CRIDA NEWS

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Dr. G. Ravindra Chary, Project Coordinator (AICRPDA), has resumed the charge of Director CRIDA, (Acting) w.e.f. from 3rd January, 2019. CRIDA family welcomes him and wishes that CRIDA would reach greater heights under his dynamic leadership.

From the Director's Desk ...

Revisiting vulnerability assessment of Indian agriculture to climate change

Assessing vulnerability of agriculture, at a scale where decision making with respect to development planning and resource allocation is done, is primarily needed as assessing vulnerability is an initial step in adaptation planning. Vulnerability assessment is also useful in planning for resilience building. CRIDA, under 'National Innovations (earlier 'Initiative') in Climate Resilient Agriculture" (NICRA), has undertaken a district level assessment of vulnerability of Indian agriculture to climate change. The analysis adopted the framework and concepts of vulnerability given by the IPCC in its 3rd and 4th Assessment Reports. Vulnerability is conceptualized, in this framework, as 'residual impact' and is determined by exposure, sensitivity and adaptive capacity. As an outcome of this analysis a document on Vulnerability of Agriculture to Climate Change was brought out in 2013 which has been extensively used by various agencies concerned with agricultural development and climate change adaptation. Vulnerability is dynamic in nature. The IPCC adopted a different conceptualization of vulnerability in its 5th Assessment Report (IPCC, 2014). This Assessment Report also provides more advanced climate projections from CMIP-5 group of climate models where projections are linked to what are called 'Representative Concentration Pathways' (RCPs) that take into consideration the possible mitigation actions over time. As opposed to its earlier conceptualization till the 4th Assessment Report, the IPCC in its 5th Assessment Report views vulnerability as a predisposition to 'hazard' or any external shock and is considered as an internal trait of the system or entity. When a vulnerable entity is 'exposed' to occurrence of hazard, its results in 'risk'. Thus, the present conceptualization puts risk management at the centre of analysis. Thus AR5 framework places more emphasis on identifying and managing risk and thus views vulnerability as a determinant. Such a conceptualization and framework will be more relevant to policy making for vulnerability reduction and thus reducing the climate change risk. Another advantage is that it will also help avoid maladaptation that may arise because of the uncertainty in climate projections. In view of this, CRIDA accordingly attempted to revise the vulnerability assessment using RCPs 4.5 based climate projections for the period 2020-49 and using updated socio-economic data and following the IPCC AR5 framework and definitions to vulnerability and risk assessment. In this analysis, hazard was constructed as a combination of historical hazard (based on historical incidence of cyclones, drought and floods) and future hazard which was represented as a combination of indicators viz., change in annual rainfall, July rainfall, maximum temperature, minimum temperature, drought incidence, incidence of dry spells, extreme rainfall events etc. Similarly, a number of indicators were chosen to represent exposure and vulnerability components of risk. Using the data on indicators, indices for exposure, vulnerability and hazard were computed and finally an index of risk was computed. The risk index so computed was multiplied with average of the proportion of the district in country's net sown area and in agricultural workforce to determine the priority based on climate change risk. The districts were categorized into different degrees of risk and districts with high risk are to be given higher priority for investment and intervention planning for enhancing resilience to climate change. Most of the districts with 'very high' risk are present in Rajasthan and a few in eastern Uttar Pradesh, Karnataka, northern Bihar, Andhra Pradesh, Maharashtra and West Bengal. I believe, like the earlier vulnerability analysis, this output will also help the researchers, administrators and policy makers engaged in climate change research and adaptation planning.

Dr. G. Ravindra Chary, Director (Acting), ICAR-CRIDA

Contents

From the Directors Desk

New Research Initiatives

Evaluation of microbial consortia for enhanced adaptation of rainfed crops to moisture stress at different rainfed regions of the country

Two microbial consortia viz., *Pseudomonas putida* P7 + *Bacillus subtilis* B30 (consortia 1) and *Pseudomonas putida* P45 + *Bacillus amyloliquefaciens* B17 (consortia 2) were being evaluated at AICRPDA centres Ballowal Saunkhri, Parbhani, and Vijayapura in Maize, *kharif* Sorghum and *Rabi* Sorghum, respectively. In the first year of evaluation, the seed + soil application of consortia 1 and consortia 2 recorded highest grain yield in Maize (26%) and in *kharif* Sorghum (15%), respectively. In *Rabi* Sorghum, seed + soil application of consortia 1 recorded 36% more yield than un inoculated control.

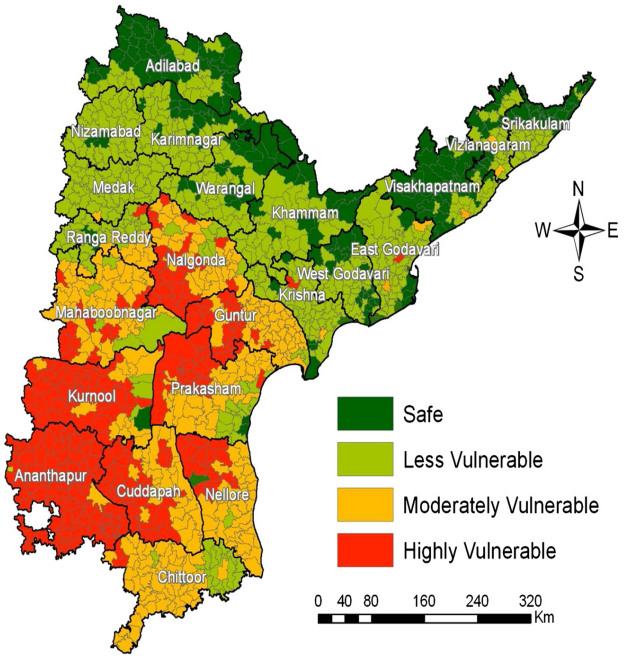
Seven drought tolerant inbreds of maize were identified for crop improvement programme under rainfed condition

Maize genotypes were evaluated under rainfed condition for two seasons during *kharif* 2017 & 2018. Genotypes DTL2, SNJ2011-03, SNJ2011-37, SNJ2011-26, Z101-15, Z32-12 and HKI766 (0) performed relatively better for yield and its attributes. These materials may be utilized in maize improvement program especially as inbred parent for developing drought tolerant hybrids.

