 2,791 to 3,197, Rs. 2,813 to 3,193, Rs. 2,778 to 3,446, Rs. 2,796 to 3,676, Rs. 2,725 to 3320, Rs. 2,801 to 3,266, Rs. 2,713 to 3,183, Rs. 2,812 to 3,034, Rs. 2,957 to 3,034 and Rs. 3,089 to 3,275 respectively.

Regional Agricultural Research Station, Lam

The return on rupee of investment of rice - rice, rice-blackgram, rice-greengram, rice-maize and rice-jowar were 0.04, -0.07, -0.08, and -0.01 and the cost of production (Rs/q) were 1841.28/-, 1979.63/- 1925.19/-,1641.52/- and 1913.57/- respectively.

During 2017-`18, in cotton, sugarcane, bengalgram, chillies, redgram, turmeric and tobacco the farmers realized -0.25, 0.13, -0.26, 0.08, -0.32, 0.10 and -0.36 as return on rupee of investment respectively.

The cost of production per quintal of paddy in direct seeded rice is Rs.1,463/- where as in traditional transplanting rice, it was 1,750/- The additional benefit of Rs.21,211/- per DSR adopted farmers was due to less cost of cultivation and slight increase in yields.

The cost of production per quintal and return on investment of transplanted paddy under farm mechanization in rice was calculated as Rs 1,775.23/-, Rs.1,551.16/- and -0.08, 0.11 respectively.

The return on rupee of investment of greengram, blackgram, redgram and bengalgram were -0.06,-0.31, -0.32 and -0.26 respectively and the cost of production (Rs./q) were Rs. 6,013.51/-, Rs.6,684.28/-, Rs.5,409.02 and Rs.4,737.88/- respectively

In Prakasam district, the average cost of cultivation of FCV tobacco crop in SLS was Rs. 29,219 $acre^{-1}$ (accounting to 45.98 per cent of total cost) and in SBS, it was Rs. 35,279 (39.06 per cent of total cost).

In West Godavari district, the average cost of cultivation of FCV tobacco crop was Rs. 47,494.45 $acre^{-1}$ accounting to 36.34 per cent to the total cost. The total operational costs of both cultivation and curing were worked out as Rs 79,402.45 acre^{-1} (60.80 per cent of total cost).

12. AINP on Biofertilizers, Amaravathi

The new strains of pigeon pea Rhizobium showed tolerance to high temperatures and performed nodulation at a temperature of 40^{o}c.

Microbial decomposition technology by using 'Decompo A' and 'Decompo B' consortia was developed. Its application on sorghum straw could decompose within a period of 45 days.

Farm crop residue recycling process was developed for effective soil health management.

Sorghum crop yields were increased because of application of Potassium Releasing Bacterial (KRB) inoculants in vertisol soils.

Microbial consortium was developed for decomposition of agricultural wastes with a target of meeting good share of nutrients from organic sources and also to protect the soil health.

Application of liquid biofertilizers (Rhizobium + PSB + KRB) enhanced blackgram grain yields by 28.8% over the control whereas with carrier based inoculants the enhancement was 20.4% over the control.

Application of 75% RDF with three biofertilizers (N-P-K) could save 25% of RDF and recorded 18% extra grain yield over 100% RDF in sorghum crop under rainfed conditions during 2017-`18.

Twenty numbers of Bacterial and Actinobacterial strains were isolated from the most drought prone area of Ananthapuram, Andhra Pradesh.

An easy multiplication technique for producing Trichoderma at farmers level was developed at ARS, Amarvathi.

A total of 388 Metric tons of powder biofertilizer formulations and 46,000 litres of liquid biofertilizer formulations to a worth of Rs. 311.6 lakhs were produced and supplied to the farming community of Andhra Pradesh during the year 2017-18.

13. Agricultural Extension

Regional Agricultural Research Station, Tirupati

Through '*Mana Verusanaga*' mobile app a total of 288 agro advisories were given to farmers through SMS and 119 agro advisories were give through email. The results of the app users, profiles reveals that majority are middle aged having intermediate education, high income group, nuclear families with 5-10 members and having more than 10 acres of land.

The ANGRAU Research Management System (ARMS) portal was brought in to operation since *Kharif* 2017. At present, 270 scientists are using and 1984 technical programmes are uploaded and being updated every month along with other related activities being attended by the scientists. User manual was prepared and distributed for all the users.

Regional Agricultural Research Station, Lam

In Guntur district, majority of the respondents (56.52%) had medium level of adoption regarding adoption of soil health cards followed by low (34.78%) and high (8.69%) levels of adoption, respectively.

In Krishna district, majority of the respondents (45.71%) had medium level of adoption regarding adoption of soil health cards, followed by low (31.43%) and high (22.86%) levels of adoption, respectively.

Regional Agricultural Research Station, Anakapalle

The bajra hybrid (ABH-06) registered superior grain yield (1.79 t ha^{-1}) with lengthy and compact panicles to that of local variety, Pittaganti (1.44 t ha^{-1}).

The bajra variety (ABV-04) showed superior performance with higher grain yield (1.66 t ha^{-1}) than that of local variety (1.42 t ha^{-1}).

The minikit paddy variety, MTU 1224 in *kharif* season at Anakapalle and Chodavaram mandals showed superior performance (5.26 t ha^{-1}) over that of check variety BPT 5204 (4.97 t ha^{-1}).

A demonstration on direct sowing of paddy variety MTU 1184 with drum seeder recorded higher yield (5.46 t ha^{-1}) over to that of normal transplanted method (4.96 t ha^{-1}; Rs.57,040) with a saving of Rs 10,416/- in the cost of cultivation (Rs 46,624).

A Study on crop shift in NC Zone of Andhra Pradesh was taken up with 180 samples from three districts. The reasons for crop shift was categorized into 4 categories as, socio-economic, technological, administrative and psychological constraints. Among Socio economic constraints, 97.2 % of farmers opined that high labour cost is the main reason for crop shift in sugarcane followed by non availability of machinery for farm activities (90%) and labour shortage (83.3%).

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". Education of rural people in agriculture and allied areas is one of the main functions of agriculture extension through frontline demonstrations/on-farm trials/extension services.

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 centres.

- Krishi Vigyan Kendras (KVKs)
- District Agricultural Advisory and Transfer of Technology Centres (DAATTCs)
- Extension Units in RARSs
- Agricultural Information & Communication Centre (AI & CC)
- Electronic Wing
- Farmers Call Centre

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 in Regional Agricultural Research Stations/Agricultural Research Stations with a multidisciplinary team of 3 Scientists mainly consisting of Crop Production, Crop Protection and Agricultural Extension.These centres were shifted from Agricultural market committees/ ARSs at District Head Quarters to the Krishi Vigyan Kendra premises w.e.f., 09-11-2017 for effective functioning of transfer of technology activities, effective utilization of manpower and to have synergy between the two extension units to serve the farmers in much more effective manner.

2. KRISHI VIGYAN KENDRAS (KVKs)

There are 13 Krishi Vigyan Kendras (KVKs), which are grass root level extension centres devoted to educate farmers, farm women and rural youth on- farm technologies and related skills through short term and long term training programmes.. Vocational training in agriculture and allied fields through KVK has become the need of the hour for ensuring livelihood security and enhancing farm income which envisages to be doubled by 2020. These centres also demonstrate the latest technological developments to the farmers and are also engaged in technology assessment and refinement under farmers' field conditions.The use of ICT by KVKs has been substantial to provide necessary and timely information on weather, markets and solutions to various day to day problems faced by the farmers.

3. FARMERS CALL CENTRE

First and foremost in the history of Indian Agriculture "Farmers Call Centre" with an innovative idea of transferring novel scientific technology in Agriculture to the farming community. It is accessible to the farmers of

Andhra Pradesh on toll free number 1800 425 0430 connected to all villages. The questions asked by the farmers along with answers are also being published in Vyavasayam, Padipantalu and other monthly magazines.

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 2017-18, 3088 calls received from different districts of Andhra Pradesh and utilized the services and benefited by taking suggestions from the Scientists of Acharya N.G. Ranga Agricultural University on crop production technologies.

Agricultural Information & Communication Centre (AI&CC):

This centre is responsible for processing of latest agricultural information generated by the university and transfer of technology to the farming community in the state through various publications and media combinations.

Electronic Wing:

After bifurcation of the University, the Electronic wing started its functioning during 2016 to promote e-extension and support TV channels and develop DVDs on various crops and technologies.

Electronic Wing and Farmers Call Centre operating as independent units under Extension and Research respectively were merged with the Agricultural Information & Communication Centre (AI & CC) for effective transfer of technology through print and electronic media w.e.f. 29-12-2017.

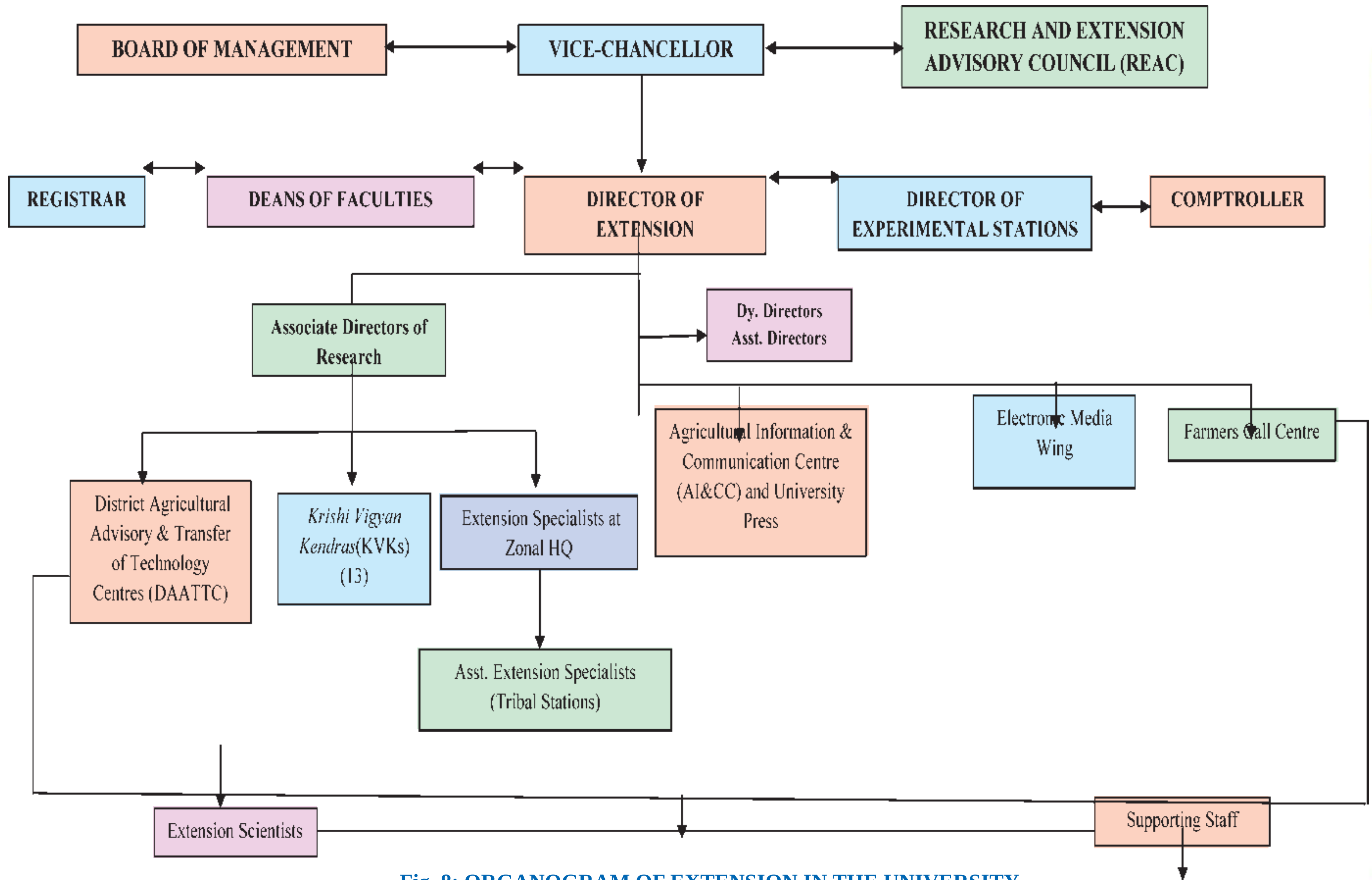


Fig. 8: ORGANOGRAM OF EXTENSION IN THE UNIVERSITY

II. EXTENSION ACTIVITIES

The significant highlights of the extension activities carried out during 2017-18 are presented below

1. TECHNOLOGY ASSESSMENT AND REFINEMENT (TAR)

"On-station research-adaptive research-extension" 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.

Minikits:

During the year 2017-18, the District Agricultural Advisory & Transfer of Technology Centres (DAATTCs-13 no.), Krishi Vigyan Kendras(6 no.) and Extension Specialists of RARS/ARS (2 no.) together have tested 56 minikit cultures of 10 crops at 2268 locations during *Kharif* 2017 (1568 no.) and *Rabi* 2017-18 (700 no) covering all the districts of the state.

On-Farm Trials (OFTs):

"On Station Research-assessment on farmer fields-extension" is a continuum culminating in the assessment and dissemination of profitable technologies to the farmers. Technology assessment and validation are crucial intermediate steps between research and extension to promote location specific/relevant technologies for adoption. Hence technology assessment under farmer's field conditions assume greater importance to validate the technologies generated at research stations so that appropriate feedback may be provided to the research scientists for suitable modification.

During 2017-18, a total of 131 technologies were assessed by KVKs and DAATT Centres and Extension Specialists of RARSs, covering field crops (82), horticultural crops (30), animal husbandry (12) and home science (7).

Front Line Demonstrations (FLDS):

KVKs and DAATTCs organized frontline demonstrations (FLDs) to disseminate the production potential of important varieties and various production technologies at several locations-specific farming agro–ecological situations. Training programmes and field days were organized to the farmers and extension functionaries for rapid dissemination of improved technologies.

During the year 2017-18, a total of 200 frontline demonstrations covering 1098.94 ha under pulses, cereals, oilseeds, commercial crops, horticulture crops, fodder crops, livestock and fisheries.

2. DIAGNOSTIC FIELD VISITS

Periodic diagnostic surveys during the crop growth period and providing timely advices to overcome the maladies identified were the most important activity of the DAATTCs, KVKs and Extension Specialists. During 2017-2018, a total of 2543 diagnostic surveys were undertaken in different districts of the state. Out of 2543, 806 surveys were undertaken by the DAATTC scientists and ESs alone and 874 by KVKs alone while 863 surveys were conducted jointly by the DAATTC, KVK, ARS Scientists and Officers of DOA.

Major biotic and abiotic stresses identified in different crops and handled through diagnostic surveys are given below

Rice	Stem borer, gallmidge, zincdeficiency, brown plant hopper, potassium deficiency, iron deficiency, leaf folder, sheath blight, leaf blast, leaf mite , sheath rot, stem rot, bacterial leaf blight, panicle mite, neck blast, false smut, cutworm, rat damage, annelids.
Maize	Stem borer, pink borer, Shoot borer, potassium deficiency, *Turcicum* blight (sheath blight), leaf blight, banded leaf, Army wormand cob borer.
Jowar	Army worm, Pink borer and Aphids
Fox tail millet	Smut
Greengram & Blackgram	*Spodoptera*, Flea beetles, *Maruca* pod borer, aphids, stem fly, white flies Powdery mildew, moisture stress, *Corynospora* leaf spot, YMV, bud necrosis, cuscuta, stem canker, rust and leaf curl.
Redgram	Pod borers (*Helicoverpa* and *Maruca*), pod fly, leaf folder, mites, leaf webber, wilt, sterility mosaic, rust, YMV, moisture stress, aphids
Bengalgram	Pod borers (*Helicoverpa*, *Spodoptera exigua*, *S. litura*), wilt and dry root rot
Cotton	Sucking pests, mealy bugs, mites, pink boll worm, *Earias*, *Helicoverpa* damage, spodopetra damage, root rot, *Fusarium*wilt, boll rot, desiccation, tobacco streak virus, grey mold, para wilt and megnesium efficiency.
Groundnut	Leaf miner, root grub, *Spodoptera*, thrips, mealy bugs, aphids, jassids, leaf webber, thrips, red hairy caterpillar, , collar rot, tikka leaf spot, stem rot, bud necrosis, late leaf spot, PBND, PSND, moisture stress, Nematodes and micro-nutrients deficiency.
Sesame	Powdery mildew, *Alternaria* leaf spot, thrips and leaf webber.
Sunflower	Necrosis, *Helicoverpa armigera*,leaf eating caterpillar and moisture stress,
Castor	Sucking pests, Spodoptera, Semilooper and capsule borer
Sugarcane	Early shoot borer, mealy bugs, mite, root grub, rust, whip smut, yellow leaf syndrome, mosaic, top rot, grassy shoot, wilt, scale insect, red rot, ring spot and Fe deficiency.
Chillies	Thrips, mites, fruit borers, midge, cercospora leaf spot leaf curl virus, Gemini and cucumber virus, fruit rot, die back, tobacco caterpillar and micro nutrient deficiencies.
Tomato	Bacterial wilt, early and late blight, south american leaf miner, bacterial leaf and fruit spot, fruit borer, alternaria leaf spot, phosphorous deficiency symptoms, leaf curl virus and viral diseases.
Brinjal	Shoot and Fruit borer, white fly, ash weevil, red spider mite, bacterial wilt, root rot.
Bhendi	YVMV, Fruit borers and sucking pests

Onion	Thrips, purple blotch, root grub and blight.
Cluster bean	Sucking pests
Turmeric	Leaf spot/leaf blotch and rhizome rot
Yam	Collar rot
Betelvine	Leaf spot
Cashew	Thrips, tea mosquito bug, root and stem borer.
Mango	Leaf hoppers, thrips, galls, mealybugs, anthracnose, powdery mildew and
Sapota	fruit fly
Coconut	Mealy bug, Eriophyid mite, Ganoderma, black headed caterpillar
Banana	Rhizome weevil, nematodes, *Spodoptera,* 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, viral complex, leaf curl virus, ring spot virus, Zn, B deficiency.
Guava	Mealy bug, tea mosquito bug
Musk melon	Mite damage, red pumpkin beetles, *Spodoptera*, sucking pest, leaf miner, downy mildew, viral diseases, boron deficiency (fruit cracks).
Apple ber	Fruit fly
Acid lime	PomegranateLeaf miner and citrus canker. Sucking pests, Potassium deficiency, Bactirial leaf blight, Boran deficiency, Fruit Sucking moth and fungal spot.
Marigold	Helicoverpa and leafminer
Rose	Black spots & thrips
Water melon	Sucking pests, viral diseases and bud necrosis
Eucalyptus	Galls formation in leaves
Soobabul	Root rot
Fisheries	Fish mortality due to Argulus disease
Cattle	Poor productive efficiency
Sheep and goat	Pyrexia, inflammation of tongue and lips, Poor reproductive and productive efficiency

3. CAPACITY BUILDING PROGRAMMES

Various capacity building programmes *viz.*, trainings, skill teachings, vocational trainings, group discussion, fields days and Rythu Sadassus were organized to build the capacity of clientele groups covering crop production and protection technologies of field and horticulture crops, home science and fisheries by DAATTCs, ESs and KVKs during 2017-18. About 151 capacity building programmes to Extension Personnel, 651 programmes to Farmers and farm women, 101 programmes to NGOs and input agencies, 79 programmes to Rural Youth,622Method demonstrations, 45 Vocational training programmes, 79 Rythu Sadassus, 753 Group discussions and 143 Field days were organized for the benefit of the farmers etc.

3.1 Extension Personnel

The DAATTCs and KVKs conducted 151 training programmes and trained altogether 6337 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.,

3.2 Farmers

A total of 651training programmes were conducted, covering 23799 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, use of bio-fertilizers, vermin 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.,

3.3 NGOs

One hundred and one training programmes were conducted benefitting 1969 personnel of NGOs, Banks and input dealers. The training programmes covered particularly aspects like soil tes 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 storage pest management and long term-storage of cereals.

3.4 Skill Teachings

A total of 42 skill teachings were imparted by KVKs and DAATTCs to 945 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 pests 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 etc.,

3.5 Vocational Trainings

One of the important mandates of the Krishi Vigyan Kendras is to organize vocational training for self-employment. During the year 2017-18, ANGRAU KVKs (12) together organized 45 vocational training programmes benefitting 2567 participants (farmers, farm women, rural youth & para seed workers). The areas of vocational training include value addition to millets, fruits & vegetables (13 no.), value addition to milk (1 no.), value addition to fish and prawn (1 no.), nursery raising for seedling production of vegetables and fruits (1 no.), mushroom production (9 no.), bakery products preparation (2 no.), organic farming and vermi compost preparation (1 no.), jute bag making (2 no.), seed production (4 no.), integrated farming system (1 no.), friends of coconut trees (1 no.), parthenium week (1 no.), nutritional week, goat rearing, farm mechanization & post-harvest technology, minor repairs of sprayers, banana fibre extraction, low cost nutritious recipes with millets, cashew orchard management and plant protection machinery.

3.6 Group Discussions

A total of 753 group discussions were organized by the DAATTCs and KVKs for 5613 farmers during 2017-18. The topicsincluded like Diseases management in paddy,Viral diseases management in rabi rice fallow pulsesGreen manure crops before rice, Pest management in Mango,Anestrum/ Silent heat in buffaloes, Mastitis - Diagnosis, Prevention and Control, Poultry diseases & Management, Sheep diseases & management,Soil test based fertilizer application, Rice Varieties suitable for kharif, Paddy seed production at farmer level, Nutritional care for preschool children, Rice nursery management, seed treatment in greengram Direct seeding in rice with seed cum ferti drill, Fertilizer application through fertilizer dispenser,Erecting of pheromone traps to monitor pink boll worm incidence, Neem seed kernel extract preparation 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, 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 143 field days were conducted by DAATTCs and KVKs and benefited 4644 farmers. These included field days on “nandyalaa senaga-1” variety of Bengalgram, *rabi* sunflower(DSH-185), varieties of rice (MTU 1061, NDLR 47), Biological control of pests in paddy, Biological control of pests in maize, sugarcane, groundnut (Dharani), Anantha seed planter in groundnut, redgram (PRG-176), blackgram (TBG 104), Intercrop of redgram + blackgram as alternate to cotton, MSRI in rice, sunflower, drum seeder technology in rice, zero tillage cultivation in maize, soil test based fertilizer application in paddy, liquid bio fertilizer in rice, captive rearing of fish etc.

4. KISAN MELAS:

Kisan Melas were organized during the period under report at Regional Agricultural Research Stations, Lam, Anakapalle, Chintapalle, Maruteru, Tirupati, Nandyal, ARS, Ragolu, ARS, Reddipalli and College of Agricultural Engineeringto create awareness and to educate farmers about latest farming technologies and developments. Kisan Melas provide an opportunity to see the latest technologies, live demonstrations, informative agricultural exhibitions, interaction with the scientists, input agencies and inculcate the habit of visiting research stations frequently for timely advices. During 2017-18, eight Kisan Melas and one Farm Engineering Expo 2018 were organized benefitting 12650 farmers. Exhibitions, rythu sadassus and field visits were arranged in the kisanmelas.

Dr.V. Damodara Naidu, Hon'ble Vice - Chancellor, ANGRAU addressing farmers on the eve of Kishan Mela at RARS, Lam

Dr. P. Rambabu, Director of Extension, ANGRAU addressing farmers on the eve of Kishan Mela at RARS, Chintapalli

5. 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" programme from 2nd October, 1998 twice a week, Tuesday and Friday. In order to exploit the role of electronic media to educate the farmers on efficient use of inputs for sustainable and export oriented agriculture, post-harvest handling, market information etc., an Electronic Media Wing was established during 2001 to promote e-extension. After bifurcation of the University the centre became functional from July, 2016.

6. PHONE IN LIVE PROGRAMMES:

Phone in live programmes were telecast through the following channels.

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 pre-informed topic for the day from 6.00 pm to6.55 pm. The Electronic Wing identified the topics and the resource persons for 25 programmes telecasted on Doordarshan phone-in-live programme during the year 2017-18.

II. Annapurna (TV5):

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.

III. VyavasayaPatasala in All India Radio (AIR)

The Vyavasaya Patasala programme was broad-cast on every Monday in All India Radio (AIR) and a total of 53 programmes were broadcasted using the services of ANGRAU scientists.

IV. VyavasayaSuchanalu in Telugu Dailies

Farming community has been alerted on weekly about the measures to be taken up in different crops through Padi-Panta Column of Sakshi daily on every Monday. Agri Plus column in Prajasakthi daily on every Friday and Krishi Column of AndhraJyothi daily from 2017 and through Kalgudi platform and Reliance foundation.

V. Kalajatha

Technology promotion through folk arts is one such method. During the year, five programmes were organised in Ongole (Prakasam Dt.), Mopidevi (Krishna Dt), Peddapuram (East Godavari Dt.), Undi (West Godavari Dt.) and Maruteru (West Godavari Dt.)

VI. Electronic Wing Blogspot (www.angrauew.blogspot.in)

A blog has been designed for the Electronic Wing, Guntur to provide the agricultural information with customized, visual, multi-perspective and multi-level active service, digital agricultural information resources sharing plan based on cloud computing to integrate and publish the digital agricultural information resources efficiently and timely.

VII. ANGRAU YouTube Channel

An effective tool to reach the needy with video content. It was inaugurated by the Hon'ble Vice-Chancellor on 13th October 2017. About 144 Subscribers with 13000 + views across 115 countries, this media founds very promising to reach out (URL:https://www.youtube.com/channel/UCD8_GxXQpdBogS5AwwFkKTQ/featured

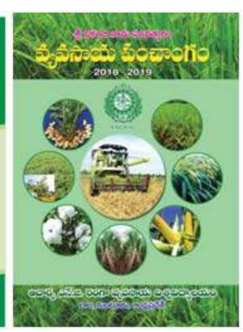
VIII. ANGRAU Electronic Wing Facebook Page

Facebook is the most used social media platform in the world and this means has an immense potential for extension professionals. ANGRAU Electronic Wing Facebook Page was initiated in December 2017 and page reach is 6918.

7. TECHNICAL PUBLICATIONS

Agricultural Information and Communication Centre (AI & CC), Guntur has brought out the following publications during the year 2016-17.

- VyavasayaPanchangam 2018-2019
- Journal of Research, ANGRAU (Quarterly)
- Vyavasayam – Monthly Telugu Farm Magazine
- ANGRAU e-News Letter
- Research & Extension Highlights 2017-2018

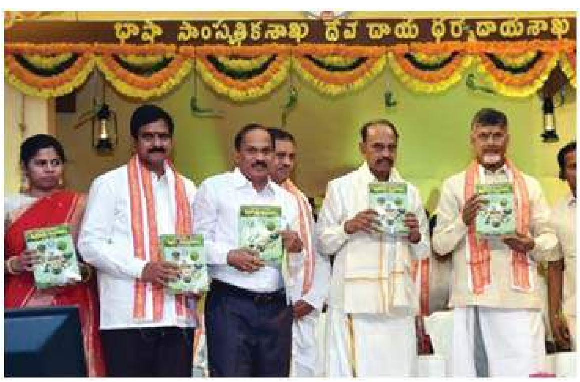


The Journal of Research ANGRAUVyavasayaPanchangam

VyavasayamANGRAU e-NEWS letter

VyavasayamANGRAU e-NEWS letter

The Vyavasaya Panchangam 2018-19 was released by the Hon'ble Chief Minister of A.P Shri N.Chandrababu Naidu, on the eve of Ugadi Day Celebrations (18-03-2018) held at Vijayawada.



Release of Vyavasaya Panchangam 2018-19 by Sri. N. Chandrababu Naidu, Hon'ble Chief Minister of Andhra Pradesh on UGADI day celebrations held at Vijayawada

Farmers Call Center poster

Designed and printed 3000 number of Farmers Call Centre sticker poster for promotion of Toll Free No 1800 425 0430 and displayed at Panchayat, Milk Collection Centres and Racha Bandas through Krishi Vigyan Kendras of Andhra Pradesh.

8. DIPLOMA IN AGRICULTURE EXTENSION SERVICES FOR INPUT DEALERS (DAESI)

One year long duration training under DAESI programme for 40 input dealers was organized at KVK, Darsi and completed during the year 2017-18 to transform them as para-extension professionals. The trainings were organized as class room teaching and field visits during Sundays or on local market holidays. The field visits intended to acquaint the input dealers with location-specific field problems and expose them to relevant technologies. The programme is spread over a period of 48 weeks, with 40 classroom sessions and 8 field visits to various institutions and farmers' fields. Study material in local language was provided and multi-media instructional devices were used in the classrooms.

