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ICAR AWARD CEREMONY

16 JULY 2022

INDIAN COUNCIL OF AGRICULTURAL RESEARCH
NEW DELHI
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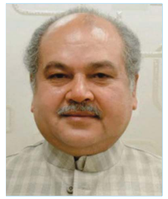
नरेन्द्र सिंह तोमर
NARENDRA SINGH TOMAR

कृषि एवं किसान कल्याण मंत्री,
भारत सरकार
कृषि भवन, नई दिल्ली

MINISTER OF AGRICULTURE & FARMERS WELFARE,
GOVERNMENT OF INDIA
KRISHI BHAWAN, NEW DELHI

संदेश



यह हर्ष का विषय है कि भारतीय कृषि अनुसंधान परिषद वैज्ञानिकों, किसानों एवं संस्थानों को उनके उल्लेखनीय योगदान के लिए विभिन्न पुरस्कार प्रदान करता है। भारतीय कृषि अनुसंधान परिषद के 94वें स्थापना दिवस के अवसर पर 5 विभिन्न श्रेणियों के 92 पुरस्कार प्रदान किए जा रहे हैं जिनमें 4 संस्थान, 1 एआईसीआरपी, 4 कृषि विज्ञान केन्द्र (केवीके), 67 वैज्ञानिक एवं 11 किसान शामिल हैं।

मुझे इस बात की भी प्रसन्नता है कि परिषद पुरस्कार प्राप्तकर्ताओं के उल्लेखनीय योगदान पर एक पुस्तिका प्रकाशित कर रही है। आज के संदर्भ में कृषि क्षेत्र में नई और बेहतर प्रौद्योगिकियों का तेजी से विकास और कृषि क्षेत्र में अनुसंधान, शिक्षण और विस्तार की नवोन्मेषी अवधारणाओं का अंगीकरण सर्वाधिक महत्वपूर्ण हो गया है क्योंकि हमें नई और अपेक्षाकृत बड़ी चुनौतियों का निरंतर सामना करना पड़ रहा है।

मुझे विश्वास है कि हमारे सभी कृषि वैज्ञानिक, अनुसंधानकर्ता, अध्यापक, विस्तार पदाधिकारी, किसान और अन्य सभी हितधारक इस तथ्य से भली–भांति अवगत होंगे और इस अवसर का लाभ उठाएंगे तथा इन समस्याओं का समाधान करने और इन जटिल चुनौतियों का सामना करने की दिशा में अपनी सामूहिक शक्ति से योगदान देंगे।

कृषि क्षेत्र में नई और बेहतर प्रौद्योगिकियों का व्यापक उपयोग किसानों की आय बढ़ाने और वर्ष 2025 तक हमारे देश की अर्थव्यवस्था को 5 ट्रिलियन डॉलर बनाने के लक्ष्य को प्राप्त करने मैं सहायक सिद्ध होगा।

मैं परिषद के प्रयासों की सराहना करता हूं और आशा करता हूं कि पुरस्कार प्राप्तकर्ताओं की उपलब्धियों से अन्य लोग भी प्रेरित होंगे और इससे देश में कृषि–विकास के सभी क्षेत्रों में वैज्ञानिक प्रयासों को बढ़ावा मिलेगा।

7 जुलाई, 2022
नई दिल्ली

(नरेन्द्र सिंह तोमर)

कैलाश चौधरी
KAILASH CHOUDHARY

कृषि एवं किसान कल्याण
राज्य मंत्री
भारत सरकार
MINISTER OF STATE FOR AGRICULTURE
& FARMERS WELFARE
GOVT. OF INDIA

संदेश

यह नोट करना उत्साहवर्धक है कि भारतीय कृषि अनुसंधान परिषद ने व्यक्तियों/वैज्ञानिकों की टीमों, विस्तार पदाधिकारियों, प्रगतिशील/नवोन्मेषी किसानों, देश में कृषि के अनुसंधान, विकास और प्रोत्साहन में संलग्नी विश्वविद्यालयों/संस्थानों तथा कृषि विज्ञान केन्द्रों की योग्यता और उपलब्धियों को मान्यता प्रदान करने एवं उनके बीच स्वस्थ प्रतिस्पर्धा सृजित करने के लिए कुल 16 पुरस्कार प्रदान किये जा रहे हैं। ये पुरस्कार और सम्मान देश में कृषि अनुसंधान, शिक्षा और प्रसार में श्रेष्ठता को प्रोत्साहित करने में महत्वपूर्ण भूमिका निभा रहे हैं। मुझे इस बात की भी खुशी हो रही है कि दिनांक 16 जुलाई, 2022 को भारतीय कृषि अनुसंधान परिषद के 94वें स्थापना दिवस के अवसर पर सम्मानित किए जाने वाले पुरस्कार विजेताओं के महत्वपूर्ण योगदान को रेखांकित करने के लिए परिषद द्वारा एक पुस्तिका का प्रकाशन किया जा रहा है। मेरा दृढ़ विश्वास है कि कृषि विज्ञानों सहित किसी भी क्षेत्र में उत्कृष्ट उपलब्धियों के लिए पुरस्कार और प्रोत्साहन, सृजनात्मक और नवोन्मेषी सोच को बढ़ावा देने के लिए अनिवार्य हैं जिससे अन्ततः नई और बेहतर प्रौद्योगिकियों तथा कौशल का विकास होता है। मुझे विश्वास है कि इन पुरस्कारों से पुरस्कारों की विभिन्न श्रेणियों के बीच प्रतिस्पर्धा सृजित होगी और कृषि उत्पादन एवं उत्पादकता में स्थायी वृद्धि करने के हमारे लक्ष्यों को प्राप्त करने के लिए पुरस्कार विजेता प्रौद्योगिकियों, ज्ञान और कौशल को विकसित करने की दिशा में कार्य करने के लिए प्रेरित होंगे जिससे हमारे लोगों की खाद्य और पोषणिक सुरक्षा सुनिश्चित होगी और किसानों की आय को दोगुना करने का लक्ष्य प्राप्त किया जा सकेगा।

शुभकामनाओं सहित।

(कैलाश चौधरी)

शोभा करांदलाजे
SHOBHA KARANDLAJE

राज्य मंत्री
कृषि एवं किसान कल्याण
भारत सरकार
MINISTER OF STATE FOR
AGRICULTURE & FARMERS WELFARE
GOVT. OF INDIA

संदेश

मुझे यह जानकर खुशी हुई कि भारतीय कृषि अनुसंधान परिषद द्वारा कृषि संस्थानों, वैज्ञानिकों, किसानों को मान्यता देने के लिए, 6 जुलाई, 2022 को अपने 94वें स्थापना दिवस के अवसर पर पुरस्कृत किया जायेगा। परिषद पुरस्कार विजेताओं के द्वारा किए गए विशिष्ट कार्यों के बारे में एक पुस्तिका भी प्रकाशित कर रही है। कृषि क्षेत्र में नई और बेहतर तकनीकों के निरंतर विकास ने देश में हरित, श्वेत और नीली क्रांतियों के युग का नेतृत्व किया है, जिससे हम न केवल अधिकांश कृषि उत्पादों मैं आत्मनिर्भर बन पाए हैं, बल्कि कई उत्पादों मैं हमारा उत्पादन अधिशेष हो रहा है। इन लाभों को जारी रखने के लिए हमें निरंतर कोशिश करने की आवश्यकता है, और हमारे वैज्ञानिक, शिक्षक और कृषक समुदाय इसके लिए महत्वपूर्ण हैं।

मुझे विश्वास है कि हमारे कृषि वैज्ञानिक, शिक्षक, विस्तार अधिकारी और कृषक समुदाय के सदस्य कृषि उत्पादन और उत्पादकता में सुधार के लिए मिलकर काम करेंगे और जलवायु परिवर्तन के कारण उत्पन्न होने वाली नई और अधिक दबाव वाली चुनौतियों से निपटने में मदद करेगी। ये पुरस्कार तथा मान्यता इस क्षेत्र की वृद्धि एवं विकास कार्य से जुड़े सभी श्रेणियों के व्यक्तियों में वैज्ञानिक उद्यम को प्रोत्साहित करने के लिए और अधिक प्रेरणादायक सिद्ध होंगे।

6 जुलाई, 2022
नई दिल्ली

(शोभा करांदलाजे)

डॉ. त्रिलोचन महापात्र
Dr. T. MOHAPATRA

Secretary
Department of Agricultural Research
& Education and Director General
Indian Council of Agricultural Research
New Delhi 110 001

MESSAGE

Incentivizing individual employees and teams for their outstanding performance, across organizations, make them more efficient, responsive and productive apart from improving their level of job satisfaction. The awards, besides recognizing merit and accomplishments, generate healthy competition among individuals, groups and institutions to strive and attain still higher levels of excellence in their respective areas of work. The Indian Council of Agricultural Research has been recognizing and rewarding the institutions, scientists, farmers every year. This year ICAR is giving 15 awards in 4 major categories: National award of Excellence for agricultural institutions, National Award for Excellence in agricultural research, National Award for Application of Agricultural technologies and National Award for Innovations and technology development by farmers.

During this year 92 awardees under 15 different awards have been selected. These comprise of four Institutions, one AICRP, 4 KVKs, 67 Scientists and 11 farmers of whom 8 are women scientists and farmers. Among the Agricultural Universities and Deemed universities, Tamil Nadu Agricultural University, Coimbatore has been bestowed with the Best Agriculture University Award for its advances in all spheres of teaching, research, extension and innovations. ICAR-National Academy of Agricultural Research Management, Hyderabad has been reorganized with the Best Institution Award among the large institute category whereas, the ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru and ICAR-Indian Institute of Spices Research, Kerala have shared the best ICAR institution award among Small ICAR Institutes category. All India Coordinated Research Project on NSP, Mau has been conferred Chaudhary Devi Lai Outstanding All India Coordinated Research Project Award 2021 Rafi Ahmed Kidwai Award has been bagged by 7 scientists for outstanding contributions in Crop & Horticultural Sciences, Natural Resource Management & Agricultural Engineering, Animal & Fisheries Sciences and Social Sciences groups, respectively. Lal Bahadur Shastri Outstanding Young Scientist Award 2021 has been bagged by 4 scientists, one each in Crop & Horticultural Sciences, Natural Resource Management & Agricultural Engineering, Animal & Fisheries Sciences and Social.

Sciences groups, respectively. Jawaharlal Nehru Awards for high quality Ph.D. thesis has been given to 3 scholars. There are 3 awardees for Panjabrao Deshmukh Woman Scientist Award. The Vasantrao Naik Award for Outstanding Research and Applications in Dryland Farming Systems for 2021 has been given to research teams from NRC- Pomegranate, Solapur and CRIDA, Hyderabad. Pandit Deendayal Upadhyay Krishi Vigyan Protsahan Puraskar for KVKs has been bagged by Krishi Vigyan Kendra, Cooch Behar; Krishi Vigyan Kendra Ramanagara. Krishi Vigyan Kendra, Basti and Krishi Vigyan Kendra, Gwalior have jointly shared the third position for outstanding extension/ outreach activities having significant impact in developing agriculture and allied sectors of the district.