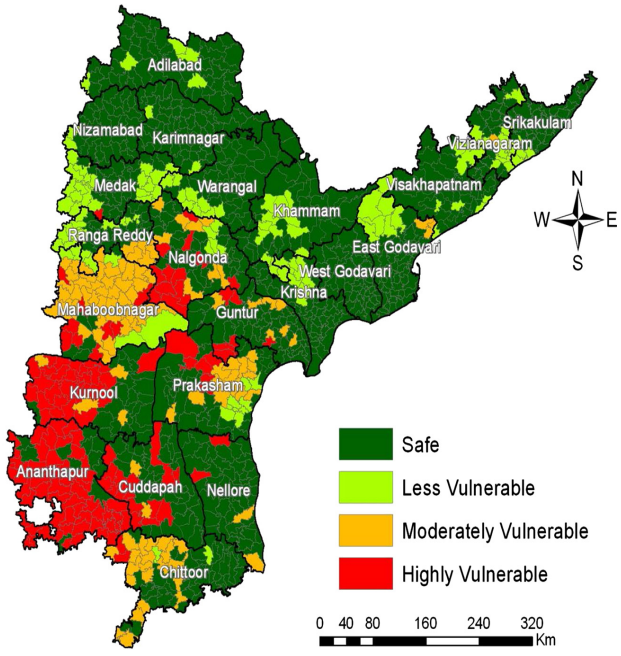
Research Highlights

Development of a new drought severity index for categorizing drought prone areas in undivided Andhra Pradesh state

A simple and novel drought severity index called CRIDA Drought Severity Index (CDSI) was developed which takes into account of frequency and intensity of agricultural droughts at mandal level. In this method, the key factors like moisture adequacy index (MAI), water-holding capacity of soils and irrigation availability were taken into account for assessment of vulnerability of mandals to agricultural drought. The years with average MAI during crop season of > 0.75, < 0.75 to > 0.50, < 0.50 to > 0.25, and < 0.25 were classified as no drought, mild, moderate, and severe drought years, respectively.



Drought severity status in different mandals and districts in Andhra Pradesh without considering the extent of irrigation



Drought severity status in different mandals and districts in Andhra Pradesh, after considering the extent of irrigation

Enhancing rainwater productivity under farm pond through solar powered micro irrigation system for small farmers

The silt suspension in the farmpond water was observed to be high due to the surface flowing runoff from the catchment of 8 acres. When submersible pumpset is installed at bottom of the farmpond, there was a problem of silt, causing the blockage of the micro irrigation components like drip and sprinklers. To remove the suspended silt in the farmpond and pump the clear water with the settlement period of one week, after the runoff stored in the structure, a floating device consisting of tube inflated with air of 17kg/cm^2 to take care of the total weight of the pumpset and other brackets of 14kgs was installed. The floating system was tested in the farmpond over the surface of water and almost 90% of the water was very clear to operate the micro irrigation systems, avoiding the filtration unit. This can reduce the filtration expenditure of Rs. 10000-15000/- to a farmer with above floating device costing Rs. 1000/-.

The above system was used for running micro sprinklers in the experimental plot with tomato and chillies in 6 beds each of 14x1m. The water productivity of the above two crops with the floating device was 20.8 and 9.46 kg/m^3 respectively. The above system can be effectively used for irrigating one acre of land for cultivating vegetables in integration with IFS modules for small farm holders under farmpond.

Floating device for submersible pumpset

Scientific Activities

Institute Advisory Committee meeting of Farmer FIRST Project

Institute Advisory Committee meeting (IAC) of Farmers First Project of CRIDA was organised on 4th February, 2019. Dr. G. Ravindra Chary, Director (Acting), ICAR-CRIDA, Dr. Y.G. Prasad, Director, ATARI, Zone-X, District officials of State Department of Agriculture, Animal Husbandry and Horticulture and scientists from CRIDA also participated. It was suggested to strengthen the project with relevant NRM interventions and convergence with centre/state programmes.

Institute Advisory Committee meeting of Farmer FIRST Project

Mid-Institute Research Council (IRC) meeting

Mid-Institute Research Council meeting was conducted on 18th February, 2019. Dr. G. Ravindra Chary, Director (Acting) and Chairman of IRC reviewed the status of RPPs and advised to adhere to the guidelines and submit them within the given time frame. He also emphasized to publish in high rated journals and at the same time scientists are advised to participate actively in various seminars/symposia, etc.

Scientific Advisory Committee meeting

Scientific Advisory Committee meeting of CRIDA-KVK, Ranga Reddy district was held on 28th March, 2019 under the chairmanship of Dr. G. Ravindra Chary, Director (Acting), ICAR-CRIDA. Scientists of CRIDA, farmers and NGO's, Dr. V. Maruthi, Member Secretary, SAC and Principal Scientist & Head, KVK presented activities of CRIDA-KVK, Ranga Reddy district. Chairman, SAC and Director, CRIDA expressed a strong linkage, convergence and collaboration between KVK and all the line departments in the Ranga Reddy district. Subject Matter Specialists presented the progress of work for the year 2018-19 and action plan for 2019-20. SAC members suggested modifications and refinement of KVK activities. Dr. Chari Appaji, Principal Scientist, ATARI Zone X and Smt. Geetha Reddy, DAO, Ranga Reddy district participated.

Scientific Advisory Committee meeting

Institute Research Council (IRC) Meeting

The Institute Research Council (IRC) meeting of ICAR-CRIDA was held in three phases ie) during 23rd - 25th April, 2019, 9th May, 2019 and 16th May, 2019. The meeting was chaired by Dr. G. Ravindra Chary, Director (Acting), ICAR-CRIDA an chairman reviewed the program. Project Coordinators of AICRPDA and AICRPAM, Heads of Divisions/Sections/Units and scientists presented the salient achievements and future results of program.