Training to input dealers

Trained input dealers

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 week for a duration of 3-5 days were organized at KVKs of Rastakuntubai, Banavasi and Reddipalli, and created awareness on soil health management, farm mechanization, entrepreneurial activities, home science technologies, horticulture, animal health camps and fisheries technologies to the farmers.

10. ATTRACTING AND RETAINING YOUTH IN AGRICULTURE (ARYA)

Attracting and Retaining Youth in Agriculture (ARYA) is a flagship project of ICAR that was launched during March 2015 as one of the components of National Agricultural Innovations Fund. KVK, Nellore of the ANGRAU is the only cntre where this project is being implemented in the state.The main objectives of the programme are to attract rural youth to take up various agriculture, allied and service sector enterprises, to enable youth to establish network groups to take up capital and resource intensive activities like processing, value addition and marketing and to demonstrate linkages with different stake holders for sustainable development of youth. ARYA has been implemented by Nellore KVK in Andhra Pradesh.

KVK, Nellore has established 60 enterprise units (mushroom production units in 21 villages benefiting 75 rural youth, vermi compost production units in 20 villages benefiting 64 rural youth and fruit and vegetable nurseries in 19 villages benefiting 64 rural youth) in the year under report. KVK, Nellore organized 4 skill training programmes on raising of fruit and vegetable nurseries, construction of shade nets and portray nursery technology, mushroom cultivation, vermi compost production benefiting710 rural youth and imparted skills to enable the youth to establish enterprises in their villages. Also organized skill training programmes like vermi compost production (3), raising fruits and vegetable nursery under shade net, construction methodology of shade net units and portray nursery technology and mushroom production benefiting 344 farmers.

Vegetables and fruit nurseries shade net unit

11. VIDEO /TELE CONFERENCING

With a view to have timely and effective review and monitoring of various University extension activities, online review was done through ‘Google hangout’ and through teleconference.

The Director of Extension, ANGRAU reviewed the progress of activities of DAATTCs and KVKs every month with Coordinators of DAATTCs and Programme Coordinators of KVKs during the period under the report.

12. VILLAGE ADOPTION PROGRAMME

The major and medium research stations and Agricultural Colleges of ANGRAU have adopted one village each during the year with an objective for the overall development of the adopted village. The programme works by utilizing Farmer-Scientist linkages in technology transfer. This also enables the adoption of technologies without time lag between technology generation and adoption with least technology dissemination losses. During 2017-18, Regional Agricultural Research Station, Chinthapalli, Anakapalli, Maruteru, Lamfarm, Tirupathi, Agricultural Research Station, Ragolu, Seethampeta, Vuyyuru, College of Agricultural Engineering and College of Food Science & Technology, Bapatla,Agriculture College, Bapatla and S.V. Agriculture College, Tirupati have adopted the villages and transferred the technologies.

Dr. Lokanadha Reddy Associate Dean, Agricultural College, Bapatla distributing Pheromone Traps in the adopted Village Damanavaripalem

Inauguration of *Tricho* card production unit at adopted village Asarada on 18-04-2018

13. T & V MEETINGS

The Training & Visit meetings are being conducted on the 1st Saturday of every month at 13 lead Research Stations of ANGRAU. The problems identified by the Agricultural Officers and Assistant Directors of Agriculture of the district concerned were thoroughly discussed jointly by the Scientists of lead Research Stations and suitable corrective measures were given in the meetings. Every meeting was followed by the field visit in the afternoon. The impact points to be disseminated to the farmers through the Extension Functionaries for the next month were also discussed in these meetings.

T & V workshop at RARS, Lam

T & V workshop at RARS, Maruteru

14. ERUVAKAPURNIMA

Eruvaka Purnima was celebrated on 9th June 2017 and on this occasion all the best management practices were showcased for the benefit of the farmers by the active participation of DAATTCs and KVKs in all the districts of state. Farmers were also educated about the critical interventions impacting the productivity, good agricultural practices leading to cost reduction and profitable farming.

Participation of KVK, Kalikiri in Eruvaka pournami

Participation of KVK, Garikapadu in Eruvaka pournami

15. POLAM PILUSTONDI

All the Scientists of DAATTCs and KVKs of ANGRAU have actively participated in the POLAM PILUSTUNDI organized by the State Government in all the districts of AP held on Tuesday and Wednesday of every month during the year under report

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. POLAMBADI:

The activities of Polambadi organized by the Official / Functionaries of of Department of Agriculture given active support by the scientists of concerned KVKs, DAATT centres, RARS and ARS of ANGRAU for the officials / functionaries of State Department of Agriculture during 2017 – 18.

18. JANMABHOOMI – MAAOORU

All the Scientists of DAATTCs and KVKs of ANGRAU have actively participated in the Janmabhumi – Maa Ooruprogramme during 2017-18. This is an opportunity for the Scientist to conduct exhibition, have exposure to farmer problems, interact and recommend the package of practices with farmers and suggest the remedial measures on the spot. It is a coordinated and collective activity of all the line and core departments to solve the problems of rural community.

19. NATIONAL INITIATIVE ON CLIMATE Resilient Agriculture (NICRA)

National Innovations in Climate Resilient Agriculture (NICRA) is a multi-institutional and multi-disciplinary network project launched by ICAR in 2011. The project aims to enhance resilience of Indian agriculture to climate change and climate variability through strategic research and technology demonstrations. The Technology Demonstration Component (TDC) of NICRA is being implemented at five Krishi Vigyan Kendras (Amadalavalasa, Undi, Chittoor, Kurnool and Reddipalli) of ANGRAU. To mitigate the climatic vulnerabilities, during the year 2017-2018, KVKs conducted demonstrations under NRM intervention *viz.,* in-situ moisture conservation practices, improved drainage in flood prone area, and various resource conservation technologies benefitting farmers. Crop production demonstration were conducted on drought, flood tolerant and short duration varieties, location specific inter cropping system, crop diversification, disease and pest management,nutrient management etc., covering farmers. Under livestock and fisheries interventions, KVKs covered farmers with demonstrations on fodder production, hydroponic fodder production, improved birds for backyard poultry, management of fish ponds

i. KVK, Amadalavalasa, Srikakulam District

a) Horizontal spread of flood tolerant varieties

Through the effort of KVK, the three flood tolerant varieties occupied an area of 16 ha in NICRA village covering 20 farmers whereas they occupied 10 ha covering 16 farmers in the adjacent village. The efforts of department of agriculture and AP seed corporation of Srikakulam district led to the spread of the three flood tolerant varieties *viz.*, MTU-1061, RGL-2537 and MTU-1064 to 1394, 2666 and 717 ha compared to 22, 475 and 0 hectares respectively before the start of NICRA in 2012.

- Yield loss reduced by 10.8% and 43.0% with MTU-1061 compared to MTU-1001.and Swarna respectively.
- Yield loss reduced by 7.5% and 29.0% with RGL2537 when compared to MTU-1001 and Swarna respectively.

Performance of flood tolerant varieties s MTU 1061 and MTU -2537 In Medium and low inundation Areas:

Treatments	Seed yield (kg/ha)	Fodder Yield (kg/ha)	Cost of cultivation (Rs/ha)	Gross income (Rs/ha)	Net income (Rs/ha)	B:C ratio	Remarks
Farmers practice	MTU-1001(53.56)	-- --	37,200	74,984	37,784	2.01	---
	MTU - 1075(60.50)		38,400	84,700	46,300	2.20	---
	MTU – 7029 (41.50)		32,000	58,100	26,100	1.81	---
Improved varieties	MTU-1061(59.38)	-- --	37,400	83,132	45732	2.22	---
	RGL-2537(57.62)		36,400	80,668	44,268	2.21	---

- *Price of paddy : RS 1400/- per Quintal*

Flood tolerant rice varieties

b) Zero tillage Maize

With a view to utilize residual soil moisture available after paddy harvesting and utilize water available in jagannadanaidu tank for crop diversification, maize was grown under zero till situation in place of blackgram which was yielding low due to YMV and adverse effect of low temperature during winter. This practice brought down cost of cultivation by Rs.2100 ha^{-1} and gave higher net returns of Rs.7128 ha^{-1} compared to normal method of maize cultivation.

Performance of zero tillage maize at KVK, Srikakulam

Treatments	Yield (Kg/ha)	Cost of cultivation (Rs/ha)	Gross income (Rs/ha)	Net income (Rs/ha)	B:C ratio
Zero tillage maize	7646	36400	91752	55352	2.5:1
Normal cultivation of maize	7052	38500	84624	46124	2.1:1
Blackgram(Local variety)	353	11250	12355	1105	1.09:1

Sowing of Zero tillage

Vegetative stage of Zero tillage

ii. KVK Reddipalli, Ananthapuramu

In-situ moisture conservation technologies

The NICRA village experiences uncertainty in productivity due to recurrent intermittent drought or erratic rainfall. The soils are slopy and shallow in depth (10-15cm) with low water holding capacity, sub soiling was practiced in groundnut to conserve soil moisture and for improving the productivity. The practice helps in better exploitation of stored soil moisture and applied nutrients from the soil profile.

The practices of sub soiling resulted in 16.07% higher yield compared to farmers with additional net returns of Rs.3738 ha^{-1}. In-situ moisture conservation through adaption of conservation furrows at an interval of 3.6 m was taken up in an area of 20 ha covering 12 farmers an additional yield of 72 kg ha^{-1} was recorded with conservation furrows than the farmers practice.

Sub-soiling with chisel plough

Drought tolerant varieties

Climate resilient varieties of groundnut, foxtail millet and paddy were demonstrated in the village. Resilient variety Dharani of groundnut recorded 47 kg ha^{-1} higher yield compared to traditional k-6 variety. SIA-3085 of foxtail millet gave Rs.1618/ ha of net returns over farmers variety Krishna devaraya. Cold, blast and BPH tolerant variety of paddy, sheetal recorded additional yield advantage of 0.78 t ha^{-1} with higher net income of Rs.15502 over farmers variety MTU-1010.

iii. KVK, Undi, West Godavari

Flood tolerant varieties

Flood tolerant varieties of paddy MTU-1061, MTU-1.06 recorded higher yield of 0.94 and 1.32 t ha^{-1} respectively over the farmers variety MTU-7029 with additional net returns of Rs. 25,550 ha^{-1} and Rs. 21127/- ha^{-1} respectively.

Short duration varieties

Short duration varieties of paddy MTU-1121, MTU-1156 were demonstrated in 15 ha area covering 20 farmers MTU-1121 was high yielder (7.22 t ha^{-1}) followed by MTU – 1156 (7.20 t ha^{-1}) compared to the farmers practice i.e., MTU-1010 (7.04 t ha^{-1}).

Mechanical transplanting

Mechanical transplanting of paddy results in higher yield advantage of 1.37 t ha^{-1} over manual transplanting. The cost of cultivation was reduced by Rs. 1650 ha^{-1} with higher net income of Rs. 26321 ha^{-1}.

Machine transplanting of rice

4. Demonstrations on Liquid bio-fertilizers: Harvesting of Zero tillage maize

Liquid bio fertilizers (1250 ml of Azospiri-llium + 1250 ml of PSB with 75 per cent demonstrated in 5 ha area with five farmers recorded an average grain yield of 6.60 t ha^{-1} as against 6.37 t ha^{-1} in farmers practice (100 Kg urea, 100 kg DAP, 100 kg MOP ha^{-1}), resulted in savig of Rs. 3000/- ha^{-1}. The B:C ratios of demo and farmers practice were 2.46:1 and 2.22:1 respectively.

Live Stock and Fisheries

Water quality management in fish ponds was taken up to avoid sudden mortality due to changes in water quality parameters. Monitoring of water quality *viz.,* Dissolved oxygen (DO), ammonia content and pH in fish ponds and adoption of correction measures on need basis resulted in 5.9% increase in yield and gave an additional income of Rs. 33520 ha^{-1}.

20. AWARENESS ON PROTECTION OF PLANT VARIETIES & FARMERSIGHTS ACT 2001

Five KVKs organized awareness cum training programmes on protection of plant varieties and farmers rights act 2001 during the year 2017-18. Awareness has been created to 7718 farmers and other stakeholders during the programme. The Minister for Agriculture, Govt. of AP, Shri. Somireddy Chandramohan Reddy participated as Chief Guest at KVK, Kondempudi on 17.3.2018 and about 4500 farmers attended to the programme. Hon'ble Prime Minister of India Shri Narendra Modi inaugurated 25 new KVKs across the country while participating in Krishi Unnathi Mela at IARI, New Delhi and addressed the farmers and other participants attending to these meetings at all the KVKs across the country through webcast. Local MPs, MLCs and MLAs participated in the programme. The participant farmers made aware of the provisions of the protection of plant varieties and farmers rights act formulated during 2001 and literature was provided to the farmers. Agricultural Exhibitions were arranged at the respective KVKs on the occasion.

With an objective of creation of awareness among farmers and other stakeholders about the provisions of Protection of Plant Varieties and Farmers Right Act 2001, five (5) Krishi Vigyan Kendras have organized training programme during the year 2017-18. The participant farmers made aware of the provisions of the protection of plant varieties and farmers rights act formulated during 2001 and literature was provided to the farmers. Agricultural Exhibitions were arranged at the respective KVKs on the occasion. Aware-ness has been created to 7718 farmers and other stakeholders during the programme.

Hon'ble Agricultural Minister Shri. Somireddy Chandra Mohan Reddy inaugurated KVK, Kondempudi

Awareness programme on PPV and FR Act at KVK, Rastakuntubai

21. AWARENESS ON NATIONAL WAREHOUSING (DEVELOPMENT AND REGULATORY) ACT

Fifty farmers, traders and dall mill owners participated in the one day awareness training programme for farmers, traders and dall mill owners on national warehousing (development and regulatory) act at KVK, Darsi on 12/03/2018. The program was organized to enable the farmers, traders and dall mill owners to know the benefits of negotiable receipts and encourage them to store their agricultural produce in registered warehouses.

22. PARTNERSHIP ACTIVITIES OF ANGRAU WITH RELIANCE FOUNDATION

Reliance Foundation Information Services (RFIS) provides validated information services with help of Acharya N.G. Ranga Agriculture University expertise to different livelihood information seekers using modern Information and Communication Technologies (ICT). The Information is disseminated though audio, dial out conferences, local cable TV scrolls, live-phone-in programmes, agro advisories on daily basis, weather news bulletins, Voice advisories, text SMSs, Jio Chat, What's app and field based programmes such as knowledge on wheels, plant clinics and training programmes covering agriculture and allied sectors.

During the year 2017-18, 1561 news bulletins and 1378 voice messages and 237 What's app messages, which are seasonal based, need based and validated content with the expert support from the ANGRAU scientists were communicated to the farmers through mobiles and 11 Cable Channels in Andhra Pradesh. About 9,32,000 + users received 266 voice advisories for 10 crops *viz.*, rice, sugarcane, blackgram, greengram, cotton, chillies, groundnut, maize and mango.

Participation of ANGRAU scientists in different ativites of Reliance Foundation Information Services

23. FARM SCIENCE CLUBS

Krishi Vigyan Kendra, Rastakuntubai has been conducting "Farm Science Clubs" as an innovative extension methodology. Reaching the unreached through student to farmer parent is the objective in which tribal college students are imparted knowledge on crop and season specific agricultural practices fortnightly once. These Farm club members in turn disseminate knowledge to the farmers in their villages and families. The activities include fortnightly interaction on recent agricultural technologies, distribution of agricultural information material, organization of guest lectures to the members on topics related to agriculture and allied sectors and organization of quiz & essay writing competitions on important days

24. TRIBAL YOUTH NETWORK

The Krishi Vigyan Kendra, Rastakuntubai selected tribal youth from remote tribal villages formed as 'Tribal Youth Network'. The main objectives of tribal youth network are promoting change agentship followed by agriprenuership among tribal youth in remote areas.

KVK facilitates these groups by establishing linkages with the line departments. These groups actively take part in various welfare and developmental activities at village and mandal level.

25. WORLD SOIL DAY- SOIL HEALTH CARDS

The Krishi Vigyan Kendras celebrated World Soil Day on 5th December, 2017 involving technical personnel, local ministers, members of parliament, MLCs, MLAs and other public representatives and farmers. Soil health cards are aimed to help farmers to improve productivity through judicious use of inputs. Shri M Rammohan Naidu, Member of Parliament (Loksabha) and Hon'ble Member, Board of Management, ANGRAU, Sri. J.C. Diwakar Reddy, Member of Parliament (Loksabha), Sri. Y.V. Subba Reddy, Member of Parliament (Loksabha), participated and emphasized on importance of soil testing and distributed Soil Health Cards to the farmers. Eleven KVKs of ANRAU *viz.*, Rastakuntubai, Undi, Garikapadu, Ghantasala, Darsi, Nellore, Kalikiri, Utukuru, Reddipalli, Kalyandurg and Banavasi organized world soil day and during the year 2017-18A total of 2713 soil health cards were distributed to farmers across the state.

Shri. M Rammohan Naidu, Member of Parliament (Loksabha) and Hon'ble Member, Board of Management, ANGRAU participated in world Soil Day

Sri. J.C. Diwakar Reddy, Member of Parliament distributed the soil health cards to farmers

26. TRIBAL SUB PLAN (TSP)

The Tribal Sub Plan which aims to bring about equitable development of tribal people at a par with others through focused activities that would improve the socio-economic conditions of them was implemented in 2 KVKs (Rastakuntubai and Darsi). The KVK districts were selected based on the tribal population of the District/Mandals in which the KVKs are operating. The KVKs were suggested to take up activities befitting all the members of households in the operational area that would lead to doubling of tribal farmers' income in a period of 3-5 years. It was emphasized that more focus be given to imparting skills and to establish enterprises for enhancing livelihood security of the tribal beneficiaries. Activities like creation on awareness on the use ofliquid bio-fertilizers in cereals and vegetables, skill training to SHG leaders/members for income generation,raising of nutria-gardens in backyards, agri based entrepreneurial activities for income generation, reproductive education for tribal adolescents, soil sample collection and its advantages, promotion of backyard poultry and integrated farming system for improving income, value addition of millets organic farming, farm mechanization and post-harvest technology and mushroom production and marketing. A total of 13 physical assets/micro-enterprises were created by the two KVKs during 2017-18 providing income generating opportunities to 240 tribal people in two districts. Besides creating assets, skills related to these enterprises were imparted to the needy beneficiaries through training programmes. Three animal health camps were also organized in tribal operational areas of KVK, Darsi. A total of 1180 samples were analysed in both KVKs and soil health cards were issued to the farmers.

Training programme on importance of millets and its consumption by KVK, Darsi

Training programme on production technology of cashewby KVK, Rastakuntubai

Distribution of Rajasri birds to tribal farmers by KVK, Darsi

Kitchen garden seeds distribution to tribal farmers by KVK, Rastakuntubai

27. CFLDs ON PULSES UNDER NFSM

The Cluster Frontline Demonstration (CFLD) Programme was initiated by Ministry of Agriculture and Farmers Welfare, Government of India during *rabi* 2015-16 under National Food Security Mission (NFSM)to increase the production and productivity of the pulses. The programme was also continued in 2017-18 and the CFLDs on pulses and oil seeds were conducted by 12 Krishi Vigyan Kendras of ANGRAU during *kharif* and *rabi* seasons in a total area of 646.4 ha by organizing 1374 demonstrations on redgram, greengram, blackgram and bengalgram crops.

28. CFLDS ON OIL SEEDS UNDER NMOOP

The cluster frontline demonstrations on oilseeds under NMOOP during *kharif* and *rabi* 2016-17 on groundnut, sunflower, sesame, castor and safflower crops were organized by all the Krishi Vigyan Kendras depending on the requirement.A total of 681 Cluster FLDs on groundnut were conducted during *Kharif* (165 ha: 256 demos) and *Rabi* (200 ha; 425 demos), covering an area of 365 ha; 123 Cluster frontline demonstrations on sunflower were conducted by three (3) KVKs in YSR Kadapa, Chittoor and Prakasam districts during *Rabi* season in an area of 50 ha and 296 cluster FLDs in blackgram were conducted covering an area of 155 ha both in *Kharif* (10 ha: 25 demos) and *Rabi* (145 ha: 271 demos) seasons. Cluster frontline demonstrations on sesame were conducted by eight (8) KVKs with “Sarada (YLM-66)” variety.

29. SEED HUBS ON PULSES

“Seed Hub Project” on pulses was initiated by Ministry of Agriculture and Farmers Welfare, Govt. of India during 2016-17 with an aim of production of pulses quality seed. In ANGRAU three KVKs were identified for implementing Seed Hub programme *viz.*, Reddipalli, Ghantasala and Amadalavalasa.The total quantity of foundation (75.50 q) and certified seed (332.80 q) of pulses produced in the KVKs was 408.30 with blackgram varieties LBG 752 and TBG 104, greengram variety WGG 42 and redgram variety PRG 176.under the programme.

30. REACH EVERY PANCHAYAT

Reach every Panchayat is a unique programme formulated and implemented by ANGRAU with a goal of reaching every Panchayat of the state to disseminate improved technologies developed by the University. As a part of the programme one key informant farmer is identified in each Panchayat who will influences other farmers’ decisions in farming. The key farmer along with Sarpanch of the Panchayat are trained and oriented with the best management practices, critical interventions for increasing the productivity of major crops grown in that area, government schemes and ICT applications. They were provided with prestigious publication of the University Farmers’ Almanac ‘Vyavasaya Panchangam’ and subscription to ‘Vyavasayam’ telugu agriculture magazine published by University for one year to place them in the village Panchayat library to facilitate their access to the farmers in the village. This programme was implemented in nine districts viz., Vizianagaram, Visakhapatnam, Krishna, Guntur, Prakasam, Nellore, Chittoor and Anantapuramu. The DAATTCs and KVKs organized the training programme benefitting 1769 farmers including Sarpanchs of Gram Panchayat covering 363 villages.

Training to key information farmers and panchayath sarpanches organized by KVK, Banavasi

Distribution of Vyavasaya Panchangam and Vyavasaya magazine to farmers by DAATTC, Guntur

31. VITTANA MITRA

Strengthening of participatory seed certification through development of cadre of Vittana Mitras as community level resource persons for seed production in Andhra Pradesh was formulated with collaboration of ANGRAU, WASSAN and APSSCA. After completion of the training these Vittana Mitras will assist in seed production and monitoring, training and provide support services to seed producing farmers.

Basic level Training Programme on Seeds and Seed Certification for *Vittana Mitras* at KVK, Kondempudi

32. FLAG METHOD OF EXTENSION

The DAATTC/KVK scientists during their tour, visit the road side / nearby farmer's fields, the yellow / conspicuously visible 'Flag' containing name of the centre, contact no, date of visit, crop, problem identified and remedial measures, is placed in the farmers field with any of the support of plant material at a strategic point to be visible to the farmer in his absence in the field to facilitate further contact with the scientist concerned. During the year under report, all the DAATTCs and KVKs of ANGRAU practiced the flag method of extension. All the DAATTCs and KVKs of ANGRAU arranged 663 Flags.

33. DEVELOPMENT OF FARMER MASTER TRAINERS

It is the process where in an identified 15-20 farmers selected from different villages spread over 2-3 mandals of a district are being provided training (knowledge & skills) at critical stages of the identified crop. The training is staggered over the crop season to the same farmers who will be exposed to technologies at different critical stages of crop cycle, (4-5 trainings of 1 day duration) facilitating the Farmers as Master Trainers. Once they have developed mastery over the crop selected, they are in turn used as Resource Farmer for training other farmers of their locality.

During the year under report the DAATTCs and KVKs of ANGRAU put together organised 34 trainings to make Farmers as Master Trainers on the crops such as Paddy, Maize, Millets, Bajra, Ragi, Foxtail millet, Pulses, Blackgram, Groundnut, Sesamum, Cotton, MSRI, Drum seeder, Sugarcane, Tomato, Onion, Chilli, Brinjal, Cashew nut and Mango have followed this methodology.

34. INNOVATIVE FARMERS NETWORK

The Innovative Farmers Network was initiated by ANGRAU in 2012. One innovative farmer among the five farmers felicitated by the DAATTC during its Foundation day celebrations was identified as Coordinator of the Innovative Farmers Network. The main objective of this network is to promote farmer to farmer extension.The Coordinators of network were provided with technology support by the DAATTCs and KVKs to update their knowledge and skills, who in turn need to share their skills and knowledge to other farmers of the network (30 members) in the district. During 2017-18, two review meetings were conducted with innovative farmers.

35. ANNAPURNA - AN ALTERNATE ICT MODEL

Interactive Information Dissemination System (IIDS) is an integrated model to address the problems of farmers by using ICT applications. IIDS is a Web, Mobile and IVRS based application, where the farmers are required to be registered with their farm and other details. The expert would provide the personalized solutions based on the inputs provided by the farmers and his available farm profile. There is a mobile (Toll free No. 1800 425 3141) interface at front end and web interface at the back end. Data will be transmitted through voice, text, images and videos from both ends (farmers to expert and back) i.e. it would allow farmers to send images/videos of the field along with their queries by using a smart phone.

The model is operational in all 13 districts of Andhra Pradesh through eight KVKs and five DAATTCs (KVKs – Nellore, Amadalavalasa, Utukur, Reddipalli, Darsi, Garikapadu, Undi, Kalikiri and DAATTCs Kurnool, Guntur, Undi, Vizianagaram, Peddapuram and Kondempudi) during 2017-18.During 2017-18, total number of farmers registered are 27,738, no of queries solved centre and discipline wise 3481, no. of messages messages (Text and Voice) are 1002 (Text messages) and 222 (voice messages).

36. MOBILE APPLICATIONS

Several android based mobile applications were developed and kept for downloading by the farmers free of cost from Google play store. The applications developed /supported from ANGARU are

- **Eruvaka**: Developed at DAATTC, Visakhapatnam in 2015 and provides information on complete package of practices for rice, sugarcane, pulses, cotton, maize and oil seeds in telugu and English and about 900 downloads were made during 2017-18 with a rating of 4.5. The app is updated with additional features of IMD weather forecast & AKPS toll free number.

Krishi Vigyan : Developed at KVK, Amadalavalasa in 2016 and provides information on complete package of practices for rice, blackgram and greengram, coconut and maize in telugu with photographs, video clips with additional feature of telephone directory of research and extension centres of ANGRAU. A total of 3342 members had downloaded during the year 2017-18, with a progressive total of 33077 members and had rating of 4.2/5.

Mana Verusanaaga: Developed at RARS, Tirupati in 2016 and provides information on complete package of practices for Groundnut in telugu with photo graphs and about 2812 downloads were made during 2017-18 with a rating of 4.8/5.

37. POCKET CARDS

An innovative low cost extension methodology in transfer of technology was introduced at KVK, Garikapadu. The critical crop interventions were published on a single small pocket card of size 3"X4", printed in multi-colour on either side high lighting the technologies impacting the productivity with attractive pictures its smartness, farmers had shown interest in possessing them and to keep them for reference.

38. AGRICULTURAL TECHNOLOGY HUB:

A ICT initiative in RARS, Tirupati was initiated on 16-3-2016 (on Kisan Mela day) for providing mobile based agro advisory services through mobile voice calls, SMS, existing social media networks like (whatsapp). For this purpose a smart phone and a BSNL mobile connection bearing number 9441670829 was taken and made popular among the farmers in the Southern Zone. Three whatsapp groups were created each for one district in the Southern Zone and agro adivisory services are being providing. Total number of registered farmers up to 14-6-2018 were 992 for Whatsapp services.

39. SWACHHTA HI SEWA

The Swachhta Hi Sewa programmes were organized at 13 KVKs from 15.9.2017 to 2.10.2017. KVKs performed Shramdhan in 104 villages benefitting 4298 participants and contri-buted towards cleanliness and hygiene in adopted villages/ public places. Rallies, awareness campaign in schools and colleges, cleaning of office, farmers' hostel, laboratories, weeding in demonstration plots, awareness camps in adopted villages, training programmes on cleanliness and sanitation, cleaning of public places, display of banners, etc. were undertaken during the period. Local public representatives and officials took part in this programme.

40. SANKALP SE SIDDHI

Sankalp Se Siddhi, an integrated yojana as a part of New India movement 2017, for betterment of the nation and doubling farmers' income by 2022, was launched in August 2017. Nine (9) KVKs conducted "Salkalp Se Siddhi - New India Movement program during the period from 19.8.2017 to 10.9.2017.

41. MAHILA KISSAN DIWAS

Women comprise a major workforce in Indian agriculture and they play multi-dimensional role in agriculture and allied sectors. According to the Food and Agriculture Organization (FAO), women participate in 48 per cent of agriculture-related employment in India and around 7.5 crore women are actively involved in livestock management. On this back drop, the Ministry of Agriculture and Farmers' Welfare had decided to observe October 15th every year as "Rashtriya Mahila Kisan Diwas". Mahila Kisan Diwas was celebrated at Krishi Vigyan Kendras on 15th October 2017 with the participation of 445 farm women to recognize the contribution of women in Agriculture. Progressive farm women were felicitated on the occasion.

