Annual Technical Progress Report

August 2019 to July 2020

Enhancing Groundnut Productivity in Andhra Pradesh and Karnataka through Farmer Acceptable Climate Smart Strategies and Weather Based Crop Management Advisories

Submitted to

Monsoon Mission-II, Indian Institute of Tropical Meteorology (IITM)
Ministry of Earth Sciences (MoES), Government of India

ICRISAT INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS

Title of the Proposal:

Enhancing Groundnut Productivity in Andhra Pradesh and Karnataka through Farmer Acceptable Climate Smart Strategies and Weather Based Crop Management Advisories

Name, address and Institute of PI:

Dr. AVR Kesava Rao, Honorary Fellow, ICRISAT Development Centre, ICRISAT, Patancheru 502 324, Telangana.

Name(s) and address of Co-P.I. (s) and other members:

Dr. Sreenath Dixit, Team Leader, ICRISAT Development Centre, ICRISAT, Patancheru 502 324, Telangana.

Sanction Order No: IITM/MM-II/ICRISAT/2018/IND-4 dated 27 July 2018

Total Sanctioned Budget:

Rs.1,12,31,000/- (Rupees one crore twelve lakhs and thirty-one thousand only)

Period of the Report:

August 2019 to July 2020

The report should contain the details of the following items:

1. **Model development work:**

(a) New initiatives taken
(b) Improvement in model results

Although the project does not involve atmospheric modelling work, the genetic coefficients identified for new groundnut varieties will add further in crop growth simulation modelling.

Nine Mandals in AP and two Taluks in Karnataka were selected as pilots in consultation with the officials of the Departments of Agriculture, Governments of AP and Karnataka. Optimum sowing windows at these pilot locations were identified for rainfed groundnut crop. Extensive field experiments were conducted at ICRISAT, Patancheru during Kharif 2019 and Rabi 2019-20 to identify crop genetic coefficients for new groundnut varieties. Meetings were conducted to enhance climate awareness among farmers and Agromet advisories prepared in both English and Local Language (Telugu / Kannada) based on the IITM / IMD weather forecasts and disseminated to farmers and other stakeholders.

2. **Technical / Computational development**

(a) Portability of the models in various systems
(b) Optimization and enhanced usability of the model
(c) Other computational improvements

The above are not relevant to the present sanctioned project

3. **Scientific research and communication**

(a) Paper published in peer reviewed journals:

NIL

(b) Papers / abstracts published in symposium / conference

NIL

(c) Book chapters / Reports / Technical reports

1. AVR Kesava Rao, Suhas P Wani and K Srinivas. 2019. Climate change adaptation and mitigation strategies for sustainable crop production. Pages 224-239 *in* Agricultural Extension and Sustainable Development Goals. (S Venku Reddy and M Suryamani eds.). APH Publishing Corporation. New Delhi.
2. AVR Kesava Rao, Suhas P Wani and K Srinivas. 2020. Climate Change Impacts at Benchmark Watershed. Pages 33-47 *in* Community and Climate Resilience in the Semi-Arid Tropics - A Journey of Innovation. (SP Wani and KV Raju eds.). Springer Nature Switzerland AG. ISBN 978-3-030-29918-7.
3. Srinivas K, Gajanan L Sawargaonkar, AVR Kesava Rao and Suhas P Wani. 2020. Improved Livelihoods through Sustainable and Diversified Cropping Systems. Pages 81-118 *in* Community and Climate Resilience in the Semi-Arid Tropics - A Journey of Innovation. (SP Wani and KV Raju eds.). Springer Nature Switzerland AG. ISBN 978-3-030-29918-7.

(d) Participation in symposium / conference / meetings

1. AVR Kesava Rao and Sreenath Dixit. 2019. Climate Change and Farmers. Invited presentation at the Tamil Nadu Agricultural University, Coimbatore on 13 Aug 2019.
2. AVR Kesava Rao and Sreenath Dixit. 2019. Climate Change Adaptations for Resilient Agriculture. Invited presentation at the Training Programme on “Disaster Management and Mitigation Strategies for Extension Professionals” at Extension Education Institute, Rajendranagar on 03 Sep 2019.
3. AVR Kesava Rao and Sreenath Dixit. 2019. Climate Change Issues – Adaptations for Resilient Agriculture. Invited presentation to Think Tank Group, IHEE France at ICRISAT Patancheru on 25 Nov 2019.
4. AVR Kesava Rao and Sreenath Dixit. 2020. Enabling Advisory Services for Climate Smart Agriculture. Invited presentation at the International Training Programme on “Good Agriculture Practices for Sustainable Agriculture in Developing Countries” under the Feed The Future India Triangular Training (FTF ITT) Program at ICRISAT, Patancheru on 20 Feb 2020.

(e) Science popularization activities.

Several village level farmers' meetings were organized in nine villages in Kurnool and Anantapur districts in AP and four villages in Tumakuru district in Karnataka to enhance climate awareness and importance of weather-based advisories for groundnut.

4. **Tours / visits:**

Sl. No.	Dates	Locations	Details
1	18-23 Nov 2019	Kurnool, Anantapur, Pavagada, Bhyadanur, Madhugiri, Sajjehosahalli, Mellakunta, Hulikallu, Gangulakunta and Jagadurthi	Participated in crop cutting experiments in ARS, Pavagada, Sajjehosahalli, Mellakunta, Hulikallu and Gangulakunta. Addressed farmers in ARS Pavagada under "Farmers Training and Field Day" programme on 19 Nov 2019. Explained on weather-based advisories being provided to farmers of Pavagada taluk under Monsoon Mission Project. Distributed groundnut seeds to selected pilot farmers at ARS Pavagada, Naliganahalli, Sajjehosahalli, Hulikallu, Gangulakunta and Jagadurthi villages. Explained to farmers on better management practices for higher groundnut yields.

5. **Equipment purchased:**

No equipment was sanctioned and purchased during the second year 2019-20.