Institute Research Council (IRC) Meeting

Contingency Plans

State level Interface Meetings on District Agricultural Contingency Preparedness for *Kharif*-2019

State level interface meetings on enhancing the preparedness for agricultural contingencies for Andhra Pradesh, Gujarat, Karnataka and Uttar Pradesh were held and major recommendations for *Kharif*-2019 have been suggested:

State	Date & Venue	Participants
Andhra Pradesh	31st May 2019, Directorate of Agriculture, Guntur	Dr. G. Ravindra Chary, Director (Acting), ICAR-CRIDA, Dr. K.V. Rao, ICAR-CRIDA, Sri B. Rajasekhar, Principal Secretary, Dept. of Agriculture, Govt. of Andhra Pradesh, Sri V.K. Singh, IFS, Vice Chairman and Managing Director, AP Oil Federation, Sri Muralidhar Reddy, Special Commissioner, Dept. of Agriculture, Govt. of Andhra Pradesh, Dr. N.V. Naidu, Director (Research), ANGRAU, Dr. Dilip Babu, Director (Research), Dr. YSR Horticulture University, Joint Directors of Agriculture of all the 13 districts, Associated Directors of Research, ANGRAU, Scientists of ICAR-CRIDA, ICAR-DPR, Local ICAR Institutes, AICRPDA and AICRPAM centers, Program Coordinators of all the KVKs, officials from State Seed Development Corporation, AP Drought Mitigation Project, AP Horticulture Department etc. attended the workshop.
Gujarat	21st June 2019, New Sachivalay, Ahmedabad	Sri Sanjay Prasad, I.A.S., Additional Chief Secretary, Dr. G. Ravindra Chary, Director (Acting), ICAR-CRIDA, Dr. Radhakrishnan, Director, ICAR-DGR, Junagadh, Dr. K.V. Rao, ICAR-CRIDA, Sri B.M. Modi, Director, Dept. of Agriculture, Govt. of Gujrat, Dr. Subhash Chandra, Director, Directorate of Millets, GOI, Director (Horticulture), Director (Seeds), Director (Research), JAU, Junagadh and NAU, Navsari, Chief Scientists of AICPRDA and AICRPAM centres located in Gujrat, Senior officials from Agriculture Department.
Karnataka	19th June 2019, Vidhan Soudha, Bengaluru	Ms. Vandita Sharma, IAS, Additional Chief Secretary and Development Commissioner, Dr. S. Bhaskar, ADG (AAF&CC), ICAR, Dr. K.V. Rao, ICAR-CRIDA, Dr. G. Srinivas Reddy, Director, KSNDMC, Sri B.Y. Srinivas, Director, Dept. of Agriculture, Govt. of Karnataka and representatives from MoA&FW, GOI, Irrigation Department, Panchayat Raj, MGNREGS, Chief Scientist, AICRPDA, Bengaluru centre, attended.
Uttar Pradesh	24th June 2019, Krishi Bhawan, Lucknow	Sri Soraj Singh, Director of Agriculture, Additional Directors of Agriculture, JDAs of commodities from Headquarters, JDAs, DDAs, SDAEOs from all the districts, Directors/representatives of ICAR institutes in the State, Director and Deputy Director from Directorate of Sugarcane Development, Chief Engineer, Irrigation Department, JDA, Horticulture Department, Scientists from IMD, Lucknow, representatives from State Agricultural Universities, Project Coordinators and subject matter specialists from KVKs.

Officials attending the interface meeting at Directorate of Agriculture, Guntur

Officials attending the interface meeting at Krishi Bhawan, Luchnow

AICRPs

Capacity Enhancement Program of AICRPAM on "Agrometeorological applications"

Capacity Enhancement program on Agrometeorological Applications was organised to scientists of AICRPAM centres at Birsa Agricultural University, Ranchi, during 16-25th February, 2019.

Participants of the program

XXVI Biennial Workshop of AICRPDA

The XXVI biennial workshop of All India Coordinated Research Project for Dryland Agriculture (AICRPDA), ICAR-CRIDA was organized at AICRPDA centre, Bengaluru, University of Agricultural Sciences (UASB), Karnataka during 16-19th January, 2019 with the main objective to critically review the progress at centres and finalize technical programme for 2019-20. Shri Ashok Dalwai, IAS, CEO, NRAA, Ministry of Agriculture & Farmers Welfare, Govt. of India was the chief guest Dr. Rajendra Prasad, VC, UASB, Dr. S. Bhaskar, ADG (Agronomy, Agroforestry & Climate Change), Dr. G. Ravindra Chary, Director (Acting), ICAR-CRIDA & Project Coordinator, AICRPDA, Dr. Y.G. Shadakshari, Director of Research, UASB, Dr. M.S. Nataraju, Director of Extension, UASB, Dr. B. Venkateswarlu, Former VC, VNMKV, Dr. K.P.R. Vittal, Former Director, ICAR-NIASM, Dr. P.K. Mishra, Former Director, ICAR-IISWC, Dr. M.J. Chandre Gowda, Director, ICAR-ATARI, Zone-XI, Dr. P.K. Mahapatra, Former Member, RAC, ICAR-CRIDA, Dr. C.R. Mehta, PC, AICRP-FIM, Dr. Prakash Patil, PC, AICRP-Fruits, Dr. T. Yellamanda Reddy, Former Director of Research, ANGRAU, Dr. M.A. Shankar, Former Director of Research, UASB, Dr. B. Rath, Technical Expert (WM), NRAA, scientists from PC Unit, AICRPDA, ICAR-CRIDA, AICRPDA centres (19 main, 3 sub and 9 voluntary centres) and most importantly, the farmers from various states. Shri Ashok Dalwai in his address appreciated the efforts of AICRPDA in developing rainfed technologies, which are integrated and implemented through convergence of various national/state agriculture/rural/tribal development programmes in the country.

Shri Ashok Dalwai, IAS, CEO, NRAA addressing the participants

Felicitation of Innovative Dryland Farmer

On the occasion, 9 best dryland farmers from various states were felicitated for their efforts in adoption and popularizing the improved rainfed technologies and 57 publications by PC unit, AICRPDA centres were released. An exhibition was organized highlighting the doable technologies from AICRPDA centres. The participants also visited on-station experiments at Bengaluru and on-farm trials/ demonstrations under AICRPDA-NICRA in Chikkamaranahalli village, Bengaluru, a rural district of Karnataka.

Annual NICRA Review Workshop of AICRPDA and AICRPAM

The Annual NICRA Review Workshop of All India Coordinated Research Project for Dryland Agriculture (AICRPDA) and All India Coordinated Research Project on Agrometeorology (AICRPAM) was organized at ICAR-CRIDA, Hyderabad during 26-28th May, 2019 with the main objective to critically review the progress at centres and finalize technical programme for 2019-20. Dr. S. Bhaskar, ADG (Agronomy, Agroforestry & Climate Change), Dr. Ch. Srinivasa Rao, Director, ICAR-NAARM, Dr. B. Venkateswarlu, Former Vice Chancellor, VNMKV, Dr. K.P.R. Vittal, Former Director, ICAR-NIASM, Dr. Y.S. Ramakrishna, Former Director, ICAR-CRIDA, Dr. G. Ravindra Chary, Director (Acting), ICAR-CRIDA & Project Coordinator (AICRPDA), Dr. B.V. Ramana Rao, Former PC, AICRPAM, Dr. G.G.S.N. Rao, Former PC, AICRPAM, Dr. V.U.M. Rao, Former PC, AICRPAM, Dr. G. Subba Reddy, Former PC, AICRPDA, scientists from PC Units, AICRPDA & AICRPAM, ICAR-CRIDA, 23 AICRPDA centres and 25 AICRPAM centres participated in the workshop.