Falicitating the progressive farm women by KVK, Utukur

Falicitating the progressive farm women by KVK, Rastakuntubai

42. DISASTER MANAGEMENT

Several parts of Srikakulam and Vizianagaram districts of North Andhra received heavy rains accompanied by gusty surface winds under the impact of the depression over Bay of Bengal. The heavy rains damaged standing paddy crop in Sompeta, Vajrapukotturu, Ichchapuram, Mandasa and some other areas in Srikakulam district. Unseasonal heavy rains due to the cyclone in Srikakulam district caused damage to rice to an extent of 12000 ha, of rice was damaged as per the reports, of which 6000 ha area was harvested and kept in the fields for drying. The scientists of KVK, DAATTC, Amadalavalasa and ARS, Ragolu and RARS, Anakapalle visited the cyclone affected paddy fields and suggested the interventions to minimize the loss.

Unseasonal rains with heavy winds occurred on 3rd and 4th May 2018 in East Godavari district caused damage to the paddy crop to the extent of 1300 ha in Pithapuram, Kakinada sub-divisions and Amalapurammandal. With the advice of the Scientists of the DAATTC, Peddapuram and RARS, Maruteru and timely interventions by the farmers could recover the crop in 95 per cent of the damaged area.

In YSR Kadapa district, floods caused due to heavy rains during October 2017 caused damage to paddy and cotton in an area of 30,917 ha and 24449 ha respectively due to continuous submergence. The scientists of DAATTC and KVK, Utukur and ARS, Utukur, RARS, Tirupati visited the affected fields and advocated foliar spray of potassium nitrate 2% at 15 days interval for cotton. Booster dose of urea and potash application was suggested for both the crops. Spraying of Hexaconazole 2 ml/litre against sheath blight & stem rot diseases was advocated for Paddy crop. These interventions could considerably reduce the loss to cotton and paddy.

Visit to cyclone affected rice fields of Srikakulam district

Visit to cyclone affected rice fields of East Godavri district

Visit to cyclone affected rice field of YSR Kadapa district

43. WORKSHOP

Annual review and action plan workshop for the KVKs of Andhra Pradesh was organized at RARS, Lam, Guntur on 21-22 May, 2018. Dr. V. Damodara Naidu, Hon'ble Vice-Chancellor, ANGRAU; Dr. Y.G.Prasad, Director, ICAR, ATARI, Zone-X; Dr. P. Ram Babu, Director of Extension, ANGRAU; Dr. R.V.S.K.Reddy, Director of Extension, Dr.YSRHU; Dr.D. Sreenivasulu, Director of Extension, SVVU; Principal Scientists from all the three Universities; Programme Coordinators and Subject Matter Specialists of KVKs participated in the workshop. The workshop finalized the action plan of all the KVKs functioning in Andhra Pradesh.

Hon'ble Vice-Chancellor addressing the participants

44. EXTENSION STUDIES

Extension Scientists of RARSs, ARSs, DAATTCs and KVKs have undertaken 14 extension studies during 2017-18 to draw some valid conclusions while preparing action plan of the concerned centres.

45. RECOGNITIONS AND AWARDS

KVK, Garikapadu received Best KVK Award and DAATTC, Ghantasala received Best DAATTC Award during 47th REAC (Research and Extension Advisory Council) Meeting held at RARS, Lam, Guntur on 21st& 22nd December, 2017.

The Programme Coordinator, KVK, Garikapadu receiving the award from the Hon'ble Vice-Chancellor, ANGRAU

VI. PLANNING AND MONITORING CELL

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 post of Director, Planning & Monitoring was withdrawn during December, 2017 and the Dean of Post Graduate studies was kept incharge to P & M Cell.

The Planning & Monitoring 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 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 Dean of PG studies and incharge of Planning and Monitoring Cell acts as the Transparency Officer of the University and oversees the implementation of Section (4) obligations of RTI Act, 2005 and maintains due transparency in implementation of the Act.

Nodal Officer (ICAR)

The Principal Scientist (P&M Cell), ANGRAU, Guntur was nominated as Nodal Officer for ICAR under Strengthening and Development of Higher Agricultural Education Division. The Nodal Officer has to look after the day to day correspondence of the ICAR, All India Survey of Higher Education (AISHE), Indian Rankings, ICAR Ranking, Preparation and submission of ICAR Annual Report, uploading the information regarding JRF/ SRF, NTS UG/PG, Student Ready Programme, Strengthening of Library facilities, development grant, Audit Utilisation Certificates etc., in ICAR Education Portal and also submitting the information to the ICAR pertaining to the questions raised in Parliament etc.

Website Maintenance

P&M Cell also attending the University Website Maintenance. Updated information like circulars/ results/exams/admissions/interviews/jobs/tenders/ quotations etc., as information provided by the faculty deans, is being uploaded by the Planning and Monitoring Cell.

In addition, the Planning and Monitoring Cell attending the following activities during the period under report.

Reports Prepared and Activities taken up during the Year

- ❖ University Outcome Budget (2018-19) for Andhra Pradesh
- ❖ University Monthly Reports to His Excellency the Governor of Andhra Pradesh
- ❖ 49th Annual Convocation Report
- ❖ Prepared the Annual Reports for the years 2015-16, 2016-17 and released in the Board of Management meeting.

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 2017-18 was Rs. 28220.36 lakh.

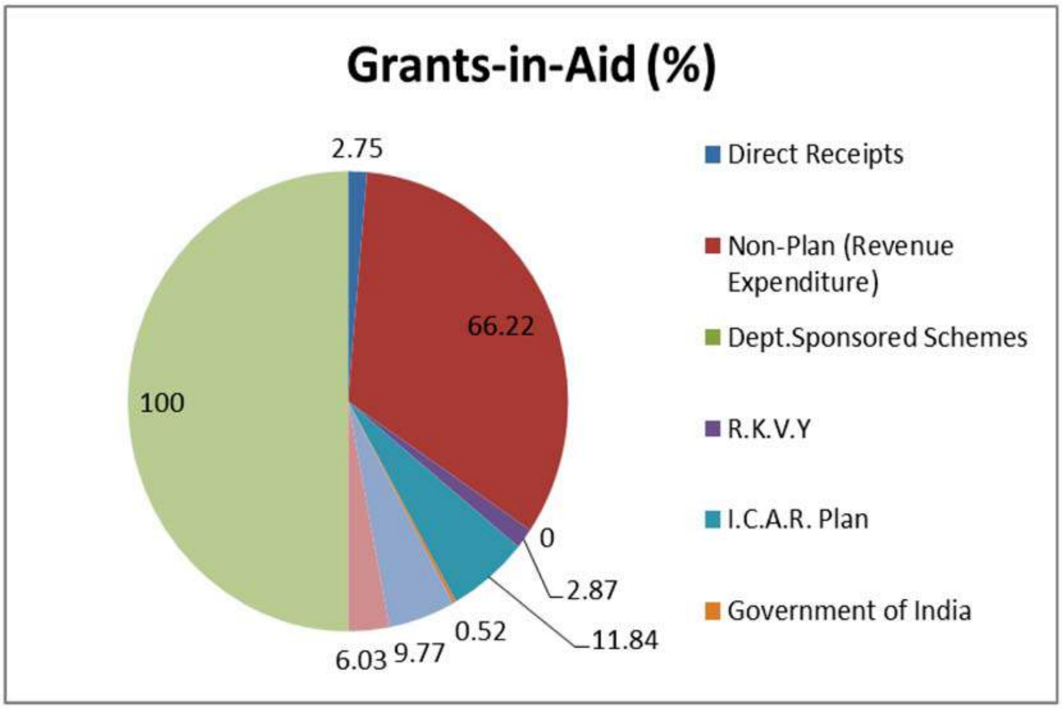
The ICAR assistance was Rs. 5044.13 lakh and the Government of India assistance was Rs. 219.72 lakh. During the year, an amount of Rs. 1222.84 lakh was received from RKVY. During the financial year 2017-18 an amount of Rs. 4166.14 lakh released under other agencies (including NABARD – RIDF).

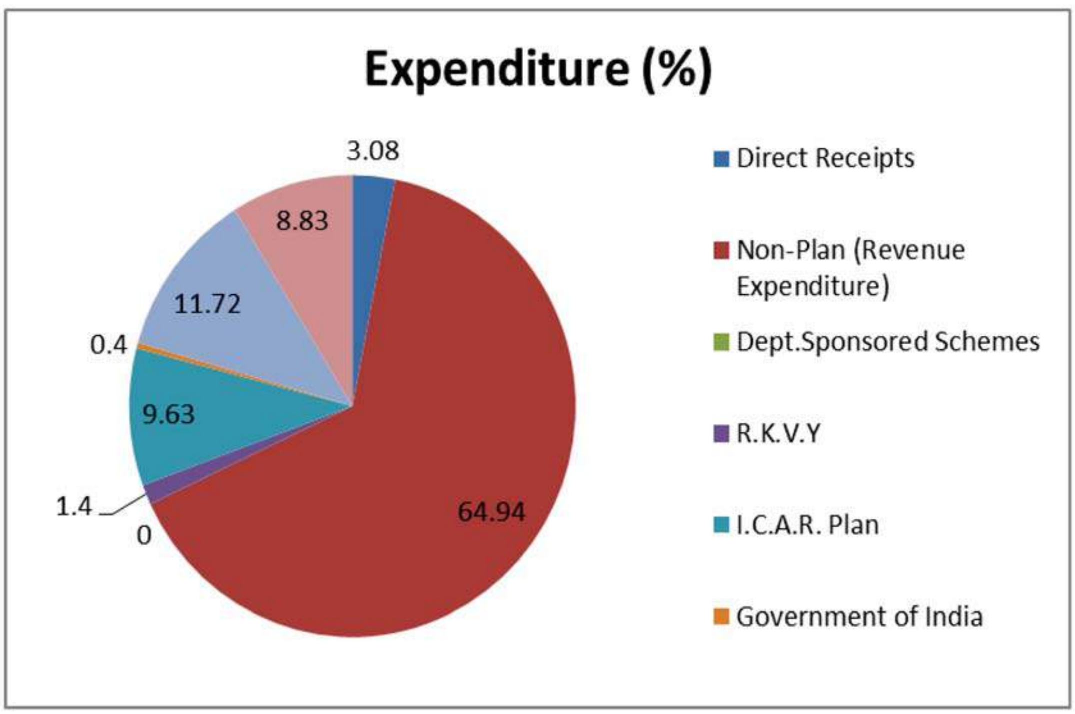
Thus, the total Finances of the University during the year 2017-18 was Rs. (28220.36 + 14394.80**) = 42615.16** lakh as detailed below.

Funding Sources – 2017-18

(Rupees in lakhs)

Sl.No.	Particulars	Grants-in-Aid & Other than Grants-in-Aid	(%)	Expenditure	(%)
1.	Direct Receipts	1171.23	2.75	1494.96	3.08
2.	Non-Plan (Revenue Expenditure)	28220.36	66.22	31523.02	64.94
3.	Dept. Sponsored Schemes	-	-	-	-
4.	R.K.V.Y	1222.84	2.87	681.12	1.40
5.	I.C.A.R. Plan	5044.13	11.84	4673.95	9.63
6.	Government of India	219.72	0.52	195.50	0.40
7.	Other Agencies	4166.14	9.77	5689.87	11.72
8.	Other Accounts	2570.74	6.03	4282.58	8.83
	Total	**42615.16**	**100**	**48541.00**	**100**


Grants-in-Aid (%)
2.75
66.22
100
0
2.87
11.84
0.52
6.03
9.77
Direct Receipts
Non-Plan (Revenue Expenditure)
Dept.Sponsored Schemes
R.K.V.Y
I.C.A.R. Plan
Government of India


Expenditure (%)
3.08
8.83
11.72
0.4
9.63
1.4
0
64.94
Direct Receipts
Non-Plan (Revenue Expenditure)
Dept.Sponsored Schemes
R.K.V.Y
I.C.A.R. Plan
Government of India

Budgetary Support to the University
Funds Released under Development Grant of ICAR – 2017-'18

(Rs. in Lakhs)

Budget Heads	Total Funding from State Government			Funding support from ICAR (Rs. Lakh)				Total ICAR support	Any other central fund-ing**	Grand Total
	Pl an	Non-Plan	Total 1+2=3	Educa tion Divisi on	AICRP	KVK	Any oth-er ICA R supp ort*			
	1	2	3	4	5	6	7	(4+5+6+7) =8	9	3+8+9
Salary	-	26,780.43	26,780.43	-	1,508.88	2,840.82	-	4,349.70	-	31,130.13
Capital	-	12,000.00	12,000.00	427.43	-	-	-	427.43	-	12,427.43
Revenue	-	4,006.96	4,006.96	267.00	-	-	-	267.00	419.02	4,692.98
Total	-	**42,787.39**	**42,787.39**	**694.43**	**1,508.88**	**2,840.82**	-	**5,044.13**	**419.02**	**48,250.54**

A. All New/Existing Civil Works Repair & Renovation under taken out of the Development Grant (Rs. in lakh)

The following works were taken up under civil works repairs and renovation.

1. College of Agricultural Engineering, Bapatla:

An amount of Rs. 77.42 lakhs was provided towards construction of first floor of the new Boys hostel and increase the height of compound wall of the college.

2. S.V. Agricultural College, Tirupati:

The works like raising of compound wall in place of existing damaged compound wall on southern side of girls hostel (Stage. I), raising of compound wall (Stage. I) back side of new girls hostel, raising of compound wall in place of existing damaged compound wall on southern side of girls hostel (Stage. II), raising of compound wall (Stage. II) back side of new girls hostel, raising of compound wall (Stage.III) back side and north side of new girls hostel and raising of compound wall (Stage. IV) southern side and front side of new girls hostel were under taken under strengthening and development with Rs. 58.75 lakhs.

3. Agricultural College, Naira:

An amount of Rs.87.50 lakhs was spent towards providing brick masonry, plastering and wall putty, VRCC M20 sunshades loft and root slabs, doors, windows, painting and sanitary items, electrification, VRCC M20 footing, pedastals and flooring, earth wok sand filling, PCC gravel and anti termite treatment, PCC M20, RCC, RBM Walls, HYSD steel, flooring, M20 columns, lintels and plastering and Imperious coat to Genetics and plant breeding department block, providing electrification to new exam hall at first floor in the main college building.

4. Agricultural College, Mahanandi:

Civil works like slab repairs to college and hostels, mess repairs and stair case repair to both boys and girls hostel, repairs and renovation to main college building for which an amount of Rs. 69.97 lakhs were spent.

5. Agricultural College, Bapatla:

An amount of Rs.87.50 lakhs was spent for civil works like repairs to the existing Girls Hostel toilet blocks in P.G. Girls Hostel & New Niveditha Girls Hostel and renovation to conference hall of main building, repairs and renovation to Administration building 2nd floor roof slab back verandah, repairs and renovation for Diamond Jubilee Girls hostel 2nd floor RCC work, repairs and renovation for Diamond Jubilee Girls hostel 2nd floor super, repairs and renovation for Diamond Jubilee Girls hostel 2nd floor finishing work, renovation to the Girls Hostel Mess, renovation of Examination Hall & Class Rooms (Front Hall & Toilets) RCC framed structure. Part – 1, renovation of Examination Hall & Class Rooms (Back Hall) RCC Framed Structure - Part 2, renovation of Examination Hall & Class Rooms (finishings for front hall) part, renovation of Examination Hall & Class Rooms (finishings for back hall) part, repairs and renovation to the existing bus sheds and repairs and renovation to the Library Building.

B. Details of Sports Facilities Strengthened by ICAR:

The sports facilities strengthened under ICAR are as follows.

1. Agricultural College, Bapatla (Physical Education):

An amount Rs.0.31 lakhs was spent for purchase of HP Laser Jet Printer M1005 / MFP, 400 Walt Metal Hilide Full set (bulb, choke, silco lite etc.,) and Iron pipes, Iron Ladder, Iron Angular etc.

2. College of Agricultural Engineering, Bapatla:

Spin bike Cross trainer to girls hostel, Gym Repair in boys hostel, TT table, 1 pair of shuttle poles, 4 Nos. of carom boards for boys and girls hostels and Ball Badminton Post for girls were purchased with an amount of Rs.2.18 lakhs for improvement of the sports facilities.

C. All Equipment purchased/replaced under Development Grants

1. College of Agricultural Engineering, Bapatla:

In Soil and Water Engineering department equipment like Steel plain alamarah, Electric weighing machine, Hot air oven, EC meter (Table top model), pH meter (Table top model and Sprinkler set with 30 pipes with an amount of Rs. 1.84 lakhs.

Under department of Farm Machinery and Power an amount of Rs.5.86 lakhs was spent for purchase of Soil compaction testers,Soil moisture sensor, Bench wise No.8, Wood wise 250 mm, 9 tine Rigid Cultivator, 9 tine spring loaded cultivator, Electrical accessories in FMP lab, Hardware material in workshop and repairs and replacements to tractors and workshop tools (Miscellaneous items).

Under department of Processing and Food

Engineering, an amount of Rs. 23.64 lakhs was spent towards B.O.D. Incubator, Refrigerated centrifuge, Water batch incubator shaker, Freeze dryer bulk rack assembly with heater control unit, Customized PEF Generator with built in power supply 15KV@100Ma, Vacuum Oven, Tablet making machine, Digital bomb calorimeter, Oscilloscope function generator Digital LCR Meter, Clevenger Apparatus of Oil heavier, Oil lighter, Heating mantles and Voltage stabilizer, PH meter and Digital LCD Food Thermometer, Vacuum filtration assembly with a vacuum pump and Heating Mantle with Energy Regulator.

In, the Department of Farm Machinery and Power Engineering, about 1.80 lakhs were spent towards purchase of 2 numbers of 500 LPD SWHS and one 9 W solar street light for installation on At the top of the college and hostel buildings**.**

2. S.V. Agricultural College, Tirupati:

An amount of Rs.25.74 lakhs was spent towards improvement of facilities in Agril. Engineering, Horticulture, Soil Science and Agril. Chemistry, Genetics & Plant Breeding, Ag in Crop Physiology department. The materials purchased are Insect show case cabinet, Insect Storage Box, Magnascopes, Chemicals, Soil sampling augers, Electronic Scale, Flame photometer, Digital Ph meter, LG Refrigerator, Projector stand, HDMI Cable, Spitter, Seed Germinator (200 lt), Voltas chest freezer -200C, Autoclave PAD (Top loading),Sony DSLR Camera, pH meter, Flame photometer, Centre fuge, Analytic balance, Quartz curettes, Horizontal electrophoresis power supply, Aqua Fresh, Canon image runner, Hikvision Camera, Water cooler, Canon image runner, Horizontal Water Bath, Rotary Evaporator, Data logger, Soil Moisture sensor, Soil temp sensor, LED lamp attachment to microscopes(50NOs), Micropippet (1No), Portable EC tester 2 NOs, CO_2 cylinders (2 Nos.) and Nikon DSLR Camera.

3. Agricultural College, Bapatla:

An amount of Rs.33.58 lakhs was spent towards purchase of equipment and Books/ Journals for Library. The list of equipment purchased include Micro Controller based conductivity meter Systronics, Model 306. Liquid Nitrogen Container 20.5 L Capacity, Trinocular microscope with phase contrast attachment digital camera and dark filed condenser (Magnees), Stercoscopic microscope, Instructional Manuals, Jaikisan JK 708 Sprayer (High pressure Knapsack Sprayer) 2 Nos, Moon Bow (RO + UV water purified and accessories, 2 HP Maize sheller, wall mounting fans, Vaccum Desiccator 250 mm, Borosil (Revolving Fund). Oil Free portable vaccum pump (JSGW) (Revolving Fund), Petri Dishes, Hot Air Oven, accessories, Power Weeder, Digital Flame Photo meter, PCR Machine, Invertor 5 KV, Power pac for Gel electrophoresis, Gel electrophoresis Maxi, Mag master microscopes 15 Nos., Multi parameter pocket tester 1 No, Molecular biology chemicals, Glassware, Molecular biology and general laboratory chemicals, Laboratory accessories, Furniture (Tables, Chairs) 10 each, Air Conditioners 2 Nos. and Repairs to buildings.

4. Agricultural College, Naira:

An amount of Rs.15.94 lakhs was spent by the College for purchasing equipment, materials and towards other works, which include, Levelling blade, Chainsaw, Paints, Thermometers, Levelling Blade, Oil Engine, Brush cutter, Cup anemometer, Paddy Reaper, Chemicals, Electrical items, Laboratory Equipments, Binocular Microscopes, Publication of Mushroom production Technology book, Chemicals, Glassware & instruments, Books, JRF Coaching classes honorarium and Printing of model exam papers.

5. Agricultural College, Mahanandi:

A total of Rs. 84.47 lakhs were spent for purchase of various equipments *viz.*, Chemicals & Glassware, LG Refrigerator F 282 RSOY, Amaron Current Tall Tubulercrtt 150 ah/12 kv & Su Kam UPS 3.5 KVA/48V, Digital Conductivity Meter Model 304, Proving Ring Penetro Meter, Soil Color C & Soil Hydrometer Detek Yodar, Apparatus & Digital Soil Moisture, F3 Fixed Volume Micro Pipette 50,100,200,500,1000, Sub Marine Horizontal Gel System Min Model, Power Pack mini pack, V Guard stabilizer, SAMSUNG LED 4 Nos. @Rs.50,000/-, Amaron Current Tall Tubler crtt 150 ah/12 kv, 18' x 4 ½ Wall Board with Aluminium Pipes with Ilam Sheet 6 X 5 & 3 x5 Display boards with teak wood sliding glasses with dharma cool sheet, Acrylic Boards with glass stands (2 ½ x1 ½), AMARON Hi Back Up UPS 24 V/1400VA UPS, SAMSUNG LED TV 55M5570, Motorized Treadmill (Fitness World Picasso), Interactive white board Wall mount kit, Short Throw 3D DLP Projector, Epson Projector, Godrej Almarah, Wireless Bridges in-Built Antennas Dishes POE s (Power over Ethernet) Adapters Net Cable 6 (305) mtr. Miscellaneous (Giya pipes(15) mtr. cable & Other items), Computer Peripherals, Ahuja Portable Amplifier, Microphones Wire coil, Godrej Iron Table with two side racks 5 x 2.6,Godrej Book Case 4 Door, Cello Perfect Super Deluxe, Powder coated populated full pad chair with book folding partition, Godrej 6 DOOR PCU, Nilkamal Executive Chairs (Libra), Cello Perfect Super Deluxe, Acoustic Studio, 450 metallic bulb 450 Doom metallic D.J.HAVE R.G.B. 1/18 WIRE, 6 x 4Window Mesh, Glass & Fixing with accessories for quarters and 5 MP HD Resolution Camera DNR Smart IR 3 + 1 CCTV Cable Box BNC Connecters and power connecters Seagate SATA 2 tb Surveillance H Installation Charges for Girls hostels.

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 seed processing and storage structure at RARS, Lam, Guntur for an amount of Rs. 50.00 lakhs.
- Construction of State Art Farm Machinery cum Training Centre at RARS, Tirupati for an amount of Rs. 25.00 lakhs.
- Construction of liquid Bio-fertilizer Lab at RARS, Tirupati for an amount of Rs. 99.00 lakhs.
- Construction of Bio-fertilizer lab at RARS, Anakapalle for an amount of Rs.55.00 lakshs.

IX. OTHER EVENTS OF THE YEAR

During the year 2017-18 several important events have occurred at different institutes of the university. 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

Inauguration

- Inaugurated Geo Spatial Centre at RARS, Lam and also conducted interaction meeting with the scientists of ANGRAU, NRSC and APSAC on 01.06.2017.
- Vermi Compost demonstration unit at KVK, Kalikiri was inaugurated by Dr.K.Raja Reddy, Director of Extension, ANGRAU, Guntur on 11.01.2018.
- The Engineering Division of ANGRAU at Rajamahendravaram was inaugurated on 13.12.2017 by Dr. G.V. Nageswara Rao, Member, Board of Management, ANGRAU in the presence of Dr. P. Rambabu, Associate Dean, Agricultural College, Rajamahendravaram, Sri B. Narasinga Rao, Deputy Executive Engineer along with his staff.
- Inauguratedthe Bio-control unit and laid foundation stone for liquid bio-fertilizer unit, Centre of Excellence in sugarcane research, and Advanced Post-Harvest Technology & Premier Training Institute at Regional Agricultural Research Station, Anakapalle by Sri SomireddyChandramohan Reddy, Hon’ble Minister for Agriculture, Horticulture, Sericulture and Agri-Processing, Sri Ganta Srinivasa Rao,Hon’ble Minister for Human Resources Development (Primary Education, Secondary Education, Higher & Technical Education), Government of Andhra Pradesh, Smt. Lalam Bhavani Bhaskar, Chairperson, ZillaParishad, Visakhapatnam,Hon’ble Vice Chancellor of ANGRAU,Sri Peela Govinda Satyanarayana, MLA, Anakapalle, Sri K.S.N.S. Raju, MLA, Chodavaram, Joint Collector-II, Visakhapatnam, Sri K. Murali, Chairman, Agricultural Market Yard, Anakapalle, Smt. K. Savithri, Mandala Praja Parishad, Anakapalle, Smt. P. Lakshmi, Mandala Praja Parishad, Kasimkota and University officers, ANGRAU, Guntur on 29.01.2018.
- Laid foundation stone for bio-fertilizer units at RARS, Tirupati on 23.02.2018 on the eve of *Kisan Mela*celebrations.
- Director of Research along with Director of Extension, Dean of Student Affairs and Dean of Home Science, ANGRAU, Guntur inaugurated tricho card production unit constructed under TSP of ICAR – AICRP on bio control, RARS, Anakapalle at Asarada tribal village, G.K.Veedhimandal, Chintapalle.
- Custom Hiring Centre under R K V Y Project was inaugurated on 10.04.2018 atDr. K L Rao, KVK, Garikapadu.

Bhoomi Pooja

- The ‘***Bhoomi Pooja’*** was performed in the endowments land on 08-12-2017 for construction of Agricultural College, Rajamahendravaram by Dr. G.V. Nageswara Rao, Hon’ble Member of Board of Management, ANGRAU Dr. P. Rambabu, Associate Dean, and staff of Agricultural College, Rajamahendravaram.

- Director of Extension performed Bhoomi Puja for construction of Administrative Building at KVK, Darsi on 4th March 2018. Estate Officer, Sri P. V. Narasimha Rao; Dr. P. Jayarami Reddy and Dr. B.Vijayabhi-nandana, Principal Scientists have participated in the event.

- 'Bhoomi Pooja' was performed by Hon'ble Vice Chancellor for construction of Mens' Hostel at Lam on 26.04.2018. The staff of Acharya N.G. Ranga Agricultural University, Lam, Guntur were present at the function.

49th Annual Convocation

The 49th Annual Convocation was held on the 4th of October, 2017 at Shri Venkateswara Kasturba Kalakshetram, Nellore. The Hon'ble Vice President of India Shri M. Venkaiah Naidu garu was the Chief Guest.

MoUs

The MoU between Acharya N.G. Ranga Agricultural University (ANGRAU) and Centre for Cellular and Molecular Biology (CCMB), Hyderabad was renewed on 15.05.2018.

Significant Events

- Agricultural Research Station, Anantapuramu has bagged the **"Vasant Rao Naik Award"** – 2016 for the best AICRP on Dryland Agriculture in the Country. On behalf of the University the award was received by Hon'ble Vice-Chancellor on 16.07.2017 from Hon'ble Sri Radha Mohan Singh, Union Minister of Agriculture and Farmers Welfare.

- The KVK, Utukur, YSR Kadapa district received the **"Pandit Deen Dayal Krishi Vigyan Protsahan Puraskar"-** 2016-17 for Zone X (Andhra Pradesh, Telangana and Tamil Nadu – 70 KVKs) ICAR award on 16th July 2017 at NASC complex, New Delhi. Hon'ble Vice-Chancellor, ANGRAU Dr. V. Damaodara Naidu, Dr. K. Raja Reddy, Director of Extension, Dr. A. Veeraiah, Programme Coordinator have received the award from the Hon'ble Union Minister for Agriculture & Farmers Welfare Sri K. Radha Mohan Singh in the presence of Dr. T. S. Mohapatra, Director General, ICAR, New Delhi.

- KVK, Nellore has arranged an Agricultural Exhibition during the Rythu Avagahana Sadassu organized by the Farmers Organiza-tions of Nellore district for 'integrated development of the farmers' at ZillaParishad office, Nellore on 29th July 2017. The Hon'ble Minister for Agriculture and Horti-culture Sri SomireddyChandramohan Reddy participated as Chief Guest.