6. **Fund utilization, manpower and targets achieved:**

a) Expenditure (Aug 2019 to Mar 2020)

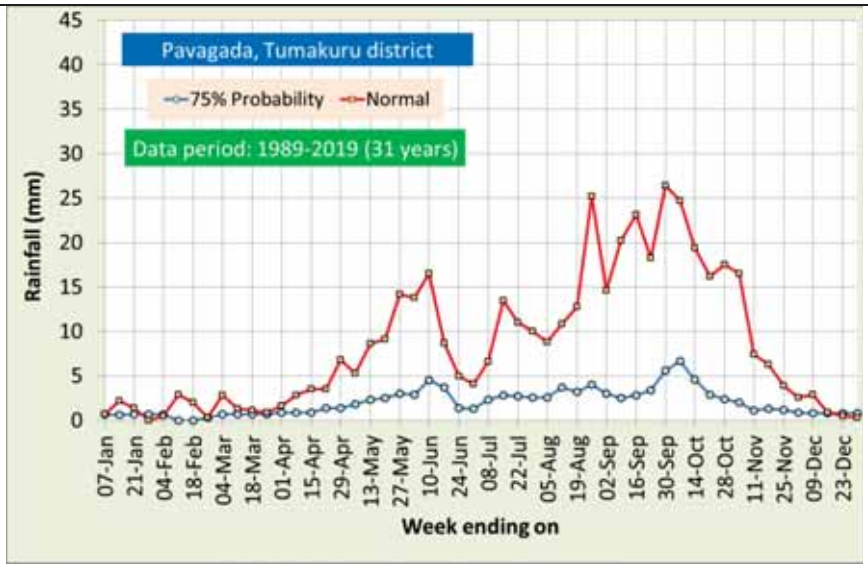
Head	Funds Released (Rs. In lakhs)	Funds utilized (Rs. In lakhs)
Human power	27,74,000	13,41,607
Travel	3,00,000	2,33,678
Pilot site establishment and others	1,93,000	4,71,700
Contingency	1,00,000	27,478
Sub-total	**33,67,000**	**20,74,463**
Overheads	1,67,000	86,713
Total	**35,34,000**	**21,61,176**

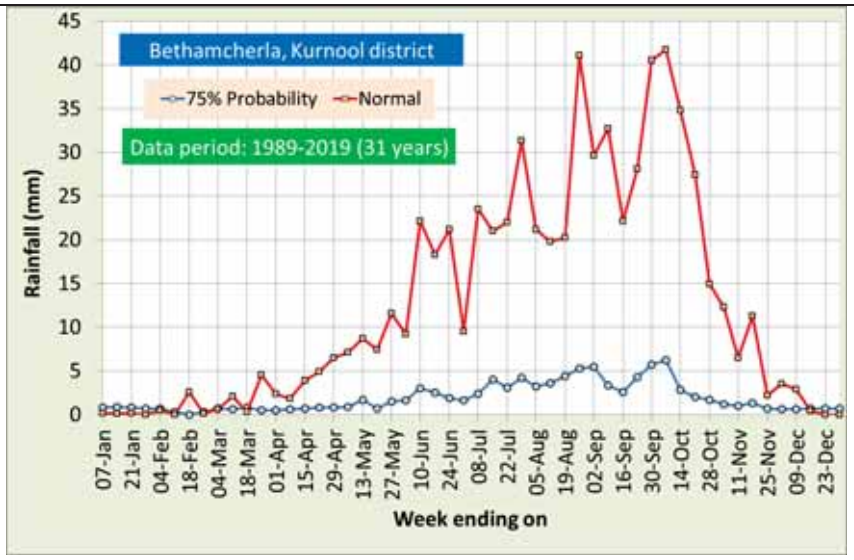
b) Human power

Description	Designation	Pay scale	Date of appointment
Ms. Aditi Kumari	SRF	Total Rs. 32,500/- (Rs.25,000/- as Base plus Rs.7,500/- as HRA)	13 Nov 2018 Resigned on 19 July 2019
Mr. Venkata Naresh A.	SRF	Total Rs. 32,500/- (Rs.25,000/- as Base plus Rs.7,500/- as HRA)	26 Dec 2018
Mr. Prithvi Ram B	SRF	Total Rs. 32,500/- (Rs.25,000/- as Base plus Rs.7,500/- as HRA)	02 Jan 2019 Resigned on 29 Feb 2020
Mr. Shankarappa	Research Technician	Rs. 17,510/-as Consolidated salary	04 Jan 2019
Mr. Somakumara	Research Technician	Rs. 19,010/-as Consolidated salary	01 Mar 2019
Mr. Chandrakanth	Research Technician	Rs. 17,510/-as Consolidated salary	25 Jul 2019 Resigned on 12 Sep 2019
Dr. John Daniel PS	Research Associate	Total Rs. 46,800/- (Rs.36,000/- as Base plus Rs.10,800/- as HRA)	16 Sep 2019
Mr. Naveen AS	SRF	Total Rs. 32,500/- (Rs.25,000/- as Base plus Rs.7,500/- as HRA)	30 Sep 2019
Ms. Shaik Sumayya	Research Technician	Rs. 18,000/-as Consolidated salary	01 Jan 2020

c) Targets Achieved

Description	**Proposed target**	**Achieved target**
Agroclimatic characterization	Collection of long-period climate data of pilot locations and analysis	Daily rainfall data for past 31 years (1989-2019) of selected five Mandals in Kurnool district, four Mandals in Anantapur district in AP, two taluks in Tumakuru district in Karnataka was collected, quality checked and database developed. Detailed agroclimatic analysis including rainfall probabilities and water balance were completed for all the 13 pilot locations.