Jagjivan Ram Abhinav Kisan Puraskar has been awarded to 3 farmers. The N.G. Ranga Award for Diversified Agriculture has been awarded to Shri Sethpal Singh, a farmer from Uttar Pradesh and Smt. Padala Bhudevi, a women farmer from Andhra Pradesh for their outstanding achievements in diversified farming. Pandit Deendayal Upadhyay Antyodaya Puraskar for small and marginal farmer category has been bagged by 4 outstanding farmers.

Fakhruddin Ali Ahmed Award for Outstanding Research in Tribal Farming Systems has been bagged by 2 teams of Scientists, one each from ICAR Research Complex for NEH Region, Meghalaya and Birsa Agricultural University, Ranchi, Jharkhand. Swami Sahajanand Saraswati Outstanding Extension Scientist Award has been conferred on two scientists, one each from ICAR-CSSRI, Karnal and KVK, Datia, Madhya Pradesh for their outstanding work with the farming community towards promotion of the sustainable development models.

The Following awards have also been given by the division of official language: - Dr. Rajendra Prasad Award, Rajashree Tandon Rajbhasha Puraskar and Ganesh Shankar Vidyarthi Hindi Patrika Puraskar. I congratulate all the award winners and their family members and hope that these awards will encourage them to attain newer heights in future and also inspire their colleagues to emulate them in pursuit of excellence. I wish to thank all the Chairmen and the members of the Award Judging Committees for a meticulous job. Our greetings to the MARES family on the occasion.

Dated the 07th July, 2022
New Delhi

(T. Mohapatra)

Dr. PAWAN KUMAR AGRAWAL
Assistant Director General
(Coordination Technical)

भारतीय कृषि अनुसंधान परिषद
कृषि भवन, डॉ राजेन्द्र प्रसाद मार्ग
नई दिल्ली - 110001

Indian Council of Agricultural Research
Krishi Bhawan, Dr. Rajendra Prasad Road
New Delhi - 110001

ACKNOWLEDGEMENT

Indian Council of Agricultural Research (ICAR) acknowledges the outstanding contributions of Institutions, AICRPs, Scientists, Women Scientists, Students and Innovative Farmers, every year by giving away Cash Awards, Citations and Certificates. The First of these awards was given in 1956. With the Passage of time, new awards were added. In a major review exercise undertaken by the Government during 2021 to consolidate the awards. Awards have been reorganized into 16 Awards in 4 major categories namely "National Award of Excellence for Agricultural Institutions (3 Awards), National Award for Excellence in Agricultural Research (5 Awards), National Award for Application of Agricultural Technologies (4 Awards) and National Award for Innovations and Technology Development by farmers (4 Awards). In the year 2021, extraordinary contributions of 60 Scientists, Farmers. Extension experts, and Institutions are being recognized under 16 different award categories. The procedure for selecting the awardees involves many meticulously planned steps and a transparent prudent mechanism. The ICAR Awards were advertised in the month of Jan-Feb, 2022. Applications/nominations were received till 28th February 2022. The documents were scrutinized and classified either subject-wise or geographical zone-wise following the guidelines of the awards. The soft copies of the documents along with the criteria for evaluation were sent to the Award Judging Committee members and Chairpersons. The committees were chaired by eminent scientists of national repute and consisted of experts from different disciplines and from different parts of the country. Inspite of the extraordinary situation caused by Corona Pandemic, the Judging Committee met physically in June, 2022 for finalizing the recommendations.

I express my sincere gratitude to Hon'ble Agriculture & Farmers Welfare Minister, Shri Narendra Singh Tomar ji, Shri Parshottam Rupala ji, Shri Kailash Chaudhary ji and Sushree Shobba Karandlaje ji for their patronage, constant encouragement and support to the Council in various activities. I am grateful to Dr. Trilochan Mohapatra, Secretary DARE & DG, ICAR, and Shri Sanjay Garg, Additional Secretary, DARE and Secretary, ICAR for continuous encouragement and guidance at all the stages. The dedicated efforts made by all the Chairmen and members of the ICAR Award Committees in objectively evaluating each individual application carefully and providing suggestions are grateftilly acknowledged. The painstaking efforts made by the Award Cell and Coordination Technical Staff Specially, Ms. Suparna Dasgupta, Sh. Hari Dass, Sh. Deepak, Ms. Shivali and others in scrutinizing the applications, organizing the meetings deserve special mention.

(P. K. Agrawal)

CONTENTS

Award 2021

NATIONAL AWARD OF EXCELLENCE FOR AGRICULTURAL INSTITUTIONS

SARDAR PATEL OUTSTANDING ICAR INSTITUTION AWARD 2021

The Indian Council of Agricultural Research (ICAR) was setup on 16th July 1929 on the recommendation of the Royal Commission on Agriculture. It was recognized in 1965. Over the years it has developed a large research and training infrastructure and operates through 100 Institutes including Bureaux, Project Directorates (PDs) & National Research Centers (NRCs) and 71 Agricultural Universities. In order to recognize the outstanding performance by the ICAR Institutes, Deemed Universities (DUs) of ICAR, Central Agricultural University (CAU) and State Agricultural Universities, three Awards of ₹ 10.00 lakh each Citation, Certificate and a Shield, shall be given to two ICAR Institutes/ NRCs/ Project Directorates/National Bureaus (one to large and other to small) and one State Agricultural University/ DUs/ CAU. The award has been named after Sardar Vallabhbhai Patel (1875-1950), the first Deputy Prime Minister and Home Minister of India. The award is categorized in three categories viz. (i) ICAR's National Institutes/Large Institutes (scientific cadre strength more than 60) (ii) ICAR's NRCs/Project Directorate etc./ small institutes (scientific cadre strength upto 60) and (iii) State Agricultural Universities/ DUs/ CAU. 27 eligible applications were received in response to the open advertisement, the recipients of awards are:

ICAR-NATIONAL ACADEMY OF AGRICULTURAL RESEARCH MANAGEMENT
HYDERABAD

ICAR-National Academy of Agricultural Research Management, Hyderabad has been awarded Sardar Patel Outstanding ICAR Institution Award 2021 in the category of Large Institute. ICAR–NAARM has been contributing in enhancing the performance and efficiency of individuals and institutions across NARES for about 45 years. The Academy is intertwined with the professional life of every agricultural scientist in India and with 100% of the scientists currently serving under ICAR having essentially undergone their Foundation Training at NAARM, the notional contribution of NAARM in the research outcome of every agricultural research institute in the country, could not be undermined. During 2016-21, the Academy enhanced its research contribution in unique areas like agricultural research, education, extension, human resource information and communication management. The Academy set an all-time high record for itself in all spheres – in terms of the number of research papers published, copyrights / trademarks obtained, number of externally funded research projects completed, number of evidence-driven training programs conducted, and clientele reached. Having recognized as the think tank of ICAR, the NAARM carved a niche for itself in policy research and published over 30 policy briefs and methodological frameworks on diverse aspects which have been internalized by the respective agencies. NAARM spearheaded the e- Learning movement and pioneered the concept of MOOC in agriculture, in the country. The Academy supports over 70 Agri Start-Ups and serves as a hallmark for promoting Agri-innovation, Agri-entrepreneurship, business incubation and IP management across NARES and beyond. The Academy also offers a PG Program on Agri-Business Management, through which it builds the human resource with requisite competence to serve in the agri-business sector in the country.

ICAR-NATIONAL INSTITUTE OF ANIMAL NUTRITION AND PHYSIOLOGY
BENGALURU

ICAR-National Institute of Animal Nutrition and Physiology, Bengaluru has been awarded Sardar Patel Outstanding ICAR Institution Award 2021 in the category of Small Institute. ICAR-National Institute of Animal Nutrition and Physiology, founded in 1995, with a mandate to conduct basic studies on physiological and nutritional problems related to biophysical translation of nutrients for productive functions in livestock. The institute has proven its excellence by making commendable scientific contributions in the fields of Feed resources, enhancing fiber digestibility by biotechnological interventions, nutraceuticals, development of national inventory on methane emission, identifying hot spots and developing strategies for amelioration, reproductive biotechnology, stem cell biology, improving reproductive and productive efficiency in the changing climatic scenario, live cycle assessment of various production systems etc. The ICAR-NIANP has completed its journey through glorious 25 years and been serving the livestock farmers with scientific inputs and advisories apart from its mandated research agenda on the basic and fundamental research in the area of Animal Nutrition and Physiology. This excellent track record in R&D endeavors and extensions activities has earned the Institute the Sardar Patel Outstanding ICAR Institute Award in 2012. ICAR-NIANP is an ISO 9001:2015 certified organization. The Institute is renowned for its high caliber and innovative research activities, partnerships and capacity building programmes for the betterment of animal husbandry sector. The Institute has a vibrant research environment and is the only discipline based national institute in the country where research Animal Nutrition and Physiology is undertaken. The pace of infrastructure development, the number and the quality of publications both in national and international journals of repute, awards received by the scientists, the human resource development, all very well reflect the tremendous progress made and the achievements of the institute in a short period of its existence.

ICAR-INDIAN INSTITUTE OF SPICES RESEARCH
KOZHIKODE

ICAR-Indian Institute of Spices Research, Kozhikode, Kerala has been awarded Sardar Patel Outstanding ICAR Institution Award 2021 in the category of Small Institute. The ICAR-Indian Institute of Spices Research (ICAR-IISR), Kozhikode, Kerala is an institute with international repute with primary focus on developing sustainable, cutting-edge technologies for spice cultivation in its mandate crops and product diversification through value addition. As the custodian of the world's largest repository of germplasm in its mandate crops, the institute has been able to harness this priceless asset for furthering its prioritized interventions. The genetic gains embedded in the varieties developed by the institute enhance profitability of spice farming for primary producers. The institute has displayed a steadfast commitment to technology development with focus on prioritized needs of its clientele. The solutions and technology inputs ranging from microbial encapsulation process, designer micronutrients, product processing protocols and comprehensive management packages for diverse ecosystems and farming systems are both critically acclaimed and widely adopted. The institute also house the largest spice research network in the country (AICRPS) that engages in nationwide collaborative and interdisciplinary research in spices. The technology disseminated, and extension services offered by the institute has remained sensitive to emerging needs of its stakeholders and has made visible and distinct impact across the country. The institute has successfully played the role of facilitator in harnessing the commercial potential offered by the spice value chains by handholding commercial ventures and start-up entrepreneurs. A special focus on socially and geographically disadvantaged stakeholder community has resulted in a host of effective intervention programmes targeting improvement in the quality of life for the vulnerable communities. With its persistent pursuit of research excellence, the institute has played a decisive and fundamental role in shaping the spice economy of the country and in making India a global leader in spice sector. An ISO 9001:2015 certified institution, ICAR-IISR stand testimony to the immense societal benefits from engineering to a creative blend of innovative science, quest for excellence and commitment to national priorities.