- Eight KVKs (Amadalalavalasa, Rasta-kuntubai, Kondempudi, Garikapadu, Kalikiri, Utukur, Reddipalli and Banavasi) have conducted "New Indian Manthan – Sankalp Se Siddhi' for doubling the farmers' income by March 2022 from 28th to 30th August at their respective premises. KVK, Rastakuntubai has organized at Parvathipuram on 28th August 2017, wherein the Hon'ble Union Minister for Civil Aviation Sri Ashok Gajapathi Raju garu participated as Chief Guest and took pledge on the occasion. Agricultural Exhibition was also arranged on various Agro techniques. Local Members of Parliament and other Public Representatives have participated in the event.

- KVK, Kalyandurg arranged an exhibition at Uravakonda village as a part of the Hon'ble

CM of A.P visit to Anantapuramu district to inaugurate the “Jala Harathi”programme.

- Released two booklets on ‘Revised Research Mandate of Research Stations of ANGRAU’ and ‘User Manual of ARMS’ from Research Wing published by Directorate of Research, ANGRAU in the 281st Meeting of Board of Management, ANGRAU at ARS, Nellore on 04.10.2017.
- The District Agricultural Advisory & Transfer of Technology Centres (DAATTCs) were housed in Krishi Vigyan Kendras (KVKs) of the University In order to strengthen the University Extension System and to extend the services of TOT in much more effective way during November 2017.
- The University has participated in the Exhibition and displayed the promising technologies for doubling the farmers income during the AP Agri Tech Summit 2017 at Visakhapatnam held from 15-17th November 2017.
- World Food Day was celebrated on the eve of FAO foundation day by the College of Home Science, ANGRAU, Guntur on 16.10.2017 in collaboration with ICDS and other line departments with theme”Change the future of migration, Invest in food security and rural development.”
- University Officers, Associate Directors of Research, Associate Deans, Teaching Staff from different colleges, scientists from different research stations, KVKs / DAATTCs and students of PG and UG have participated in the AP AgTech Summit 2017 organized by AP State Government at Visakhapatnam from 15th to 17th November, 2017.
- K.Lalitha (PF/15-010), IIIYear student represented ANGRAU in Rhythymic Gymnastic (women) event at All India Inter University Artistic Gymnastic (Men & Women), Rhythmic Gymnastics (Women) and Malkhamb (Men & Women) Championships 2017-18 held at Kurukshetra University, Haryana from 15th to 19th January, 2018.
- Hon’ble Prime Minister of India, Shri Narendra Modi laid foundation stone and inaugurated the new Krishi Vigyan Kendra for Visakhapatnam district at Kondempudi, Butchayyapeta mandal on 17th March 2018. Sri Somireddy Chandramohan Reddy, Hon’ble Minister for Agriculture, Horti-culture, Sericulture and Agri-Processing, Sri CH. Ayyannapatrudu, Hon’ble Minister for Roads and Buildings, Govt. of Andhra Pradesh, Sri Muttamsetti Srinivasa Rao, Hon’ble Member of Parliament, Anakapalle, Smt. Lalam Bhavani Bhaskar, Chairperson, Zilla Parishad, Visakhapatnam, Sri K.S.N.S. Raju, MLA, Chodavaram, other Public Representatives, Members of Board of Management and Director of Extension, Dr. K. Raja Reddy, participated in the event at KVK, Kondempudi.
- ANGRAU’s Vyavasaya Panchangam 2018-19, a folder on forecast of Climate and Market prices of certain crops, a brochure and poster on Certificate Courses (Organic farming & Terrace Gardening) of Open and Distance Learning Centre were released on 18th March 2018, being a Telugu New Year’s Day ‘UGADI’ by the Hon’ble Chief Minister of Andhra Pradesh Shri N.Chandrababu Naidu in the presence of Minister for Agriculture and other Cabinet Ministers. Dr.V.Damodara Naidu, Vice-Chancellor,

ANGRU and University Officers were present on the occasion.

- Ministry of Science and Technology, Government of India has sanctioned the projectentitled "Establishment of Biotech-KISAN Hub at Acharya N.G. Ranga Agricultural University, Guntur under Department of Biotechnology (DBT) for a budget outlay of Rs. 114.30 lakhs (Rupees one crore fourteen lakhs thirty thousand only) for two years.

Agricultural Education Day

"Agricultural Education Day" was conducted on 03.12.2017 in a befitting manner at all Colleges and Polytechnics of the Acharya N.G. Ranga Agricultural University on the eve of the birthday of Bharat Ratna Dr. Rajendra Prasad, the first President of Independent India

Other Significant Events

S. No.	Event	Date	Venue
1	Nava Nirmana Deeksha	02.06.2017	All Centres of the ANGRAU
2	Eruvaka Purnami	09.06.2017	All the KVKs and DAATTCs have participated in their respective districts of Andhra Pradesh
3	The third International Yoga Day	21.06.2017	All Centres of the ANGRAU
4	KVK, Kalikiri has arranged an exhibition stall during the visit of Panchayatraj and IT Minister Sri N. Lokesh, Sri Adinarayana Reddy, Minister for Marketing and Sri N. Amaranatha Reddy Minister for Industries	23.06.2017	Mahal village, Kalikirimandal
5	KVK, Garikapadu conducted sensitization programme on "Monitoring and management of Pink Boll Worm"	08.09.2017	Vijayawada in association with State Department of Agriculture
6	Conducted Farmers Awareness Programme on climate and weather for the tribal farmers of HAT Zone	15.09.2017	GKMS Unit, RARS, Chintapalle funded by the Indian Meteorological Department, New Delhi
7	Exposure visit to ManaVithana Kendra Farmers	04.10.2017	RARS, Chintapalle

S. No.	Event	Date	Venue
8	117th Birth Anniversary of Acharya N.G. Ranga	07.11.2017	All Centres of the ANGRAU
9	Mahila Kisan Diwas	15.10.2017	All Krishi Vigyan Kendras of the ANGRAU
10	‘World Food Day’	16.10.2017	All KVKs and DAATTCs of the ANGRAU
11	World Diabetes Day	14.11.2017	College of Home Science, Guntur
12	One day brainstorm session on Latest Technology in Agriculture, Horticulture and Animal Husbandry	22.11.2017	RARS, Tirupati
13	Exposure visit to Integrated Farming System on ‘Paddy cum fish culture’	23.11.2017	KVK, Amadalavalasa
14	The World Soils Day organized pre-rabi Kisan Sammelan involving local Members of Parliament, MLCs, MLAs and other public representatives at their respective KVK centres.	05.12.2017	All the Research Stations and 11 KVKs of the ANGRAU (excluding KVK, Ghantasala and Kondempudi)
15	Field Day of Mechanized SRI	20.12.2017	By KVK, Amadalavalasa conducted at Ambativanipeta of Gara Mandal in coordination with department of Agriculture ATMA and Agri Business center of excellence, Srikakulam.
16	‘National Dietetics Day’ on the theme given by the Indian Dietetic Association, i.e., “Ensuring Safe and Nutritious Food”.	10.01.2018	College of Home Science, Guntur organized at Vejendla village, Guntur District
17	Capacity building programme to the 16 Gram Sarpanches and 16 young farmers under Reach every Panchayat	24.01.2018	By DAATTC, Guntur at Veldurthi village, Guntur district

S. No.	Event	Date	Venue
18	Mini Kisan Mela cum farmer scientist interaction programme	02.02.2018	Krishi Vigyan Kendra and DAATTC, Banavasi in association with ATMA – Kurnool
19	Technology and Machinery Demonstration Mela-2018	16.02.2018	All India Coordinated Research Projects on Post-Harvest Engineering Technology, Bapatla & Anakapalle; Farm Implements and Machinery, Bapatla at Post Harvest Technology Centre, Bapatla
20	Millet Fest 2018	16.02.2018	KVK and DAATTC Kalikiri, Chittoor
21	Farmers awareness programme on ‘Weather based agro advisories’	28.02.2018	Regional Agricultural Research Station, Anakapalle
22	International Women’s Day	08.03.2018	At all Institutions under ANGRAU
23	SikkoluSedyam (Toll Free number-1800 425 0051)	06.04.2018	KVK, Amadalavalasa
24	Kisan Melas	29.01.2018 23.02.2018 07.04.2018 19.04.2018 22.04.2018	RARS, Anakapalle RARS, Tirupati RARS, Maruteru RARS, Chintapalle ARS, Ragolu
25	Pre-season awareness programme on pink boll worm management in cotton	27.04.2018	ANGRAU in collaboration with AP Cotton Association

Meetings Organized

S. No.	Event	Date	Venue	Organized by
1	Mega Seed Project meeting	14.06.2017	RARS Nandyal	ANGRAU in collaboration with IOWA University
2	A meeting with all the Associate Directors of Research and staff of NBCC to review the building plans sanctioned under NABARD Tranche XXI and finalize the structures.	11.07.2017	RARS, Lam	ANGRAU
3	A joint meeting of scientists of ANGRAU with Agri Biotech Foundation (ABF), Rajendranagar, Hyderabad to take up collaborative research projects in blackgram for external funding with specific reference to Mungbean Yellow Mosaic Virus (MYMV)	08.09.2017	Lam, Guntur	ANGRAU
4	Review meeting for finalization of revised agricultural polytechnic syllabus for implementation from the Academic Year 2018-19 after approval in the Academic Council.	16.10.2017	Agricultural College, Bapatla	ANGRAU
5	Mungbean expert meeting	25.11.2017	RARS, Lam	ANGRAU in coordination with World Vegetable Centre, ICRISAT Campus, Patancheru, Hyderabad
6	A stakeholder meeting on "Situational Analysis of Practicing Natural Farming for Benchmark in A P"	29.11.2017	RARS, Tirupati	ANGRAU
7	Review meeting of IRRI collaborative research project on Satellite Based Rice Monitoring and Crop Insurance System for Andhra Pradesh	05.12.2017	RARS, Lam	ANGRAU

S. No.	Event	Date	Venue	Organized by
8	A meeting with crop experts from ANGRAU and the experts from VASSAR Labs to discuss and finalize the pest and soil moisture rules for all crops	20.12.2017	RARS, Lam	ANGRAU
9	Farmers - Scientists interaction meeting on the occasion of Farm Engineering Expo-2018	28.02.2018	college of Agricultural Engineering, Bapatla	ANGRAU
10	ZREAC Meetings			
	Krishna Zone	03.04.2018 & 04.04.2018	Acharya Ranga Bhavan, Ongole	ANGRAU
	Scares Rainfall Zone	09.04.2018 & 10.04.2018	ARS, Ananthapuramu	ANGRAU
	Southern Zone	11.04.2018 & 12.04.2018	ARS, Utukur, Kadapa	ANGRAU
	HAT Zone	18.04.2018 & 19.04.2018	RARS, Chintapalle	ANGRAU
	North Coastal Zone	20.04.2018 & 21.04.2018	Andhra University, Visakhapatnam	ANGRAU
	Godavari Zone	24.04.2018 & 25.04.2018	RARS, Maruteru	ANGRAU
11	Zonal level Foundation seed production meeting for the year 2018-19	03.05.2018	RARS, Anakapalle	ANGRAU
		05.05.2018	RARS, Nandyal	ANGRAU
12	SLTP Meetings	07.05.2018 to 24.05.2018	Different venues of the University	ANGRAU

Training Programmes / Short Courses / Orientation Programmes Organized

S. No.	Event	Date	Venue	Organized by
1	Advanced level training programme to the Vittana Mitras to strengthen the role of 'Vittana Mitras' in the seed production	01.06.2017 to 15.06.2017	KVK, Kalikiri	KVK, Kalikiri
2	Two training programmes on 'Integrated Farming system with improved breeds of Swarnandhra Backyard poultry and Hydroponic techniques'	03.06.2017 & 15.06.2017	KVK, Kalyandurg	KVK, Kalyandurg
3	Pre *kharif* training programme Green manure crops, rice cultivation methods and Redgram cultivation.	13.06.2017	Sarubujjili village of Sarubujjili mandal	DAATTC, Srikakulam
4	Three training programmes on kharif preparedness and good agricultural practices for enhancing the yield and income of the farmers	14.06.2017, 16.06.2017 & 21.06.2017	DAATTC, Anantapuramu	DAATTC, Anantapuramu
5	Training programme cum field visit to farmers on 'Rain water harvesting methods & management and selection of drought tolerant Groundnut varieties for *Kharif*'	17.06.2017	KVK, Kalyandurg	KVK, Kalyandurg in collaboration with Centre for Collective Development NGO
6	Method demonstration on 'Raising of rice nursery on plastic sheets and plastic trays of MSRI'	21.06.2017 & 23.06.2017	DAATTC, Kadapa	DAATTC, Kadapa
7	Training programme on 'Use of neem based products in Agriculture'.	22.06.2017	Bhatlapalli village of Mundlamuru mandal	KVK, Darsi
8	An Interaction cum group discussion with Andhra Pradesh Smart villages committee of State, District and mandal wise Coordinators on income generating activities.	23.06.2017	KVK, Undi	KVK, Undi
9	Training programme for farmers on 'Profitable Cotton Cultivation' as per the MoU with M/s. Bayer Crop Science Limited	28.06.2017	Guntur & Prakasam districts	ANGRAU
10	Training Programmes on ANGRAU Research Management System (ARMS)	29.06.2017 to 05.07.2017	All the Zones	ANGRAU

S. No.	Event	Date	Venue	Organized by
11	Training programme for marketing staff of Coromandel International Limited of Andhra Pradesh & Telangana states on 'Integrated Crop Management practices in cotton'	01.07.2017 & 02.07.2017	RARS, Lam, Guntur	RARS, Lam, Guntur
12	Training programmes on 'Importance of Mother's milk' and 'Value addition to millets'	21.07.2017; 25.07.2017 & 26.07.2017	Anumanchipalli village	Chillakallu village KVK, Garikapadu
13	An awareness programme on 'Farm Ponds'	05.07.2017	KVK, Ghantasala	KVK, Ghantasala
14	Training programme on 'Soil Test Based Nutrient Management in redgram and cotton'	06.07.2017	Chanduluru village of Darsi mandal	KVK, Darsi
15	Training programme on 'Various aspects of Agriculture' to the newly selected Seed Certification officers	10.07.2017 to 14.07.2017	RARS, Lam, Guntur	ANGRAU
16	'Andhra Pradesh Rural Youth Skill Development Programme'	11.07.2017 to 15.07.2017	KVK, Banavasi	KVK, Banavasi in coordination with the Andhra Pradesh Micro Irrigation Project and NETAFIM Irrigation India
17	Training programme cum awareness programme on 'Farmer Producer Organizations'	13.07.2017	Pasalavandlapalli of Kalikiri mandal	KVK, Kalikiri
18	Training programme to the extension functionaries on 'Preparation of nutrition recipes with millets for preschool children'	20.07.2017	Adoni	KVK, Banavasi
19	Training programme on 'Value addition to pineapple'	23.07.2017 to 25.07.2017	KVK, Amadalavalasa	KVK, Amadalavalasa
20	Training programme to the 50 input dealers and covered all the protection measures in the major crops of the area	24.07.2017	DAATTC, Kakinada	DAATTC, Kakinada
21	Training programme on 'Vennamei shrimp culture'.	25.07.2017	Ramannapalem village	KVK, Undi

S. No.	Event	Date	Venue	Organized by
22	An awareness programme on 'Terrace gardening to the teachers and students of Tarimela Nagireddy School'	26.07.2017	KVK, Nellore	KVK, Nellore
23	Training programmes being the 'World Honey Bee Day' at their premises and in the villages	19.08.2017	All the KVKs and DAATTCs	ANGRAU
24	Training programmes to the farm women in the adopted villages	01.09.2017 to 07.09.2017	KVK, Nellore, Kalyandurg	KVK, Nellore, Kalyandurg
25	Vocational training programme on 'Hand made paper carry bags' to the farm women and rural youth of Yemmiganur.	06.09.2017 to 08.09.2017	KVK, Banavasi	KVK, Banavasi
26	Vocation training programme on 'Jute Making'	14.09.2017 to 16.09.2017	KVK, Nellore	KVK, Nellore, in collaboration with ATMA, Nellore
27	Training programmes on 'Diagnosis of pests and Diseases' and 'Management strategies in major *Kharif* crops' to ADA's, AO's	16.09.2017 & 22.09.2017	KVK, Amadalavalasa	KVK, Amadalavalasa
28	Training programme on 'Gatherix App' to the Department officials and extension workers in Tadepalligudem and Bheemadolu Agricultural sub divisions	20.09.2017	DAATTC, Eluru	DAATTC, Eluru
29	Vocational training programme on 'Integrated Farming Systems'	26.10.2017 to 31.10.2017	KVK, Garikapadu	KVK, Garikapadu
30	Training programme on 'Work Excellence' to the non-teaching staff of ANGRAU	14.11.2017	RARS, Lam	ANGRAU
31	Vocational training programme on 'Value addition to minor millets to the 20 SGH Group leaders'	14.11.2017 to 17.11.2017	KVK, Amadalavalasa	KVK, Amadalavalasa
32	Advanced training programme on 'Pulses Seed Production, Processing and Certification'	21.11.2017 to 27.11.2017	KVK, Amadalavalasa	KVK, Amadalavalasa
33	Training programme on 'crop Insurance and crop loans'	21.11.2017	K. Kotapadu village of Visakhapatnam district	KVK, Kondempudi

S. No.	Event	Date	Venue	Organized by
34	Training programme to the 25 MPEOs/AEOs each day on 'Integrated weed management in major crops; cotton and pulses production technology'	23.11.2017 to 25.11.2017	DAATTC, Guntur	DAATTC, Guntur
35	Vocational training to the farmers on 'Handling, maintenance of sprayers and spray fluid application techniques'	16.12.2017	Ganjihall village Gonegandla mandal	KVK, Banavasi
36	Training programme on 'Bee-keeping' was conducted to the scientists of various research and extension units of the ANGRAU	18.12.2017	ARS, Vijayarai, West Godavari District	ANGRAU
37	Vocational training programme on 'Mushroom cultivation'	19.12.2017	KVK, Utukur	KVK, Utukur
38	The vocational training on 'Low cost nutrition recipes' for urban SHGs	20.12.2017 & 21.12.2017	Proddatur	KVK, Utukur
39	Kisan Diwas on the occasion of Chow. Charan Singh birthday	23.12.2017	Ambedkar Nagar, Etcherla mandal	KVK, Amadalavalasa in collaboration with FTC, Srikakulam
40	LEDP (Livelihood Entrepreneurship Development Programme) training on 'Mushroom production' assisted by NABARD, Anantapuramu	05.01.2018	Penugonda	KVK, Reddipalli in collaboration with Samata NGO
41	Training programme on 'Rabi crops-Management' to MPEOs and AEOs working in Srikakulam Dist.	02.02.2018	DAATTC, Amadalavalasa	DAATTC, Amadalavalasa with the support of ATMA, Srikakulam
42	Skill development training programme on 'Mushroom Cultivation Techniques'	14.02.2018 to 16.02.2018	KVK, Nellore	KVK, Nellore
43	Friends of Coconut Trees programme to 20 numbers of Coconut farmers from different mandals of Srikakulam District	15.02.2018 to 20.02.2018	KVK, Amadalavalasa	KVK, Amadalavalasa
44	Training programme to create awareness on 'Women oriented developmental programmes and schemes'	17.02.2018	College of Home Science, Guntur	College of Home Science, Guntur

S. No.	Event	Date	Venue	Organized by
45	Training programme to the newly recruited scientists working in KVKs and DAATTCs on 'Crop production, crop protection, value addition' etc.	19.02.2018 to 21.02.2018	RARS, Nandyal	RARS, Nandyal
46	Training programme to B.Sc. (Agriculture) final year students of Agricultural College, Rajamahendravaram under 'Student Development Programme' on 'Job search process, Resume writing, Group discussion, Personal interview skills'	20.02.2018 & 21.02.2018	Agricultural College, Rajamahendra-varam	Agricultural College, Rajamahendra-varam
47	Training programme to final year B.Sc. (Ag) students of Agricultural College, Mahanandi was organized on 'Arithmetic and Reasoning' for various competitive exams through Sri Venkateswara Banking Coaching Institute, Nandyal.	26.02.2018 & 27.02.2018	Agricultural College, Mahanandi	ANGRAU
48	Training programme on 'Detection of adulterants in foods'.	28.02.2018	College of Food Science & Technology, Bapatla	College of Food Science & Technology, Bapatla
49	Training programme on 'Career Planning & personality enhancement' for III Year B.Sc.(Ag.) students of Agricultural College, Bapatla	07.03.2018 & 08.03.2018	Agricultural College, Bapatla	Agricultural College, Bapatla by Agro-friendly Academy Hyderabad
50	Krishi Ghoshti and training cum awareness programme on Protection of Plant Varieties and Farmers Rights Act duly involving local MLAs and MPs, District Collectors and other Public Representatives and farmers	17.03.2018	At their respective KVK premises	All the Krishi Vigyan Kendras
51	Training programme on 'Field Oriented Agricultural Technologies' for SMSs/ Scientists working in KVKs and DAATTCs of Southern Zone	19.04.2018 to 21.04.2018	RARS, Tirupati	RARS, Tirupati

S. No.	Event	Date	Venue	Organized by
52	Skill development training to rural youth on 'Commercial dairy, sheep and goat production' for self-employment generation	25.04.2018	KVK, Banavasi	KVK, Banavasi
53	Training programme for input dealers under DAESI programme on 'Identification of Nutritional Disorders in Field crops'.	06.05.2018	KVK, Amadalavalasa	KVK, Amadalavalasa in collaboration with ATMA, Srikakulam
54	Training programme on 'Value addition to millets'	08.05.2018 to 10.05.2018 & 29.05.2018 to 31.05.2018	Vallur and C.K. Dinne	KVK, Utukur, Kadapa
55	Pre Kharif orientation training programme to AEOS and MPEOs with the financial support of ATMA, Srikakulam	17.05.2018, 18.05.2018 & 19.05.2018	KVK, Amadalavalasa,	AMC, Pondur and Tekkali ANGRAU
56	World Honey Bee Day and training programme on 'Apiculture'	20.05.2018	KVK, Kalikiri	KVK and DAATTC, Kalikiri
57	A short course training on 'Advance Statistical Computations for Data Analysis'	21.05.2018 to 30.05.2018	Agricultural College, Bapatla	Agricultural College, Bapatla
58	Skill training for Rural Youth (STRY) 'To impart knowledge and skill related to different aspects of agriculture and allied sectors'	24.05.2018 to 30.05.2018	KVK, Utukur, Kadapa	KVK, Utukur, Kadapa under sponsorship of ATMA, Kadapa
59	Pre-season *Kharif* training programme on 'Production and protection technologies in agricultural and horticultural crops'	26.05.2018 & 29.05.2018	KVK, Kalyandurg	KVK, Kalyandurg in association with RDT

Workshops/ Seminars / Conferences/Symposia Organized

S. No.	Event	Date	Venue	Organized by
1	National seminar on 'Agronomic Approaches for Climate Resilience in Agriculture'	02.05.2017	RARS, Nandyal	ANGRAU
2	A meeting on District wise Contingency Crop Plans	01.08.2017	ARS, Anantapuramu	ANGRAU
3	Krishna River Water disputes group meeting	07.08.2017	RARS, Lam	ANGRAU
4	XXIII Biennial Workshop on AINRP on Tobacco	23.10.2017 & 24.10.2017	RARS, Nandyal	ANGRAU
5	Sensitization workshop	01.11.2017	RARS, Lam farm, Guntur	ANGRAU
6	National Conference on "Emerging Trends in Agri nano technology - 2017" (Agri NANO-2017)	02.11.2017 & 03.11.2017	RARS, Tirupati	ANGRAU
7	National Seminar on 'Futuristic Agri-culture for Sustainable Food Security'	21.02.2018 to 23.02.2018	S.V. Agricultural College, Tirupati	ANGRAU
8	National Conference on "Digital and Engineering Technologies for Precision Agriculture and Value Addition & Farm Engineering Expo-2018"	26.02.2018 to 28.02.2018		ANGRAU
9	XXX Annual meeting of the Plant Physiology Club (APAU) and a workshop on 'Cutting edge innovations for future prospects of crop physiology'	27.02.2018 & 28.02.2018	RARS, Tirupati	ANGRAU
10	National Dialogue on "Smart Farming for Sustainability of Smallholders"	24.03.2018 & 25.03.2018	Agricultural College, Bapatla	NABARD Chair Unit, ANGRAU
11	National Conference for Post Graduate Students - 2018 on "Techno - Strategic Interventions for Profitable Agriculture"	26.03.2018 & 27.03.2018	Agricultural College, Bapatla	Agricultural College, Bapatla and APGC, Lam, Guntur
12	One day Workshop on 'Biological diversity Act and Access & Benefit sharing (ABS) Mechanism'	28.03.2018	Agricultural College, Naira	Agricultural College, Naira in collaboration with A.P.State Bio-diversity Board, Guntur
13	Convened Biosafety Capacity Building Workshop under UNEP/GEF supported Phase II capacity building project on Biosafety	23.04.2018	RARS, Tirupati	ANGRAU

Participation / Visits of Vice-Chancellor

S. No.	Event	Date	Venue	Purpose
1	Dr. V. Damodara Naidu has assumed charge as Hon'ble Vice-Chancellor	05.06.2017	-	-
2	98th Meeting of the Academic Council	09.06.2017	Lam, Guntur	Chairman
3	Visited and evaluated the teaching activities	12.06.2017	SV Agricultural College, Tirupati	Inspection
4	Visited and reviewed the research progress and also launched ANGRAU Research Management (ARMS) Portal.	13.06.2017	RARS, Tirupati	Chairman
5	279th Meeting of the Board of Management	15.06.2017	RARS, Anakapalle	Chairman
6	Visited and reviewed the progress of Technical Programmes of Scientists.	16.06.2017	RARS, Anakapalle	Chairman
7	Meeting with University Officers and reviewed various on-going activities	19.06.2017	Chambers of Hon'ble Vice-Chancellor, Admin Camp Office, Guntur	Chairman
8	'International Yoga Day' and 'Mega Seed Park functionality with ANGRAU'	21.06.2017	Admin. Block, Lam, Guntur	Participation
9	Reviewed research/teaching activities of different zones/colleges at Bi-Monthly meeting.	22.06.2017	Faculty Block, Lam, Guntur	Chairman
10	Reviewed research and extension activities at KVK, Kalikiri and the teaching activities	24.06.2017	Agril. Polytechnic Colleges, Kalikiri, Chittoor district	Inspection
11	Visited and inspected experimental fields, laboratories and interacted with Scientists.	25.06.2017	ARS, Nellore and also KVK, Nellore	Inspection
12	Reviewed research activities and also reviewed the teaching activities	26.06.2017	ARS, Podalakur and Agril. Polytechnics, Podalakur	Inspection
13	Conducted CAS interviews to Teaching Faculty	27.06.2017 to 30.06.2017	Chambers of Hon'ble Vice-Chancellor	Chairman

S. No.	Event	Date	Venue	Purpose
14	"World Agricultural Forum"	06.07.2017 to 07.07.2017.	Raffles City Convention Centre, Singapore	Participation
15	Inaugurated the counselling event of students' admissions into the courses of B.Tech (Agri. Engg.); B.Tech (Food Science & Technology) under farmers quota and Bachelor's degree (Home Science)	10.07.2017	RARS, Lam, Guntur	Chairman
16	Monitored the on-going research / teaching activities at Agricultural College, Bapatla; CAE, Bapatla; College of Home Science, Guntur, Saline Water Scheme, RRU, PHET and suggested for their improvement	11.07.2017	---	Inspection
17	Participated in ICAR Foundation Day celebrations and also received "Pandit Deendayal Upadhyay Rashtriya Krishi Vigyan Protshahan Puraskar" - 2016-17 for Zone-X awarded to KVK Utukur, Kadapa and "Vasant Rao Naik Award" - 2016 for the best AICRP on Dryland Agriculture to ARS, Anantapuramu	16.07.2017	New Delhi	Participation
18	Conducted interviews for the positions of Assistant / Associate Professors in various departments of Agriculture, Agricultural Business Management, Veterinary, Agricultural Engineering & Technology, and Home Science	14.07.2017 to 31.07.2017	Administrative Office, Lam, Guntur	Chairman
19	280th Meeting of the Board of Management	12.08.2017	Administrative Office, Lam, Guntur	Chairman
20	Independence Day Celebrations	15.08.2017	Administrative Office, Lam, Guntur	Participation
21	The 8th Brain Storming Session on "Expectations from Agricultural Universities, Challenges & Mitigation" organized by IAUA	19.08.2017 & 20.08.2017	Kolkata	Participation