Targets Achieved (Continued)

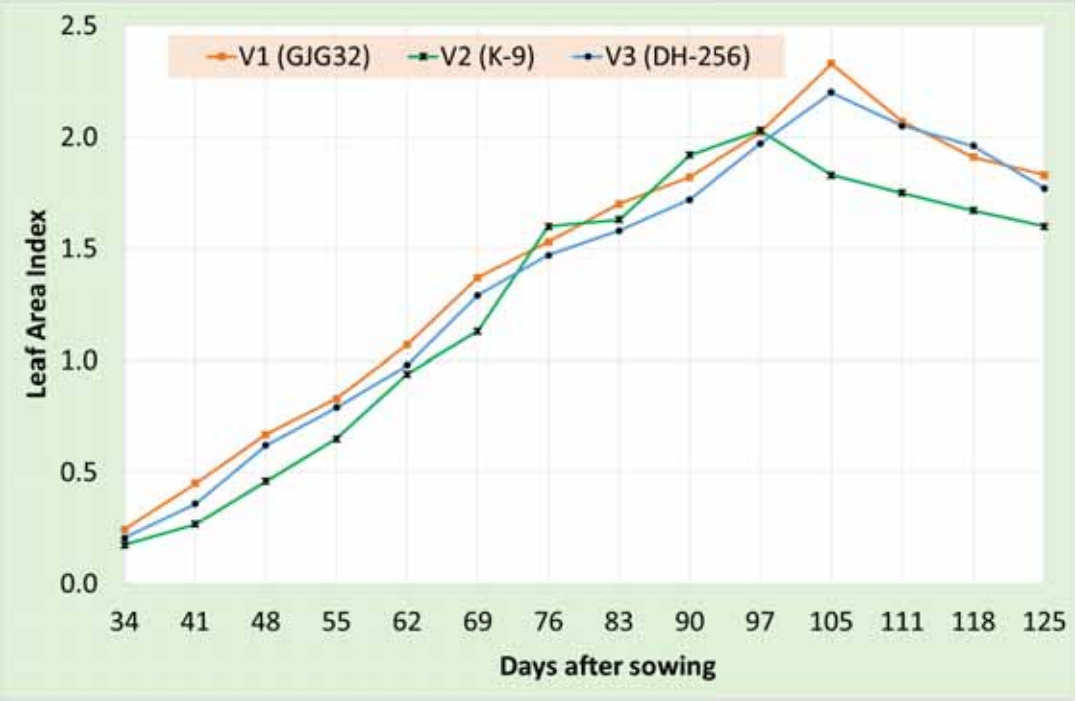
Description	Proposed target	Achieved target
Field experiments on groundnut	Identify groundnut crop genetic coefficients for use in crop-growth simulation models	Field experiments were conducted at ICRISAT, Patancheru during *Kharif* 2019 and *Rabi* 2019-20 seasons and extensive data collected for use in PnutGRO model.

Groundnut experiments during Kharif 2019 at ICRISAT

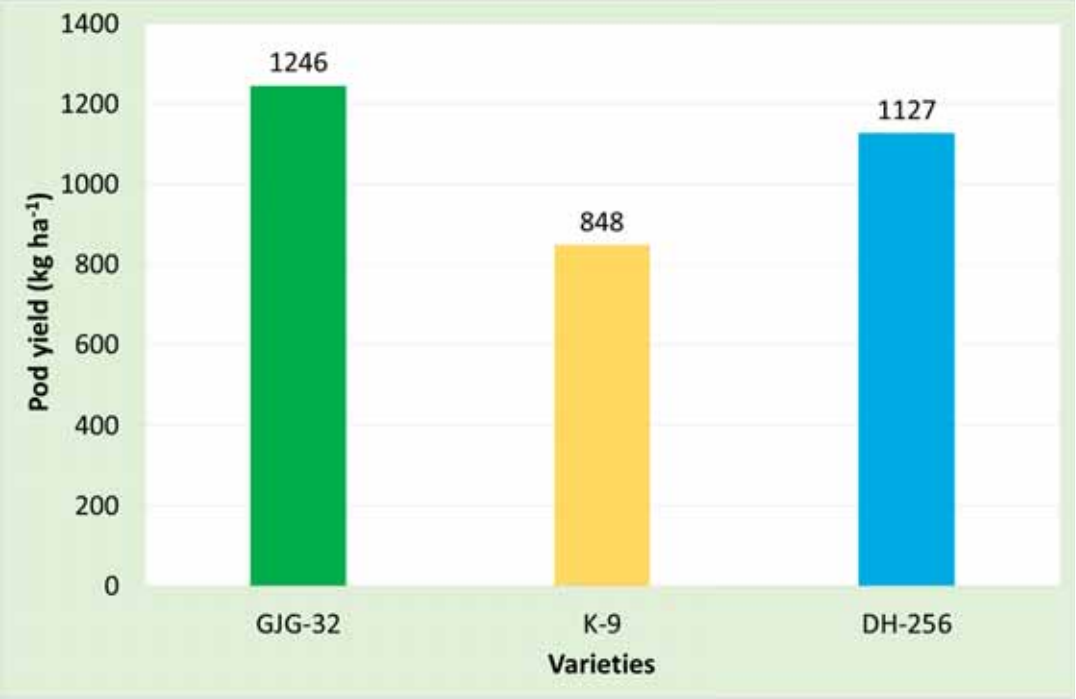
Groundnut experiments in ICRISAT during *kharif* 2019

Crop Observations (25) for use in PnutGRO model recorded at ICRISAT

Weekly growth monitoring (17)		Phenology (8)
Plant height (cm)	Root fresh weight (g)	Days to germination
Root length (cm)	Root dry weight (g)	Initiation of flowering
Number of branches	Petiole fresh weight (g)	50% flowering
Number of leaves	Petiole dry weight (g)	100% flowering
LAI	Number of pegs per plant	Days to peg initiation
Leaf fresh weight (g)	Number of pods per plant	Days to 50% pegging
Leaf dry weight (g)	Pod yield (kg/ha)	Physiological maturity
Stem fresh weight (g)	Seed yield (kg/ha)	Harvest maturity
Stem dry weight (g)		



Groundnut Leaf Area Index (LAI) during Kharif 2019 at ICRISAT



Yield variation across groundnut varieties during Kharif 2019 at ICRISAT

Summary of results of groundnut experiments during Kharif 2019 at ICRISAT

The experiment was laid out in Randomized Complete Block Design with four replications in RCW 13B field in ICRISAT, Patancheru during Kharif 2019. The three varieties GJG-32, K-9 and DH-256 varieties were sown on 20 June 2020. Crop growth and phenology were monitored regularly and final yields were recorded.