ICAR-TAMIL NADU AGRICULTURAL UNIVERSITY
COIMBATORE

ICAR-Tamil Nadu Agricultural University, Coimbatore has been awarded Sardar Patel Outstanding ICAR Institution Award 2021 in the category of Universities. The Tamil Nadu Agricultural University, Coimbatore is one of the most prestigious SAUs in India. It offers a wide array of UG (10), M.Sc. (35) and Ph.D. (30) programs including Nanotechnology and Geoinformatics. TNAU has exhibited its extraordinary brilliance through academic/research outcomes. Unique academic programs infused with practical skills makes TNAU very unique and deserving. TNAU played a lead role in adopting Dual Degree Programs with Cornell University, USA and Dalhousie University, Canada. TNAU students excel in the National level competitive examinations conducted by ICAR, DBT, UPSC etc., During 2021, 122 students have obtained competitive fellowships to pursue their higher education. TNAU registered a h-index of 85 in 2021 which is the highest amongst SAUs. Students and faculty of TNAU have published >280 research papers in high impact journals (NAAS score >6) during 2021. The ICAR ranking has improved from 33 in 2018 to 8 in 2019. TNAU has developed >850 high yielding with special traits which helped in augmenting agricultural productivity in the State amid climate vulnerability. The university demonstrated the smart farming practices encompassing Weather Forecasting, Nanotechnology, Geoinformatics and Drone technology. The University has 14 KVKs networked to deliver technologies at the farm gate to more than 6 lakh farmers. The initiatives to timely price forecast through DEMIC are well appreciated. Considering its commendable accomplishments in all dimensions, Indian Council of Agricultural Research feels proud in awarding the "Sardar Patel Best Institution Award 2021" to Tamil Nadu Agricultural University, Coimbatore, which celebrates its Golden Jubilee Year.

Award 2021

NATIONAL AWARD OF EXCELLENCE FOR AGRICULTURAL INSTITUTIONS

CHAUDHARY DEVILAL OUTSTANDING ALL INDIA COORDINATED RESEARCH PROJECT (AICRP) AWARD 2021

The Council has several All India Coordinated Research Projects (AICRP). In order to recognize the outstanding performance of the AICRP and its cooperating centres for enhancement of agricultural productivity, one award of ₹3.0 lakh (₹2.0 lakh for main coordinating unit and ₹1.0 lakh for the best centre) is given to the All India Coordinated Research Project. The Award has been named after Chaudhary Devi Lal (1914-2001) who had been the Deputy Prime Minister and Agriculture Minister of India. In all 10 eligible applications were received in response to the open advertisement. The details about the winning AICRP along with major achievements are as follows:

ICAR-INDIAN INSTITUTE OF SEED SCIENCE
MAU

The All India Coordinated Research Project on National Seed Project, ICAR-Indian Institute of Seed Science, Mau has been conferred Chaudhary Devilal Outstanding All India Coordinated Research Project Award 2021. Quality seed is numerouno input for sustained agriculture. ICAR launched AICRP on NSP (Crops) in 1979- 80 with mandate to produce breeder seed and to conduct seed technology research. Production of more than one lakh quintal breeder seed surpassing indents at every juncture is a phenomenal achievement under AICRP-NSP (Crops). On seed technology front, research pertinent to development of seed production technologies, safe seed storage methods, PCR based diagnostic kits & management practices for seed borne diseases & insect pests, identification of alternative areas for seed production and unique SSR markers for genetic purity assessments led to notable outcomes, which have been included in Indian Minimum Seed Certification Standards, 2013. Cooperating centers have registered their own brand and are performing effective marketing. Even MoUs for commercialization through private seed companies got a fillip. Seed entrepreneurship development and promotion of SHGs and FPOs are also accentuated. In future, under adept directives of ICAR, AICRP on NSP (Crops) will strive for ensuring adequate availability of quality seed to farmers.

Best performing centers: Considering the performance over the years, **JNKVV, Jabalpur** and **TNAU, Coimbatore** are graded as best performing centers under breeder seed production and seed technology research component, respectively under AICRP-NSP (Crops).

Award 2021

NATIONAL AWARD OF EXCELLENCE FOR AGRICULTURAL INSTITUTIONS

PANDIT DEENDAYAL UPADHYAY KRISHI VIGYAN PROTSHAHAN PURASKAR 2021

Indian Council of Agricultural Research (ICAR) has instituted one National with nomenclature Pandit Deendayal Upadhyay Rashtriya Krishi Vigyan Protshahan Puraskar to promote healthy competition among Krishi Vigyan Kendras (KVKs) for application of science and technology in agriculture, provide incentives for improving the efficiency and performance of KVKs for espousing the cause of farming community and to promote a sense of Institutional pride among KVKs for large scale application of scientific methods and appropriate technologies for enhanced productivity, profitability and sustainability of farming systems. In view of the pivotal role envisaged for the KVKs in the National Missions on Doubling Farmers Income and Building New India, these awards assume special significance. KVKs are playing and shall continue to play key role in ensuring rapid growth, development and transformation of Indian agriculture. Three awards at National level shall be given with total prize money of ₹ 25.0 lakh (I-₹ 10.00 Lakhs, II-₹ 8.00 Lakhs, III- ₹ 7.00 Lakhs) besides Shield, Certificate and Citation.

KRISHI VIGYAN KENDRA
COOCH BEHAR

Krishi Vigyan Kendra, Cooch Behar - Uttar Banga Krishi Vishwavidyalaya, Cooch Behar, West Bengal has been awarded Pandit Deendayal Upadhyay Rashtriya Krishi Vigyan Protshahan Puraskar 2021. The Cooch Behar Krishi Vigyan Kendra exemplifies the quality of an outstanding dedicated institute that possesses immense potential to bring a break-through in the farming scenario in a meaningful way with praiseworthy working spirit, energetic creative talents with tremendous perseverance no matter how demanding and challenging the situation may be. The Krishi Vigyan Kendra in compliance of the mandated activities of technology generation and dissemination process with due consideration of natural resource management, production of seed and planting material, fingerling, mobilizing and nurturing farmers' club and self-help group organizations as also small-scale farm mechanization in a unique consummate style of mentorship is able to enable the dreams of farmers come true.

KRISHI VIGYAN KENDRA
RAMANAGARA

Krishi Vigyan Kendra, Ramanagara, University of Agricultural Sciences, Bengaluru has been awarded Pandit Deendayal Upadhyay Rashtriya Krishi Vigyan Protshahan Puraskar 2021. The KVK is working as resource & Knowledge centre to address the problems of farmers related to major crops and enterprises viz., Finger millet, Minor millets, Red gram, Coconut, Mango, Banana, Vegetables and allied enterprises like Sericulture and Livestock rearing. KVK has adopted Integrated Farming System (IFS) approach in the Whole farm. KVK is demonstrating alternate land use systems like Agri+Silvi+ Horti, Silvi+Horti+Pasture, Agri+Horti and Silvi+Horti systems for maximizing income, suitable for small and marginal farmers. As part of mandated activities, 13 successful on–farm testings (OFTs) comprising 45 technologies and 135 farmers under different crops and enterprises were tested and 30 successful Front-line demonstrations (FLDs) covering 450 farmers were demonstrated with 55% increase in productivity and 69% increase in profitability and 23% reduction in cost of cultivation. Introduction of new high yielding varieties/hybrids in cereals, pulses, fodder has boosted the farmers' income by three to four folds. Appropriate IPDM techniques advocated by KVK has reduced the cost of cultivation & led to the quality production in vegetables and pulses. Introduction of Bhagya and PKM-1 variety of drumstick in the district has resulted in year-round production of drumstick pods and availability in the market, thus hastening the nutritional security. KVK is producing and selling mango & banana special (micronutrient spray-IIHR technology) due to which farmers are obtaining good quality bunches fetching high price and demand in the market. KVK has refined cycle weeder suiting to different types of crop and has sold more than 3900 units in collaboration with department of agriculture. The adoption level is about 58% due to which there is reduced labour dependency, timely operation and effective inter-cultivation and weed management among trained farm families. In addition, induction of fruit fly traps in mango reduced the fruit fly incidence by 52% resulting in additional income by 18%. Thus, KVK has made a significant impact in developing the agriculture and allied sectors of the district.

KRISHI VIGYAN KENDRA
BASTI

Krishi Vigyan Kendra, Basti, Acharya Narendra Dev University of Agriculture & Technology, Ayodhya, Uttar Pradesh has been awarded Pandit Deendayal Upadhyay Rashtriya Krishi Vigyan Protshahan Puraskar 2021 which it shares with Krishi Vigyan Kendra, Gwalior, Madhya Pradesh.There are three categories of farmers in the district namely resource rich, resource poor and landless labourers. This KVK is the only source of latest technical agricultural knowledge in the district and the only platform to impart employment generating vocational training in agri-based activities in the district, development of relevant literature, development and maintenance of demonstrative units on scientific line for providing work experience to the trainees. It also provides practical training facilities to extension functionaries. The KVK also acts as a complementary to the line departments by providing training and skill upgradation of the need personnel (self-help groups) and getting them associated with concerned department for financial assistance and awareness of the other schemes available to the farmers so that the technology / schemes are disseminated to the beneficiaries.

KRISHI VIGYAN KENDRA
GWALIOR

Krishi Vigyan Kendra, Gwalior, Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya, Madhya Pradesh has been awarded Pandit Deendayal Upadhyay Rashtriya Krishi Vigyan Protshahan Puraskar 2021. KVK Gwalior is functioning since 1999 in the district for the improvement in the farming practices and livelihood security among the villagers. KVK not only provide technical information to the needy farmers but also provide several services and inputs to them for adopting the improved technology. Thousands of farmers have been benefitted directly or indirectly by the activities of the KVK, Gwalior. The intervention in terms of improve crop and natural resource management as well as adopting principles of integrated framing system have paid big dividends, KVK has established various demonstration units like vermin-composting, nursery raising and kadaknath poultry rearing which are constantly producing vermi-compost, seedling/ sapling, poultry birds, eggs respectively. KVK has developed a model Agro-technology Part at headquarter for the demonstration of improved farming and water saving practices. Agro-technology Park introduced Kharif onion, better utilization of natural resources and mushroom production technology to improve livelihood security. KVK has also introduced integrated farming system as well as diversified production of horticultural crops for income generation.

Award 2021

NATIONAL AWARD FOR INNOVATIONS AND TECHNOLOGY DEVELOPMENT BY FARMERS

N.G. RANGA FARMER AWARD FOR DIVERSIFIED AGRICULTURE 2021

The Council has instituted the N.G. Ranga Farmer Award for diversified agriculture in order to recognize the distinguished farmers for their outstanding contributions in the field of diversified agriculture. The award is aimed at creative and innovative approaches resulting in enhancement of production and productivity, resource conservation and application of improved farming techniques/practices in different disciplines of agriculture. The award carries a cash prize of ₹ 1.00 lakh and given annually. The award has been named after Late Prof. N.G. Ranga (1900-1995). A total of 45 applications were received in response to the open advertisement, the recipient of award is:

Sh. Sethpal Singh

Nandi Firozpur, District - Saharanpur, Uttar Pradesh

Sh. Sethpal Singh, an innovative farmer from Nandi Firozpur, District - Saharanpur, Uttar Pradesh has been awarded ICAR - N.G. Ranga Farmer Award for Diversified Agriculture 2021. He has developed Machan Vegetable production system and modified Singhara crop geometry and practicing crop rotation with fenugreek which is an innovative concept. He is following the integrated farming system including dairy, fishery, mushroom and Singhara production. He has adopted vermin compost production system and is producing organic vegetables. He has modified the guava and mango high density technology to closer spacing and saved 60 per cent irrigation water by use of fertigation system. Adoption of IPM and IDM practices at farm helps him in the efficient management of insect pests and diseases. The efforts of Shri Sethpal Singh have earned him widespread recognition in the entire agricultural fraternity.