S. No.	Event	Date	Venue	Purpose
22	Convened meeting with University Officers and reviewed various on-going activities	22.08.2017	Administrative Office, Lam, Guntur	Chairman
23	Convened and reviewed research/ teaching activities of different zones/ colleges at Bi-Monthly meeting	23.08.2017 & 24.08.2017	Administrative Office, Lam, Guntur	Chairman
24	Visited and inspected the experimental fields, labs and interacted with scientists about the on-going technical programme	11.09.2017	Agriculture Research Station, Kadiri & N.P.Kunta	Inspection
25	Visited and inspected the experimental fields, labs and interacted with scientists and teachers about the on-going technical programme and also about conduct of classes and other aspects.	12.09.2017 to 14.09.2017	ARS, Ananthapuramu, KVK, Ananthapuramu, DAATTC, Ananthapuramu, APT, Ananthapuramu, ARS, Reddipalli, KVK, Kalyandurg, Private Agril. Colleges, APT, Tadipatri, Agril. Eng. College, Madakasira, RARS, Nandyal and ARS, Darsi	Inspection
26	Visited and inspected the experimental fields, labs and reviewed individual scientist on-going technical programme by power point presentations	18.09.2017	ARS, Perumallapalle, RARS, Tirupati and APT, Tirupati	Inspection
27	Visited and interacted with the staff and students on various activities.	20.09.2017	S.V. Agricultural College, Tirupati	Inspection
28	Visited and reviewed various on-going activities at respective centres.	21.09.2017	KVK, Kalikiri, APT, Kalikiri, AEPT, Kalikiri, APT & AEPT, Sodam	Inspection

S. No.	Event	Date	Venue	Purpose
29	Visited and interacted with staff and students	22.09.2017	DAATTC, Chittoor, AEPT, Puttur, APT, Narayanavanam	Inspection
30	Attended selections of University Officers as expert members in University of Agricultural Sciences, Raichur	23.09.2017	Raichur	Member
31	Visited and suggested to improve the condition of instructional farm, maintain very few prominent varieties of crops grown in the jurisdiction along with self-explanatory field labels and maintaining economics of the demo units etc.	25.09.2017	ARS, Garikapadu, KVK, Garikapadu, and APT, Garikapadu	Inspection
32	Gandhi Jayanthi Celebrations	02.10.2017	Administrative Office, Lam, Guntur	Participation
33	49th Annual Convocation of ANGRAU	04.10.2017	Sri Venkateswara Kasturba Kalakshetram, Nellore	Organized
34	281st Meeting of Board of Management	04.10.2017	Agricultural Research Station, Nellore	Chairman
35	Rythu Sabha Programme	07.10.2017	Navabharath Ventures Ltd., Samalkota, East Godavari District	Participation
36	Visited and carried out technical and office inspections	07.10.2017	ARS, Peddapuram	Inspection
37	Inspected fields and offices	09.10.2017	DAATTCs, Kurnool	Inspection
38	Participated in Foundation stone laying ceremony (by Hon'ble CM of Andhra Pradesh) of Mega Seed Park	09.10.2017	Thangadancha, Kurnool district of Andhra Pradesh	Participation

S. No.	Event	Date	Venue	Purpose
39	Inspected KVK, Banavasi and Agril. College, Mahanandi	10.10.2017	---	Inspection
40	Inspected College of Food Science and Technology, Pulivendula, ARS, DAATTC and KVK, Utukur	11.10.2017	---	Inspection
41	Inspected Private Agricultural Polytechnics, Badvel, Agricultural College Farm, Mahanandi	12.10.2017	---	Inspection
42	Inaugurated the first issue of ANGRAU e-newsletter and ANGRAU You Tube and Blog	13.10.2017	---	---
43	The Borlaug Dialogue International Symposium at Des Moines, IA, US and Mega Seed Park Workshop discussion	18.10.2017 to 20.10.2017	Iowa State University, USA	Participation
44	Convened meeting with University Officers and reviewed various on-going activities	30.10.2017	Administrative Office, Lam, Guntur	Chairman
45	Convened and reviewed research/ teaching activities of different zones/ colleges at Bi-Monthly meeting	30.10.2017 & 31.10.2017	Administrative Office, Lam, Guntur	Chairman
46	ASRB Review Meeting	01.11.2017	NAARM, Hyderabad	Participation
47	National Conference on Emerging Trends in Agri Nanotechnology 2017	02.11.2017	Tirupati	Participation
48	SLCC Meeting on Doubling Farmers Income by 2025	03.11.2017	New Delhi	Chairman
49	Visited DAATTC, RARS, Anakapalle, Narsipatnam, ARS, Yelamanchili, BCT KVK, Yelamanchili	04.11.2017	---	Inspection

S. No.	Event	Date	Venue	Purpose
50	Visited ARS, Vizianagaram, DAATTC, Vizianagaram, Pittada (RAWEP villages), APT, Nelliparti, Seed Technology Polytechnic, Nelliparti, ARS, Seethampeta, KVK, Rastakuntabai	05.11.2017	---	Inspection
51	Visited Etcherla Private Agril. College, SSR Puram, Ag. College, Naira, ARS, Amadalavalasa, KVK, Amadalavalasa, & ARS, Ragolu	06.11.2017	---	Inspection
52	AP Science Congress	07.11.2017	Visakhapatnam	Participation
53	Visited ARS, KVK, Darsi, NS Agril. Private Poly. College, Markapuram	10.11.2017	---	Inspection
54	Visited KVK, ARS, Ghantasala, ARS, DAATTC, AJK Agril. Private Poly. College, Machilipatnam, SRS, Vuyyuru	13.11.2017	---	Inspection
55	Chaired in training programme on "Work Excellence" to Non-Teaching staff	14.11.2017	Admn. Office, Lam, Guntur	Chairman
56	AP Agri. Tech Summit 2017	15.11.2017 to 17.11.2017	Visakhapatnam	Participation
57	Visited and interacted with students	18.11.2017	Agricultural College, Naira	Inspection
58	Inaugurated Girls Hostel, Workshop - I Floor, inspected PHTC, Agril. Farm, Saline Water Scheme, CFST, CAE, Ag. College, Bapatla	20.11.2017	---	Inspection
59	Visited Lam Farm and monitored functioning of Drone Machine, Plantix App	21.11.2017 to 23.11.2017	---	---
60	Inauguration of Maize Research Centre Foundation Stone Laying Ceremony	26.11.2017	ARS, Vijayarai Agricultural College, Rajamahendra-varam	Participation

S. No.	Event	Date	Venue	Purpose
61	Inaugurated Seminar Hall	28.11.2017	Advanced Post-Graduate Centre, Lam, Guntur	Inspection
62	282nd Meeting of Board of Management	30.11.2017	Administrative Office, Lam, Guntur	Chairman
63	Visited and carried out technical inspections	04.12.2017	RARS, Nandyal, Agricultural Polytechnic, Nunepalli, Nandyal, G.M. Institute of Agricultural Polytechnic, Nandyal, and KVK, Banaganapalle	Inspection
64	IRRI Satellite Based Rice Monitoring & Crop Insurance System	05.12.2017	Lam, Guntur	Participation
65	Mega Seed Park workshop discussions	05.12.2017	Hon'ble Agriculture Minister Chambers, Velagapudi	Participation
66	Meeting on Mega Seed Park	06.12.2017	Admn. Office, Lam, Guntur	Participation
67	62nd Death Anniversary of Dr. B. R. Ambedkar.	06.12.2017	Admn. Office, Lam, Guntur	Participation
68	Visited and reviewed the technical programme of work and activities	06.12.2017	ARS, KVK & Agril. Polytechnic, Garikapadu	Inspection
69	Convened University Officers meeting	07.12.2017	Admn. Office, Lam, Guntur	Chairman
70	Performed Bhumi Pooja for construction of modern jaggery plant and also visited Regional Agricultural Research Station, Chintapalle and inspected the on-going research activities and polytechnic programmes	11.12.2017	Regional Agricultural Research Station, Anakapalle	---

S. No.	Event	Date	Venue	Purpose
71	Visited and inspected the on-going research activities	14.12.2017	Agricultural Research Station, Jangamaheswara-puram	Inspection
72	Inaugurated the Inter- Collegiate Sports, Games, Cultural and Literary Meet 2017-18	16.12.2017	Tirupati	Chairman
73	Phone-In-Live programme and answered the queries raised by the farmers	18.12.2017	Doordarshan, Vijayawada	Participation
74	99th Academic Council meeting	20.12.2017	APGC Seminar Hall, Lam, Guntur	Chairman
75	Bi-Monthly Review Meeting	20.12.2017	Admn. Office, Lam, Guntur	Chairman
76	REAC Meeting	21.12.2017 & 22.12.2017	RARS, Lam, Guntur	Chairman
77	100th Annual Conference on Indian Economic Association (IEA). (Shri Ram NathKovind, Hon'ble President of India is the Chief Guest; Shri E.S.L. Narasimhan, Hon'ble Governor of AP & Shri N. Chandrababu Naidu, Hon'ble CM of AP are the Guests of Honour)	27.12.2017	Acharya Nagarjuna University, Guntur	Participation
78	Concluding ceremony of Sports Meet for students	30.12.2017	Agricultural College, Bapatla	Participation
79	Conducted U.Os meeting	10.01.2018	Board meeting Hall, Admn. Office, Lam, Guntur	Chairman
80	Visited and conducted technical inspection	11.01.2018	ARS, Kavali	Inspection
81	Visited and conducted technical inspection	12.01.2018	ARS, Nellore & Podalakur, Agril. Polytechnic, Somasila, Podalakur and Vakadu and KVK, Nellore	Inspection

S. No.	Event	Date	Venue	Purpose
82	Dr.YSRHU - 47th Board Meeting	13.01.2018	Office of Commissioner of Horticulture and Ex-Officio Secretary to Government, TTPC Building, 1st Floor, Old Market Yard, Near Rythu Bazar, Chuttugunta, Guntur	Participation
83	Student Ready Programme	18.01.2018	APGC, Lam, Guntur	---
84	Training programme on "Work Excellence"	19.01.2018	APGC, Lam	---
85	Field visit to Blackgram, Redgram, Bengalgram of Mr. Bodavula Laxminarayana in Puruchur, Prakasam Dist.	20.01.2018	---	---
86	Visited Dr.Y.S.R.Horticultural University, Venkataramannagudem, ARS, Vijayrai, HRS, Vijayrai, Indian Institute of Oil Palm Research, Pedavegi	23.01.2018	---	---
87	283rd meeting of the Board of Management	24.01.2018	Rajamahendra-varam	Chairman
88	Republic Day celebrations	26.01.2018	Admn. Office, Lam, Guntur	Participation
89	Visited RARS, Anakapalle to attend the Kisan Mela and also participated in Inaugural functions of NABARD building, Biofertilizer units	29.01.2018	RARS, Anakapalle	Participation
90	RKVY Meetings	30.01.2018	RARS, Lam, Guntur	Chairman
91	Participated in Study Tour and visited IRRI field sites in Thailand, Vietnam and Philippines as part of on-going A.P. Government sponsored IRRI - ANGRAU collaborative project "Satellite based Rice Monitoring System for A.P."	03.02.2018 to 08.02.2018		Participation

S. No.	Event	Date	Venue	Purpose
92	Review Meeting on the activities of Implementation of AP - IOWA State University Mega Seed Park at District	20.02.2018	Thangadancha, Kurnool	Participation
93	National Seminar on "Futuristic Agriculture for Sustainable Food Security"	21.02.2018 to 23.02.2018	S V Agricultural College, Tirupati	Participation
94	Convened and reviewed research/ teaching activities of different zones/ colleges at Bimonthly meeting of the ADRs and ADs	22.02.2018	RARS, Tirupati	Chairman
95	Participated in Kisan Mela and Foundation for LBF Unit, IABM, Tirupati	23.02.2018	IABM, Tirupati	Participation
96	Opening of SBF Unit and SVAC III Floor Block, Tirupati	23.02.2018	Tirupati	Participation
97	National Conference on Digital and Engineering Technologies for Precision Agriculture and Value Addition & Farm Engineering Expo - 2018	26.02.2018 & 27.02.2018	College of Agricultural Engineering, Bapatla	Participation
98	48th Meeting of the Board of Management at Conference Hall, International Guest House, University Campus, Dr.Y.S.R. Horticultural University, Venkataramannagudem	28.02.2018	Dr.Y.S.R. Horticultural University, Venkataramanna-gudem	Participation
99	Meeting of Director General IRRI with Hon'ble Chief Minister, Shri Nara Chandrababu Naidu, Hon'ble Minister for Agriculture Shri Somireddy Chandramohan Reddy	02.03.2018	CM Camp Office, Amaravati	Participation
100	Visited Agricultural College, Bapatla with Director General IRRI	02.03.2018	---	---
101	Meeting with Director General IRRI and visited ARS, Nellore and IRRI Innovation Centers	03.03.2018	---	---

S. No.	Event	Date	Venue	Purpose
102	Annual Conference of Vice Chancellors of Agricultural Universities and Interface meeting with Directors' of ICAR	07.03.2018 & 08.03.2018	New Delhi	Participation
103	Enlightened the Hon'ble Vice President, Government of India, Shri M.Venkaiah Naidu, at New Delhi regarding sanctioning of ICAR sponsored schemes in A.P. Visited experimental plots of various crops and labs at IARI	09.03.2018	---	---
104	Interaction Meeting with Management and Principals of Polytechnics	12.03.2018	RARS, Lam	Participation
105	Meeting on Implementation of Integrated University Management Solutions (IUMS) for paperless Administration, Academic, Research and Extension activities	15.03.2018	Admn. Office, ANGRAU, Lam, Guntur	Participation
106	Meeting on Power Purchase Agreement (PPA) with TEP Solar India Private Limited, Hyderabad	15.03.2018	Admn. Office, ANGRAU, Lam, Guntur	Participation
107	Release of Vyavasaya Panchangam 2018-19 by Hon'ble Chief Minister	18.03.2018	Tummalapalli Kalakshetram, Vijayawada	Participation
108	Meeting with newly appointed University Officers and also reviewed various on-going activities at on.	27.03.2018	Administrative Office, Lam, Guntur	Chairman
109	Closing ceremony of a National Conference titled "Innovations and Challenges in Biotechnology".	28.03.2018	Sri Venkateswara University, Tirupati	Chief Guest
110	Meeting with CEO, SERP	04.04.2018	Administrative Office, Lam, Guntur	Participation
111	Babu Jagjivan Ram Birthday celebrations	05.04.2018	Administrative Office, Lam, Guntur	Participation

S. No.	Event	Date	Venue	Purpose
112	Meeting with APIIC officials and Finger 6 Architects	06.04.2018	Administrative Office, Lam, Guntur	Participation
113	Interacted with the participants of 6th Foundation Course for Faculty of Agricultural Universities (FOCFAU) and attended cultural events	07.04.2018	ICAR - NAARM, Rajendranagar, Hyderabad	Participation
114	The DPC meeting	13.04.2018	Board meeting Hall, Admn. Office, ANGRAU, Lam, Guntur	Chairman
115	Dr.B.R.Ambedkar Birthday celebrations	14.04.2018	Admn. Office, ANGRAU, Lam, Guntur	Participation
116	53rd Annual Rice Research Group meeting	15.04.2018 & 16.04.2018	IIRR, Hyderabad	Participation
117	Review meeting on the progress of construction of Integrated Administrative Building with APIIC officials and Finger 6 Architects	17.04.2018	Administrative Office, Lam, Guntur	Chairman
118	Brainstorming Session on "Emerging Plant Protection Technologies: Opportunities and Challenges"	20.04.2018	NIPHM, Rajendranagar, Hyderabad	Participation
119	State Level Bio-safety Capacity Building Workshop under Phase Capacity Building Project on Bio-safety	23.04.2018	RARS, Tirupati	Participation
120	Meeting with Associate Deans of Constituent and Affiliated Agricultural Colleges of ANGRAU	25.04.2018	---	Chairman
121	Convened and reviewed research/ teaching activities of different zones/ colleges at Bimonthly meeting of the ADRs and ADs	26.04.2018	Administrative Office, Lam	Chairman

S. No.	Event	Date	Venue	Purpose
122	Delivered Guest Lecture on "Farm Mechanization: Extension Approach for Small and Marginal Farmers of India" and interact with staff	27.04.2018	MANAGE, Hyderabad	Participation
123	State Level Technical Programme (SLTP) meeting of Genetics and Plant Breeding including Biotechnology, Seed Science & Technology and Agronomy	07.05.2018 to 10.05.2018	Tirupati	Participation
124	State Level Technical Programme (SLTP) meeting of Entomology	14.05.2018	Tirupati	Participation
125	49th Meeting of the Board of Management of Dr. YSR Horticultural University	14.05.2018	Citrus Research Station, Tirupati	Participation
126	State Level Technical Programme (SLTP) meeting of Soil Science & Agricultural Chemistry, Biochemistry, Microbiology & Nanotechnology	15.05.2018	RARS, Lam	Participation
127	State Level Technical Programme (SLTP) meeting of Plant Pathology	16.05.2018	RARS, Maruteru	Participation
128	Inspected APT, Maruteru and APT - AE&T Polytechnics, Palakollu	16.05.2018	---	Inspection
129	Visited HRS, Ambajipet	16.05.2018	---	---
130	Farm Office inauguration	17.05.2018	Agricultural College, Rajamahendra-varam	Participation
131	Visited APT, Rampachodavaram, HRS, Pandirimamidi and KVK, Pandirimamidi	17.05.2018 Forenoon	---	Inspection
132	Visited Pattiseema and Polavaram dam site	17.05.2018	---	Visit
133	Soil Science P.G and Ph.D. / Technical programme discussions	18.05.2018	RARS, Lam, Guntur	Participation
134	Inspected ARS, Amaravathi bush clearance work	19.05.2018	---	Inspection

S. No.	Event	Date	Venue	Purpose
135	ICAR - ATARI - Annual Action Plan Workshop of KVKs of A.P. for 2018-19 organized by ANGRAU	21.05.2018	RARS, Lam	Participation
136	State Level Technical Programme (SLTP) meeting of Agril. Engg. & Technology	21.05.2018	Agricultural College, Bapatla	Participation
137	Inspected New Buildings in Agricultural College and College of Food Science & Technology, Bapatla and College Farms	21.05.2018	---	Inspection
138	State Level Technical Programme (SLTP) meeting of Agricultural Extension	23.05.2018	APGC, Lam	Participation
139	Special Invitee at "Rythu Avagahana Sadassu" organized by AP Cotton Association" on "Management of Pink Boll Worm"	24.05.2018	Guntur	Participation
140	285th meeting of the Board of Management	26.05.2018	RARS, Chintapalle	Chairman

Visitors

S. No.	Visitor (s)	Date	Place Visited	Remarks
1	Sri S.Chandramohan Reddy Garu, Hon'ble Minister for Agriculture, Govt. of A.P.	22.06.2017	RARS, Tirupati	visited different laboratories in IFT building and attended press conference
2	A team of Scientists with the Director, SeileYohannes of Jigjiga University, Ethiopia	17-07-2017	RARS, Anakapalle	Interacted with the Scientists
3	Sri S.G. Markandeya, Member Secretary, Rajiv Gandhi Science &	04.10.2017	AICRP on Post-Harvest	Visit

S. No.	Event	Date	Venue	Purpose
	Technology Commission, Govt. of Maharashtra, Mumbai		Engineering and Technology of RARS, Anakapalle	
4	Monitoring & Review Team of the Education Division, ICAR	13.10.2017 & 14.10.2017	ANGRAU	Reviewed the impact of strengthening and development grant of Education Division to ANGRAU during XII plan
5	Sri Pithani Satyanarayana, Hon'ble Minister for Labour, Employment, Training and Factories, Government of Andhra Pradesh	23.10.2017	RARS, Maruteru	Visit
6	Dr. SujoyRakshit, Director, IIMR, Ludhiana	13.11.2017	Agricultural Research Station, Pedapuram	Visit
7	Cotton monitoring team from AICRP, CICR, Coimbatore	23.11.2017	RARS, Nandyal	Visited and interacted with the AICRP scientists and examined the field experiments
8	NITI Aayog members Dr. Sachi Joshi, Joint Director and Dr. Indra Kumar, Deputy Director	06.12.2017	KVK, Kalikiri	Visited to see the activities of KVK and interacted with the farmers and entrepreneurs for ranking of the KVKs
9	Dr. DatoImbrahim Bin Che Omar, Deputy Vice-Chancellor, University of Malasia Kelantan	03.01.2018 & 04.01.2018	ANGRAU	Visited and discussed issues pertaining to students and faculty exchange programme,

S. No.	Event	Date	Venue	Purpose
				collaborative research programmes and organization of joint conferences etc.
10	Dr. P.S. Pandey, ADG (EP&HS), ICAR, New Delhi	19.02.2018	S.V. Agricultural College, Tirupati	Visited and interacted with the Heads of the different Departments and also AELP students of S.V. Agricultural College, Tirupati. He also visited the AELP unit.
11	QRT members of Dr. Raj Krishan Gupta, Member, QRT (Ex South Asia Coordinator, CIMMYT, New Delhi), Dr. M.J. Kaledhonkar, Member Secretary (Project coordinator, ICAR-CSSRI) and Dr. KVGK Rao, Member, QRT (Ex- Head, DIDE, ICAR-CSSRI, Karnal)	25.02.2018 to 27.02.2018	AICRP on SAS & USW, Bapatla Center	Visited and reviewed the work done for the period from 2011 to 2017
12	Sri M.D.Vasudevan, District Development Manager, NABARD	26.04.2018	NABARD/RDF constructions,	Visitedthe Hostels of Agricultural College, Naira

X. RESEARCH PUBLICATIONS

A. BY TEACHING FACULTY

1. Agriculture

Books and Chapters

1. Dipak De, Srinivasa Rao M, and Jirli, B, 2017, Entrepreneurship: A conceptual framework. Published in Entrepreneurship in Agricultural Development. Book edited by De. Dipak. Day Publishing House, *Astral International Pvt., Ltd.*, New Delhi
2. Kirti Sharma, Panduranga G S and Ram Singh, 2017, "Integrated management of fruit flies in Horticultural crops", In "Doubling of farmers income through Horticulture" at Indian Horticulture Congress held at IARI, New Delhi.
3. Nirmal Ravi Kumar, K., "Econometrics" Narendra Publishing House, New Delhi 2017
4. Uday Bhaskar M, Srinivasa Rao M and Gopi Krishna T, 2018, Empowerment of farmers through the use of ICT. National Conference for Post Graduate Students (NCPGS-2018) Techno – Strategic Interventions for Profitable Agriculture 26-27th March 2018. Organised by Advanced P.G. Centre, Lam, Guntur at Agricultural College, Bapatla.
5. Uday Bhaskar M, Srinivasa Rao M, and Gopi Krishna T, 2018, Youth as Social Entrepreneurs in Achieving Food to Nutritional Security. National Conference for Post Graduate Students (NCPGS-2018) Techno – Strategic Interventions for Profitable Agriculture, 26-27th March 2018. Organised by Advanced P.G. Centre, Lam, Guntur at Agricultural College, Bapatla.

Research Papers

1. Abhilash Chandel, Prabhavathi Y, Rajeswari S and Ravindra Reddy B, 2017, "Buying Behaviour and Perception on Mycorrhizal Biofertilizer Product- A Case Study", *The journal of Research*, ANGRAU, 45(3) 95-98.
2. Abhilash chandel, Prabhavathi Y, Rajeswari S, Ravindra Reddy B, 2017, "Buying Behaviour and perception on Mycorrhizal Biofertilizer product – A case study", *J. Res.* ANGRAU, 45(3) 95-98.
3. Affia Phenica B, Lakshmi T, Prasad S V and Reddi Ramu Y, 2017, "Constraints and suggestions perceived by Post Graduate students and Research Scholars in utilization of Digital Library at S.V.Agricuttural College, Tirupati.", *Trends in Biosciences*., 10(40) :8358-8361.
4. Aliveni A, Rao A S, Ramana A V and Jagannadham J, 2017, "Nutrient Uptake by Vicia sativa and other Weeds in Rice-Fallow Blackgram", *The Andhra Agricultural Journal*, 63(3): 295-298.

5. Ambedkar A, Rambabu P, Srinivasa Rao V and Ramnaidu G B M, 2017, “Profile characteristics of Bengal gram in Prakasam district of Andhra Pradesh”, *The Andhra Agricultural Journal*, 64(3):722-726.

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7. Anil Kumar Yadav K, Madhumathi T, Krishnayya P V and Manoj Kumar V, 2017, “Influence of diatomous earth in combination with spinosad to control Sitophilus oryzae (Linn.) (Cucculionidae): Coleoptera”, *The Andhra Agricultural Journal*, 64(4): 837.

8. Anitha D, Nagavani A V and Chandrika V, 2017, “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).

9. Anusha K, Ramana A V, Upendra Rao A and Jagannadham J, 2017, “Nutrient Management and Yield of Semi-dry rice (Oryza sativa L.) for North Coastal zone of A.P”, *The Andhra Agricultural Journal*, 63(3): 304-307.

10. Anusha S, Rao G M V P and Kumar D V S, 2017, “Influence of different nitrogen levels on the management of Bt cotton sucking pests”, *Journal of Entomology and Zoology Studies*, 5(2): 16-21.

11. Aparna K, Raja Rajeswari V, Sudhakar P and Subba Rao M, 2017, “Comparison of Different Yield Components in Various Ragi Genotypes Under Irrigated and Rainfed Conditions”, *Trends in Biosciences*, 10(33): 7086-7088.

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13. Aparna P, Shanthi Priya M, Mohan Reddy D and Latha P, 2018, “Estimation of genetic parameters in ground nu for yield and its contributing chracters under inorganic fertilizer managements”, *Int. j. Curr. Micro.biol. App.Sci*, 7(4): 1559-1565.

14. Aparna P, Shanthi Priya M, Mohan Reddy D and Latha P, 2017, “Correlation and path coefficient analysis for pod yield and its components in groundnut (Arachis hypogaea L.) under organic management”, *Bulletin of Environment, Pharmacology and Life sciences*, 6(3): 258-26.

15. Aparna P, Shanthi Priya M, Mohan Reddy D, Latha P and Ravindra Reddy B, 2018, “Studies on character association and path analysis in groundnut (Arachis hypogaea L.)”, *Green farming*, 9(3): 419.

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XI. AWARDS AND HONOURS

Dr. V. Radha Krishna Murthy, Professor, Agronomy, Agricultural College, Bapatla received Life Time Achievement Award at DISHA-2017.

Dr. Sk. Nafeez Umar, Asst. Professor, Dept. of Statistics & Computer Applications, Agricul-tural College, Bapatla received outstanding achievement award in the field of Agricultural Statistics at DISHA-2017.

Dr. D. Ramesh, Asst., Professor, Dept. of Statistics & Computer Applications, Agricultural College, Bapatla received Young Teacher Award in the field of Agricultural Statistics at DISHA-2017.

Dr. P. R. K. Prasad, Professor & Head, Dept. of Soil Science & Agricultural Chemistry, Agricul-tural College, Bapatla received UgadiPuraskaram Award for the outstanding performance in the discipline of Soil Science & Agricultural chemistry.

Dr. R. Naseeruddin, Assistant Professor, Agricultural College Farm, Bapatla received best oral presentation award from University of Kelentan, Malaysia during National Conference on "Emerging Trends in Agrinanotechnology – 2017" on 2nd& 3rd November, 2017, held at RARS, Tirupati.

Dr. A.V. Nagavani, Professor, Dept. of Agronomy, S.V. Agricultural College, Tirupatire-ceived Meritorious teacher Award for the year 2015 in 49th Annual Convocation held at Nellore on 04.10.2017.

Dr. M.V.S. Naidu, Professor, Dept. of SSAC, S.V. Agricultural College, Tirupatireceived State Level Best TeacherAward and also Prof. Sant Singh Award.

Dr. M. ReddiSekhar, Professor, Dept. of GPBR, S.V. Agricultural College, Tirupati received State Best Teacher for 2017.

Dr. V. Umamahesh, Assistant Professor, Dept. of Crop Physiology, S.V. Agricultural College, Tirupati received Meritorious Teacher Award for the year 2015 presented in 49th Annual Convocation held at Nellore on 04.10.2017.

Dr. B. Ravindra Reddy, Associate Professor, Dept. of Statistics & Comp. Applications, S.V. Agricultural College, Tirupati received Best Research Paper Award from 'Society of Agri-nanotechnology' for Best Research paper 2017.

Dr. V. Umamahesh, Assistant Professor, Dept. of Crop Physiology, S.V. Agricultural College, Tirupati received Excellence in Teaching Award by SIRI, Warangal based N.G.O. during the national seminar on doubling the farmers income organized at S.V. University, Tirupati – 2017.