Highest pod yield was obtained in GJG-32 variety compared to K-9 and DH-256 varieties. Improved yield attributing characters i.e., number of pegs per plant, number of pods per plant and pod weight have contributed for the higher yield of GJG-32. Number of pods mostly depended on the number of pegs per plant. Number of pegs per plant produced by GJG-32 (74) was significantly higher than K-9 (58) and DH-256 (63) varieties.

Higher yield produced by GJG-32 variety could be due to its capacity to translocate assimilates to pod development in a better way. Further, increase in yield could be related to better growth characters i.e., leaf rea, leaf area index and dry matter production compared to other two varieties. Total dry matter at harvest and increased LAI resulted in higher pod yield in GJG-32 variety.

GJG-32 variety produced higher pod yield of 1246 kg per ha which was on par with DH-256 (1127 kg per ha) variety. K-9 variety recorded lower yield (848 kg per ha) which could be due to infection of tikka leaf spot disease. DH-256 suffered more due to leaf spot disease compared to other two varieties, though similar plant protection measures were taken for all varieties. Increased yield in GJG-32 due to better yield attributing characters i.e., number of pegs per plant, number of pods per plant and pod weight as well as increased LAI and total dry matter production at harvest stage. GJG-32 produced higher haulm yield of 4200 kg per ha compared to DH-256 (4012 kg per ha) and K-9 (3588 kg per ha) varieties.

In all varieties, days taken for first flower initiation were between 30-35 days. GJG-32 followed by DH-256 variety produced more number of flowers and lasted for longer period resulting in more reproductive efficiency. It may be summarized that GJG-32 variety performed better followed by DH-256 and K-9 in terms of morphology, yield attributes and yield at RCW13B field, ICRISAT during *kharif* 2019.

Groundnut experiments during Rabi 2019-20 at ICRISAT

Groundnut field experiments were conducted in RCW 13B field at ICRISAT Patancheru during Rabi 2019-20. The experiment was laid out in Randomized Complete Block Design with three varieties GJG-33, K-9 and ICGV-15016 and with four replications. All the varieties were sown on 18 December 2019 and crop growth and phenological observations are recorded and the data is under analysis. Due to COVID-19 menace, ICRISAT has closed from 23 March 2020, hence no observations were taken after middle of March 2020.

Flower count in groundnut field at RCW13B during *Rabi* 2019-20

Targets Achieved (Continued)

Description	**Proposed target**	**Achieved target**
Climate awareness	Enhance climate awareness among farmers through wall boards and group meetings	Soil-test based nutrient recommendations available at farmer level. Wallboards on local agroclimate for the 13 locations prepared and displayed. During the Kharif 2019 and Rabi 2019-20, farmers were contacted personally and through mobile phones to bring awareness of forecasted weather and in using advisories provided.

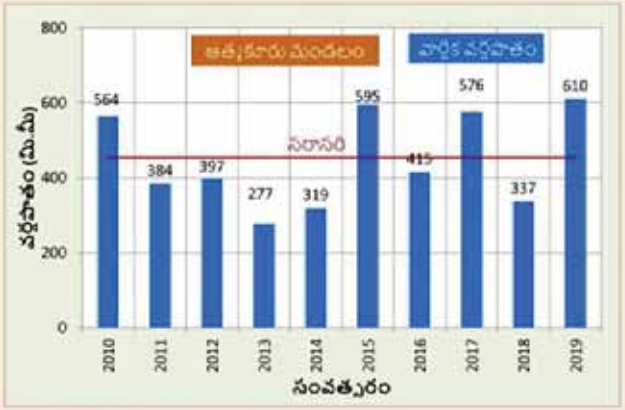
ICRISAT ఆత్మకూరు గ్రామం, ఆత్మకూరు మండలం, అనంతపురం జిల్లా, ఆంధ్రప్రదేశ్

అక్షాంశం: 14.63° N, రేఖాంశం: 77.34° E, ఎత్తు: 514 మీ

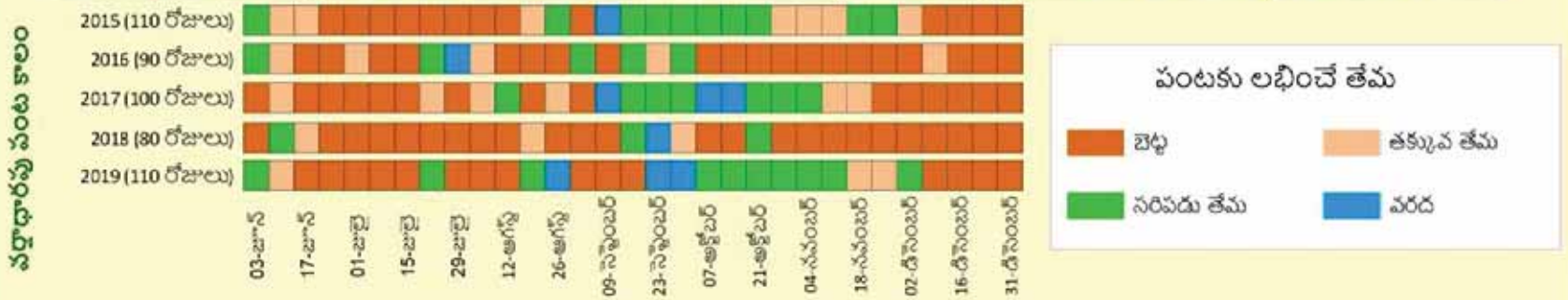
శీతోష్ణస్థితి : Hot dry semi-arid

సరాసరి వర్షపాతం (31 సంవత్సరముల (1989-2019) లెక్కల ప్రకారం
జూన్ – సెప్టెంబర్ : 269 మి.మీ (17 వాన కురిసిన రోజులు)
అక్టోబర్ – డిసెంబర్ : 118 మి.మీ (8 వాన కురిసిన రోజులు)
సంవత్సర మొత్తం : 460 మి.మీ (29 వాన కురిసిన రోజులు)

నేల స్వభావము : ఎర్ర నేలలు
వర్షాధారపు పంట కాలం : 60-90 రోజులు
ముఖ్యమైన పంటలు ఖరీఫ్ : వేరుశనగ , కంది, ఆముదము
రబీ : వరి, వేరుశనగ