Dr. S. Bhaskar, ADG (A, AF & CC) addressing the participants

Release of publications by the dignitaries

National Innovations in Climate Resilient Agriculture (NICRA)

Eleventh High Level Monitoring Committee Review meeting organized

Eleventh High level monitoring committee (HLMC) meeting of National Innovations in Climate Resilient Agriculture (NICRA) was held at NASC, New Delhi on 7th March, 2019 with the objective to review the Action Taken Report on the recommendations of the 10th HLMC and to review the progress and achievements of the project from May, 2018 to February, 2019. Dr. T. Mohapatra, Secretary (DARE) & Director General (ICAR) chaired the meeting. The dignitaries include Shri Bimbadhar Pradhan, Additional Secretary & Financial Advisor (DARE/ICAR), Shri Sushil Kumar, Additional Secretary (DARE) & Secretary (ICAR), Dr. K. Alagusundaram, DDG (NRM & AE) and Dr. J.K. Jena, DDG (Fisheries & AS). Dr. S. Bhaskar, ADG (A, AF & CC), Dr. V.P. Chahal, ADG (Extension), Dr. T. Janakiram, ADG (HS), Dr. D.K. Yadava, ADG (Seed), Dr. Y.P. Singh, ADG, Dr. G. Ravindra Chary, Director, CRIDA, Dr. R.S. Sinha, Addl. Commissioner (NRM), DAC, Senior Officers from ICAR, representatives from various Ministries viz., Department of Agriculture and Cooperation, Ministry of Rural Development and Panchayat Raj and DST and Scientists from CRIDA also participated.

Eleventh High level monitoring committee (HLMC) meeting of National Innovations in Climate Resilient Agriculture (NICRA) was held at NASC, New Delhi

Technical Review Workshop of Strategic Research Partner Institutes (Crop Sciences) under NICRA organized at NASC complex, ICAR

Technical Review Workshop of Crop Sciences Group institutes under strategic research component of NICRA was held at conference hall, NASC Complex, ICAR. The inaugural session was chaired by Dr. K. Alagusundaram, DDG (NRM & AE) and co-chaired by Dr. HE Shashidhar, NICRA Expert Committee member. Dr. N.P. Singh, Director, IIPR, Kanpur also participated in the review meeting.

Dr K. Alagusundaram deliberated on the importance of climate resilient varieties and suggested to expedite the process of varietal release proposals under NICRA. Dr AK Singh, DDG (CS & HS) in his remarks suggested to discuss on the issue of availability of resilient varieties at village level to farmers.

Technical Review Workshop of Strategic Research Partner Institutes (Crop Sciences) under NICRA organized at NASC, New Delhi

Technical Review Workshop of Strategic Research Partner Institutes (Integrated Modelling) under NICRA organized at IIT, Chennai on 3rd May, 2019

Technical Review Workshop of Modelling Group institutes under strategic Research component of NICRA was held at Conference Hall-I, Centre for Industrial Consultancy and Sponsored Research (ICSR), IIT, Chennai. The session was chaired by Dr. K. Alagusundaram, DDG (NRM & AE) and co-chaired by Dr. B. Venkateswarlu, NICRA Expert Committee member. Dr K Alagusundaram suggested that the contribution of modeling work under NICRA may be quantified in terms of contribution to new knowledge generation, research and policy and for that NICRA must be acknowledged.

Technical Review Workshop of Strategic Research Partner Institutes (Integrated Modeling) under NICRA organized at IIT, Chennai

Technical Review Workshop of Strategic Research Partner Institutes (Horticulture Sciences) under NICRA organized at ICAR-IISR, Kozhikode on 20th May, 2019

Technical Review Workshop of Horticulture institutes under strategic Research component of NICRA was held at Director's Conference Room, ICAR-IISR, Kozhikode on 20th May, 2019. The session was chaired by Dr. S. Bhaskar, ADG (AAF&CC), ICAR, New Delhi and co-chaired by Dr. S.K. Pandey, Ex-Director, ICAR-Central Potato Research Institute (CPRI), Shimla & NICRA Expert Committee member.

Technical Review Workshop of Strategic Research Partner Institutes (Horticulture Sciences) under NICRA organized at ICAR-IISR, Kozhikode

Annual Review and Action Plan Workshop of KVKs under NICRA-TDC organized at ICAR-CRIDA, Hyderabad

Three day Annual Review Workshop of 121 KVKs involved in the Technology Demonstration Component of National Innovations in Climate Resilient Agriculture (NICRA) was held at ICAR-CRIDA-Hyderabad during 4-6th June 2019. Dr. A.K. Singh, (DDG,AE), Dr. S. Bhaskar, (ADG, A, AF & CC), Directors of seven ATARIs, Directors/ Deputy Directors of Extension, Chairmen, Zonal Monitoring Committees and Nodal Officers from ATARIs, Scientists/SMS from 121 KVKs and CRIDA participated in the Workshop.

Dr. A.K. Singh, DDG (Agricultural Extension) highlighted the uniqueness of the project, salient achievements, the need for the spread of the resilient practices and for documenting the promising resilient technologies which can be communicated to the developmental programs for integration. Dr. S. Bhaskar spoke about the recent developments on the risk assessment with respect to climate change, impacts of technologies demonstrated and the need for focus on tree based systems. Dr. G. Ravindra Chary, Director-CRIDA detailed about the resilience due to climate change, climate resilient villages and emphasized on the need for implementation of real time measures for minimising the impact of climate variability.

During the occasion, 22 best performing KVKs in the project were awarded and two publications were released. The action points for implementation for the year 2019-20 were finalised.

Annual Review and Action Plan Workshop of KVKs and best KVKs awarded under NICRA-TDC organized at ICAR-CRIDA, Hyderabad

Technology Transfer

Field day on improved tube rose variety- Arka Prajwal with Good Agricultural Practices

Field day was conducted on 'Performance of Tube rose variety Arka Prajwal with Good Agricultural Practices for High quality productivity' at Phalgutta village Chevella Mandal, Ranga Reddy district on 17th January, 2019. About 42 flower crop growers were attended the programme. Dr. Chari Appaji, Principal Scientist, ATARI-Zone-X, KVK team, Department of Horticulture officials along with market linked extension officers participated. Successful farmer Sri Subhash Reddy shared his experience in adopting Good Agricultural Practices in tuberose cultivation.