Dr. P. Seetharamu, Assoc. Professor, Dept. of Entomology, Agricultural College, Naira received Fellow of Plant Protection Association of India (FPPAI) at Brain Storming Session on" Emerging Plant Protection Technologies Opportunities and Challenges" at NIPHM, Hyderabad on 20.04.2018.

Mr. D. Anil Kumar, Asst.Prof., Dept. of Entomology, Agricultural College, Naira received Certificate of appreciation on 15th August, 2017 from District administration, Srikakulam on the occasion of 63rd Independence Day celebrations.

Dr.Ch.Sreenivas, Associate Professor (SSAC), Agricultural College, Rajamahendra-varam received Best Oral Presentation Award from UMK, Malasia in Agrinano-2017 conference on 3rd, November, 2017at Tirupati and also selected for Out Standing Scientist award, 2018 in International Journal of Tropical Agriculture in "7th International Conference".

Dr. M.S.Chaithanya Kumari, Associate Professor, College of Home Science, Guntur received Meritorious Teacher Award in the Faculty of Home Science presented at the 49th annual convocation held on 4th October 2017 at Sri Venkateswara Kasturba Kalakshetram, Nellore.

Mrs. M. Sandhya, Assistant Professor, College of Home Science, Guntur received Meritorious Teacher Award in the Faculty of Agricultural Engineering & Technology presented at the 49th annual convocation held on 4th October 2017 at Sri Venkateswara Kasturba Kalakshetram, Nellore.

Dr. B.V.S. Prasad, Professor & University Head, College of Agricultural Engineering, Bapatla received "State Best Teacher" award by Government of Andhra Pradesh.

Dr. A. Ashok Kumar, Assistant Professor, College of Agricultural Engineering, Bapatla received "Young Engineer Award" by the Institute of Engineers India (IEI) in Agricultural Engineering.

Dr. Ch.V.V. Satyanarayana, Professor & Head (Food Engg.), College of Food Science & Techno- logy, Bapatla received ISAE Fellow Award.

College of Food Science and Technology, Pulivendula received Certificate of Appreciation from Indian Association for the Blind for outstanding excellence and amazing commitment towards voluntary contribution during the year 2016-17 for the empowerment of persons with visual challenge.

Dr. M. Bharathalakshmi, Principal Scientist (Sugarcane), RARS, Anakapalle received Best Researcher Award for the year 2016 in the National Workshop organized by IRDP group of journals, Chennai, India on 14.10.2017.

Dr. Ch. Mukunada Rao, Principal Scientist (Crop Physiology), RARS, Anakapalle received an Out Standing Scientist Award 2017 / ICAHPS by International Journal of Tropical Agricultural of Serials publications private limited, New Delhi on 24.7.2018, Bharat Jyothi Puraskar 2018 award by Best Citizen Publishing Home, New Delhi, Feb, 2018 and Best Research Scientist award by IRDP journal at Chennai on 14.10.2017.

Dr. P.V.K. Jagannadha Rao, Principal Scientist (Ag Engg.), RARS, Anakapalle has been selected by research editors of International publisher "Rufacimento International", New Delhi for inclusion of his bio-graphical note in the 'Asia Pacific Who's Who (Vol.XVI) on 14.09.2017.

Dr. K. Vijay Krishna Kumar, Senior Scientist & Head and Dr. N. Raja Kumar, Senior Scientist (Plant Pathology), RARS, Anakapalle were awarded Best Achievement award for his contribution to Asian PGPR Society during 5th Asian PGPR, International Conference for Sustainable Agriculture held at Bogor, Indonesia held from 16th to 19th July 2017 at Bogor, Indonesia.

Dr. V. Gouri, Senior Scientist (Agronomy), RARS, Anakapalle received Best Poster Award for the research article entitled "Effect of micro nutrient application through soil and drip fertigation on yield and quality of sugarcane" presented in the poster session at the International Symposium on "Sugarcane Research Since Co 205:100 years and beyond, Sucrosym-2017, held at Coimbatore from 18th to 21st September, 2017.

Dr. Manukonda Srinivas, Senior Scientist (Agronomy), RARS, Maruteru received World Agricultural Excellence Award 2017 sponsored by World Achievers Foundation, Kolkata during Common Wealth Vocation University Doctoral Convocation on 25th June, 2017 at Mumbai and Honorable Mention Certificate - Scientist category EET CRS 5th Science & Technology Awards, 2017 on 11th June, 2017 at Bangalore.

Dr.M.Girija Rani, Scientist (Genetics and Plant Breeding), RARS, Maruterureceived MandavaVenkata Ramaiah Gold medal and Vadadi Narasimha SwamyMemorial Gold medal on 04-10-2017 at 49th Annual convocation of ANGRAU at Nellore.

Dr. A.Sireesha, Scientist (Soil Science), RARS, Maruteru received Acharya NG Ranga Young Scientist Award on 04-10-2017 at 49th Annual convocation of ANGRAU at Nellore.

Dr. M.SeshaMahaLakshmi, RARS, Lam Received Meritorious Research Scientist Award from the University on 04.10.2017 during 49th Annual Convocation at Nellore.

Dr.T.MuraliKrishna, Principal Scientist (Entomology), RARS, Tirupati received Best Poster presentation award for the research article on *"Detection of Pesticide Residues in Groundnut leaf Samples"* in National Seminar on Emerging Trends in Agri-Nanotechnology" held from 2nd-3rd November, 2017.

Dr. L. Prasanthi Principal Scientist (PB), RARS, Tirupati received Mandava Venkata-ramaiah Best Researcher Award for the year 2016-17 on 04.10.2017 from ANGRAU.

Dr. L. Prasanthi Principal Scientist (PB), RARS, Tirupati received best Poster presentation during Agri nano Workshop held on 2-3 November 2017 at Tirupati.

Dr. M.V. Ramana, Principal Scientist (Ag. Engg.), RARS, Tirupati received Australian award fellowship by ICE Warm International Center of Excellence in Water Resources Management, Adelaide, Australia, Government of Australia.

Dr. K. John, Principal Scientist (Pl.Br.), RARS, Tirupati received the Professionally Excellence award in the International Conference held at Jaipur on 08.11.2017.

Dr. K. John, Principal Scientist (Pl.Br.) RARS, Tirupati received the Award of Ugadi Puraskaram- 2018 from the Hon'ble Chief Minister of Andhra Pradesh on 18.03.2018.

Dr. Balaguravaiah, Associate Dean, Agricultural College, Mahanandi received "UgadiPuraskaram – 2018 from the Hon'ble Chief Minister of Andhra Pradesh on 18.03.2018.

Dr.T.Prathima, Principal Scientist (Agro), RARS, Tirupati received district level Meritorious Scientist award from District Collector, Chittoor on 26th January, 2018.

Dr.T.N.V.K.V.Prasad, Senior Scientist (Soil Physics), RARS, Tirupati received ASN-YSM Young Scientist Award-2017 from Academy of Sciences, Malaysia, Australian Endeavour Awards Ambassador Award -2018 from Australian High Commissioner to INDIA and prestigious Smt. Vallabhaneni Lakshmamma Gold medal (First person to receive this award).

Dr. K.V. NagaMadhuri, Senior Scientist (Soil Science), RARS, Tirupati received Young Scientist Innovator award from National Agricultural Sciences, Malaysia during National Conference on Agrinano-2017.

Dr. P. Latha, Senior Scientist (Crop Physiology), RARS Tirupati received Meritorious Research Scientist award from Sri M. Venkaiah Naidu, Hon'ble Vice-President of India during 49th Annual Convocation of ANGRAU held at Nellore on 04.10.2017.

Dr. A.R. Nirmal Kumar, Scientist (Crop Physiology), RARS Tirupati received Meritorious award from District Collector and Magistrate, Chittoor District on the occasion of Republic Day celebrations on 26.01.2018 and best poster presentation award from Malaysia Kelantan University, Malaysia, during the National Conference on Emerging trends in Agri Nano Technology 2017 held at Regional Agricultural Research Station, Tirupati on 2-3 November 2017.

Dr. Kadiri Mohan, Scientist (Agril.Extn), RARS Tirupati received best oral paper presentation awards by UMK, Malaysia received in the Agri Nano 2017 National Conference held on 2-3 Nov 2017 at RARS, Tirupati.

Dr. S. KhayumAhammed, RARS, Nandyal received Sri VeerapaneniNarsimham Gold Medal Award, ANGRAU, Lam, Guntur.

Dr. V. Jayalakshmi, RARS, Nandyal received UgadiPuraskaram, Govt. of Andhra Pradesh.

Dr. V. Gouri, Senior Scientist (Agronomy), ARS, Vijayarai received best poster award for poster presentation on "Effect of Micronutrient Application through Soil and Drip Fertigation on Yield and Quality of Sugarcane" during International Symposium on Sugarcane Research Since 100 Years and Beyond (SucroSym 2017) held at Sugarcane Breeding Institute, Coimbatore from 18th-21st, September, 2017 and Sri Malla Jagannadham Memorial Award based on her Sugarcane Best Sugarcane Scientist for the year 2016-17 during 59th Kisan Mela Celebrations of Regional Agricultural Research Station, Anakapalle from Hon'ble Vice Chancellor, ANGRAU, Guntur on 29.01.2018.

Dr. K. Jhansi, Principal Scientist (Entomology), SRS, Vuyyuru received V. R. Durgamba Charitable Trust Endowment Prize for the year 2015-16 during the 49th Annual Convocation for organic research in sugarcane held on 04-09-2017 in Sri Venkateswara Kasturba Kalakshetram, Nellore.

Dr. P. Ramesh Babu, Principal Scientist (Plant Breeding), ARS, Nellore received Padmasri. Dr. I.V. Subba Rao RytuNestham Puraskaram-2017 in RytuNesthamPuraskaralu organized by Muppavarapu foundation from Hon'ble Vice President of India at Vijayawada on 03.10.17 and Sri Neelakantapuram Kaverappa Gold Medal for the year 2015-16 for the development of short and medium duration rice varieties with molagolukulu grain quality with resistance to blast and lodging in 49th Annual Convocation held at Nellore on 04.10.2017.

Dr. P. Raja Sekhar, Principal Scientist and Head and Dr. C.P.D. Rajan, Principal Scientist and University Head (Plant Pathology), ARS, Nellore received Best Agricultural Research Station Awardfrom Dr. V. Damodara Naidu, Hon'ble Vice-Chancellor, ANGRAU, Guntur in Category B in the 47th REAC meeting conducted at RARS, Lam, Guntur on 21.12.2017.

Dr.V.Surekha Devi, Scientist (Entomology), ARS, Podalakur received Commendation Certificate from the Collector and District Magistrate, Nellore on 15.08.2017 in Chess, First prize in Group Dance and Second Prize in Group Song at University Level Sports and Games Competitions.

B. Sahadeva Reddy, B. Ravindranatha Reddy, K.Bhargavi M. VijayaSankar Babu, K. Madhu- sudhan Reddy, G. Narayana Swamy and C. Radha Kumari, ARS, Anantapur received the prestigious VasantraoNaik (ICAR Award) for the outstanding contributions in dry land farming systems and water conservation from Sri K. Radha Mohan Singh, Hon'ble Union Minister for Agriculture, Govt. of India at, New Delhi on the eve of ICAR foundation Day (16.07.2017).

Dr. M.Vijaya Sankar Babu, ARS, Anantapur received the best performing officer award from district administration, Ananthapuramu on the eve of Reublic Day Celebrations (26.01.2018).

Sri N. Kishore, ARS, Anantapur received outstanding performance award in" Cultural Events (Men)" as part of the 5th Foundation Course for Faculty of Agricultural Universities during 17th January – 15th February, 2018 conducted at NAARM, Hyderabad.

Dr. P. Srivalli, ARS, Anantapur received Best Research Concept in6th Foundation Course for Faculty of Agricultural Sciences at NAARM, Hyderabad, from 12.03.2018 to 10.04.2018.

Dr. K. L. Rao Krishi Vigyan Kendra, Garikapadu, Krishna district received "Best Presentation Award" during the Annual Zonal Workshop of KVKs Zone V (Andhra Pradesh, Telangana and Maharashtra) held at Nasik during 23.07.2017 to 25.07.2017.

Dr. K.L.RaoKrishi Vigyan Kendra, Garikapadu, Krishna District Received "Best KVK award for the year 2016-17" in 47th REAC meeting from Hon'ble Vice chancellor Dr. V. Damodar Naidu Garu, for outstanding contribution in Agricultural extension and for rendering timely services to farming community on 21.12.2017.

Dr. M. Rajasri, Programme Coordinator, Dr. K.L. Rao Krishi Vigyan Kendra, Garikapadu, Krishna Districtreceived 1st prize in group singing, 2nd prize in elocution, 2nd prize in brisk walking and runners up in Shuttleat University Level Sports and Games Competitions from 03.03.2018 to 05.03.2018.

Dr. M. Rajasri, Programme Coordinator, Dr. K L Rao Krishi Vigyan Kendra, Garikapadu, Krishna district, Andhra Pradesh received "Ugadi Puraskaralu Award 2018" from the Hon'ble Chief Minister Sri N.Chandrababu Naidu Garu at Tummalapalli Kala Kshetram, Vijayawada on 18.03.2018.

KVK, Utukur, Kadapa, YSR dist. received Pandit Deendayal Upadyaya Krishi Vigyan Prosthahana Puraskar 2017 (ICAR Zonal Award).

Dr. Pradeep Manyam KVK, Nellorereceived Best Trainee Award in foundation course for newly recruited Scientists at NAARM, Hyderabad.

Dr. CH. Varaprasad Rao, KVK, Darsi received Best Scientist Award under Extension category in 49th Convocation of ANGRAU held at Nellore on 04.10.2017.

Dr. G.S. Haritha, KVK, Darsi received Best Trainee Award in 5th FOCFAU, NAARM, Hyderabad.

KVK, Ghantasala, Krishna District got best DAATT Centre award for the year 2016-17 from the University.

ANNEXURE I

MEMBERS OF THE 98th ACADEMIC COUNCIL
OTHER UNIVERSITIES

Vice-Chancellor
Andhra University
Waltair
Visakhapatnam District

Vice-Chancellor
Osmania University
Hyderabad

Vice-Chancellor
Sri Venkateswara University
Tirupati – 517 502

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Government of Andhra Pradesh
Old Market Yard, Mirchi Yard,
Guntur

UNIVERSITY OFFICERS

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Dr T V Satyanarayana
Registrar i/c & Secretary Registrar

Dr T Ramesh Babu
Dean of Agriculture i/c

Dr R Veera Raghavaiah
Dean of Post Graduate Studies i/c

Dr D Bhaskara Rao
Dean of Agricultural Engineering &
Technology i/c

Dr (Mrs.) T Neeraja
Dean of Home Science i/c

Dr P Sambasiva Rao
Dean of Student Affairs i/c

Dr N V Naidu
Director of Research i/c

Dr K Raja Reddy
Director of Extension i/c

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Controller of Examinations
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Guntur

Dr N Venugopal Rao
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Anakapalle

Dr R Sarada Jayalakshmi Devi
University Librarian
ANGRAU
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Dr G Sunil Kumar Babu
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ANNEXURE II

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Director of Research, ANGRAU

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Progressive Agriculturist, Guntur

Sri T V Muralinatha Reddy,
Progressive Agriculturist, Tirupati

Sri AlluriVijaya,
Progressive Agriculturist, Visakhapatnam

Sri ChaparaGanapathi Rao,
Progressive Agriculturist, Srikakulam

Sri P. Rajsekhar, ZPTC
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Professor (Plant Pathology), ANGRAU
Rajamahendravaram

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Govt. of A.P

Managing Director,
A.P.S.S.D.C

Director,
APSSCA, Govt. of A.P.

Director,
Women and Child Welfare, Govt. of A.P

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Dr. D. Bhaskar Rao
Dean of Agril.Engg.& Technology, ANGRAU

Dr. T. Neeraja
Dean of Home Science

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Ex. Director of Extension, ANGRAU

Dr.A.Satyanarayana,
Ex-Director of Extension, ANGRAU

Dr. N. Srirama Reddy,
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Associate Directors of Research

Dr J Krishna Prasadji
North Coastal Zone

Dr P Munirathnam
Godavari Zone

Dr P Ratna Prasad
Krishna Zone

Dr T C M Naidu
Southern Zone

Dr M Subba Rao
Scarce Rainfall Zone
Dr G Jogi Naidu
High Altitude and Tribal Area Zone

Associate Deans of Colleges

Dr. D. Lokanatha Reddy
Agricultural College
Bapatla – 522 101
Guntur District.

Dr. V. Raja Rajeswari
S.V. Agricultural College
Tirupati – 517 502
Chittoor District.

Dr. P V. Krishnayya
Agricultural College
Naira – 532 185
Srikakulam District.
Dr. D. Balaguravaiah
Associate Dean,
Agricultural College (M.C Farm)
Mahanandi – 518 502
Kurnool District.

Dr. P. Rambabu
Associate Dean,
Agricultural College
(SKVT Degree College Campus)
Near Y Junction,
Rajahmundry – 533 105
East Godavari District.

Dr. A. Mani
Associate Dean
College of Agricultural Engineering
Karlapalem Road
Bapatla - 522101
Guntur District.

Dr. C. Ramana
Associate Dean
College of Agricultural Engineering
Madakasira – 515301
Anantapuramu District

Dr. D Vishnu Sankar Rao
Associate Dean
College of Food Science & Technology
Bapatla - 522101
Guntur District.

Dr. S. Kaleemullah
Associate Dean
College of Food Science & Technology
Pulivendula – 516 390
Kadapa District.

Dr. L. Uma Devi
Associate Dean
College of Home Science
Door No- 238
Chinmaya Balanivas (Balanivas)
S.V.N. Colony
Guntur – 522 006.

Progressive Farmers

Sri Gangadhar,
Annavaram Village,
Chodavaram Mandal,
Visakhapatnam District

Sri MucherlaKalyan Kumar
Near Venugopalaswami temple,
Pawara Village, Samalkot Mandal,
East Godavari District

Sri K. Rama Krishna,
Obanna Village,
Naguppalpadu Mandal,
Prakasam District

Sri C. VenkataSubba Reddy
Goturu Village & Post,
Valluru Mandal,
YSR Kadapa District

Sri P. Mahesh,
Udiripikonda,
Kuderu Mandal,
Anantapuramu district.

Sri N. Nooka Raju,
Gujjipadu Village,
Kurupam Mandal,
Vizianagaram District

Agro Business Consortium

Sri A. Bhavani Prasad,
D. No.31-7-7/C,
Ghna Apartments, A3,
Maruthinagar,
Vijayawada, Krishna District

Sri P. Bhudevi,
Hiramandalam Village & Post,
Srikakulam District

Woman Farmer

Smt.M. Bhanumathi,
W/o. M. Venkata Narasimha Rao,
D. No.1-126, Opp: Ramalayam Street,
Maddirala Post,
Chilakaluripet Mandal,
Guntur District

Special Invitees

Sri I. Narasimha Raju,
Farmer, Yendagandi Village,
Bheemavaram Mandal,
West Godavari District

Sri K. Sri Hari Rao
Farmer, Lingarao Palem Post,
Yedlapadu Mandal,
Guntur District

Sri A. Malleswari,
Farmer, Nutakki,
Mangalagiri Mandal,
Guntur District

Sri Ch. Sriramamurthy,
Farmer, Ch Uppalapadu Post,
Ammanabrolu,
Naguppulapadu Mandal,
Prakasam District

Sri K. Malakondaiah,
Farmer, Singapeta Village,
Alluru Mandal,
SPSR Nellore District

Smt.K. Ratnamala,
Farmer, Munagalapalem Village & Post,
Yerpedu Mandal,
Chittoor district

Sri N. Nageswara Raju,
Farmer, Swamrayakandriga,
NR Kandriga Post,
Karavetinagar Mandal,
Chittoor district

Sri D. Rama Subba Reddy,
Farmer, Appalapuram Village,
Banaganapalle Mandal,
Kurnool District

Smt.G. Sakuntala
W/o. G. Venkata Sep,
Farmer, Pandipadu Village,
Kalluru Mandal,
Kurnool district

Sri K. Rama Chandra Reddy,
Farmer, Akuledu Village,
Singanamala Mandal,
Anantapuramu district

Smt K. Kalavathi,
Farmer, Lakkaguda Village,
GL Puram Mandal, Vizianagaram district

Sri BatchuSreenivasa Rao,
Chairman,
BR Group of Educational Institutions,
301, Anish Residency,
3rd line Symala Nagar,
Guntur-522 006.

Representative from KVKs (operated by NGOs)

Programme Coordinator,
KVK, Yagantipalle,
Kurnool District.

Programme Coordinator,
KVK, BCT, Yellamanchilli,
Visakhapatnam

Programme Coordinator,
KVK, RASS, Tirupati.

Principal Scientists of crops / disciplines

Principal Scientist (Rice),
RARS, Maruteru.
Principal Scientist (Millets) & Head,
ARS, Perumallapalle, Chittoor district.

Principal Scientist (Pulses),
RARS, Lam, Guntur.
Principal Scientist (Groundnut),
ARS, Kadiri, Anantapuramu district.

Principal Scientist (Sugarcane),
RARS, Anakapalle,
Visakhapatnam district.

Principal Scientist (Cotton),
RARS, Lam, Guntur.

Principal Scientist (Farm Mechanization),
RARS, Tirupati, Chittoor district.
Principal Scientist (Microbiology) & Head,
ARS, Amaravati, Guntur district.

Principal Scientist (Dryland Agriculture) & Head,
ARS, Anantapuramu.

Principal Scientist (Agronomy),
Integrated Weed Management Scheme,
RARS, Lam.

Principal Scientist (Seeds),
STR & PC, Thangadancha,
via Jupadu Bunglow,
Kurnool district.

University Heads of Departments

Nodal Officer,
Admn. Office, ANGRAU, Guntur
and University Head, Department of Agronomy
Principal Scientist (Plant Breeding),
RARS, Lam, Guntur and University Head,
Department of Genetics & Plant Breeding.

Principal Scientist (Biotechnology) &
University Head, Department of Biotechnology,
RARS, Tirupati.

Associate Dean, Agricultural College, Naira
and University Head, Department of Entomology.
Principal Scientist (Plant Pathology),
ARS, Nellore & University Head,
Department of Plant Pathology

Associate Dean, Agricultural College, Mahanandi
and University Head,
Department of Soil Science & Agricultural Chemistry.

Principal Scientist (Microbiology)
& University Head,
Department of Microbiology,
ARS, Amaravati.

Professor and University Head,
Department of Crop Physiology,
Agricultural College, Rajamahendravaram

Associate Dean,
College of Food Science and Technology, Bapatla
and University Head,
Department of Agril.Economics.

Associate Dean,
Agricultural College,
Rajamahendravaram & University Head,
Department of Extension Education.

Professor & University Head,
Department of Statistics and Mathematics,
Agricultural College, Bapatla.
Professor (Academic),
O/o Dean of Agricultural Engineering and Technology,
Admn. Office, ANGRAU, Guntur
and University Head,
Department of Soil & Water Engineering.

Principal Scientist (Agril. Engg.),
AICRP on PHET,
RARS, Anakapalle and University Head,
Department of Agril. Process &
Food Engineering

Associate Dean,
College of Agricultural Engineering,
Madakasira and University Head,
Department of Farm Machinery & Power.

Professor & University Head,
Department of Food Engineering,
College of Food Science and Technology, Bapatla.

Professor & University Head,
Department of Food Science & Technology,
College of Agricultural Engineering, Bapatla.

Professor and University Head,
Department of Foods & Nutrition,
College of Home Science, Guntur.

Associate Dean,
College of Home Science, Guntur
and University Head,
Department of Human Development &
Family Studies,
Extension & Communication Management.

Professor and University Head,
Department of Apparel & Textiles,
College of Home Science, Guntur.

ANNEXURE III

CADRE-WISE FACULTY STRENGTH DURING 2017-18

S. No.	Name of the College / Research Station / Extension Unit	Professor / Principal Scientist		Associate Professor / Senior Scientist		Assistant Professor / Scientist	
		S	I.P.	S	I.P.	S	I.P.
1	2	3	4	5	6	7	8
TEACHING							
1	Agricultural College, Bapatla	03	02	07	05	63	51
2	S.V. Agricultural College, Tirupati	02	02	07	07	47	33
3	Agricultural College, Naira	01	01	08	05	16	08
4	Agricultural College, Mahanandi	01	-	04	04	14	08
5	Agricultural College, Rajamahendravaram	01	-	06	04	16	12
6	Advanced P.G. Centre, Guntur	-	1	-	03	-	03
7	Institute of Agri. Business Management, Tirupati	-	-	-	-	-	01
8	College of Agricultural Engineering, Bapatla	01	01	04	04	12	07
9	College of Agricultural Engineering, Madakasira	01	01	06	01	10	07
10	College of Food Science & Technology, Bapatla	01	01	03	02	06	03
11	College of Food Science & Technology, Pulivendula	01	-	07	-	12	03
12	College of Home Science, Guntur	01	01	-	-	07	04
13	Agriculture Polytechnic, Anakapalle	-	-	-	-	-	01
14	Agriculture Polytechnic, Maruteru	-	-	01	-	-	-
15	Agriculture Polytechnic, Podalakur	-	-	01	01	-	-
16	Agriculture Polytechnic, Reddipalli	-	-	01	01	01	-
17	Agriculture Polytechnic, Utukur	-	-	01	-	01	01
18	Agriculture Polytechnic, Garikapadu	-	-	01	-	02	-
19	Agriculture Polytechnic, Madakasira	-	-	-	-	02	-
20	Agriculture Polytechnic, Nandyal	-	-	-	-	-	-
21	Agriculture Polytechnic, Tirupati	-	-	-	-	-	-
22	Agriculture Polytechnic, Kalikiri	-	-	01	-	01	01
23	Agriculture Polytechnic, Somasila	-	-	-	-	-	-
24	Agricultural Polytechnic, Rampachodavaram	-	-	-	-	-	-

S. No.	Name of the College / Research Station / Extension Unit	Professor / Principal Scientist		Associate Professor / Senior Scientist		Assistant Professor / Scientist	
		S	I.P.	S	I.P.	S	I.P.
1	2	3	4	5	6	7	8
25	Agricultural Polytechnic, J.M.Puram	-	-	-	-	-	-
26	Agricultural Polytechnic, Gantasala	-	-	-	-	-	-
27	Agricultural Polytechnic, Ramagiri	-	-	-	-	-	-
28	Agril. Polytechnic (Seed Technology), J.M.Puram	-	-	-	-	-	-
29	Agril. Polytechnic (Organic Farming) Chintapalle	-	-	-	-	-	-
30	Polytechnic of Agricultural Engineering, Kalikiri	-	-	-	-	-	-
31	Polytechnic of Agricultural Engineering, Anakapalle	-	-	-	-	-	-
	Sub Total (Teaching)	**13**	**10**	**58**	**37**	**210**	**143**
RESEARCH							
I. KRISHNA ZONE							
Guntur District							
1	Regional Agricultural Research Station, Lam	03	02	10	10	30	27
2	Rice Research Unit, Bapatla	-	-	-	-	04	03
3	Post-Harvest Technology, Bapatla	-	-	02	02	04	03
4	Saline Water Research Scheme, Bapatla	-	01	02	02	04	03
5	AICRP on Sorghum	-	01	01	01	02	02
6	AICRP on FIM	-	02	01	-	0	01
7	Agricultural Research Station, Amaravati	-	01	-	-	02	01
8	Agricultural Research Station, J.M.Puram	-	-	-	-	03	03
Krishna District							
9	Agricultural Research Station, Vuyyuru	-	-	01	01	05	03
10	Agricultural Research Station, Machilipatnam	-	-	-	-	03	01
11	Agricultural Research Station, Garikapadu	-	-	02	02	03	02
12	Agricultural Research Station, Ghantasala	-	-	02	02	03	02
13	**Prakasam District**						
14	Agricultural Research Station, Darsi	-	-	01	01	04	03