- 2013 సంవత్సరంలో 09 జూన్ నుండి 11 ఆగస్టు వరకు 65 రోజుల బెట్ట సంభవించింది
- 2001 సంవత్సరం సెప్టెంబర్ 17న ఒక్కరోజులో అత్యధికంగా 115 మి.మీ వర్షపాతం నమోదయింది
- 2007 సంవత్సరంలో 15 సెప్టెంబర్ నుండి 19 సెప్టెంబర్ వరకు (వరస 5 రోజుల్లో) సుమారు 140 మి.మీ వర్షపాతం నమోదయింది



Meeting with farmers from Bhyadanuru village on 19 November 2019

Providing GJG-33 groundnut seeds to farmers in Sajjehosahalli and Jagadurthi villages

Groundnut variety GJG-32 crop cutting experiment in Mellakunta, Kambadur, Anantapur

Media coverages for farmers' meetings

ఈనాడు
epaper.eenadu.net

సాగులో వాతావరణ సమాచారం కీలకం

డోన్ గ్రామీణ, న్యూస్‌టుడే: వాతావరణ పరిస్థితులను బట్టి వేరుసెనగ పంటలో జాగ్రత్తలు తీసుకుంటే నష్టాలు వాటిల్లకుండా మంచి దిగుబడులు సాధించవచ్చని ఇక్రిశాట్ శాస్త్రవేత్త కేశవరావు అన్నారు. శనివారం మండలంలోని జగదుర్తి గ్రామంలో మాన్‌సూన్ మిషన్ ప్రాజెక్టులో భాగంగా రైతులకు జిజేజిసి రకం విత్తనాలను అందజేశారు. ఈ సందర్భంగా ఆయన మాట్లాడుతూ వాతావరణ పరిస్థితులపై ఎప్పటికప్పుడు రైతుల చరవాణులకు సంక్షిప్త సమాచారం అందిస్తారన్నారు. వాతావరణం ఎలా ఉంటుంది, వర్షాలు వచ్చే పరిస్థితులు, ఎండలు ఉండే పరిస్థితులు తెలియజేస్తారన్నారు. దీన్నిబట్టి రైతులు ఆ సమయంలో ఎలాంటి జాగ్రత్తలు తీసుకోవాలో తెలియజేస్తారని, రైతులకు నష్టం వాటిల్లకుండా మంచి దిగుబడులు సాధిస్తారన్నారు. అధికారుల నుంచి వచ్చే సమాచారాన్ని ఎప్పటికప్పుడు రైతులు తప్పకుండా పాటించాలని సూచించారు. వ్యవసాయాధి

Date : 24/11/2019 EditionName : ANDHRA PRADESH(KURNOOL, DHONE) PageNo : 01

Jagadurthi village, Dhone Mandal, Kurnool district - Eenadu Newspaper on 24 Nov 2019

నూతన వంగడాల సాగుతో అధిక దిగుబడి - ఇక్రిసాట్ సైంటిస్ట్ డాక్టర్ కేశవరావు

రాప్తాడు, నవంబరు 22 ప్రభాతవార్త

జిల్లాలో ఖరీఫ్, రబీ వేరుశెనగ సీజన్‌లలో రైతులు పంటలను సాగు చేసే పంటల్లో భాగంగా అధిక దిగుబడులను ఇచ్చే వంగడాలను రూపొందించిన శాస్త్రవేత్తల సూచనలు, సలహాలు పాటిస్తే అధిక దిగుబడులు సాధించవచ్చని ఇంటర్నేషనల్ క్రాప్స్ రీసెర్చ్ ఇన్‌స్టిట్యూట్ ఫర్ ది సెమి ఎరిడ్ ట్రాపిక్స్(ఇక్రిసాట్) శాస్త్రవేత్త డాక్టర్ కేశవరావు సూచించారు. రాప్తాడు మండలం గంగలకుంట గ్రామానికి చెందిన రైతు మల్లికార్జున ఖరీఫ్‌లో సాగుచేసిన పొలాన్ని ఏఓ శుభకర్‌తోపాటు సీనియర్ సైంటిస్ట్ అదినారాయణ, అగ్రికల్చర్ రీసెర్చ్ సైంటిస్ట్ కె.అరుణ్‌కుమార్, ఎంపీఈఓ బి.లక్ష్మి, రీసెర్చ్ టెక్నీషియన్ శంకర్‌లతో కలిసి సందర్శించారు. ఈ గ్రామానికి సంబంధించిన పొలంలో " కే6 " రకానికి ప్రత్యామ్నాయంగా " జీజే జీ32" అనే వేరుశెనగ రకాన్ని ఈ ఖరీఫ్‌లో ప్రయోగాత్మకంగా విత్తనాన్ని సాగు చేయించామన్నారు. రైతు అనుసరించిన యాజమాన్య పద్ధతులను గురించి వివరాలను తెలుసుకున్న తర్వాత పంటలోత ప్రయోగాలు చేశారు. 3/3 మీటర్లలో వేరుశెనగను తొలగించి దిగుబడిని లెక్కించగా 4.03 కిలోల ప్రకారం ఎకరాకు రెండు టన్నుల దిగుబడి వస్తుందని అంచనా వేశారు.

యాజమాన్య పద్ధతుల గురించి తెలుసుకుంటున్న ఇక్రిసాట్ శాస్త్రవేత్త డాక్టర్ కేశవరావు

వార్త
Sat, 23 November 2019
https://epaper.vaartha.com/c/46140484

Gangulakunta, Rapthadu- Vaartha Newspaper on 23 Nov 2019

Targets Achieved (Continued)

Description	Proposed target	Achieved target
Agromet advisories	Identifying advisories specific to groundnut cultivation	List of groundnut-specific advisories was finalized; need-based weather-based agro advisories are prepared in English, Telugu and Kannada, and disseminated to the registered farmers through SMSs

Agromet Advisories disseminated to farmers

In the Kharif 2019, Monsoon Mission Project was very successful in enhancing climate awareness among the groundnut farmers in the three pilot districts. About 118 agromet advisories were disseminated based on Monsoon Mission Weather Forecasts. Great interest and enthusiasm is shown by the farmers in the villages and officials from the department of agriculture in the districts. More and more farmers are keen to receive climate services from the Monsoon Mission Project for profitable and sustainable farming. Hence, it is proposed to enhance number of participating farmers from the present 650 to about 800 in the Kharif 2020 season.