Smt. Padala Bhudevi

Hiramandalam Mandal, District-Srikakulam, Andhra Pradesh

Smt. Padala Bhudevi, a progressive woman farmer from Hiramandalam Mandal, Srikakulam District, Andhra Pradesh has been awarded ICAR - N.G. Ranga Farmer Award for Diversified Agriculture 2021. She started the Guliragi process in agriculture to increase the production of the Ragi crop. The cost of production is reduced due to the use of Ragi in the Guliragi system and the production is 12-14 quintals. She has used Pancha Patra infusion, Dasha Parni infusion and Neem oil Panchagavya infusion to control pests in crops. She also promoted value-added products with millets. Chinnayya Adivasi Vikas Sangham (CAVS), a local NGO in Hiramandalam supported women in the formation of Farmer Producer Organization (FPO). Smt. Padala Bhudevi, as the Director of FPO, leading the organization for empowering the women through value addition of millets as livelihood option. The FPO produces millet products under the brand name of Neelammatalli Bakery. Presently, the Neelammatalli Millet Bakery was supplying ₹ 52,625/- worth of millet biscuits to Anganwadi schools of Integrated Child Development Scheme (ICDS). The unit serves 47 schools in the 38 mandals of Srikakulam. The unit is producing 50-60 kgs millet biscuits in a day. The millet processing unit providing employment for 48 women from Seetampeta and earning a monthly profit of ₹ 60,000. Due to this initiative millet production in the area increased drastically from 500 acres to 3000 acres and farmers are getting a premium price for their produce with 15-20% hike. The efforts of Smt. Padala Bhudevi has earned her widespread recognition in the entire agricultural fraternity.

Award 2021

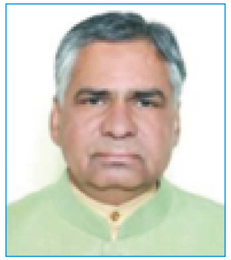
NATIONAL AWARD FOR INNOVATIONS AND TECHNOLOGY DEVELOPMENT BY FARMERS

JAGJIVAN RAM ABHINAV KISAN PURASKAR/JAGJIVAN RAM INNOVATIVE FARMER AWARD 2021

ICAR instituted this award for Innovative farmers in order to recognize the outstanding contribution of innovative farmers for initiatives in development, adoption, modification and dissemination of innovations and improved technologies for increased and sustained productivity, improve resource use efficiency and higher profitability. These awards have been named after Late Sh. Jagjivan Ram (1908-1986) who was the Deputy Prime Minister and Union Minister for Food and Agriculture in the Union Cabinet. Three annual awards of ₹ 1.00 lakh each in any of the areas of agriculture and allied sciences are given. 88 eligible applications were received in response to the open advertisement. The winners are:

Sh. Mohammed Ameerbabu K
District-Malapuram, Kerala

Sh. Mohammed Ameerbabu K, an innovative farmer from Malapuram district, Kerala has been awarded ICAR-Jagjivan Ram Abhinav Kisan Puraskar 2021. The farmer is cultivating his 1.5 acres of land with field crops, horticultural crops, agroforestry, dairying, and fisheries. Shri Mohamed Ameerbabu has adopted new technologies like Organic manure production, Automated irrigation system, Polyhouse cultivation which includes salad cucumber, cowpea, tomato etc., open precision farming, floriculture (marigold and sunflower), and also cultivated cool-season vegetables like cabbage, onion, carrot, and beetroot along with Poultry farming also. He modified the check dam in Naaranath Chira by renovating it. He used transplanter, tractor-mounted furrower, and bund former in his farming. The crops which he had cultivated are Paddy, Amorphophallus, Watermelon, OP melon, and Cucurbit vegetables with high productivity levels. Innovative interventions like sequential cropping, crop rotation and polyculture farming, new package practices, technology dissemination and farmer services through social media, and Prevention of outbreak of disease and pests through Ecological Engineering.



Sh. Surendra Awana

District-Jaipur, Rajasthan

Sh. Surendra Awana, a progressive farmer from Jaipur, Rajasthan has been awarded ICAR-Jagjivan Ram Abhinav Kisan Puraskar 2021. He is cultivating his 17 hectares of land with field crops, horticultural crops, agro-forestry, dairying, and fisheries. For organic farming, he has been producing 750 tons of bio-fertilizers per year, 4000 L/year of bio-pesticide, 200 tons of vermin-compost per year. He received Gopal Ratna Award 2021 on National Milk Day celebrated on 26.11.2021 by the National dairy Development Board, Govt. of India. He was also awarded with the Innovative Farmer Award on 27.02.2021 in Pusa Krishi Vigyan Mela by the ICAR-New Delhi for his admirable works.

Sh. Ravindra Manikrao Metkar

District-Amravati, Maharashtra

Sh. Ravindra Manikrao Metkar, a progressive farmer from Amravati, Maharashtra has been awarded ICAR-Jagjivan Ram Abhinav Kisan Puraskar 2021. He is involved in the cultivation of pulses, horticultural crops and agroforestry and has adopted organic cultivation. He cultivated paddy Var Pusa-1692, Pigeon pea Var Pusa-16, Pusa 991 & 992, and Wheat Var HD-32256. This shows his proactiveness in adopting new technologies generation through ARS. He is also following IPM, and INM technologies. The improved technologies employed by him include indoor vertical farming, greenhouse farming, tractors with all types of equipment required for farming, automatic watering, drip system, remote sensing irrigation system, and organic agriculture. He organized a farm mela at his farm to create awareness about water conservation through drip irrigation. In 2017-18, he produced cotton 37.50 Quilted/Hector duly the same year, all other farmers were facing the problem of pink bollworm but as he used the poultry manure as the fertilizer, the pink bollworm infection found negligible. In addition to farming, Sh. Metkar has 1.5 lakh poultry birds and is selling 90,000 eggs daily and earning huge profits. He established a poultry feed mill for preparing 13 tonnes of feed daily using farm produce from villagers. Sh. Metkar developed a new technology in poultry farm. He constructed silo system to fulfill the daily requirement of twenty-thousand-kilogram feed, which is required for rearing 100000-layer birds. Silo system saved 90% labour cost. A conveyor belt system is used to shift the feed from silo pit to poultry shed. Due to his efforts, he is very well recognized by the farming community of the area.

Award 2021

NATIONAL AWARD FOR INNOVATIONS AND TECHNOLOGY DEVELOPMENT BY FARMERS

PANDIT DEENDAYAL UPADHYAY ANTYODAY KRISHI PURASKAR AWARD 2021

In order to recognize the contributions of marginal, small and landless farmers for developing sustainable integrated models of farming, the ICAR has instituted Pandit Deendayal Upadhyay Antyodaya Krishi Puraskar annually. Three awards comprising of ₹ 1,00,000/- (Rupees One Lakh only) besides Memento, Certificate & Citation are to be given annually. This year 53 applications were received through an open advertisement.

Sh. Kundan Lal
District-Mandi, Himachal Pradesh

Sh. Kundan Lal, a progressive farmer from Mandi district, Himachal Pradesh has been awarded ICAR-Pandit Deendayal Upadhyay Antyodaya Krishi Puraskar 2021. He is a small farmer with a meagre of one acre of land. He has become a role model for his integrated farming system model that not only secured the livelihood but also a source of inspiration for other fellow farmers. Flower cultivation under protected structures, fruit production, off season vegetable cultivation, dairy, bee-keeping, sericulture, azolla production, vermi-compost production and round the year mushroom cultivation are the major components of his farming model. He is a brilliant master trainer involved in upscaling the improved Agri-technologies especially of mushroom cultivation among the farmers in the state of Himachal Pradesh and has trained more than two thousand farmers across the state in mushroom cultivation.

Sh. Devajit Changmai
District-Dhemaji, Assam

Sh. Devajit Changmai a progressive farmer from Dhemaji district, Assam has been awarded ICAR-Pandit Deendayal Upadhyay Antyodaya Krishi Puraskar 2021. Sh. Changmai is an early adapter of technology. After he came into contact with KVK, Dhemaji, he was exposed to different technologies through training, demonstration, technology testing, exposure visits, meetings, workshop and personal contacts. He observed that cultivation of local cultivars like paddy was not profitable and practice was subsistence in nature. He felt the need of high yielding varieties and approached KVK, Dhemaji. He adopted Horti-fish-poultry integrated farming system in his backyard. Considering the limitation of land area for the system he refined the system by incorporating a small nursery for planning material generation along with low-cost polyhouse for offseason vegetable cultivation under horticulture component. This has become a model for other resource limited small and marginal farmers of the district.

Sh. Suresh Vishwanath Patil
District-Belagavi

Sh. Suresh Vishwanath Patil, a progressive farmer from Belagavi has been awarded ICAR-Pandit Deendayal Upadhyay Antyodaya Krishi Puraskar 2021 which he shares with Smt. Bindu Joseph, Kerala. Sh. Patil focused on optimizing agricultural output from the same piece of land by using available resources and modern technologies which really worked well. Meanwhile developed and created side allied business including animal husbandry, open herd, vermicompost, green fodder (silage machine), agriculture equipment (works without energy) and rainwater harvesting system. He has been educating farmers about new techniques through examples, practical demonstrations and sharing technical literatures and conducting various seminars, newspaper publications and social media.

Smt. Bindu Joseph
District-Kozhikode, Kerala

Smt. Bindu Joseph, a progressive women farmer from Kozhikode, Kerala has been awarded ICAR-Pandit Deendayal Upadhyay Antyodaya Krishi Puraskar 2021. She has a plant nursery which was initially started with a few plants in 36 cents of own land around the house which soon became a roaring success, even in faraway places of Kozhikode. In addition to the commercial horticultural nursery, they mainly practice coconut-based farming with black pepper, nutmeg, ginger, turmeric, tubers, vegetables, banana and other fruit plants as intercrops.

Other enterprises practiced are rubber, ornamental fish culture and vermiculture. Water harvesting pits are also taken in different parts of the farm for soil and water conservation. She faced problems like lack of technical know-how, insufficient land for nursery expansion, poor marketing channels etc. With the technological interventions of KVK Calicut for production of quality planting materials, imparting knowledge in scientific farming, guiding for local and distance sales. Another highlight is the cost saving of about ₹ 2.5 lakhs in the production of nursery plants as well as farm operations using family labour.

NATIONAL AWARD FOR INNOVATIONS AND TECHNOLOGY DEVELOPMENT BY FARMERS

HALDHAR ORGANIC FARMER AWARD 2021

In order to recognize the outstanding contributions of the farmers in the area of organic farming, ICAR has instituted an annual award titled Haldhar Organic Farmer Award. One annual award consists of the Cash Prize of ₹1,00,000/- (Rupees One Lakh only), Citation and the Certificate. Any farmer involved in organic farming and related activities in the area of field/horticultural/medicinal crops, milk production and allied activities, with at least 5 years of experience is eligible. This year 39 applications were received through open advertisement.