S. No.	Name of the College / Research Station / Extension Unit	Professor / Principal Scientist		Associate Professor / Senior Scientist		Assistant Professor / Scientist	
		S	I.P.	S	I.P.	S	I.P.
1	2	3	4	5	6	7	8
II. GODAVARI ZONE							
West Godavari District							
15	Regional Agril. Research Station, Maruteru	02	1	17	15	27	20
16	Agricultural Research Station, Vijayarai	-	-	01	01	04	03
East Godavari							
17	Agricultural Research Station, Peddapuram	-	-	-	01	02	02
III. NORTH COASTAL ZONE							
Visakhapatnam District							
18	Regional Agril. Research Station, Anakapalle	3	-	10	-	20	13
19	Agricultural Research Station, Yelamanchili	-	-	-	-	04	03
Srikakulam District							
20	Agricultural Research Station, Amadalavalasa	-	-	01	01	05	04
21	Agricultural Research Station, Ragolu	-	-	02	02	03	03
Vizianagaram District							
22	Agricultural Research Station, Vizianagaram	-	-	01	01	05	03
IV. SOUTHERN ZONE							
Chittoor District							
23	Regional Agricultural Research Station, Tirupati	02	-	13	12	11	11
24	Agricultural Research Station, Perumallapalle	-	-	02	01	05	05
SPS Nellore District							
25	Agricultural Research Station, Nellore	-	-	04	0	05	03
26	Agricultural Research Station, Podalakur	-	-	01	01	04	02
27	Agricultural Research Station, Kavali	-	-	-	-	03	02
YSR (Kadapa) District							
28	Agricultural Research Station, Utukur	-	-	01	-	05	03
V. SCARCE RAINFALL ZONE							
Kurnool District							
29	Regional Agricultural Research Station, Nandyal	1	-			20	16
30	STRPC, Thangadancha	-	-	-	01	-	02

S. No.	Name of the College / Research Station / Extension Unit	Professor / Principal Scientist		Associate Professor / Senior Scientist		Assistant Professor / Scientist	
		S	I.P.	S	I.P.	S	I.P.
1	2	3	4	5	6	7	8
Anantapuramu District							
31	Agricultural Research Station, Anantapuramu	1	1			15	09
32	Agricultural Research Station, Reddipalli	-	-	01	01	-	-
33	Agricultural Research Station, Kadiri	1	-	-	-	04	04
VI.	**HIGH ALTITUDE AND TRIBAL AREA ZONE**						
	Visakhapatnam District						
34	Regional Agril. Research Station, Chintapalle,	01	-	01	-	07	05
Srikakulam District							
35	Agricultural Research Station, Seethampet	-	-	01	01	04	02
Sub Total (Research)		**14**	**09**	**78**	**63**	**216**	**169**
Krishi Vigyan Kendras (KVKs)							
1	KVK, Reddipalli, Anantapuramu Dist.	-	-	01	01	06	05
2	KVK, Rastakuntabai, Vizianagaram Dist.	-	-	01	01	06	01
3	KVK, Amadalavalasa, Srikakulam Dist.	-	-	01	01	06	06
4	KVK, Utukur, YSR (Kadapa) Dist.	-	-	01	01	06	05
5	KVK, Undi, West Godavari Dist.	-	-	01	01	06	05
6	KVK, Darsi, Prakasam Dist.	-	-	01	01	06	05
7	KVK, Nellore, SPS Nellore Dist.	-	-	01	01	06	05
8	Dr. K. L.Rao KVK, Garikapadu, Krishna Dist.	-	-	01	01	06	05
9	KVK, Kalyandurg, Anantapuramu Dist.	-	-	01	01	06	04
10	KVK, Banavasi, Yammiganur, Kurnool Dist.	-	-	01	01	05	05
11	KVK, Kalikiri, Chittoor Dist.	-	-	01	01	06	04
12	KVK, Ghantasala, Krishna Dist.	-	-	01	01	06	02
13	KVK, Kondempudi, Visakhapatnam Dist.	-	-	01	01	06	03
District Agricultural Advisory & Transfer of Technology Centres (DAATTCs)							
14	DAATTC, Guntur District.	-	-	-	-	03	02
15	DAATTC, Machilipatnam, Krishna District.	-	-	-	-	03	02

S. No.	Name of the College / Research Station / Extension Unit	Professor / Principal Scientist		Associate Professor / Senior Scientist		Assistant Professor / Scientist	
		S	I.P.	S	I.P.	S	I.P.
1	2	3	4	5	6	7	8
16	DAATTC, Eluru, West Godavari District.	-	-	-	-	03	01
17	DAATTC, Kakinada, East Godavari District	-	-	-	-	03	02
18	DAATTC, Ongole, Prakasam District	-	-	-	-	03	02
19	DAATTC, Anakapalle, Visakhapatnam District.	-	-	-	-	03	02
20	DAATTC, Vizianagaram District.	-	-	-	-	03	02
21	DAATTC, Srikakulam District	-	-	-	-	02	02
22	DAATTC, SPS Nellore District.	-	-	-	-	03	02
23	DAATTC, YSR (Kadapa) District.	-	-	-	-	03	02
24	DAATTC, Kurnool District.	-	-	-	-	03	02
25	DAATTC, Anantapuramu District.	-	-	-	-	03	02
26	DAATTC,Chittoor District	-	-	-	-	03	02
Other Extension Centres							
27	Farmers Call Centre	-	-	-	-	03	05
	Sub Total (Extension):	**-**	**-**	**13**	**13**	**119**	**84**
	Administration	10	33	-	01	05	06
	Grand Total	**37**	**52**	**149**	**114**	**550**	**402**

ANNEXURE IV

STUDENTS' ENROLMENT BY COURSES, FIRST YEAR TO FINAL YEAR IN UNDERGRADUATE, POSTGRADUATE, DOCTORAL AND DIPLOMA PROGRAMMES DURING 2017-18

Course	Year	Total Student Enrolment			Enrolment Distribution														
					SC Students		ST Students		BC Students		OC Students		Muslim Minority		Physically Challenged Students		Foreign Students	
		Boys	Girls	Total	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Faculty of Agriculture																		
UG Programmes																		
B.Sc. (Ag)	I	326	442	768	52	66	29	21	146	188	89	147	09	10	02	05	-	01
	II	330	438	768	48	74	23	20	162	193	84	135	09	12	05	09	-	-
	III	269	306	575	38	47	25	09	106	127	90	114	07	04	05	08	-	-
	IV	218	324	542	29	60	10	13	104	134	69	107	05	08	04	04	-	-
Sub Total (UG)	1143	1510	2653	167	247	87	63	518	642	332	503	30	34	16	26	-	01	
PG Programmes																		
M.Sc. (Ag)	I	50	48	98	05	09	05	06	17	33	18	19	-	-	-	-	-	-
	II	67	81	148	06	08	06	01	21	31	14	28	-	-	-	-	-	-
	Total	117	129	246	11	17	11	07	38	64	32	47	-	-	-	-	-	-
M.Sc. (ABM)	I	11	06	17	02	01	-	-	01	-	03	03	02	-	-	-	-	-
	II	08	04	12	02	-	-	01	04	03	04	02	-	-	-	-	-	-
	Total	19	10	29	04	01	-	01	05	03	07	05	02	-	-	-	-	-
Sub Total (PG)	136	139	275	15	18	11	08	43	67	39	52	02	-	-	-	-	-	
Doctoral Programmes																		
Ph.D. (Ag.)	I	18	26	44	03	04	01	01	09	11	05	10	-	-	-	-	-	-
	II	22	25	47	04	06	02	01	11	09	05	09	-	-	-	-	-	-
	III	14	21	35	-	-	04	-	05	15	05	06	-	-	-	-	-	-
Sub Total (Ph.D.)		54	72	126	07	10	07	02	25	35	15	25	-	-	-	-	-	-

Course	Year	Total Student Enrolment			Enrolment Distribution														
					SC Students		ST Students		BC Students		OC Students		Muslim Minority		Physically Challenged Students		Foreign Students	
		Boys	Girls	Total	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Diploma Programmes																		
Diploma (Agriculture)	I	201	253	454	42	61	20	13	120	164	13	37	07	07	03	02	-	-
	II	150	178	328	51	53	17	15	102	167	22	34	02	07	02	02	-	-
	Total	351	431	782	93	114	37	28	222	331	35	71	09	14	05	04	-	-
Diploma (Seed Technology)	I	06	13	19	-	03	01	-	02	05	01	04	02	01	-	-	-	-
	II	09	12	21	01	03	-	01	05	05	03	03	-	-	-	-	-	-
	Total	15	25	40	01	06	01	01	07	10	04	07	02	01	-	-	-	-
Diploma Organic Farming)	I	06	16	22	02	03	02	-	02	11	01	02	-	-	-	-	-	-
	II	07	15	22	01	01	01	01	03	10	01	04	-	-	-	-	-	-
	Total	13	31	44	03	04	03	01	05	21	02	06	-	-	-	-	-	-
Sub Total (Diploma)	379	487	866	97	124	41	30	234	362	41	84	11	15	05	04	-	-	
Sub Total (Agril.)	1712	2208	3920	286	399	146	103	518	1106	427	664	43	49	21	30	-	01	
Faculty of Agricultural Engineering and Technology																		
UG Programmes																		
B.Tech. (Ag.Engg.)	I	63	36	99	06	06	03	02	30	17	18	11	01	-	01	-	05	01
	II	74	52	126	10	06	03	01	38	34	16	09	-	02	-	-	07	-
	III	58	43	101	06	09	05	01	31	21	13	11	01	01	-	-	02	-
	IV	62	48	110	06	08	03	02	32	25	18	13	01	01	-	-	01	-
	Total	257	179	436	28	29	14	06	131	97	65	44	03	04	01	-	15	01

Course	Year	Total Student Enrolment			Enrolment Distribution													
					SC Students		ST Students		BC Students		OC Students		Muslim Minority		Physically Challenged Students		Foreign Students	
		Boys	Girls	Total	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
B.Tech																		
(Food Tech.)	I	37	51	88	03	07	02	02	14	27	13	15	-	-	-	-	-	-
	II	29	32	61	06	05	04	-	09	15	08	16	01	-	-	-	-	-
	III	42	50	92	07	11	05	01	17	19	11	21	-	02	-	-	-	-
	IV	47	76	123	07	11	04	02	13	40	14	29	-	-	-	-	-	-
	Total	155	209	364	23	34	15	05	53	101	46	81	01	02	-	-	-	-
Sub Total (UG)	412	388	800	51	63	29	11	184	198	111	125	04	06	01	-	15	01	
PG Programmes																		
M.Tech.																		
(Ag.Engg.)	I	07	07	14	02	02	01	01	03	03	-	01	-	-	-	-	01	-
	II	05	12	17	01	01	-	02	04	05	-	03	-	01	01	-	01	-
Sub Total (PG)	10	19	29	03	03	01	03	07	08	-	04	-	01	01	-	02	-	
Doctoral Programmes																		
Ph. D. (Ag.Engg.)	I	05	01	06	-	-	-	-	03	01	02	-	-	-	-	-	-	-
	II	10	-	10	03	-	01	-	02	-	03	-	-	-	-	-	01	-
	III	03	07	10	-	01	01	-	01	03	01	02	-	01	-	-	-	-
Sub Total (Ph.D.)	18	08	26	03	01	02	-	06	04	06	02	-	01	-	-	01	-	
Diploma Programmes																		
Diploma																		
(Ag.Engg.)	I	14	21	35	07	05	02	02	12	14	03	12	-	01	-	-	-	-
	II	14	42	56	04	07	01	02	15	17	08	05	-	-	-	-	-	-
	III	13	19	32	07	04	01	01	09	20	06	02	-	01	-	-	-	-
Sub Total (Diploma)	41	82	123	18	16	04	05	36	51	17	24	-	02	-	-	-	-	
Sub Total (Ag.Engg)		481	497	978	75	83	36	19	233	261	134	155	04	10	02	-	18	01

Course	Year	Total Student Enrolment			Enrolment Distribution													
					SC Students		ST Students		BC Students		OC Students		Muslim Minority		Physically Challenged Students		Foreign Students	
		Boys	Girls	Total	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Faculty of Home science																		
UG Programmes																		
B.Sc. (HS)	I	-	75	75	-	17	-	07	-	35	-	15	-	01	-	-	-	-
	II	-	92	92	-	19	-	11	-	41	-	16	-	05	-	-	-	-
	III	-	35	35	-	11	-	03	-	13	-	06	-	02	-	-	-	-
	IV	-	27	27	-	07	-	06	-	13	-	01	-	-	-	-	-	-
Sub Total (UG)	-	229	229	-	54	-	27	-	102	-	38	-	08	-	-	-	-	
PG Programmes																		
M.Sc. (HS)	I	-	13	13	-	04	-	01	-	06	-	02	-	-	-	-	-	-
	II	-	14	14	-	04	-	01	-	04	-	05	-	-	-	-	-	-
Sub Total (PG)	-	27	27	-	08	-	02	-	10	-	07	-	-	-	-	-	-	
Ph.D. Programmes																		
Ph.D. (HS)	I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	II	-	03	03	-	02	-	-	-	01	-	-	-	-	-	-	-	-
	III	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sub Total (Ph.D)	-	03	03	-	02	-	-	-	01	-	-	-	-	-	-	-	-	
Sub Total (HS)	-	259	259	-	64	-	29	-	113	-	45	-	08	-	-	-	-	
GRAND TOTAL		2193	2964	5157	361	546	182	151	751	1480	561	864	96	67	24	30	18	02

ANNEXURE V

COLLEGE-WISE STUDENTS STRENGTH -FIRST YEAR TO FINAL YEAR DURING 2017-18

S. No.	Name of the College	Year	Boys	Girls	Total	SC	ST	BC	OC	Muslim Minority	Physically Challenged Students		Foreign Students	
											Boys	Girls	Boys	Girls
Faculty of Agriculture														
		B.Sc. (Ag)												
1	Agricultural College, Bapatla	I	94	156	250	37	14	92	99	08	03	01	-	-
		II	93	152	245	43	13	98	79	12	01	05	-	-
		III	83	131	214	35	13	90	69	07	02	03	-	-
		IV	84	120	204	39	09	83	63	10	02	02	-	-
		M.Sc. (Ag)												
		I	22	30	52	06	04	27	15	-	-	-	-	-
		II	33	33	66	12	04	32	18	-	-	-	-	-
		Ph.D. (Ag)												
		I	08	11	19	02	01	12	04	-	-	-	-	-
		II	09	12	21	05	-	11	05	-	-	-	-	-
		III	08	09	17	05	-	10	02	-	-	-	-	-
2	S.V. Agricultural College, Tirupati	**B.Sc. (Ag)**												
		I	74	85	159	21	11	58	56	08	04	-	-	01
		II	79	87	166	24	12	57	62	06	03	02	-	-
		III	55	74	129	18	06	33	65	03	02	02	-	-
		IV	51	75	126	18	05	32	68	02	-	01	-	-

S. No.	Name of the College	Year	Boys	Girls	Total	SC	ST	BC	OC	Muslim Minority	Physically Challenged Students		Foreign Students	
											Boys	Girls	Boys	Girls
		M.Sc. (Ag)												
		I	24	29	53	08	03	20	22	-	-	-	-	-
		II	12	13	42	01	01	16	24	-	-	-	01	01
		Ph.D. (Ag)												
		I	09	15	24	04	01	08	11	-	-	-	1	-
		II	11	11	22	02	02	09	09	1	-	-	-	-
		III	12	17	29	06	04	10	09	-	-	-	-	-
3	Agricultural College, Naira	**B.Sc. (Ag)**												
		I	68	89	157	21	12	93	25	03	-	03	-	-
		II	77	90	167	19	06	119	18	03	01	01	-	-
		III	60	38	98	07	08	60	19	01	01	02	-	-
		IV	31	50	81	11	05	60	03	01	-	01	-	-
		M.Sc. (Ag)												
		I	02	03	05	02	01	02	-	-	-	-	-	-
		II	-	04	04	02	-	02	-	-	-	-	-	-
4	Agricultural College, Mahanandi	**B.Sc. (Ag)**												
		I	53	56	109	18	05	54	29	-	02	01	-	-
		II	51	59	110	18	06	41	44	-	-	01	-	-
		III	48	31	79	14	04	31	29	-	-	01	-	-
		IV	33	45	78	09	02	39	27	-	01	-	-	-

S. No.	Name of the College	Year	Boys	Girls	Total	SC	ST	BC	OC	Muslim Minority	Physically Challenged Students		Foreign Students	
											Boys	Girls	Boys	Girls
		M.Sc. (Ag)												
		I	02	05	07	02	03	1	01	-	-	-	-	-
		II	02	02	04	-	02	2	-	-	-	-	-	-
5	Agricultural College, Rajahmundry	**B.Sc. (Ag)**												
		I	37	56	93	21	08	37	27	-	03	-	-	-
		II	30	50	80	18	06	40	16	-	-	-	-	-
		III	23	32	55	11	03	19	22	-	-	-	-	-
		IV	19	34	53	12	02	24	15	-	01	-	-	-
6	Advanced P.G. Centre, Guntur	**M.Sc. (Ag)**												
		I	06	09	15	01	-	06	07	-	-	-	1	-
			II	06	10	16	02	01	04	-	-	-	-	- -
		Ph.D. (Ag)												
		I	01	01	02	01	-	-	01	-	-	-	-	-
		II	01	04	05	02	01	01	01	-	-	-	-	-
		III	02	09	11	05	01	02	03	-	-	-	-	-
7	Institute of Agril. Business Management, Tirupati	**M.Sc. (Ag)**												
			I	11	06	17	02	01	07	06	-	-	-	1 -
		II	08	04	12	02	01	06	02	-	-	-	-	-

S. No.	Name of the College	Year	Boys	Girls	Total	SC	ST	BC	OC	Muslim Minority	Physically Challenged Students		Foreign Students	
											Boys	Girls	Boys	Girls
Faculty of Agricultural Engineering & Technology														
		B.Tech. (Ag. Engg.)												
8	College of Agricultural Engineering, Bapatla	I	43	24	67	10	02	26	22	01	01	-	05	01
		II	48	37	85	10	03	44	19	02	-	-	07	-
		III	38	31	69	10	04	35	16	02	-	-	02	-
		IV	41	32	73	10	02	39	19	02	-	-	01	-
		M.Tech. (Ag. Engg.)												
		I	07	07	14	04	02	06	01	-	-	-	01	-
		II	05	12	17	02	02	09	03	01	01	-	01	-
		Ph.D. (Ag. Engg.)												
		I	05	01	06	-	-	04	02	-	-	-	-	-
		II	10	-	10	03	01	02	03	-	-	-	1	-
		III	03	07	10	01	01	04	03	01	-	-	-	-
		B.Tech. (Ag. Engg.)												
9	College of Agricultural Engineering, Madakasira	I	20	12	32	02	02	21	07	-	-	-	-	-
		II	26	15	41	06	01	28	06	-	-	-	-	-
		III	20	12	32	05	02	17	08	-	-	-	-	-
			IV	21	16	37	04	03	18	12	-	-	-	- -

S. No.	Name of the College	Year	Boys	Girls	Total	SC	ST	BC	OC	Muslim Minority	Physically Challenged Students		Foreign Students	
											Boys	Girls	Boys	Girls
	B.Tech. (Food Tech.)													
10	College of Food	I	24	33	57	06	02	31	18	-	-	-	-	-
	Science and	II	20	25	45	09	04	16	16	-	-	-	-	-
	Technology,	III	32	29	61	11	04	25	21	-	-	-	-	-
	Bapatla	IV	15	30	45	05	02	24	14	-	-	-	-	-
	B.Tech. (Food Tech.)													
11	College of Food		I	13	18	31	04	02	15	10	-	-	-	- -
	Science and	II	09	07	16	02	-	05	08	-	-	-		-
	Technology,	III	10	21	31	07	02	09	11	02	-	-	-	-
	Pulivendula	IV	32	46	78	13	03	29	29	-	-	-	-	-
Faculty of Home Science														
	B.Sc. (H.Sc.)													
12	College of	I	-	75	75	17	07	35	15	01	-	-	-	-
	Home Science,	II	-	92	92	19	11	41	16	05	-	-	-	-
	Bapatla	III	-	35	35	11	03	13	06	02	-	-	-	-
		IV	-	27	27	07	06	13	01	-	-	-	-	-

S. No.	Name of the College	Year	Boys	Girls	Total	SC	ST	BC	OC	Muslim Minority	Physically Challenged Students		Foreign Students	
											Boys	Girls	Boys	Girls
13	Agricultural Polytechnic, Maruteru	Diploma (Agriculture)												
		I	22	29	31	15	04	35	06	-	-	-	-	-
		II	24	36	60	16	03	26	06	-	-	-	-	-
14	Agricultural Polytechnic, Anakapalli	Diploma (Agriculture)												
		I	19	36	55	09	03	39	4	-	-	-	-	-
		II	15	42	57	08	02	44	3	-	-	-	-	-
15	Agricultural Polytechnic, Podalakur	Diploma (Agriculture)												
		I	11	11	22	03	02	13	02	02	-	-	-	-
		II	12	14	26	04	01	14	03	04	-	-	-	-
16	Agricultural Polytechnic, Reddipalli	Diploma (Agriculture)												
		I	12	13	25	03	04	14	04	-	-	-	-	-
		II	12	13	25	05	03	12	05	-	-	-	-	-
17	Agricultural Polytechnic, Utukuru	Diploma (Agriculture)												
		I	07	18	25	05	01	12	07	-	-	-	-	-
		II	10	16	26	06	03	09	08	-	-	-	-	-

S. No.	Name of the College	Year	Boys	Girls	Total	SC	ST	BC	OC	Muslim Minority	Physically Challenged Students		Foreign Students	
											Boys	Girls	Boys	Girls
18	Agricultural	Diploma (Agriculture)												
	Polytechnic, Kalikiri	I	02	03	05	01	13	01	-	-	01	2	-	-
		II	-	03	03	03	10	07	-	-	-	01	-	-
Diploma Programmes														
19	Agricultural	Diploma (Agriculture)												
	Polytechnic, Ramachandrapuram	I	22	-	22	03	02	17	-	-	-	-	-	-
			II	13	12	25	04	01	17	03	-	-	-	- -
20	Agricultural	Diploma (Agriculture)												
	Polytechnic, JM Puram	I	11	15	26	08	02	12	01	02	01	-	-	-
		II	13	10	23	07	02	09	04	-	-	01	-	-
21	Agricultural	Diploma (Agriculture)												
	Polytechnic, Madakasira	I	13	08	21	04	01	11	03	01	01	-	-	-
		II	10	12	23	04	01	13	01	03	01	-	-	-
22	Agricultural	Diploma (Agriculture)												
	Polytechnic, Chintapalli	I	06	16	22	05	02	13	03	-	-	-	-	-
		II	07	15	22	02	02	13	05	-	-	-	-	-

S. No.	Name of the College	Year	Boys	Girls	Total	SC	ST	BC	OC	Muslim Minority	Physically Challenged Students		Foreign Students	
											Boys	Girls	Boys	Girls
23	Agricultural	Diploma (Agriculture)												
	Polytechnic, Nandyal	I	03	02	05	02	09	21	03	-	-	01	-	-
		II	02	03	05	01	02	29	04	-	01	-	-	-
24	Agricultural	Diploma (Agriculture)												
	Polytechnic, Somasila	I	09	12	21	04	01	11	03	02	-	-	-	-
		II	15	14	29	09	03	15	-	02	-	-	-	-
Diploma Programmes														
25	Agricultural	Diploma (Agriculture)												
	Polytechnic, Garikapadu	I	23	16	39	07	02	24	06	05	01	-	-	-
			II	10	28	38	09	02	24	01	02	-	01	- -
26	Agricultural	Diploma (Agriculture)												
	Polytechnic, Tirupati	I	11	12	23	04	01	11	06	-	01	-	-	-
			II	07	18	25	06	03	13	03	-	-	-	- -
27	Agricultural	Diploma (Agriculture)												
	Polytechnic, Gantasala	I	07	29	36	08	01	22	03	02	-	-	-	-
		II	18	20	38	11	02	21	03	01	-	-	-	-

S. No.	Name of the College	Year	Boys	Girls	Total	SC	ST	BC	OC	Muslim Minority	Physically Challenged Students		Foreign Students	
											Boys	Girls	Boys	Girls
28	Agricultural	**Diploma (Agriculture)**												
	Polytechnic, Ramagiri	I	23	33	56	14	04	35	03	-	-	-	-	-
		II	-	-	-	-	—	-	-	-	-	-	-	-
29	Seed Technology	**Diploma (Seed Technology)**												
	Polytechnic, JM Puram	I	06	13	19	03	01	07	05	03	-	-	-	-
		II	09	12	21	04	01	10	06	-	-	-	-	-
Diploma Programmes														
30	Polytechnic of	**Diploma (Agricultural Engineering)**												
	Agriculture Engineering, Kalikiri	I	03	02	05	01	11	06	-	01	-	-	-	-
		II	03	03	06	02	15	07	-	-	-	-	-	-
		III	02	03	05	02	10	10	-	01	-	-	-	-
31	Polytechnic	**Diploma (Agricultural Engineering)**												
	of Agriculture Engineering, Anakapali	I	11	19	30	07	02	16	05	-	-	-	-	-
		II	11	18	29	05	01	17	06	-	-	-	-	-
		III	11	16	27	06	01	18	02	-	-	-	-	-

ANNEXURE VI

AGRO-CLIMATIC ZONE-WISE LIST OF RESEARCH STATIONS AND THEIR FUNCTIONS

S. No.	Zone / Research Station	Functions		
		Main	Priorities	Verification
I.	**Krishna Zone**			
1.	Regional Agricultural Research Station, Lam -522 034. Phone: 0863-2524017	• Development of sustainable, profit-able technologies and Integrated cropping/ farming systems for rainfed/ I.D conditions in pulses, cotton, millets and oil seeds. • Extending of weather based agro advisory services, working out of viable effective price forecasting for major crops.	• Development of Short / medium duration cotton varieties / hybrids. • Development of ideotypes in cotton suitable for HDPS and mechanical picking. • Climate resilient produc-tion technologies (includ-ing organic farming) for cotton and cotton based cropping systems. • Sustainable integrated management technologies for biotic and abiotic stresses. • Mechanization in cotton. • Value addition in cotton. • Weather based Agro advisories to farmers. • Research on Socio-economic aspects of farming community.	• Control of weeds in rice fallow pulses.
2.	Agricultural Research Station, Machilipatnam	• Development of medium duration, salt tolerant / resis-tant rice varieties suitable to coastal ecosystem and management strate-gies for improving productivity in salt affected areas.	• Development of medium duration and salt tolerant rice varieties. • Conduct of basic, applied and adaptive research on increasing and stabilizing rice productivity in coastal saline ecosystems. • Production technologies for improving productivity in salt affected areas. • Collection, evaluation, conservation of rice germplasm.	• Testing and identification of suitable blackgram varieties for salt affected areas.

S. No.	Zone / Research Station	Functions		
		Main	Priorities	Verification
3.	Agricultural Research Station, Ghantasala	• Development and identification of high yielding blackgram and greengram varieties suitable for rice fallows(*rabi*) and production and protection technologies for improving productivity.	• Development of short or medium duration greengram and blackgram varieties to escape terminal moisture stress and biotic stress with special emphasis on sucking pests & viral diseases. • Alternate crops to greengram and blackgram for rice fallows. • Mechanization in pulse crops. • Organic enrichment of soils to sustain rice fallow pulse cropping sequence.	• Identification of suitable mustard and maize varieties (Zero tillage) and production technologies under rice fallows.
4.	Agricultural Research Station, Vuyyuru, Krishna District	• Development of sugarcane varieties possessing high cane yield potential and sugar content coupled with tolerance / resistance to biotic and a biotic stresses and viable agro techniques suitable for Krishna - Godavari Zone.	• To develop high yielding sucrose rich varieties with climate resilience and multiratooning ability. • To develop cost effective comprehensive production technologies. • Water saving technologies to enhance water and nutrient productivities. • To develop technologies for soil health, management of ESB, INB and red rot. • To identify efficient clones under water logged conditions & clones with tolerance for post-harvest deterioration. • Agro-techniques for mechanized sugarcane cultivation.	

S. No.	Zone / Re-search tation	Functions		
		Main	Priorities	Verification
5.	Agricultural Research Station, Garikapadu	• Research on water management of different crops grown under NSP left canal command area.	• To conduct research on crops and cropping systems and water management for NSP left command area.	• Testing and identification of suitable rice, pulses and soybean varieties for the tract. • Transfer of proven technologies through field demonstrations in farmers fields.
6.	Agricultural Research Station, Amaravati	• Research, production and quality control of *Rhizobium* and *Azotobacter* etc. • Research and mass production of biofertilizers and associated protocols.	---	• Testing efficacy of biofertilizers on mandatory crops of the zone.
7.	Post-Harvest Technology Centre Agricultural College campus, Bapatla-522101. Phone: 08643-225098.	• Design, fabrication, valuation of post -harvest equipments/ machinery for reducing the crop losses and enhancing value addition. • Research on bio-chemical quality factors in storage and impact of abiotic and biotic factors on storage of food grains and control methods of storage pests.	• Design and development of crop specific and location specific technologies and machineries for value addition and safe storage. • Development of value added products using innovative and novel technologies. Design and development of efficient storage structures for cereals, pulses and oilseeds and horticulture produces. • Design and development of low cost ripening chambers for fruits/ crops. • Utilization of innovative biotechnological approaches for preparation of value added products. • Development of complete protocol for agricultural waste management.	• Demonstration and popularization of post-harvest related equipment/ technologies.