State	District	Mandal/Taluk	Village	Total SMS
Karnataka	Tumakuru	Madhugiri	Chembenahalli	10
			Sajjehosahalli	10
		Pavagada	Bhyadanuru	10
			Naliganahalli	10
Andhra Pradesh	Anantapur	Atmakuru	Atmakuru	9
		Kalyanadurgam	Hulikallu	10
		Rapthadu	Gangulakunta	9
		Kambadur	Mellakunta	10
	Kurnool	Bethamcherla	Kolumulapalle	8
		Dhone	Jagadurthi	8
		Krishnagiri	Putluru	8
		Peapully	Gudipadu	8
		Veldurthi	L. Nagaram	8
Total number of advisories disseminated				**118**

Copy of advisory sent to Naliganahalli farmers in Tumakuru district

Advisory (in English translation) sent to Naliganahalli farmers in Tumakuru district on 23 Sep 2019	**Advisory in Kannada sent to Naliganahalli farmers in Tumakuru district on 23 Sep 2019**
1. Greetings to the farmers of Naliganahalli. ICRISAT Monsoon Mission Project is providing weather-based groundnut cultivation advisories. 2. About 60 mm rainfall received in last 5-6 days. Rainfall is likely to be 60-70 mm over the next 4-5 days. 3. Farmers are requested to make proper drainage system in farm to remove excess rain water. 4. There is high humidity in the atmosphere so there is chance of fungal diseases to the crop. 5. When fungus is found in the crop there is a chance of stem rot disease occurrence.	1. ನಲಿಗನಹಳ್ಳಿ ಗ್ರಾಮಸ್ಥರಿಗೆ ನಮಸ್ಕಾರಗಳು ಶೇಂಗಾ ವ್ಯವಸಾಯದಲ್ಲಿನ ಮಾಹಿತಿಗಳನ್ನು ಇಕ್ರಿಸ್ಯಾಟ್ ಮಾನ್ಸೂನ್ ಮಿಷನ್ ಪ್ರಾಜೆಕ್ಟ್ ಮೂಲಕ ನಿಮಗೆ ನೀಡುತ್ತೇವೆ. 2. ಸುಮಾರು 5-6 ದಿನಗಳಲ್ಲಿ ಸುಮಾರು 60ಮಿ.ಮೀ. ಮಳೆ ಬಂದಿರುತ್ತದೆ ಮುಂಬರುವ 4-5 ದಿನಗಳಲ್ಲಿ ಸುಮಾರು 60-70 ಮಿ.ಮೀ.ಮಳೆ ಬರುವ ಸಂಭವವಿದೆ. 3. ಆದ್ದರಿಂದ ರೈತರು ತಮ್ಮ ಬೆಳೆ ಜಮೀನಲ್ಲಿ ಮಳೆ ನೀರು ಹೊರಹೋಗಲು ಸೂಕ್ತ ಕಾಲುವೆ ವ್ಯವಸ್ತೆ ಮಾಡಿಕೊಳ್ಳ ಬೇಕಾಗಿ ವಿನಂತಿ. ವಾತಾವರಣದಲ್ಲಿ ತೇವಾಂಶ ಹೆಚ್ಚಾಗಿರುವುದರಿಂದ ಶಿಲೀಂದ್ರ ರೋಗಗಳು ಹೆಚ್ಚಾಗಿ ಬರುವ ಸಾದ್ಯತೆ ಇರುತ್ತದೆ. 4. ಶೇಂಗಾ ಬೆಳೆಯಲ್ಲಿ ಶಿಲೀಂದ್ರಗಳು ಹೆಚ್ಚಾಗಿ ಕಂಡು ಬಂದಾಗ ಕಾಂಡ ಹಾಗೂ ಕಾಯಿ ಕೊಳೆ ರೋಗ ಬರುವ ಸಾಧ್ಯತೆ ಇರುತ್ತದೆ. 5. ಈ ರೋಗ ಲಕ್ಷಣ ಕಂಡಾಗ ರೈತರು ಕಾರ್ಬನ್ ಡೈಜಿನ್ 1 ಗ್ರಾಂ. ಪ್ರತಿ ಲೀಟರ್ ನೀರಿನಲ್ಲಿ ಬೆರಸಿ 10-15 ದಿನಗಳ ಅಂತರದಲ್ಲಿ 2 ಬಾರಿ ಸಿಂಪರಣೆ ಮಾಡಬೇಕು.

Feedback from farmers in Tumakuru district

Majority of farmers who followed need based agro-advisories disseminated by our Monsoon Mission Project have expressed that they were able to reduce the crop losses and enhanced their yields compared to their normal yields obtained by them in previous seasons. Farmers appreciated that the Agromet Advisories related to field operations were good and advisories given at the time of harvest and post-harvest measures as very good. A short feedback recorded as video to understand how farmers perceived the advisories at different crop growth stages and their actions in the field are as follows.

Name of farmer: Sri Manjunatha Village: Naliganahalli Taluk: Pavagada District: Tumakuru	• Sri Manjunatha told that receiving information about management practices in groundnut was very useful to him • Crop advisories were received at the time of harvesting regarding storage of harvested produce by using tarpaulin cover. • This advisory helped us to store the produce safely; otherwise we keep in open field • These advisories are very useful to manage farm operations in a better way

Feedback from farmers in Kurnool district

Sri Shaik Allabakshu, farmer from Jagadurthi village, Dhone Mandal, Kurnool district with half acre (0.5) of land said that he got GJG-32 groundnut variety seeds from ICRISAT Monsoon Mission Project.

He received agromet advisories from ICRISAT through SMS. Advisories included recommendations of on land preparation, FYM and soil-test based fertilizer application, seed treatment, sowing, maintaining proper plant density, observing Boron and Zinc deficiency in field and applying nutrients if needed, harvesting, shade drying of harvested pods and storage. He says that he is thankful to ICRISAT Monsoon Mission Project.