Sh. Manoj Purushottambhai Solanki

District-Kuchch, Gujarat

Shri Manoj Purushottambhai Solanki, an innovative farmer from Kuchch, Gujarat has been awarded ICAR-Haldhar Organic Farmer Award 2021. The farmer has been doing organic Natural or Zero Budget farming since 2011 onwards. The farmer is cultivating his 26 hectares of land with filed crops (23ha), horticultural crops (4ha), agro-forestry (l ha) and rearing of 400 nos. of Desi Kankrej Breeds. For organic farming he has been producing 1250 tons of bio-fertilizers per year, 5000 L/year of bio-pesticides, 250 tons of vermin-compost/year, 11000 Lt/year, 40-ton Enzyme Mixture, 2300 lit/pH Stabilizer, 15000Lt Jeevaamruit and Bijaamrut annually at his own unit. He has invented Bullock drawn ploughing, Hoeing and weeding machine. He got Certification as Organic Land from IMO Organic Certification Agency, which resulted in increased productivity as well as profitability with less expenditure and get quality production, also by using other organic resources which is effective for making his land more fertile with having organic carbon of more than 1.24 which was less than 0.2 in before 2015 which resulted in increasing sustainability and also helps in disease control. In his farm he developed Organic pesticides (Neem Ark, Bio-Enzyme Waste Decomposer) and used it to control insect, pest and diseases. He used Farm Yard Manure (FYM), Vermi-Wash & composting in horticulture crops. He is very innovative and adopting new technologies on his farm and use of Drip Irrigation, Solar Water Pump, Solar System for House, Biogas, Vermicompost, compost (Indore method), Jivamrit Waste Decomposer, Super Composter Machine, Neem Cake and Oil Machine, and Modem Dairy Farm. He is also promoting the cow dung-based products at his farm and also motivating to the rural backward people to make some money from cow dung which could be not aware about them earlier. He is having very vast experience in indigenous technology for organic farming on the basis of zero-budgeting and also producing biofertilizer and biopesticides; harvesting rain water for farm and collecting it in pond for use in critical irrigation and use of biogas plant for cooking the food in home. The farmers, extension workers, Scientists from nearby area visit the farmers' field for learning the technology and inventions done by him, especially bio-fertilizers for organic farming, bio-pesticides to control insect-pest of field and horticultural crops; and quality fodder dairy animals which enhance the milk production of Kankrej cattle; vermicomposting. He has invented Bullock drawn ploughing, Hoeing and weeding machine. He established to his market outlet known as "Sanjivani Store" at Madhapar town where the farmers may come and visit the shop and procure the needed items including Biopesticide, Bio Fertilizers, Vermiwash, pH stabilizer, Compost, PROM, Super Compost, Cow Dung Based products, Milk and Ghee on reasonable price. Recently he also starts the marketing through mobile, through farmers may access their price and detailed of the product through WhatsApp only and place their order through the phone also. Furthermore, he also established soil and water testing lab at his own level and also offer the services to the farmers of district as well as nearby district in technical supervision of KVK Kukma. More than 3500 farmers till date have been witnessed of his natural zero budget farming and experience personally for 3 days free of cost training programme organized particularly on 12, 13 &14 date of every month jointly in collaboration with CAZRI, KVK. Presently, 111 farmers are closely associated with Shri Manoj Bhai and all are doing natural farming in 1 acre of land initially under the close supervision of him as well as teams of KVK and they also witness the significant results in their farming. He has received certificate of appreciation from CAZRI -Krishi Vigyan Kendra, Kukma, and Department of Agriculture, Kutch.

Dr. Mohammed Idris Ahmed Quadri

District-Bidar, Karnataka

Dr. Mohammed Idris Ahmed Quadri, from Bidar district, Karnataka has been awarded ICAR-Haldhar Organic Farmer Award 2021. Dr. Quadri has been practicing organic farming since the last 15 years and has a vast experience of over 50 years in agriculture and allied activities. He has developed new technologies like slurry digestor, poisonous plant extract for pest management, calves feeding tub, animal lifting device, wheat cutter, manure grinding and mixing machine, innovative inter-cropping in sugarcane etc. Solar system for water pumps and street lights, sugarcane eye buds cutting machine, animal deterrent device, combined seed cum fertilizer drill are some of the modern technologies adopted by him. His contribution towards organic farming and humanitarian services have granted him widespread recognition.

Award 2021

NATIONAL AWARD FOR EXCELLENCE IN AGRICULTURAL RESEARCH

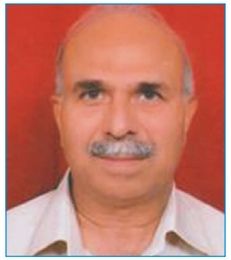
RAFI AHMED KIDWAI AWARD FOR OUSTANDING RESEARCH IN AGRICULTURAL SCIENCES 2021

The Council has instituted the Rafi Ahmed Kidwai Award for Outstanding Research in Agricultural Sciences in order to recognize outstanding research in agricultural and allied sciences and provide incentives for excellence in agricultural research. This award is to be given to agricultural scientists for outstanding contribution in specific areas defined as: (1) Crop and Horticultural Sciences; (2) Natural Resources Management and Agricultural Engineering; (3) Animal and Fisheries Sciences and (4) Social Sciences. A total of four awards are assigned one each in theabove areas. Each award consists of ₹5.00 lakh in cash. All Indian Scientists engaged in agricultural research and overseas Indian scientists working in the area relevant to Indian agriculture are eligible for these awards. The award has been named after Late Sh. Rafi Ahmed Kidwai (1894-1954) who was the president of ICAR from 1952-1954. This year 77 applications were received in response to the open advertisement and the winners with their contributions are:

Dr. Ajoy Kumar Roy
Principal Scientist (Genetics) & Project Coordinator,
AICRP on Forage Crops & Utilization, ICAR-IGFRI, Jhansi

Dr. Ajoy Kumar Roy, Principal Scientist (Genetics) & Project Coordinator, AICRP on Forage Crops & Utilization, ICAR-IGFRI, Jhansi has been awarded for Rafi Ahmed Kidwai Award for Outstanding Research in Agricultural Sciences 2021 in the category of Crop & Horticultural Sciences. Forage plant Genetic Improvement is a difficult area which has not been given due attention despite its important role in animal productivity and ecological services. During the last 3 decades, Dr. A.K. Roy has made significant contributions through various multi-disciplinary institute level and external funded projects. The forage genetic resources were enriched especially in perennial range crops and annuals such as oats, Trifolium, Medics, Stylos, etc. through explorations and selective introduction of exotic germplasm which were evaluated using morphological, biochemical, cytological, molecular markers, and nutritive parameters and documented in the form of 7 catalogues. Wild relatives and germplasm were utilized by conventional and biotechnological tools to transfer desired traits and develop varieties and widening the genetic base. New Protocols were developed, and many reports were first global reports in the respective areas. First report of SSR markers in Barseem developed. 19 improved varieties developed, 25 novel genetic stocks registered as well as >100 papers in national and international reputed referred journals. The technologies were developed and also popularized and are well adopted as evidenced by the national seed chain as well as demand.

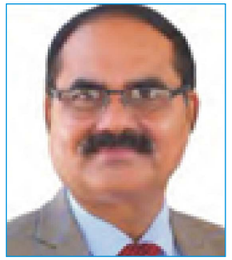
CROP & HORTICULTURAL SCIENCES



Dr. Parbodh Chander Sharma
Principal Scientist (Crop Science) &
Director, ICAR-CSSRI, Karnal

Dr. Parbodh Chander Sharma, Principal Scientist (Crop Science) & Director, ICAR-CSSRI, Karnal has been awarded for Rafi Ahmed Kidwai Award for Outstanding Research in Agricultural Sciences 2021 in the category of Crop & Horticultural Sciences. Dr. PC Sharma have devoted almost 3 decades to pursued innovative and pioneering research on (i) development of salt tolerant varieties/Genetic stocks/Innovative conceptual technologies/ methodology/models (ii) conservation and climate smart agriculture, (iii) Software and APP for crop management and precision agriculture, and (iv) Farming system/multi-Enterprises model which are aligned with each other and has complementarity. He is instrumental in developing 3 mustard varieties (CS 56, CS 58 and CS 60), two lentil variety (PDL 1 and PSL 9), a number of rice (CSR 46, CSR 56, CSR 49, CSR 60, CSR 52 and CSR 76) and wheat varieties (KRL 283). All these rice varieties are contributing to national food production and providing gainful return to the rice farmers cultivating in the saline conditions. Besides, he has contributed immensely to develop and popularize the conservation agriculture in the country. His contributions have been recognized through publications in highly reputed journals like Science.

NATURAL RESOURCE MANAGEMENT & AGRICULTURAL ENGINEERING



Dr. Ashok K. Patra
Director, ICAR-IISS, Bhopal

Dr. Ashok K. Patra, Director, ICAR-IISS, Bhopal has been awarded for Rafi Ahmed Kidwai Award for Outstanding Research in Agricultural Sciences 2021 in the category of Natural Resource Management and Agricultural Engineering. Dr. Patra have made pioneering basic and applied research on nitrogen dynamics in soil-plant-environment under different agro-ecosystems. He has developed a procedure for bromide (B--) extraction and estimation as a tracer (instead of costly 15N) for studying nitrate -N movement/leaching in soil and water. Using tracers, quantified N-transformations in major soils of India. Using lysimeters under intensive legume-based forage production system, quantified for the first time that leaching of nutrients during large storms is a major constraint in the semiarid regions. Unraveled for the first time that N supply from soil is strongly influenced by interactive effects of soil management, organic matter fractions, depth and weather conditions. He has established encapsulated calcium carbide (ECC) as a nitrification-denitrification inhibitor-that C2H2, which slowly released from ECC and inhibits activity of ammonia mono-oxygenase, is associated with reducing population of the ammonia oxidizing bacteria in soil. Developed soil quality index (SQI) and SQI Cal software for rapid assessment and mapping of soil quality. He has also developed a digital portable mini-lab *Mridaparikshak* for quantitative assessment of 15 soil parameters, which has been widely adopted in India for soil health assessment, fertilizer advisory and preparation of soil health cards. Significantly contributed to develop soil fertility maps for effective distribution and management of fertilizers in the country, and rapid composting technologies (*in situ* and *off situ*) with efficient microbial consortia. He has also made a significant contribution for mass aware nest of the importance of soil health and its management, for which FAO has conferred King Bhumi Bol World Soil Day 2020 Award to ICAR-IISS, Bhopal.