Field day on improved tube rose variety- Arka Prajwal

District Kisan Mela organized

CRIDA-KVK in convergence with ATMA-Ranga Reddy has organized "Kisan Mela" at Hayathnagar Research Farm on 16th February, 2019 and 520 farmers and farm women have participated from Ranga Reddy and Medchal–Malakajgiri districts. Project Director, ATMA briefed about Kisan Mela. Dr. G. Ravindra Chary, Director (Acting), CRIDA, Chief guest of the programme highlighted the improved rainfed technologies specific to Southern Telangana region. Director, ATARI; Head, KVK, CRIDA; ADR-Palem, Nagakurnool, Coordinator Rythu Samanvaya Samithi and KVK subject matter specialists, scientists from ICAR-IIMR, NIPHM, Fodder institute, agriculture officers and ATMA staff participated. An exhibition was organised on the occasion.

District Kisan Mela

Training cum demonstration on control of fruit fly

Organised training cum demonstration on control of fruit fly in mango orchards in Gangupally village, Pudur mandal, Vikarabad District on 8th May, 2019. Dr. G. Nirmala, Dr. A.G.K. Reddy and Dr. K. Nagasree have participated in the program.

Training cum demonstration on control of fruit fly

Exposure Visit to 'Seed Mela'

An exposure visit to 'Seed Mela' for the farmers of Farmers First Project village was organized on 24th May, 2019 at PJTSAU, Hyderabad. About 50 farmers were participated in the Seed Mela. Dr. G. Nirmala and Dr. Anshida Beevi facilitated the exposure visit. The farmers were exposed to different seed varieties and farm implements.

Exposure Visit to 'Seed Mela'

Action learning programme on "Farm mechanization for small farm holdings"

An action learning programme on farm mechanization for small farm holdings was organized from 29-30th March, 2019 under ICAR-Consortium Research Platform (CRP) on "Farm mechanization and precision farming".

Dr. V. Praveen Rao, VC, PJTSAU, Dr. L. G. K. Naidu, Dr. Y. G. Prasad, Director, ATARI Zone X, Dr. G. Ravindra Chary, Director (Acting), ICAR-CRIDA, Dr. K. Sammi Reddy, Head, DRM and Dr. I. Srinivas participated in the programme. Training included lectures on small farm mechanization, establishment of custom hiring centres, repair and maintenance of the machinery etc. Besides these, hands on training were given on all the improved machineries.

Dr. V. Praveen Rao, VC, PJTSAU addressing the participants

Important Events

Republic Day celebration

ICAR-CRIDA celebrated 70th Republic day on 26th January, 2019 with pride and excitement. Dr. G. Ravindra Chary, Director (Acting), ICAR-CRIDA hoisted the national flag and addressed the gathering. On the eve of republic day, cultural and recreation club of ICAR-CRIDA conducted various games and singing competition for the staff.

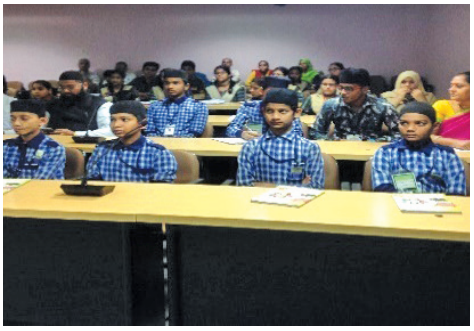
Dr. G. Ravindra Chary, Director (Acting), ICAR-CRIDA addressing the staff

National Science Day organized

ICAR-CRIDA organized National Science day on 28th February, 2019 with the theme "Science for the People and People for Science". Around 150 participants comprising of students teachers, scientists and technical officers of the institute participated. Dr. S.K. Yadav, Principal Scientist welcomed the participants, briefed the purpose of organizing National Science Day and highlighted about the significant contribution of great physicist, Dr. C.V. Raman. Dr. G. Ravindra Chary, Director (Acting), ICAR-CRIDA highlighted the importance and societal relevance of scientific knowledge, particularly agricultural science and its application for safe environment and better mankind. Further, he suggested the students to be more inquisitive and creative in gaining scientific knowledge. An awareness programme was organized for the students with activities like demonstrations through posters, exhibits and practical insights in laboratories through exposure visit. Mrs. Pushpanjali and Dr. A.K. Indoria

Dr. G. Ravindra Chary, Director (Acting), ICAR-CRIDA addressing the students

Dr. K.L. Sharma demonstrating students in Central lab



Students participation on occasion of National Science Day

interacted with the students on various soil types, procedure of soil sample collection and analysis and usage of recommendations for higher crop yields through use of Soil Health Cards. CRIDA scientists interacted with the students and teachers and shared their research experience in rainfed agriculture. Dr. S.S. Balloli and Dr. Anshida Beevi coordinated the activities.

International Women's Day celebrated

The international women's day was organized on March 8, 2019 at ICAR-Central Research Institute for Dryland Agriculture, Hyderabad in which CRIDA staff members including scientists, technical, administrative and supporting staff, senior research fellows, young professionals and contractual staff participated. Dr. Arun Kumar Shanker, Principal Scientist in his welcome address highlighted the history of women's day celebration. Dr. G. Ravindra Chary, Director (Acting) in his opening remarks stressed the need of celebrating international women's day and uplifting the women's status in the society. As a part of celebration, an extempore competition was held for the CRIDA staff on the theme, "Think equal, Build smart, Innovate for change".

Dr. G. Ravindra Chary, Director (Acting), ICAR-CRIDA addressing the staff

ICAR-CRIDA Foundation Day Celebrated

The 35th Foundation Day of ICAR-CRIDA was celebrated on 12th April, 2019. Dr. G. Ravindra Chary, Director (Acting), CRIDA welcomed Dr. T. Mohapatra, Secretary, DARE and Director General, ICAR was the chief guest. Directors and scientists from local ICAR Institutes and staff of CRIDA participated. DG, ICAR, appreciated that CRIDA is well recognized globally and at national level for its contributions in dryland agriculture research and development, particularly climate resilient agriculture. He emphasized that in depth analysis is needed in cropping and integrated farming system mode for transforming dryland villages into climate resilient villages and CRIDA should play key role in driving this initiative involving several ICAR institutes, SAUs and NGOs in the country and advocated that to strengthen the research on the emerging technologies viz., precision farming, artificial intelligence, develop indigenous modelling frame work, climate change research, micro-level agromet advisories etc. He further advised to bring visibility of the institute at national and international level. Further, DG, ICAR suggested that institute foundation day to be organized with a series of events involving retired employees, students, farmers and other local ICAR institutes.