S. No.	Zone / Research tation	Functions		
		Main	Priorities	Verification
			• Development of process technology for utilization of by-products. • Design and development of Agro Processing Clusters based on production catchments of various agro climatic zones of the state.	
8.	Rice Research Unit, Agricultural College Campus, Bapatla - 522101. Phone: 0863-225901	• Development of improved long duration rice varieties with good grain quality and sustainable agro-techniques suitable for black soils of Krishna Western Delta and NSP area.	• Development of climate resilient rice varieties for KW Delta and NSP area. • Development of varieties suitable for direct seeding. • Breeding long duration varieties with fine grain quality. • Evolving of cost reduction technologies. • Innovative and adaptable production and protection technologies. • Identification of efficient integrated farming systems.	
9.	Saline Water Scheme, Agricultural college campus, Bapatla - 522 101 Phone : 08643- 25098	• Research on water quality, soil survey & monitoring of benchmark sites and reclamation & fertility management of problematic soils.	• Water quality soil survey and monitoring of benchmark sities. • Up-coming problems of sea water in coastal sandy soils. • Reclamation of abandoned aqua ponds, sandy soils. • Effective management and utilization of thorough harvesting techniques and irrigation methods. • Reclamation of salt affected areas-aqua ponds.	• Testing and identification of crops/ varieties suitable for problematic soils.
10.	Agricultural Research Station, Jangamaheswarapuram	• Development of high yielding rice varieties with good grain quality and resistance to pest & diseases suitable to NSP right canal area.	• Development and identification of rice varieties suitable for NSP right canal area. • Evaluation of water saving technologies and micro irrigation systems to enhance water productivity.	• Identification of HYVs in greengram and redgram suitable for the tract.

<table>
<tr><th rowspan="2">S. No.</th><th rowspan="2">Zone / Re-search tation</th><th colspan="3">Functions</th></tr>
<tr><th>Main</th><th>Priorities</th><th>Verification</th></tr>
<tr><td></td><td></td><td>• Production of breeder and foundation seed of different varieties of rice</td><td>• Seed research& seed production technologies for rice and pulses.
• Standardization of seed production technologies for fodder and green manure crops.</td><td></td></tr>
<tr><td>11.</td><td>Agricultural Research Station, Darsi</td><td>• Development of economically viable and efficient cropping system models, Agro-forestry system, water-shed management technologies suitable for NSP right canal area for enhancing the productivity of rainfed crops.</td><td>• Development of high yielding varieties with resistance to pests and diseases in millets, pulses and oilseeds.
• Identification of crops and cropping systems suitable for NSP right canal area.
• To identify a suitable Agro-forestry system matching soil and environ-mental conditions.
• To evaluate different techniques of modification of crop microclimate for enhancing the water-use efficiency and productiv-ity of rainfed crops.
• Development of suitable technologies for water harvesting and conserva-tion.
• Identification of viable agro-technologies for crops suitable to the tract.</td><td>• Identification of alternative crops to Tobacco.
• Introduction of drought tolerant oilseed crops viz., safflower and castor.
• Screening of cowpea and horsegram variet-ies for their adaptabil-ity.
• Introduction of millets in kharif season preceding to rabi bengalgram.
• Organic enrichment to improve the physical properties of the soil.
• Testing & identifica-tion of greengram, blackgram, redgram varieties suitable for the tract.</td></tr>
</table>

S. No.	Zone / Research tation	Functions		
		Main	Priorities	Verification
II.	**Godavari Zone**			
1.	Regional Agricultural Research Station, Maruteru, West Godavari District.	• Rice, Rice based sustainable/ integrated cropping/ farming systems through development of suitable varieties, sustainable crop production and protection technologies.	• Development of climate resilient rice varieties. • Development of rice varieties for direct seeding. • Breeding for mid late duration rice varieties with fine grain. • Development of exportable rice. • Development of rice varieties for semi-deep water situations. • Bio-fortification in rice. • Cost reduction technologies. • Innovative and adaptable production technologies. • Processing and value addition. • Integrated farming systems. • Organic / natural farming. • Soil health management. • Mechanization in rice. • Research on summer pulses. • Imparting skill oriented training to farmers & extension functionaries. • Research on non-pesticide management. • Weather based Agro advisories to farmers. • Research on Socio-economic aspects of farming community.	• Identification of suitable maize varieties for *rabi* season
2.	Agricultural Research Station, Vijayarai, West Godavari District	• Research on maize and maize based cropping systems and on apiculture.	• Development of medium and short duration maize hybrids/ varieties. • Development of specialty corn varieties/hybrids. • Development of location specific innovative production technologies for maize. • Research on honeybees - Breeding for disease resistance, high yielding, non-pestiferous pollinators. • Capacity building on bee keeping	----

S. No.	Zone / Research tation	Functions		
		Main	Priorities	Verification
3.	Agricultural Research Station, Pulla, West Godavari District	• Development of rice varieties for semi-deep water situation. • The land (3.5 acres) at Pulla Village where deep water research was going on was taken over by Govt. of Andhra Pradesh for construction of Indiramma gruhalu. • Due to fish ponds coming up around the remaining land of Research Farm resulting in inundation for more than 10 months in a year. In this regard, the committee constituted by University has recommended for closure of the research station and intensification of research on semi deep water rice at RARS, Maruteru. • Therefore the mandate of Agricultural Research Station, Pulla was shifted to RARS, Maruteru during 2005.	----	----
4.	Agricultural Research Station, Peddapuram, East Godavari District.	• Research on finger millet, pulses (blackgram, greengram,redgram), maize and oilseeds (ground nut & sesamum).	• Development of climate resilient finger millet varieties and profitable production technologies. • Evaluation of varieties / hybrids of blackgram, greengram, redgram, maize, groundnut & sesamum.	-----
III.	**North Coastal Zone**			
1.	Regional Agricultural Research Station, Anakapalle, Visakhapatnam District	• Research on sugarcane, sugarcane based cropping systems, cost reduction technologies and value addition.	• Development of high yielding climate resilient varieties of sugarcane. • Development of INM, IPM and IDM strategies for sustainable sugarcane production.	• Testing & identification of thermo & photo insensitive varieties of sesame and

<table>
<tr><th rowspan="2">S. No.</th><th rowspan="2">Zone / Research tation</th><th colspan="3">Functions</th></tr>
<tr><th>Main</th><th>Priorities</th><th>Verification</th></tr>
<tr><td></td><td></td><td></td><td>• Development of cost reduction technologies for sustainable sugarcane production.
• Processing and value addition of jaggery and sugarcane by products.
• Identification of profitable and sustainable sugarcane based cropping systems for different agro climatic conditions.
• Soil health, pest and disease management in multi ratooning.
• Mechanization in sugarcane.
• Development of water smart technologies for increasing the crop and water productivity.
• Popularization of feasible and adaptable technologies (bio-pesticides, bio-fertilizers).
• To encourage small and marginal farmers to set up industries for value addition.
• Weather based Agro advisories to farmers.
• Research on Socio-economic aspects of farming community.</td><td>groundnut.
• Evaluation of varieties / hybrids of maize suitable for Kharif and rabi.
• Identification of suitable varieties in rice.
• To evolve suitable package of practices for organic / natural farming.</td></tr>
<tr><td>2.</td><td>Agricultural Research Station, Vizianagaram, Vizianagaram District</td><td>• Research on ragi, ragi based cropping systems and minor millets (proso, kodo, ooda and foxtail).</td><td>• Development of climate resilient ragi varieties (with blast resistance and non-lodging nature) and production technologies.
• Evaluation / identification of suitable varieties / hybrids in minor millets.
• Evaluation / identification of groundnut varieties with biotic and abiotic stress tolerance.
• Bio fortification, processing and value addition in ragi and other minor millets.
• Identification of profitable ragi based cropping system including organic farming.
• Mechanization in millets.</td><td>• Testing & identification of suitable varieties in greengram, blackgram, redgram, horsegram, maize and sunflower.</td></tr>
</table>

S. No.	Zone / Re-search tation	Functions		
		Main	Priorities	Verification
3.	Agricultural Research Station, Ragolu, Srikakulam District	• Rice, Rice based cropping systems, climate resilient, sustainable / integrated cropping / farming systems, soil and water management for canalfed and tankfed areas and research on rice fallow pulses.	• Development of fine grain, long and medium duration varieties for canalfed and rainfed areas. • Development of climate resilient short duration varieties for uplands. • Development of innovative and adoptable production technologies for different ecosystems (canal, tankfed and rainfed) including direct seeding. • Identification and popularization of profitable integrated farming systems. • Standardization of organic / natural farming practices. • Research on rice fallow pulses. • Development of cost reduction technologies (planting methods, bio fertilizers and bio control agents). • Bio fortification and value addition. • Development of suitable technologies for zero tillage maize.	• Testing & identification of suitable varieties in greengram, blackgram, redgram, horsegram, maize and sunflower.
4.	Agricultural Research Station, Amadalavalasa, Srikakulam District	• Research on mesta, mesta based cropping systems, post harvest technology and on pulses.	• Development of climate smart varieties of mesta with biotic and abiotic stress tolerance. • Identification of profitable and sustainable mesta based cropping systems. • Development of innovative and climate resilient production technologies. • Post-harvest technology and value addition.	• Verification function of cotton, redgram upland pulses, maize and rainfed sugarcane. • dentification of suitable sugarcane, maize and other crops for rainfed conditions. • Evaluation / identification of cotton hybrids / varieties and IPM practices suitable for rainfed situation.

S. No.	Zone / Research tation	Functions		
		Main	Priorities	Verification
5.	Agricultural Research Station, Yellamanchili, Vishakhapatnam District	• Research on sesamum and sesamum based cropping systems.	• Development of climate resilient (Photo insensitive) sesame varieties and profitable production technologies. • Evolving varieties / hybrids of sunflower. • Breeding for improved varieties of groundnut suitable for North Coastal Zone	• Testing / Identification of varieties / hybrids of millets suitable for light soils & rainfed areas of North Coastal Zone. • Identification of suitable varieties of sugarcane, greengram, horsegram and redgram for rainfed situations.
IV.	**Southern Zone**			
1.	Regional Agricultural Research Station, Tirupati, Chittoor District	• Research on groundnut and sustainable groundnut based cropping systems, pulses, soil and water management, farm mechanization and post- harvest technology.	• Development of drought tolerance, high yield, pest and disease resistance varieties in groundnut and pulses for the zone. • Research on groundnut based cropping systems, production and protection technologies. • Soil, water and nutrient management technologies for groundnut and pulses including arid legumes. • Evaluation of farm machinery and post-harvest technologies. • Testing, production and distribution of efficient strains of bio-fertilizers. • Weather based agro advisories to farmers. • Research on Socio-economic aspects of farming community.	• Identification of viable Integrated Farming Systems for Dryland / rainfed farmer. • Agro-climate advisory services for dry land/ rainfed farming. • Development of digital agricultural communication technologies for efficient transfer of technology. • Creation of farmers organizations and technology commercialization. • Testing / identification of HYVs of fodders, organic/ natural farming practices.

S. No.	Zone / Research tation	Functions		
		Main	Priorities	Verification
2.	Agricultural Research Station, Perumallapalle, Chittoor District	• Research on sugarcane, maize, jowar and millets.	• Development of high yielding sugarcane varieties possessing tolerance to biotic and abiotic stresses and suitable for jaggery mechanization and diversified uses in Southern Zone. • Development of input use efficient cane management technologies. • Seed production of elite clones through conventional and micro propagation techniques. • Development of high yielding blast resistant finger millet varieties suitable for Andhra Pradesh. • Breeding varieties/hybrids of Jowar, Maize and Pearl millet. • Development of input use efficient crop production and protection practices for maize, jowar and millets.	• Testing and identification of HYVs of minor millets and value addition
3.	Agricultural Research Station, Nellore, Nellore District	• Rice and rice based cropping systems.	• Development of rice varieties of different duration maturity groups suitable to southern zone. • Development of rice varieties resistant/ tolerant to blast. • Screening / identification of resistant donors for major insect pests and diseases. • Development of pest and disease management strategies. • Development of varieties and technologies for aerobic, direct seeding of rice. • Working out package for organic rice cultivation/natural farming. • Basic research on the resistance to insect pests with particular reference to Brown Plant Hopper. • Monitoring and identification of rice gall midge biotypes in Southern Zone. • Development of Integrated pest and disease management including biological control. • Research on the methods of non-pesticide management.	• Identification of suitable varieties in gingelly. • Identification of HYVs of sesamum. • Testing of pulses under rice fallows.

S. No.	Zone / Research tation	Functions		
		Main	Priorities	Verification
4.	Agricultural Research Station, Podalakur, Nellore District	• Development of high yielding insect pest & disease tolerant varieties in pulses, jowar and evolving climate resilient suitable agro-techniques.	• Development of blackgram, greengram and redgram varieties with high yield and tolerance to insect pests and diseases. • Development of sorghum varieties suitable for rabirainfed conditions. • Research on sorghum based cropping systems. • Development of climate resilient agro techniques.	• Testing and identification of suitable groundnut varieties for the tract. • Evaluation of fodder sorghum, sunflower and gingelly varieties/hybrids. • Seed production in pulses, jowar and groundnut.
5.	Agricultural Research Station, Kavali, Nellore District.	• Agro-Forestry research	• Evaluation of different agroforestry species including eucalyptus, casuarinas, Malabary, vepa and red sandels clones.	• Evaluation/identification of varieties in rice, pulses and groundnut.
6.	Agricultural Research Station, Utukur, Y.S. R Kadapa District	• Rice and rice based cropping systems, water management and STCR research.	• Rice and rice based cropping systems. • Water management and dryland agriculture. • Mass multiplication of biofertilizers. • Basic and strategic research on soils. • Evaluation of fertilizer schedules for major crops.	• Identification of suitable oilseed and pulses.
V.	**Scare Rainfall Zone**			
1.	Regional Agricultural Research Station, Nandyal, Kurnool District	• Development/ identification and popularization of suitable crops/ cropping systems, varieties and technologies pertaining to cotton, rice, jowar, small millets, chickpea, sunflower and tobacco.	• Development of climate resilient varieties/hybrids in cotton, rice, jowar, small millets, chickpea, sunflower and tobacco. • Research on climate smart technologies to cope up with the weather aberrations in mandate crops. • Intensification of research for innovative and small farmer friendly mechanization for	• Development of Agro techniques for rice fallow sorghum.

S. No.	Zone / Re-search tation	Functions		
		Main	Priorities	Verification
			mandatory crops. • Soil health management in major crops/cropping systems. • Development of water smart technologies in major crops/ cropping systems. • To intensify quality seed production of newly released varieties of mandatory crops. • Working out organic production package of practices for small millets and blackgram. • Introduce hybrid rice research. • Weather based agro advisories to farmers. • Research on Socio-economic aspects of farming community.	
2.	Agricultural Research Station, Anantapuramu, Anantapuramu District	• Development and popularization of climate smart sustainable dryland agriculture technologies and groundnut, bajra integrated farming systems and extending weather based agro advisory servies.	• Development of climate resilient technologies in groundnut and other major rainfed crops/cropping systems. • Strengthening the research on climate smart technologies to cope up with weather aberrations in rainfed crops. • Intensification of research for innovative and small farmer friendly mechanization in rainfed crops. • Development of integrated farming system models for rainfed agriculture. • Soil health management under rainfed situations. • Development and evaluation of climate resilient varieties/hybrids in pearlmillet and arid legumes. • Development of crop-weather-pest relationships and dissemination of Agro advisories.	• Evaluation of varieties of sorghum castor, foxtail millet, redgram, horsegram and field bean.

S. No.	Zone / Research tation	Functions		
		Main	Priorities	Verification
3.	Agricultural Research Station, Reddipalli, Anantapuramu District	• Development and popularization of climate and water smart sustainable oilseed crop based cropping systems.	• Development of climate resilient technologies in oilseed crops/cropping systems. • Soil health management for oilseed crops. • Development of water smart technologies for oilseed crops/cropping systems.	• Evaluation of varieties/ hybrids of oilseed crops, rice and redgram. • Transfer of technologies through OFTs.
4.	Agricultural Research Station, Kadiri, Anantapuramu District	• Development and popularization of suitable groundnut varieties and climate smart groundnut based cropping systems.	• Development of climate smart groundnut varieties for different situations. • Evolving of efficient and sustainable production technologies. • Screening of groundnut varieties for major pests and diseases. • Development of management strategies for major pests and diseases in groundnut. • Intensification of seed research and quality seed production of newly released groundnut varieties. • Basic studies on management of viral diseases in groundnut.	• Evaluation of redgram, arid legumes and sunflower varieties/ hybrids.
5.	Seed Technology Research & Production Center, Thangadancha, Kurnool District	• Seed Technology Research, development of seed production technologies and capacity building of clientele for quality seed production in major field crops of the state.	• Development of technologies for enhancing seed viability/ seed longevity. • Seed production technologies for newly released varieties in major crops. • Coordinating and monitoring of seed production activities. • Capacity building of clientele for quality seed production, processing and storage.	----

S. No.	Zone / Research tation	Functions		
		Main	Priorities	Verification
VI.	**High Altitude and Tribal Zone**			
1.	Regional Agricultural Research Station, Chintapalle, Visakhapatnam District.	• Development/ identification and popularization of suitable crop varieties and technologies on watershed basis for improving the livelihood of tribal farmers	• Research on Rajamash and Niger. • Evaluation of varieties/hybrids in upland rice, maize, wheat, millets, sugarcane & redgram. • Development/evaluation of soil and water conservation practices. • Development of integrated farming system models. • Improving organic / natural farming practices. • Weather based Agro Advisories to farmers. • Research on Socio-economic aspects of farming community.	----
2.	Agricultural Research Station, Seethampeta, Srikakulam District.	• Identification and popularization of suitable crops/ crop varieties/ cropping systems and development & popularization of technologies on watershed basis for improving the live hood of tribal farmers	• Testing the performance of improved varieties of cereals, millets, pulses, oil seeds and fodder crops. • Soil and water conservation in the agency area. • Development of organic/natural farming package for major crops in the agency areas. • Identification of profitable and non-traditional crops and cropping systems. • Integrated farming system research for economic upliftment of tribals. • Promotion of processing and storage of millets.	• Identification of profitable cropping/ farming system.

ANNEXURE VI

LIST OF ICAR COORDINATED RESEARCH PROJECTS OPERATED IN RESEARCH STATIONS

I. NORTH COSTAL ZONE

1. AICRP on Sugarcane, RARS, Anakapalle
2. AICRP on PHE and Technology, 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 IFS, ARS, Vizianagaram

II. GODAVARI ZONE

7. AICRP on Rice, RARS, Maruteru
8. AICRP on Cropping System Research (MAE), RARS, Maruteru
9. AINP on Vertibrate Pests, RARS, Maruteru
10. AICRP on Honey Bee Research & Training, ARS, Vijayarai
11. AICRP on Maize, ARS, Peddapuram.

III. KRISHNA ZONE

12. AICRP on Pulses, MULLaRP, RARS, Lam
13. AICRP on Cotton, Main Centre, RARS, Lam
14. AICRP on Pulses (Pigeonpea), RARS, Lam
15. AICRP on Management of Salt Affected Soils and Use of Saline Water, Bapatla
16. AICRP on Post-Harvest Technology, Bapatla
17. AICRP on Farm Implements and Machinery, Bapatla
18. AINP on Soil Biodivesity & Biofertilizers, ARS, Amaravathi
19. AICRP on MULLaRP, ARS, Ghantasala
20. AICRP on Dryland Agriculture, Voluntary Centre, ARS,Darsi

IV. SOUTHERN ZONE

21. AICRP on Groundnut Sub Centre, RARS, Tirupati
22. AICRP on Forage crops, Voluntary Centre, RARS, Tirupati
23. AICRP on Sesamum, RARS, Tirupati
24. AICRP on Rice, ARS, Nellore

V. SCARCE RAINFALL ZONE

25. AICRP on Cotton, Sub-Centre, RARS, Nandyal
26. AICRP on Improvement of Small Millets, RARS, Nandyal
27. All India Network Project on Tobacco, RARS, Nandyal
28. AICRP on Oilseeds, Sub-Centre on Sunflower, RARS, Nandyal
29. AICRP on Chickpea, RARS, Nandyal
30. AICRP on Sorghum, RARS, Nandyal
31. AICRP on Dryland Agriculture, ARS, Anantapuramu
32. AICRP on Pearl Millet Improvement Project, ARS, Anantapuramu
33. AICRP on Agrometeorology, ARS, Anantapuramu
34. AICRP on Castor, ARS, Anantapuramu
35. AICRP on Oilseeds, Main Centre for Groundnut, ARS, Kadiri

IX. HIGH ALTITUDE AND TRIBAL ZONE

36. AICRP on Niger, RARS, Chintapalle

ANNEXURE VIII

LIST OF PROJECTS UNDER RASHTRIYA KRISHI VIKAS YOJANA (RKVY)

Sl. No.	Title of the project	Research Station	Total budget allocation during 2017-18 (Rs. in Lakhs)	Budget released for 1st installment 2017-18 (Rs.in Lakhs)	Amount now released as 2nd Installment (Rs. in Lakhs)
I	**Research**				
1	Establishment of the medium term Seed Storage Bank in the Residual State of Andhra Pradesh	RARS, Nandyal	2,06,68,000	--	2,06,68,000
2	Establishment of Agricultural Market Intelligence Center	ANGRAU, Guntur	1,05,83,000	--	1,05,83,000
3	Advanced Centre for Agro Climate Research and Weather Forecasting	RARS, Tirupati	2,40,94,000	1,15,48,455	1,25,45,545
4	Establishment of Centre of Excellence in Post-Harvest Engineering & Technology	PHET, Bapatla	3,51,81,000	--	3,51,81,000
5	Establishment of Agro Processing Centre (APC) for preparation of value added products to cater the needs of farmers in North Coastal Districts of Andhra Pradesh	RARS, Anakapalle	19,35,000	19,35,000	--
6	Establishment of Farm Machinery Testing and Training centre	AICRP on FIM, CAE, Bapatla	73,03,000	73,03,000	--
7	Establishment of Soil Microbiology Laboratory	RARS, Tirupati	73,62,000	73,62,000	--
8	In situ Management of Indigenous Crop Diversity for improved Market Access by Value Addition in Rainfed and High Altitude Tribal Areas through Community Managed Seed Systems	ICAR-NBPGR, Regional Station, Hyderabad (Lead institute)	34,93,000	34,93,000	--
9	Strengthening of Infrastructure for research and capacity building for upscaling tribal livelihood by diversified	RARS, Chintapalle	84,44,000	--	84,44,000

Sl. No.	Title of the project	Research Station	Total budget allocation during 2017-18 (Rs. in Lakhs)	Budget released for 1st installment 2017-18 (Rs.in Lakhs)	Amount now released as 2nd Installment (Rs. in Lakhs)
	cropping / farming systems in high altitude areas of Andhra Pradesh				
10	Development of infrastructure facilities at RARS, Maruteru				
A	Construction of rattery cum animal house for rodent management experimentation	RARS, Maruteru	17,60,000	17,60,000	--
B	Strengthening and upgrading of irrigation and drainage facility at APRRI & RARS, Maruteru		65,97,000	--	65,97,000
II	**Agribiotech**				
1	Strengthening of Agribiotech Foundation, Reddipalli, Ananthapuramu	Agribiotech, Reddipalli, Ananthapuramu	1,02,85,000	25,68,440	77,16,560
III	**Agricultural Engineering**				
1	State of Art Training Centre for skill development and empowerment of rural youth on farm mechanization and allied farm engineering technology - network Centre	Lead centre - Madakasira Sub centers Ananthapuramu Tirupati Anakapalle	1,40,49,000	35,08,411	1,05,40,589
IV	**Extension**				
1	Strengthening of Krishi Vigyan Kendras and DAATTCs for enhancing their capacities in promoting extension services to the farmers in Andhra Pradesh	All KVKs and DAATTCs of ANGRAU	2,49,14,000	62,21,694	1,86,92,306
V	**Information Technology**	Lam, Guntur	63,32,000	--	63,32,000
1	Digitization of Agriculture cell at ANGRAU, Lam, Guntur				
		Total: Rs.	**18,30,00,000**	**4,57,00,000**	**13,73,00,000**

ANNEXURE IX

DISTRICT AGRICULTURAL ADVISORY & TRANSFER OF TECHNOLOGY CENTRES (DAATTCs)

District Agricultural Advisory & Transfer of Technology Centre Krishi Vigyan Kendra Premises Amadalavalasa – 532 185 Srikakulam Dist.	District Agricultural Advisory & Transfer of Technology Centre Agricultural Research Station Premises Gajularega - 535 003 Vizianagaram Dist.
District Agricultural Advisory & Transfer of Technology Centre Krishi Vigyan Kendra Premises Kondempudi – 531026 Butchayyapeta Mandal, Visakhapatnam Dist.	District Agricultural Advisory & Transfer of Technology Centre Agricultural Research Station Premises Peddapuram - 533 437 East Godavari District.
District Agricultural Advisory & Transfer of Technology Centre Krishi Vigyan Kendra Premises Undi – 534 199, Bhimavaram Road, West Godavari District.	District Agricultural Advisory & Transfer of Technology Centre Krishi Vigyan Kendra Premises Ghantasala - 521 133 Krishna District.
District Agricultural Advisory & Transfer of Technology Centre Extenstion Education Unit Regional Agricultural Research Station Premises, Lam, Guntur – 522 034.	District Agricultural Advisory & Transfer of Technology Centre Krishi Vigyan Kendra Premises Darsi - 523 247, Prakasam District.
District Agricultural Advisory & Transfer of Technology Centre Krishi Vigyan Kendra Premises B.V.Nagar, Nellore – 524 004. SPSR Nellore District.	District Agricultural Advisory & Transfer of Technology Centre Krishi Vigyan Kendra Premises Kalikiri - 517 234, Chittoor District.
District Agricultural Advisory & Transfer of Technology Centre Krishi Vigyan Kendra Premises Banavasi, Yemmiganur – 518 360 Kurnool District.	District Agricultural Advisory & Transfer of Technology Centre Krishi Vigyan Kendra Premises Utukur, Kadapa - 516 001 YSR Kadapa District
District Agricultural Advisory & Transfer of Technology Centre Krishi Vigyan Kendra Premises Reddipalle – 515 701 Anantapuramu District	

LIST OF EXTENSION CENTRES
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 Undi - 534 199 West Godavari Dist.	*Krishi Vigyan Kendra* Ghantasala - 521133 Krishna Dist.
Dr. K.L. Rao Krishi Vigyan Kendra Garikapadu - 521 175 Krishna Dist.	*Krishi Vigyan Kendra* Agricultural Research Station Darsi - 523 247 Prakasam Dist.
Krishi Vigyan Kendra Agricultural Research Station Nellore - 524 004 SPS Nellore Dist.	*Krishi Vigyan Kendra* Kalikiri - 517 234 Chittoor Dist.
Krishi Vigyan Kendra Agricultural Research Station Utukur - 516 003 YSR (Kadapa) Dist.	*Krishi Vigyan Kendra* Banavasi, Yemmiganur Kurnool - 518 003 Kurnool Dist.
Krishi Vigyan Kendra Bukkarayasamudram, Reddipalli Anantapuramu - 515 001 Anantapuramu Dist.	*Krishi Vigyan Kendra* Garudapuram, Kalyandurg - 515 761 Anantapuramu Dist.
Krishi Vigyan Kendra Kondempudi, Dr.No: 6-89, Opp. Sakha Grandhalayam Main Road, Ravikamatham Visakhapatnam. Dist. - 531 025	

FARMERS CALL CENTRE

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Agricultural Information & Communication Centre

Flat 402, Srinivasa Citadel, Opp. Hosanna Mandir, Guntur – 522 034

College Day Celebration at Agricultural College, Naira on 03rd May, 2018

Inaugurating the Online Examination Cell By Dr. V. Damodara Naidu, Hon`ble Vice-Chancellor, ANGRAU at Agril. College, Mahanandi on 10th October, 2017

Visit of Sri Somireddy Chandramohan Reddy, Hon'ble Agricultural Minister, Govt. of A.P. at S.V. Agricultural College, Tirupati on 22nd June, 2017

Mathew Morell, Director General, IRRI, Philippines, Dr. V. Damodara Naidu, Hon'ble Vice-Chancellor, ANGRAU Dr. N. V. Naidu, Director of Research, ANGRAU and other Scientists from IRRI on Visit to Agricultural Research Station, Nellore on 03rd March, 2018

Release of "Vyavasaya Panchangam" by the Hon`ble Chief Minister, Govt. of A.P. & Hon'ble Vice-Chancellor, ANGRAU on 19th March, 2018

Bhoomi Pooja at the proposed site of Administrative Office Building by Honb`le Vice-Chancellor, ANGRAU on 04th October, 2018