NATURAL RESOURCE MANAGEMENT & AGRICULTURAL ENGINEERING

Dr. Rajbir Singh
Director, ICAR-ATARI, Ludhiana

Dr. Rajbir Singh, Director, ICAR-ATARI, Ludhiana has been awarded for Rafi Ahmed Kidwai Award for Outstanding Research in Agricultural Sciences 2021 in the category of Natural Resource Management and Agricultural Engineering. Dr. Rajbir Singh has devoted over two and half decades to intensively research work to develop, validate and promote conservation agriculture (CA) based practices and management of natural resources for sustainably increasing agricultural productivity and income. The research conducted by him in the field of plasticulture, water management, conservation agriculture, and climate-smart agriculture (CSA) has made a significant impact at scale and received wide applications. Dr. Singh is instrumental in the dissemination of resource conservation technologies (Happy Seeder sown wheat, direct-seeded rice) in planes of northern India for the sustainability of rice-wheat system and impacted at scale. Based on his significant research with practical findings and drive to work with farmers for impact, the area under climate-smart agricultural practices has increased exponentially during Covid-19. He is instrumental in development and establishment of Custom Hiring Centres (CHCs) in 22 KVKs of Punjab for promoting entrepreneurship development among rural youth. This unique model facilitates hands on training to farmers besides provide machine for in-situ management of paddy straw. His sincere efforts led to piloting of Climate Smart Model Villages across the states of Punjab, Himachal Pradesh and Jammu & Kashmir. His outstanding research publications include over fifty articles in high-rated journals having 3924 citations and h-index of 26.

ANIMAL & FISHERIES SCIENCES

Dr. Samit Kr. Nandi
Professor and Former Head, Dept. of Veterinary Surgery & Radiology,
West Bengal University of Animal & Fishery Sciences, Kolkata

Dr. Samit Kumar Nandi, Professor and Former Head, Department of Veterinary Surgery & Radiology, West Bengal University of Animal & Fishery Sciences, Kolkata has been awarded for Rafi Ahmed Kidwai Award for Outstanding Research in Agricultural Sciences 2021 in the category of Animal & Fisheries Sciences. Professor Samit Kumar Nandi has made a path-breaking contribution in developing affordable biomaterials-based strategies for the treatment of orthopaedic, cartilage, diabetic wound, dental problems using calcium phosphate scaffold and cement including doped, 3-D printed tricalcium phosphate scaffold, marine-based materials, magnesium phosphate, and silicate materials, ceramic glass-coated metallic implants, surface-modified and bioactive glass-coated titaniumim plants, fluorcanasite glass-ceramic reinforced degradable resin, fish collagen, xenogenic cartilage, waste eggshell membrane, dental implants, and local antibiotic delivery systems in the animal models which have immense impact in complicated animal and human clinical cases. His research findings for reducing bovine lameness have opened a new horizon for obtaining optimum productivity for rural dairy farmers. The application-oriented work on developing biodegradable magnesium alloy-based bone plate, silk-based biomaterial for diabetic wound healing, cartilage tissue engineering, bone repair, artificial vascular graft has shown a new insight into biomedical research vis-à-vis the national healthcare program.

Dr. Atmakuri Ramakrishna Rao
ADG (PIM), ICAR Hqrs., Krishi Bhawan, New Delhi

Dr. Atmakuri Ramakrishna Rao, ADG (PIM), ICAR Hqrs., Krishi Bhawan, New Delhi has been awarded for Rafi Ahmed Kidwai Award for Outstanding Research in Agricultural Sciences 2021 in the category of Social Sciences. Dr. Rao has made significant research contributions in the fields of Agricultural Statistics and Bioinformatics, which have received wide acceptance and appreciation both at National and International level. His endeavours in development of algorithms have led to unravel underlying mechanism of splicing in important plant and animal species. Novel procedures developed by him in statistical genetics and population genomics, involving multivariate and machine learning techniques, are effectively utilized for simultaneous selection of genotypes for high yield and stability, generation of core and mini-core sets germplasm, predicting antimicrobial peptides, insecticide & herbicide resistant proteins, DNA barcode-based identification of species, etc. His association in recent findings on detection and estimation of wheat spikelets by Artificial Intelligence from visual image processing is noteworthy. He has efficiently translated lab-based research findings to breeders and biotechnologists working in genomics assisted breeding programmes through development of large number of databases and web application servers. The computational insight provided by him into RNAi-based therapeutics for foot and mouth disease of cattle is a recent contribution in animal sciences. He has provided able leadership in establishing centralized supercomputing facilities with outstanding analytical support to research scientists for discovering omics knowledge in agriculture. Dr. Rao has published 141 research papers in peer reviewed national and international journals of repute; 1 Book; 2 e-Books; 3 Manuals. He has 14 copyrighted software to his credit. He has guided 6 Ph.D. and 7 M.Sc. students as Chairman in the disciplines of Agricultural Statistics and Bioinformatics. For his outstanding contributions, Dr Rao has been conferred with "Recognition Award" in Social Sciences by National Academy of Agricultural Sciences; "Bharat Ratna Dr. C. Subramaniam Award for Outstanding Teachers" by ICAR; Professor PV Sukhatme Gold Medal Award by Indian Society of Agricultural Statistics (ISAS); Best Teacher Award in Agricultural Higher Education by IARI; Overseas Associateship (Long Term) by DBT. He is Fellow of National Academy of Agricultural Sciences, Indian Society of Agricultural Statistics, Indian Society of Genetics and Plant Breeding, Society of Applied Biotechnology. He held the position professor (Bioinformatics) at IARI during 2016-2020. He is a senior Editorial Board Member, Scientific Reports, Nature Publishing Group.

SOCIAL SCIENCES

Dr. Mahesh Chander
Principal Scientist & Head, (Div. of Extn. Education),
ICAR-IVRI, Izatnagar

Dr. Mahesh Chander, Principal Scientist & Head, (Div. of Extn. Education), ICAR-IVRI, Izatnagar has been awarded for Rafi Ahmed Kidwai Award for Outstanding Research in Agricultural Sciences 2021 in the category of Social Sciences. Dr. Chander has undertaken the project entitled "A Swot Analysis of Organic Livestock Production In India"implemented during 2005-06-2011-12, to find out the training needs of farmers, input use in agriculture particularly in livestock production, demand and supply avenues for organic livestock products, strengths, weaknesses, constraints and possibilities with respect to organic livestock production in India. This demand driven research project could narrow the information, Knowledge and data gaps in an evolving filed like organic animal husbandry, since the available information in Indian context is almost negligible considering the internationally recognized norms for organic production as prescribed by among others FAO, CODEX, EU, NOP & APEDA. The information so generated & synthesized is useful for farmers, processors and exporters to cash upon the opportunity of exporting high quality organic food products of animal origin. The experience gained under this project including several publications emerged has been helpful to several international agencies and Government of India bodies like NAB, APEDA, BIS, FSSAI, ICAR Education division. Government of Bhutan and states of Sikkim & Rajasthan among several others. The experience gained helped in designing and developing the master's course approved recently by ICAR. The work done has triggered further research & development activities including development of package of practices on organic production, which could be helpful to researchers, academics, policy planners and development departments.

Award 2021

NATIONAL AWARD FOR EXCELLENCE IN AGRICULTURAL RESEARCH

LAL BAHADUR SHASTRI OUTSTANDING YOUNG SCIENTIST AWARD 2021

The Council has instituted the Lal Bahadur Shastri Outstanding Young Scientist Award in order to recognize the talented young scientists who have shown extraordinary originality and dedication in their research programmes. Four individual awards are given annually across the disciplines, limited to only one award in4 subject areas(Crops and Horticultural Sciences, Natural Resources Management and Agricultural Engineering, Animal and Fisheries Sciences, and Social Sciences). An individual award of ₹ 1.00 lakh in cash and a challenge project for three years with budgetary provision of ₹ 10.00 lakh per year, ₹ 5.00 lakh for foreign training (3 months). All young scientists who possess a doctoral degree and are below 40 years of age, and hold a regular teaching, research, extension education job in the ICAR-SAU system of institutions and engaged in research in agricultural and allied sciences for at least five years continuously are eligible for consideration. The award has been named after Late Sh. Lal Bahadur Shastri (1904-1966) the former Prime Minister of India who gave the slogan 'Jai Jawan Jai Kisan'. This year 60 applications were received in response to the open advertisement and the winners are:

Dr. Koushik Chakraborty
Scientist (Sr. Scale), ICAR-National Rice Research Institute
Cuttack, Odisha

Dr. Koushik Chakraborty, Scientist (Sr. Scale), ICAR-National Rice Research Institute, Cuttack has been awarded Lal Bahadur Shastri Outstanding Young Scientist Award 2021 in the category of Crop & Horticultural Sciences. As a plant physiologist, he is actively associated with basic, strategic and applied research for crop improvement for marginal farmers of inland and coastal saline areas. He had identified and registered seven (07) unique rice germplasms having distinctive tolerance abilities of different abiotic stresses (salinity, anaerobic germination, stagnant-flooding) and two (02) unique groundnut germplasm having facultative CAM-transition property under severe drought and salinity conditions. Two of the identified rice accessions having multiple abiotic stress tolerance potential, is being used for understanding the tolerance mechanism and identification of novel gene/QTL for simultaneous occurrence of multiple abiotic stresses in rice. He was also associated with development of two rice varieties, one suitable for coastal saline area and the other a high protein variety in the genetic background of mega rice variety Swarna. The original work contributed by him resulted in significant advancement of understandings on salt-tolerance mechanism in rice and oilseeds. His works elucidated the membrane ion transport mechanism and role of different transporters/ion channels/pumps in stage- and tissue-specific salt tolerance strategies of rice and mustard. The fundamental knowledge developed, and unique germplasms identified are currently being used for discovery of novel genes/QTLs and development of climate resilient rice varieties particularly for problem-stricken (coastal saline) areas.

NATURAL RESOURCE MANAGEMENT & AGRICULTURAL ENGINEERING

Dr. Rahul Tripathi
Sr. Scientist, ICAR-National Rice Research Institute,
Cuttack, Odisha

Dr. Rahul Tripathi, Sr. Scientist, ICAR- National Rice Research Institute, Cuttack has been awarded Lal Bahadur Shastri Outstanding Young Scientist Award 2021 in the category of Natural Resource Management & Agricultural Engineering. The research work focused on real time site specific nutrient management, carbon sequestration, soil quality and ecosystem services under the rice based cropping system. He has developed innovative and cost-effective management options to restore soil health particularly under changing climatic scenario. He delineated management zones to address spatial variability of nutrients for precise nutrients management for different areas in India. His study revealed that long term application of chemical fertilisers and organic manures increased the water stable macro aggregates, aggregate associated carbon and nitrogen along with enhancing soil carbon sequestration, moderates GHG emissions, and sustained rice yield. He made valuation of the ecosystem services from rice fields and also evaluated the variations in ecosystem services in response to spatial and temporal changes in land use land cover. He was involved in developing android apps like 'RiceXpert', 'riceNxpert', 'Rice Crop Manager' and satellite-based N management strategy. He also prepared atlas for soil micronutrients and secondary nutrients for Madhya Pradesh and Odisha and developed customized leaf color chart which is commercialized, and widely popularized (> 2 lakhs units sold).