Dr. T. Mohapatra, DG, ICAR addressing the CRIDA staff

Dr. V. Praveen Rao, Hon'ble Vice-Chancellor, Prof. Jayashankar Telangana State Agricultural University (PJTSAU) in his chief guest address, appreciated the services rendered by CRIDA to dryland agriculture development in the country through various national and state level programmes. Dr. Rao suggested that the outcomes of research being done at institutes and universities should reach

the farmers and the scientists have to work hard for up-liftment of the farmers through on-farm research and technologies. On the occasion, five publications were released, felicitated ten Innovative Dryland Farmers from different states and senior CRIDA staff who were superannuating during 2019-20. Some of the awarded innovative dryland farmers shared their experiences about their success.

The daylong event was attended by Dr. Y.G. Prasad, Director, ATARI, Hyderabad; Dr. S.R. Voleti, Director, ICAR-IIRR; Dr. R.S.V. Chatterjeee, Director, ICAR-DPR; Dr. Sarath Babu, Head, Regional Station, NBPGR; Dr. J. Chandra Sekhar, Head, Regional Station, ICAR-IIMR; representatives of other local ICAR institutes, Dr. K.P.R. Vittal, former Director, NIAM, Baramati, former Project Coordinators of AICRPDA and AICRPAM, former Heads of Divisions, CRIDA, retired and present scientific, technical and administrative staff of CRIDA, Innovative dryland farmers from across the country. Dr. M. Maheshwari, Head, Division of Crop Science proposed vote of thanks.

Dr. V. Praveen Rao, VC, PJTSAU addressing the gathering

Felicitation of Innovative Dryland Farmers

International day of Yoga

The Fifth International Day of Yoga (IDY) was organized at ICAR-CRIDA, Hyderabad on June 21, 2019. Over 150 members of staff of CRIDA actively participated in a 2-hr session starting from 10 am onwards at the campus. Dr. P. Vijaya Kumar, Director In-charge administered the pledge of making yoga an integral part of life to all the participants. He stressed the need of practicing yoga in our daily life. Later, the participants performed *Upa Yoga* as demonstrated by the volunteers of Isha Yoga Foundation and also *yoga asanas* as demonstrated in the Common Protocol video. The celebrations came to an end with vote of thanks.

Glimpses of yoga day

Important Visitors

Visit of Dr. K. Alagusundaram, Deputy Director General (NRM)

Dr. K. Alagusundaram, Deputy Director General (NRM) visited ICAR-CRIDA on 5th January, 2019 to review the research activities of CRIDA. Dr. G. Ravindra Chary, Director (Acting) briefed about overall research activities. DDG interacted with the scientists and appreciated the efforts by CRIDA for its outstanding work at National and International level.

Dr. K. Alagusundaram, DDG (NRM) addressing the staff

Students and Farmers Visit

About 1300 students visited ICAR-CRIDA from various agricultural universities like Tamil Nadu Agricultural Universitiy, Dr. P.D.K.V. Akola, Maharashtra, MPKV Rahuri, PJTSAU Rajendranagar, Hyderabad, AAU, Assam, QUAT, Bhubaneswar, CAET, Navsari Gujrat, KAU, Kerela etc. Farmers (about 104) from different states like Tamil Nadu, Andhra Pradesh visited the institute.

List of important delegates visit to CRIDA

Date of visit	Affiliation of Visitors
February 5, 2019	International delegates from NIRDPR
March 28, 2019	ARS probationers (109th FOCARS) from NAARM
May 21, 2019	Stakeholders/agro entrepreneurs from NIRDPR
May 29, 2019	Mr. Danial Cavallari from Fyteko, Belgium
June 25, 2019	High level officials from Centre on Integrated Rural Development for Asia and Pacific (CIRDAP) members countries

Visits Abroad

Dr. C.A. Rama Rao, Head, Section of Design and Analysis, participated in the workshop on "Exercise on foresight for food system in south Asia", during 11-14 February, 2019 at Kathmandu, Nepal. During the workshop, an overview of the approach, methods and utility of foresight analysis was provided with reference to food systems.

Dr. M. Prabhakar participated in the SAARC Regional training on building resilient agriculture: packages of solutions for communities in SAARC member states", during 27-30 May, 2019 at Kathmandu, Nepal.

Dr. M. Prabhakar at SAARC Regional training on building resilient agriculture: packages of solutions for communities in SAARC member states

Human Resource Development

Training on Open Field cultivation

KVK, ICAR-CRIDA conducted Open Field cultivation training from December 27 - January 23, 2019. It was a 25 days residential programme which covered 200 hours duration of training. It aimed at improving skills in both theory and practical outlook of package of practices in flower crops cultivation. Twenty young and educated farmers were identified for this training from the Ranga Reddy district as per the guidelines of Agriculture Skill Council of India.

Floriculturist-Open field cultivation training programme

Entrepreneur training for dairy farmers

KVK, ICAR-CRIDA conducted training for dairy farmers from January 18 - February 11, 2019 for improving skills in both theory and practical outlook of Dairy farmer as well as entrepreneurship aspects. Twenty rural youth were identified for this training as per the guidelines of Agriculture Skill Council of India.