Sri Shaik Allabakshu said that he has done crop cutting following the suggestions of ICRISAT. Now he knows his groundnut yield correctly thankful to ICRISAT for giving better groundnut variety seeds and all advisories and suggestions. He says that he followed them and could save his crop.

Sri D. Venkata Reddy, farmer from Kolumulapalle village with half acre (0.5) of land said that he received weather advisories from ICRISAT Monsoon Mission Project. He has followed the advisories and cultivated groundnut crop and he got good yields compared to the other farmers, and he is very thankful to ICRISAT for giving advisories without any cost.

Feedback from farmers in Anantapur district

Farmers are opined and appreciated in their feedback that the Agromet Advisories on field operations were good but advisories given at the time of harvest and post-harvest measures as very good. Higher yields were recorded by farmers who adopted the weather-based agro advisories provided by ICRISAT Monsoon Mission Project. The percent gain in yield of groundnut across the pilot villages ranged from 25 to 52% higher compared to non-advisory farmers. Yield increase in groundnut of advisory farmers varied from 301 to 587 kg per ha. Hence, it is seen that the agro advisory information communicated has benefitted farmers. Majority of farmers who followed agro-advisories expressed that they were able to get enhanced yields compared to the yields obtained by them in previous years. A short feedback recorded to understand how farmers perceive the advisories at different crop growth stages and their action on the advisories.

CCE for yield estimations in Smt Rajeshwari's field, Atmakur village, Anantapur district

Smt. Rajeshwari, farmer from Atmakuru village, Atmakuru Mandal, Anantapur district said that they learnt that groundnut crop sowings should be done between 30 Jun to 15 Jul; If delayed further, yield could be reduced. They have received advisories on pest and disease management from ICRISAT Monsoon Mission Project. Advisory dated 11 Oct 2019 suggested for spraying of Chlorpyrifos @500ml mixed in 200 litres of water to avoid damage of leaf miner and gram pod borer. She did accordingly and could stop the spread of disease. She highlighted that at the time of harvest also, we received advisory from ICRISAT as rainfall is forecasted in the coming 4-5 days in Atmakuru village and farmers are requested to harvest in the first week of November. This is to avoid damage due to prevailing weather conditions on 07 Nov 2019. Accordingly, we followed, and could save our crop.

Sri Mallikarjuna, farmer from Gangulakunta village, Rapthadu Mandal, Anantapur district mentioned that climate smart variety GJG 32 which is tolerant to the pest, diseases particularly late leaf spot and stem rot. It is tolerant to prolonged dry spells which are common in this area. He said that they received advisory on seed treatment and soil test based fertilizer applications at the time of sowing in the month of first week of July.
Sri Mallikarjuna mentioned that essential chemicals against pest and diseases are advised and we followed through their timely advisories. After harvest also he received advisory from Monsoon Mission Project, ICRISAT that rainfall is forecasted in coming 4-5 days in their area. Farmers are requested to harvest their groundnut crop after the prevailing weather conditions. They were benefitted by this advisory.

Sri Venkatesh, farmer from the Mellakunta village, Kambadur Mandal, Anantapur district said that he was provided with climate smart variety GJG 32, which is very tolerant to the pest, diseases particularly late leaf spot and stem rot. This variety in his opinion has high fodder value as its leaf drop is very less even at harvesting stage.

Sri Suresh, farmer from Hulikallu village, Kalyanadurgam Mandal, Anantapur district gave the feedback and said that they received advisories with weather forecast information, pest and disease management from Monsoon Mission Project, ICRISAT.

Feedback on high rainfall advisory

Groundnut crop in Jagadurthi pilot village was harvested and kept outside in the fields for drying. Due to high rainfall predicted, we have advised the farmers on 28 April 2020 to cover the harvested crop with tarpaulin and save the harvested groundnut. Rainfall recorded in the village was about 26.7 mm on29 April 2020.

Sri P Venkata Ramana Reddy, farmer from Jagadurthi village, Dhone Mandal, Kurnool district has given a video feedback. In his feedback, Sri Ramana Reddy has mentioned that they have kept their harvested groundnut pods for drying in the open field. When they received the advisory on high rainfall possibility and precautions to be taken up from the Monsoon Mission Project, he and other farmers in the village acted quickly. They have covered their harvested groundnuts and fodder with tarpaulin. The above photos show the ground truth. Farmers are happy and thankful to Monsoon Mission Project for providing them the advisory.

Review and Planning Workshop at ICRISAT on 06 March, 2020

A Review and Planning Workshop was organized at ICRISAT Patancheru on 06 March 2020 to review the progress of the project and to plan future activities. In the workshop, the following were presented and discussed:

- Rainfall and groundnut crop situation in Kharif 2019 in the selected villages
- Status of agromet advisory services and usage by selected farmers
- Performance of the newly introduced groundnut variety GJG 32
- Improving implementation of project activities at field level to enhance climate resilience to the rainfed groundnut farming community

List of participants		
Sl. No.	Name	Address
1	Sri Ankur Srivastava	Scientist, Monsoon Mission, IITM, Pune
2	Sri Ashok Vardhan Reddy P	Assistant Director of Agriculture (R), Dhone, Kurnool
3	Sri Abdul Shafi S	Mandal Agricultural Officer, Dhone, Kurnool
4	Sri Kiran Kumar G	Mandal Agricultural officer, Bethamcherla, Kurnool
5	Sri Mallikarjuna K	Assistant Director of Agriculture, Kalyandurg, Anantapur
6	Sri Venkata Ramudu M	Assistant Director of Agriculture, Anantapur
7	Sri Subhakar G	Mandal Agricultural Officer, Rapthadu, Anantapur
8	Sri Dileep Kumar K	Mandal Agricultural Officer, Kambadur, Anantapur
9	Smt Chetana MP	Agricultural Officer, Raitha Samparka Kendra, Badavanahalli, Madhugiri, Tumakuru
10	Smt Jeevitha S	Agricultural Officer, Raitha Samparka Kendra, Kasaba Hobli, Pavagada, Tumakuru
11	Smt Shamshad Unnisa S	Agricultural Officer, Raitha Samparka Kendra, Nagalamadike, Pavagada, Tumakuru
12	Dr Pooran Gaur	Research Programme Director, Asia, ICRISAT
13	Dr Sreenath Dixit	Head, ICRISAT Development Centre, ICRISAT
14	Dr Kesava Rao AVR	Honorary Fellow and Principal Investigator, IDC, ICRISAT
15	Dr John Daniel	Research Associate, MM Project, ICRISAT
16	Sri Somakumara	Research Technician, MM Project, Tumakuru
17	Sri Adinarayana G	Scientific Officer, Anantapur
18	Ms. Shaik Sumayya	Research Technician, MM Project, Kurnool
19	Sri Anjaneyulu A	Senior Programmer, IDC, ICRISAT