ANIMAL & FISHERIES SCIENCES

Dr. Naresh L. Selokar
Scientist (SS), ICAR-National Rice Research Institute
Cuttack, Odisha

Dr. Naresh L. Selokar, Scientist, ICAR- National Dairy Research Institute, Karnal has been awarded Lal Bahadur Shastri Outstanding Young Scientist Award 2021 in the category of Animal & Fisheries Sciences. Dr. Selokar has been working on different assisted reproductive techniques in buffalo, particularly animal cloning, to produce elite genetic stocks for the breeding purpose to improve its genetic potential. During his research studies at ICAR-National Dairy Research Institute, Karnal, India, he has contributed to optimize an economical and efficient animal cloning technique called hand-made (HMC) cloning in buffalo. Since the optimization of HMC (2008 onwards), more than 25 cloned buffaloes produced using this simplified technique, and proved established buffalo cloning technique in India. At present, the technique is being regular in use to produce more cloned and transgenic buffaloes. In addition, he has proved a novel concept of recreation dead progeny-tested bulls by producing cloned calves from somatic cells cultured from frozen-semen doses (Selokar et al., 2014, PLoS One. 10;9(3): e90755). In 2013, He joined as a Scientist at the ICAR-Central Institute for Research on Buffaloes, Hisar, Haryana; and played a key role to translate buffalo cloning technique from NDRI to CIRB. And, now CIRB becomes a lead center for buffalo cloning research. Through his continuous efforts, CIRB has produced two cloned breeding bulls, namely Hisar-Gaurav (Murrah bull) and Sach-Gaurav, a cloned bull of Assamese buffalo in the field, 100 km away from the laboratory. Also, more than 20 progenies were produced from Hisar-Gaurav semen and their performance assessment studies are ongoing. Through his efforts, the cloning technology has also been transferred to the field, and now it is possible to clone the buffaloes at the farmers' doorsteps. His scientific expertise has been employing to produce quality breeding bulls, which can significantly contribute to establish 'Cloned Bull Mother Farm' for genetic improvement of India's buffalo population. Very recently, CIRB has produced 7 clones of superior bull M29, and a re-cloned calf of Hisar-Gaurav cloned bull. And, at NDRI, three cloned bulls are produced, and they are alive and growing well. In addition to this, in 2020, he has initiated CRISPR editing projects to improve buffalo's production potential and its induceddisease resistance. In addition to buffalo cloning, he has also been well versed with the other assisted reproductive techniques such as in-vitro embryo production (IVF), embryonic andadult stem cell research, cryopreservation of somatic cells (established somatic cell bank of elite buffaloes at CIRB), oocytes and embryos, ultra-sonography, artificial insemination and embryo transfer in buffalo.

SOCIAL SCIENCES

Dr. Shivendra Kumar Srivastava
Scientist, ICAR-National Institute of Agricultural Economics and Policy Research (NIAP), New Delhi

Dr. Shivendra Kumar Srivastava, Scientist, ICAR-National Institute of Agricultural Economics and Policy Research (NIAP), New Delhi has been awarded Lal Bahadur Shastri Outstanding Young Scientist Award 2021 in the category of Social Sciences for his outstanding contribution to aiding policy discourse and research endeavors through evidence based insights, new approaches, multi-disciplinary procedures and innovative techniques, and inferences out of policy and technology evaluation on sustainable and profitable agricultural growth under changing socio-economic, technological and policy environment to ensure food and nutritional security on a continuous basis. His significant contributions are in the form of outlining contours of changing food production and consumption environment, maneuvering regional approaches (identification of agriculturally disadvantageous regions, suggesting regional crop plans) for sustainable development in agriculture, devising innovative techniques to monitor groundwater use in crop production (volumetric assessment), evaluating effects of removing power subsidy on groundwater savings and cropping pattern (in Punjab), identifying the underlying causes of rising production cost and diminishing profitability, assessing effects of substitution between labour and machine on crop profitability, establishing direct association between technological improvement and reduction in production cost, assessing the effects of dietary diversification on calorie intake, foresighting likely effect of direct cash transfer of food subsidies over in-kind transfer through PDS on calorie-intake, etc. He extended concerted efforts in effective communication of research findings and imparting training to various stakeholders.

Award 2021

NATIONAL AWARD FOR EXCELLENCE IN AGRICULTURAL RESEARCH

PANJABRAO DESHMUKH OUTSTANDING WOMAN SCIENTIST AWARD 2021

In order to recognize and encourage the women agricultural scientists for their outstanding research contribution in agriculture and allied sciences, the ICAR has constituted Panjabrao Deshmukh Outstanding Woman Scientist Award. One annual award is meant exclusively for outstanding women agricultural scientists. The award consists of ₹1.00 lakh in cash. All women scientists engaged in research in agricultural and allied subjects/extension in a recognized institution are eligible. The awards are exclusively meant for individual woman scientists. The award has been named after Late Sh. Panjabrao Deshmukh (1898-1965) who was Minister of Agriculture in the first cabinet of Pt. Nehru in 1952. This year 29 applications were received in response to the open advertisement. The awardees are:

Dr. Sushila Maan
Principal Scientist & Head,
Deptt. of Animal Biotechnology, College of Veterinary Sciences,
Lala Lajpat Rai University of Veterinary & Animal Sciences, Hisar

Dr. Sushila Maan, Principal Scientist & Head, Deptt. of Animal Biotechnology, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary & Animal Sciences, Hisar has been awarded Panjabrao Deshmukh Outstanding Woman Scientist Award 2021. She is recognized for her vital contributions to the extraordinary high impact success of bluetongue virus (BTV) and other pathogens' research and surveillance. Her pioneering work includes the development of innovative next generation sequencing techniques, identification of seven new Orbivirus species and the 26th serotype of BTV. She has developed advanced molecular diagnostic systems for pathogens of livestock and wildlife importance, which has led to the isolation and identification of new BTV serotypes (BTV-4, 5, 12 and 24) for the first time in India. She has demonstrated co-circulation and emergence of multiple BTV serotypes, along with the introduction of exotic viruses thus changing the identity of the dominant strains causing recent outbreaks, potentially reducing the wider efficacy of current pentavalent vaccines being used in India. Additionally, concurrent infection with multiple pathogens has been detected through her recent work, causing complexity in reliable diagnosis. Responsive molecular strategies of virus strain identification developed by scientist would help to ensure/improve the diagnosis and the efficacy of the ongoing vaccines to protect against risks posed by a changing compliment of viruses in current circulation eventually leading to improved animal health, poverty reduction and sustainable livelihoods of poor livestock farmers and farming communities of India.

Dr. (Mrs.) Kambham Madhavi Reddy
Principal Scientist & In-charge Head,
Division of Vegetable Crops, IIHR, Bengaluru

Dr. (Mrs.) Kambham Madhavi Reddy, Principal Scientist & In-charge Head, Division of Vegetable Crops, IIHR, Bengaluru has been awarded Panjabrao Deshmukh Outstanding Woman Scientist Award 2021. She is involved in the development of CGMS based high yielding chilli F1 hybrids viz., Arka Meghana, Arka Harita, Arka Sweta and Arka Khyati suitable for varied market segments. Three among them were released for commercial cultivation at National level by AICRP (VC); and Arka Harita for its cultivation in Karnataka. Also, engaged in commercial seed production of these chilli F1 hybrids in the farmers? fields under Seed Village Concept since 2015. The women laborers were trained regularly in crossing techniques utilizing CGMS lines. CGMS based F1 seed production of chilli hybrids, have given excellent seed yield of 60-80 g per plant in Haveri district of Karnataka and the farmers could fetch a net profit of ₹1 ,50,000 from a net size of 80x100 mtrs. Because of use of powdery mildew resistant CGMS line, the seed yield obtained was good with less input cost (labor & pesticides). Realizing the demand for these chilli hybrids, the seedling production got commercialized by the private entrepreneurs and also the parental lines of the hybrids have been licensed to private seed industry on non-exclusive basis. Recently, developed CGMS based chilli leaf curl virus (ChLCV) resistant F1 hybrids viz., Arka Tejasvi, Arka Yashasvi, Arka Saanvi, Arka Tanvi and Arka Gagan; and the hybrids have entered AICRP (VC) trials and also state varietal evaluation trials during 2021.

Dr. Sonu Gandhi
Scientist-D,
National Institute of Animal Biotechnology,
Hyderabad

Dr. Sonu Gandhi, Scientist-D, National Institute of Animal Biotechnology, Hyderabad has been awarded Panjabrao Deshmukh Outstanding Woman Scientist Award 2021. Dr. Sonu Gandhi has made highly significant contribution in biosensor development for pesticides, mycotoxins monitoring in vegetables, fruits and milk. She has developed several different types of devices such as lateral flow, micropads, flow injection immunosensors, field effect transistors, electrochemical sensors, cantilever based immunosensors for successful detection of pesticides at picomolar to femtomolar concentration. She has developed sensitive, fast, reliable, filed applicable and cost-effective biosensor for detection of pesticides such as atrazine, 2, 4-D and chlorpyrifos in agriculture food including fruit, vegetable and milk; herbicide diuron in crops, aflatoxin, ochratoxin in milk and histamine in fish samples. She has developed various types of immunoassays based on enzymes, fluorophore, gold and iron oxide nanoparticles, carbon nanotubes by using antibodies and aptamers. Developed biosensors ensure ultrafast detection limit in femtomolar range without the aid of any sophisticated instrument for on-site detection of target analytes in sample.

Award 2021

NATIONAL AWARD FOR EXCELLENCE IN AGRICULTURAL RESEARCH

JAWAHARLAL NEHRU AWARD FOR P.G. OUTSTANDING DOCTORAL THESIS RESEARCH IN AGRICULTURAL AND ALLIED SCIENCES 2021

The ICAR instituted the Jawaharlal Nehru Award for Outstanding Doctoral Thesis Research in Agricultural and allied sciences as an incentive for high-quality fundamental or applied research and to recognize outstanding research work done by them in different fields of agricultural research. The award, given annually, shall comprise of 4 awards (From Crop & Horticultural Sciences, Natural Resources Management & Agricultural Engineering, Animal & Fisheries Sciences, and Social Sciences, respectively) of ₹ 50,000/-in cash, Citation, Certificate and silver medal (gold polished) each for the outstanding original doctoral research work in agriculture and allied sciences. The award has been named after Late Pt. Jawaharlal Nehru (1889-1964), the first Prime Minister of India. This year 56 applications were received for consideration in different disciplines. The awardees and their contributions are given in following pages:

CROP & HORTICULTURAL SCIENCES

Dr. Roshan Kumar Singh
Project Scientist-I
National Institute of Plant Genome Research, New Delhi

Dr. Roshan Kumar Singh has been awarded Jawaharlal Nehru Award for Outstanding Doctoral Thesis Research in Agricultural and Allied Sciences 2021 in Crop & Horticultural Science category for his doctoral thesis on the topic "Delineating the roles of heat shock factor- and heat shock protein- encoding gene(s) of foxtail millet [*Setariaitalica* (L.) P. Beauv.] during abiotic stress" pursued from Jawaharlal Nehru University, New Delhi.He has revealed the molecular function of an organellar sHSP, SisHSP27 imparting the prevention of protein degradation and maintain chloroplast integrity during high temperature stress. Evidence has provided that a single sHSP can protect a large number of substarte proteins. He has developed a thermotolerant and photosynthetically improved rice line through overexpressing foxtail millet's SisHSP27. The plant architecture and overall yield per plant have been relatively superior to wild-type rice plants. The work would lead to a new avenue to further design climate-smart crop plants employing the SisHSP27 encoding gene.