Entrepreneur training for dairy farmers

Participation in Seminars and Symposia

Participation in International events and Important Meetings held at New Delhi

Name of the scientist	Workshop/Meeting/Seminar/ Symposia	Duration & Venue
G. Ravindra Chary	Attended Monsoon Mission - II, AGROMET Workshop	January 9, ICRISAT, Hyderabad
	Project Proposal on Climate Resilient Agriculture with IWMI	January 22, New Delhi
	CGIARs to discuss their ongoing activities with India Focus as well as their future plans	January 24-25, New Delhi
	13th International Conference on Dryland Development as Co-organizer for the theme Sustainable Intensification & Diversification (Arid Horticulture, Aquaculture, Protected Agriculture) (Theme 6)	February 12, ICAR-CAZRI, Jodhpur
	Workshop to Discuss Issues Related to Objective Assessment of Crop Loss by Ground Truthing, Early Declaration of Drought, Dry Spells etc.	February 14, New Delhi
	First interaction meeting of ICAR Scientists/Experts & AI Team of NITI Ayog on Artificial Intelligence	March 13, Krishi Bhavan, New Delhi
M. Maheswari	Workshop on Prevention of Sexual Harassment of Women at Work Place	January 17-18, NAHRD, New Delhi
	Indian Plant Science Congress	January 23-25, SRM University, Kattankulathur, Tamil Nadu
P. Vijayakumar	Bilateral workshop "Building an Operational Composite Drought monitoring index for India" in collaboration with university of Nebraska	January 22-23 NASC Complex, New Delhi
	Indo-Denmark workshop "Digital Agriculture for accelerated climate risk management in India"	March 12, ICRISAT, Hyderabad
K. Sammi Reddy	13th International Conference on Development of Drylands (ICDD), CAZRI, Jodhpur	February 11-13, ICAR - CAZRI, Jodhpur
	National Convention of Revitalizing Rainfed Areas (RRA) Network	February 14-15, India International Centre, Delhi
C.A. Rama Rao	Workshop on Participatory Exercise on Foresight for Food Systems in South Asia Organized by IFPRI and ACIAR	February 11-14, Kathmandu, Nepal
K.S. Reddy, M. Vanaja, M. Srinivasa Rao	13th International Conference on Development of Drylands Converting Dryland Areas from Grey into Green	February 11-14, ICAR-CAZRI, Jodhpur
K.S. Reddy, B. Sanjeeva Reddy	53rd Annual Convention of Indian Society of Agricultural Engineers (ISAE) and International Symposium on Engineering Technologies for Precision and Climate Smart Agriculture	January 28-30, BHU, Varanasi
K.V. Rao	Workshop on Building an Operational Composite Drought Monitoring Index for India	January 22-23, New Delhi
M. Prabhakar	Workshop on Sustainable Livelihood and Adaptation to Climate Change (SLACC) project	January 3-4, NASC, New Delhi
	Workshop on Technical Cooperation Agri-Business (Department of Agriculture Cooperation of Farmers Welfare, Govt. of India and Min. of Foreign Affairs and Worship, Govt. of Argentina)	February 15, NASC, New Delhi
	Workshop on Climate Change Impact on Inland Open Water Fisheries: Status and Way forward	March 15, ICAR-CIFRI, Kolkata
S.K. Bal, R. Rejani, A.V.M. Subba Rao	International Conference on Advances in Agrometeorology for Managing Climatic Risks of Farmers (INAGMET 2019)	February 11-13, JNU, New Delhi
S.K. Bal, A.V.M. Subba Rao	International National Symposium on Agrometeorology (INAGMET 2019)	February 11-13, JNU, Delhi
K. Sreedevi Shankar	Workshop for Liaison Officers	January 28 – 29, ISTM, New Delhi
P.K. Pankaj, K. Sreedevi Shankar, K. Ravi Shankar	XIV Agricultural Science Congress: Innovations for Agricultural Transformation	February 20-23, NASC, New Delhi

Awards and Recognition

ICAR "Dr. Rajendra Prasad Puraskar for Technical Books in Hindi in Agriculture and Allied Sciences – 2018", for technical book in Hindi on "Varsha Aadharit Krishi Kshetron ki Samasyaein Evam Samadhaan" by Ch. Srinivasa Rao, A. K. Indoria, K. L. Sharma, S.K. Yadav, K. Sammi Reddy, S.R. Yadav and G. Prabhakar for their immense contribution in developing the technical book in Hindi on "Varsha Aadharit Krishi Kshetron ki Samasyaein Evam Samadhaan".

Dr. P. Vijaya Kumar, Project Coordinator, AICRPAM was felicitated by Dr. Harsha Vardhan, Hon'ble Union Minister of Earth Sciences on the event of 144th foundation day of IMD on 15th January 2019 for the contributions made in Dynamic Crop Weather Calendar and contingency planning in Agrometeorology.

"Fellow" of Association of Agrometeorologists (FAAM), India was awarded to Dr. S.K. Bal at International Symposium on "Advances in Agrometeorology for Managing Climatic Risks of Farmers" during 11-13 Feb, 2019.

Dr. P. Vijaya Kumar, Project Coordinator, AICRPAM being felicitated at 144th foundation day of IMD

Dr. S.K. Bal Awarded as "Fellow" of Association of Agrometeorologists (FAAM), India

Personnel Information

Appointments

Name and Designation	Appointments	Date w.e.f
Shri B. Prashanth	LDC	21.01.2019
Shri Jagiri Pradeep Kumar	Stenographer Grade-III	31.05.2019
Shri Ch. Singa Raju	Technician (Fieldman)	21.01.2019
Shri J. Ramana Reddy	Technician (Mechanic)	02.02.2019
Shri P. Venkateswarlu	Technical Assistant (Librarian)	02.02.2019
Shri K. Rajamohan	Technician (Machinist)	20.03.2019

Retirements

Name	Designation	Date of superannuation
Shri V Pandurangaiah	Skilled Support Staff	28.02.2019
Dr. (Smt.) Kaushalya Ramachandran	Pr. Scientist	31.03.2019
Shri Prem Bahadur	Skilled Support Staff	30.04.2019
Shri K.L. Prasad	Technical Officer	31.05.2019
Shri N.N. Reddy	Pr. Scientist	31.05.2019
Smt. V. Renu	Private Secretary	30.06.2019
Shri Gyara Muthyalu	Skilled Support Staff	30.06.2019
Shri Bathuka Ramulu	Skilled Support Staff	30.06.2019

Cultural, Welfare and Sports Activities

ICAR Inter-zonal sports tournament

ICAR-CRIDA sport contingent participated in ICAR Inter-Zonal Sports Tournaments at ICAR-IVRI, Izatnagar during February 25-28, 2019. Mr. B. Kiran Kumar, SSS bagged Gold medal in javelin throw event. Mr. Surender Rao, CTO, sport manager was also felicitated for his contributions in the field of sports.

Mr. B. Kiran Kumar receiving 1st prize in Javelin throw

Forthcoming Events

Title of the Event	Date
Independence Day Celebration	August 15
37th FTF ITT International training program on climate smart agriculture	August 20 - September 3
Swacchta hi seva campaign	September 11- October 2
Model Training Course on "Rain-fed Horticulture and Alternate Land Use Systems for Livelihood Security" Sponsored by D.O.E., Ministry of Agriculture & Farmer's Welfare, Govt. of India, New Delhi	September 23 - 30
ICAR South Zone Sports Meet	November 4-8
World soil day	December 6

For further details please visit the website: www.crida.in

निदेशक की कलम से ...