After completing registration by around 0830 h, all participants visited the groundnut experimental field RCW 13B in ICRISAT. Layout of the plot and aims of the field experiment were explained to the participants. Varietal characters of GJG-33 and K-6 are discussed by

all participants. All visited the experimental plots and examined the growth variations among the three varieties GJG-33, K-6 and ICGV-1516. Sri Indrakumar, Project Assistant has demonstrated the Neutron Probe Equipment on taking soil moisture observations at different depths and operation of dual-purpose raingauge. Workshop started by 09:45 h and Dr Kesava Rao welcomed the participants and Dr Sreenath Dixit, Head, IDC presented objectives of the workshop. Opening remarks were given by Dr Pooran Gaur, Research Programme Director, Asia Programme. Sri Ankur Srivastava presented on the Monsoon Mission Project phase 1 and 2 and also explained major achievements of Monsoon Mission Project at country level. Later, progress of Monsoon Mission Project at ICRISAT was presented by Dr AVR Kesava Rao, Principal Investigator. He dealt with soil-test based farming, rainfall patterns of the pilot locations, crop-growth simulation of groundnut crop, topics included in the agromet advisories provided during Kharif 2019, feedback received from the farmers and future work being proposed.

In the afternoon session, detailed discussions on proposed activities for Kurnool, Anantapur and Tumakuru district were held. All the agricultural officers from the three districts have actively participated and provided feedback on project activities in Kharif 2019 and suggested ways of further improvement in Kharif 2020. These discussions have arrived at the following recommendations:

1. Increase the number of farmers in Kurnool and Anantapur districts from the present 50 to 75 for each village. No change in the number of farmers in Tumakuru district.
2. Take five to ten more number of soil samples from each village.
3. Conduct farmer awareness meetings at village level during 3rd or 4th week of April 2020.
4. Update Agroclimatic boards in the pilot villages.
5. Consider distribution of pigeonpea seeds to demonstration farmers.
6. Plan to provide separate advisories to farmer groups with different sowing periods; this helps in taking better farm operations because in one village sowing dates vary.

The workshop ended with vote of thanks by Dr John Daniel, Research Associate.

Visit to the groundnut experimental field at ICRISAT, Patancheru

Sri Ankur Srivastava presenting on Monsoon Mission Project

Group photo with Dr. Peter Carberry, Director General, ICRISAT

Impacts of COVID-19

(Photographs taken on 12 June 2020)

Groundnut field experiments in ICRISAT were severely affected by COVID-19 menace. No crop observations were taken after middle of March 2020 and crop could not be harvested because of non-availability of labour and no permission to enter ICRISAT campus except for essential services. Groundnut crop was left as it is as seen in the photographs.

Virtual meetings with field staff

As there are restrictions on travel between States, restrictions on conduct of meetings, we were working from home and could not conduct any village level meetings for farmers since April 2020. However, we have conducted virtual meetings (audio only using mobile phones) with our project staff working in the three districts; details are as follows:

Sl. No	Meeting Date	Day and Time	Participants
1	08 April 2020	Wednesday (10.30 to 11.30 h)	MMP team members from three districts and from ICRISAT Patancheru
2	30 April 2020	Thursday (10.00 to 11.20 h)	MMP team members from three districts and from ICRISAT Patancheru
3	21 May 2020	Thursday (10.00 to 11.30 h)	MMP team members from three districts and from ICRISAT Patancheru
4	26 May2020	Tuesday (9.40 to 10.25 h)	MMP team members from three districts and from ICRISAT Patancheru
5	31 May2020	Sunday (13.00 to 13.35 h)	MMP team members from three districts
6	08 June 2020	Monday (11.00 to 12.00 h)	MMP team members from three districts

Participants were

1. Dr AVR Kesava Rao, Principal Investigator, MMP Project
2. Dr John Daniel, Research Associate, MMP at ICRISAT
3. Sri Anjaneyulu A, Senior Programmer at ICRISAT
4. Sri Adinarayana G, Scientific Officer, Anantapur
5. Sri Shankarappa, Research Technician, Anantapur
6. Sri NS Naveen, Senior Research Fellow, Tumakuru
7. Sri Somakumara, Research Technician, Tumakuru
8. Miss Shaik Sumayya, Research Technician, Kurnool

Points of discussion during these virtual meetings were on precautions for COVID-19, likely rainfall for the next few days, selection and registration of additional farmers, regular collection of rainfall data from the pilot villages, computerizing already collected field experimental data, collection of feedback from farmers, finalizing the content of the Agromet Advisories to be disseminated to pilot villages and others.

7. **Future plans**:

The project is sanctioned till July 2021 and the following activities will be taken up till the end of the project as per the approved technical programme.

- Adding more analyses like wet and dry spell probabilities to the present climatic characterization
- Estimating groundnut crop genetic coefficients for selected varieties
- Conduct farmers' surveys and climate awareness meetings
- Fine tuning the list of groundnut-specific advisories based on farmers' requirement and feedback
- Validation of weather forecasts at pilot locations
- Continue disseminating weather-based advisories to the registered groundnut farmers through SMSs in local language
- Prepare a report on impact assessment of climate services on groundnut productivity in target locations at the end of the project period
- Prepare high quality research journal papers

(AVR Kesava Rao) (Sreenath Dixit)

(Signature of the Principal Investigator) (Signature of the Co-Principal Investigator)

Date: 19 June 2020
Station: Patancheru