जलवायु परिवर्तन के लिए भारतीय कृषि के भेद्यता मूल्यांकन का पुनरीक्षण

कृषि की भेद्यता का आकलन, उस पैमाने पर जहां विकास योजना और संसाधन आवंटन के संबंध में निर्णय किया जाता है, मुख्य रूप से आवश्यक है क्योंकि भेद्यता का आकलन अनुकूलन योजना में एक प्रारंभिक कदम है। लचीलेपन का मूल्यांकन लचीलापन निर्माण के लिए योजना बनाने में भी उपयोगी है। जलवायु अनुकूल कृषि में राष्ट्रीय नवोन्मेष (एनआईसीआरए) (पहले 'पहल') के तहत क्रीडा (सीआरआईडीए) ने जलवायु परिवर्तन के लिए भारतीय कृषि भेद्यता का जिला स्तर पर आकलन किया है। विश्लेषणकर्ताओं ने अपनी तीसरी और चौथी आकलन रिपोर्ट में आईपीसीसी द्वारा दी गई भेद्यता की रूपरेखा और अवधारणाओं को अपनाया। भेद्यता को इस ढांचे में, 'अवशिष्ट प्रभाव' प्रभाव के रूप में संकल्पित किया जाता है और इसे जोखिम, संवेदनशीलता और अनुकूली क्षमता द्वारा निर्धारित किया जाता है। इस विश्लेषण के परिणामस्वरूप 2013 के दौरान कृषि में जलवायु परिवर्तन की भेद्यता पर एक दस्तावेज लाया गया था जिसका उपयोग कृषि विकास और जलवायु परिवर्तन अनुकूलन से संबंधित विभिन्न एजेंसियों द्वारा बड़े पैमाने पर किया गया है। भेद्यता प्रकृति में गतिशील है। आईपीसीसी ने अपनी पांचवीं आकलन रिपोर्ट (आईपीसीसी, 2014) में भेद्यता की एक अलग अवधारणा को अपनाया। इस आकलन रिपोर्ट ने जलवायु मॉडल के सीएमआईपी-5 समूह से अधिक उन्नत जलवायु अनुमान भी प्रदान किए हैं जहां अनुमानों को 'प्रतिनिधि एकाग्रता मार्ग' (आरसीपी) से जोड़ा जाता है जो समय के साथ संभावित शमन क्रियाओं को ध्यान में रखते हैं। चौथी आकलन रिपोर्ट तक इसकी पहले की अवधारणा के विपरीत, अपनी पांचवीं आकलन रिपोर्ट में आईपीसीसी 'खतरे' या किसी बाहरी झटके की पूर्वसूचना के रूप में भेद्यता को मानते हैं और इसे सिस्टम या इकाई का आंतरिक लक्षण माना जाता है। जब एक कमज़ोर इकाई खतरे की घटना के लिए उजागर होती है, तो इसके परिणाम जोखिम में होते हैं। इस प्रकार, वर्तमान अवधारणा विश्लेषण के केंद्र में जोखिम प्रबंधन रखती है। इस प्रकार पांचवी मूल्यांकन रिपोर्ट फ्रेमवर्क जोखिम की पहचान और प्रबंधन पर अधिक जोर देती है और इस प्रकार निर्धारक के रूप में भेद्यता को देखती है। इस तरह की एक अवधारणा और ढांचा भेद्यता में कमी के लिए नीति बनाने और इस प्रकार जलवायु परिवर्तन के जोखिम को कम करने के लिए अधिक प्रासंगिक होगा। इन सबका एक अतिरिक्त लाभ यह है कि यह जलवायु के अनुमानों में अनिश्चितता के कारण उत्पन्न होने वाली विकृति से बचने में भी मदद करेगा। इसे देखते हुए, क्रीडा ने तदनुसार 2020-49 के लिए आरसीपी 45 आधारित जलवायु अनुमानों और अद्यतन सामाजिक-

आर्थिक आंकड़ों को उपयोग करके और आईपीसीसी एआर5 ढांचे और कमजोरियों तथा जोखिम मूल्यांकन के लिए परिभाषाओं का उपयोग करके भेद्यता मूल्यांकन को संशोधित करने का प्रयास किया गया। इस विश्लेषण में, ऐतिहासिक खतरे (चक्रवातों, सूखे और बाढ़ की ऐतिहासिक घटनाओं के आधार पर) और भविष्य के खतरे के संयोजन के रूप में आशंकाओं का निर्माण किया गया था, जिसे संकेतक अर्थात वार्षिक वर्षा, जुलाई माह की वर्षा, अधिकतम तापमान में बदलाव के संयोजन के रूप में दर्शाया गया था, न्यूनतम तापमान, सूखा घटना शुष्क मंत्र, अत्यधिक वर्षा की घटना आदि। इसी तरह जोखिम के जोखिम और जोखिम वाले घटकों का प्रतिनिधित्व करने के लिए कई संकेतक चुने गए। संकेतकों पर डेटा का उपयोग करते हुए, जोखिम, भेद्यता और खतरे के सूचकांकों की गणना की गई और अंत में जोखिम के एक सूचकांक की गणना की गई। देश के शुद्ध बोए गए क्षेत्र और कृषि कार्यबल में जिले के अनुपात के औसत के साथ गणना किए गए जोखिम सूचकांक को जलवायु परिवर्तन जोखिम के आधार पर प्राथमिकता निर्धारित करने के लिए गुणा किया गया था। संबंधित जिलों को जोखिम की विभिन्न डिग्रियों में वर्गीकृत किया गया था और उच्च जोखिम वाले जिलों को जलवायु परिवर्तन के लिए लचीलापन बढ़ाने के लिए निवेश और हस्तक्षेप योजना के लिए उच्च प्राथमिकता दी जानी है। 'बहुत अधिक' जोखिम वाले अधिकांश जिले राजस्थान और पूर्वी उत्तर प्रदेश, कर्नाटक, उत्तरी बिहार, कर्नाटक, आंध्र प्रदेश, महाराष्ट्र और पश्चिम बंगाल राज्यों में मौजूद हैं। मेरा मानना है कि पहले के भेद्यता विश्लेषण की तरह, यह आउटपुट भी शोधकर्ताओं, प्रशासकों और नीति निर्माताओं को जलवायु परिवर्तन अनुसंधान और अनुकूलन योजना में मदद करेगा।

डॉ. जी. रविंद्र चारी, निदेशक (कार्यकारी)
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To

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भाकृअनुप ICAR

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