ANIMAL AND FISHERIES SCIENCES

Dr. (Ms.) Anusree M
Technical Assistant
Central Marine Fisheries Research Institute, Kerala

Dr. (Ms.) Anusree M has been awarded Jawaharlal Nehru Award for Outstanding Doctoral Thesis Research in Agricultural and Allied Sciences 2021 in the Animal & Fishery Sciences category for her doctoral thesis on the topic "Characterization and Evaluation of Small Molecular Bioactives and Polysaccharides from the Phaeophytic Marine Macroalga *Sargassum wightii* (family Sargassaceae) as Defense Metabolites against Oxidative Stress Induced Diseases" pursued from Mangalore University. Dr. Anusree M. has extensive research contributions in the frontier area of bioactive molecule discovery from marine macroalga (seaweed) *Sargassum wightii* as promising therapeutic agents against various diseases with research records in the form of two granted patents, high-impact research papers in peer-reviewed journals, and three commercialized technologies. Dr. Anusree has the credit to develop potential pharmacophores with anti-dyslipidemic, anti-diabetic, anti-hypertensive, and anti-inflammatory activities from *Sargassum wightii*. She has the credit to develop commercialized nutraceuticals CadalminTMAnti-hypercholesterolemic extract, Antidiabetic extract, and Antihypertensive extract. Her work constitutes the first all-inclusive document of bioactive properties of the predominantly available seaweed resource to develop novel small molecular compounds and (1 3)/(1 4)-linked polygalactofucans, which will provide promising therapeutic leads against various human ailments. Considering the promising perspective to utilize marine macroalgae, her work on the development of high-value compounds and nutraceuticals will immensely contribute to the seaweed-based value chain that is gaining momentum during the recent years.

SOCIAL SCIENCES

Dr. Tanuj Misra
Teaching Associate
Rani Laxmibai Central Agricultural University, Jhansi

Dr. Tanuj Misra has been awarded Jawaharlal Nehru Award for Outstanding Doctoral Thesis Research in Agricultural and Allied Sciences 2021 in Social Sciences category for his doctoral thesis on the topic "Image Analysis Algorithm for High-throughput Phenotyping of Rice and Wheat" pursued from ICAR-Indian Agricultural Research Institute, New Delhi. Computer vision and Machine Learning aided plant phenotyping has emerged as major solution to non-destructive high throughput precision phenotyping of germplasm for crop improvement and precision agriculture. Dr. Tanuj Misra carried out high Ph.D. research work to address two important gaps *viz.*, biomass estimation and automated spike detection and counting in the computer vision aided plant phenotyping. He developed a method for determination of leaf area and leaf fresh weight with enhanced accuracy by multi-modal approach using artificial neural network approach and developed useful R-Packages. He developed a method for automated detection of spikes, the grain bearing organs that determine crop yield in wheat, by using deep learning approaches. This was also converted in to software for its effective use. Thus, the new methods and tools developed by Tanuj Misra is useful to plant scientists involved in crop improvement, and agri-startups involved in precision agriculture.

NATIONAL AWARD FOR APPLICATION OF AGRICULTURAL TECHNOLOGIES

VASANTRAO NAIK AWARD FOR OUTSTANDING RESEARCH APPLICATION IN DRYLAND FARMING SYSTEMS 2021

In order to provide recognition for outstanding research and application leading to improvement of dryland farming systems and water conservations, ICAR instituted an annual Vasantrao Naik Award for Outstanding Research and Application in Dryland Farming Systems. One award which consists of ₹ 1.00 lakh in cash, Certificate and Citation is given to a scientist or an extension worker who has made outstanding contribution in the areas of Water Conservation and Dryland Farming System. The award has been named after Late Sh. Vasantrao Naik (1913-1979) who is regarded as Father of Green Revolution in Maharashtra. This year 7 applications were received in response to the open advertisement and the winner is:

Dr. R.A. Marathe
Director
ICAR-National Research Centre on Pomegranate, Solapur

Dr. R.A. Marathe (Team Leader) and his team which involves Dr. Jyotsana Sharma (Principal Scientist), Dr. Nripendra Vikram Singh (Sr. Scientist), Dr. Karuppannan Dhinesh Babu (Principal Scientist), Dr. Ashis Maity (Sr. Scientist) and Dr. Nilesh Nivrutti Gaikwad (Sr. Scientist) from ICAR-National Research Centre on Pomegranate has been awarded Vasantrao Naik Award for Outstanding Research Application in Dryland Farming Systems 2021. They have been involved in the development of effective technologies to improve the livelihood security of pomegranate farmers under climatically and edaphically challenged semi-arid and dryland areas. The team aimed at development of array of technologies to address multifarious challenges of improving productivity, profitability, resource optimization, sustainability, improving WUE, NUE, adoption and climate resilience. The technologies include, production of elite, disease free and bio-hardened pomegranate planting material for better field performance; sustainable and integrated nutrient and water management technologies to enhance nutrient and water use efficiency and development of biofortified, high yielding and early maturing variety to increase profitability in pomegranate production, integrated diseases and insect-pests management schedule, total utilization through processing and value addition and creating wealth from agricultural waste. The team has come out with highly effective and farmers' friendly technologies which have large scale impact on resolving the major issues in pomegranate production. The team work has led to the commercialization of 8 technologies with as many as 25 companies and registered nurseries and large-scale adoption of IDIPM, INM and stem solarization technique. These technologies have direct impact over an area of more than 10000 acres. The team is also engaged intensively in capacity building of farmers and other stakeholders.

Dr. J.V.N.S. Prasad
Principal Scientist
ICAR–Central Research Institute for Dryland Agriculture
Hyderabad

Dr. J.V.N.S. Prasad (Team Leader), Principal Scientist, ICAR-Central Research Institute for Dryland Agriculture, Hyderabad and his associates including Dr. V.K. Singh, Dr. U.N. Tank, Dr. R.K.S. Tomar, Dr. Lakhan Singh and Dr. S.R.K. Singh were conferred Vasantrao Naik Award for Research and Application in Dryland Farming Systems for 2021. The team assessed more than 50 location specific dryland technologies in each of two districts representing arid and semi-arid regions with systematic technological application, prioritization, targeting and created impact by convergence. Promising technologies for imparting resilience to drought were identified. The team has established that necessary support systems such as custom hiring centers, seed and fodder banks, building capacities of communities are essential for enhancing adoption of technologies. These technologies improved crop yields upto 1% in stress year and 33% in normal year and profitability upto 55% in stress years and minimised GHG emissions. The promising technologies are to be scaled up through convergence with development programs.

Award 2021

NATIONAL AWARD FOR APPLICATION OF AGRICULTURAL TECHNOLOGIES

FAKHRUDDIN ALI AHMED AWARD FOR OUTSTANDING RESEARCH IN TRIBAL FARMING SYSTEMS 2021

ICAR instituted Fakhruddin Ali Ahmed Award for Outstanding Research in Tribal Farming Systems primarily for any person or team (with two or three associates, if any) engaged in applied research and its applications in tribal areas of the country aimed at improving the biological resources and livelihoods or in original work directly applicable to tribal farming system. One award of ₹ 1.00 lakh in cash, a citation and provision of equal amount for study on related subject in the geographical area for a year. The award has been named after Late Sh. Fakhruddin Ali Ahmed (1905-1977) who was president of ICAR Society from 1971 to 1974. This year 45 applications were received in response to the open advertisement. This year the award has been shared and the winners with their contribution are:

Dr. G. Kadirvel
Principal Scientist
ICAR-Research Complex for Neh Region, Meghalaya

Dr. G. Kadirvel (Team Leader), Principal Scientist, Division of Animal and Fisheries Sciences, ICAR Research Complex for NEH Region, Meghalaya together with his team which includes Dr. Kishore Kumar Baruah (Principal Scientist and Head), ICAR Research Complex for NEH Region and Dr. Sourabh Deori (Scientist), ICAR Research Complex for NEH Regionhas been awarded Fakhruddin Ali Ahmed Award for Outstanding Research in Tribal Farming Systems 2021. They carried out outstanding work on applied research of pig production for improving income and livelihood of tribal farmers in North East India which focused towards AtmaNirbhar of Tribal society. They developed pig variety (Lumsniang) along with complete husbandry practices for housing, feeding, breeding, health care and manure management, and established community participatory seed village for faster supply and propagation of pig variety in tribal areas. These technological interventions enhanced the income and livelihood of tribal farmers by 140-160%. They also demonstrated Artificial insemination (AI) technology in backyard pig production system and popularized different AI delivery models for producing crossbreed piglets at tribal farmers doorstep to overcome the breeding constraints and genetic improvement besides saving mating and transportation cost. Further, promoted small scale rural entrepreneurship through pig production and pork processing which created backward and forward linkage and supply chain management thereby enhanced income and generated employment among tribal youths.

Dr. M.S. Malik
Dean (Forestry) & Principal Investigator
NAHEP-CAAST-IFS, Birsa Agricultural University, Ranchi

Dr. M.S. Malik (Team Leader), Dean (Forestry) & Principal Investigator, NAHEP-CAAST-IFS, BAU, Ranchi together with his team which includes Dr. Prabhat Kumar, National Co-ordinator, NAHEP- CAAST, ICAR, New Delhi and Dr. Adyant Kumar, Research Associate, NAHEP-CAAST-IFS, BAU, Ranchi has been awarded Fakhruddin Ali Ahmed Award for Outstanding Research in Tribal Farming Systems 2021. The team has been responsible for the overall facilitation of the project entitled NAHEP-CAAST Project on Integrated Farming System, Birsa Agricultural University, Ranchi, Kanke, Ranchi among the tribal farmers of Ulihatu village, Khunti Dist., Jharkhand and Transfer of technologies and their extension to the tribal farmers of Ulihatu village, Khunti. The number of enterprises included in farming system depends upon the basic needs of a farm family and maximizing the profit by optimal use of available resources of a farm. The major interventions in crop production have been made through introduction of high yielding varieties in paddy, maize, wheat, mustard, pigeon pea, urad, niger, tomato, potato, and brinjal. The pulse crops were introduced in upland conditions during *Kharif* season for gaining better yield, and in medium and low land situation during *Rabi* season for taking the advantage of residual soil moisture. New breeds of livestock have been introduced as well as non-descript zebu cattle were upgraded through artificial insemination. Watershed management was done through rain water harvesting by recycling of farm ponds and ground water recharge. These interventions helped the tribal farmers of Ulihatu village, Khunti Dist., Jharkhand in achieving better livelihood security as well as their socio-economic upliftment.

Award 2021

NATIONAL AWARD FOR APPLICATION OF AGRICULTURAL TECHNOLOGIES

SWAMI SAHAJANAND SARASWATI OUTSTANDING EXTENSION SCIENTIST AWARD 2021

The Council has instituted the Swami Sahajanand Saraswati Outstanding Extension Scientist Award in order to provide recognition to outstanding agricultural extension work done by agricultural scientists and teachers in the ICAR-SAU system and to provide incentive for excellence in agricultural extension scientist/teacher. One annual award comprising of ₹ 1.00 lakh in cash, certificate and a citation is given. The award has been assigned across the disciplines in agriculture and allied sciences. The award has been named after Late Swami Sahajanand Saraswati (1889-1950) a social reformer and the first president of All India Kisan Sabha. This year 36 eligible applications were received in response to the open advertisement. This year the award has been shared and the winners with their significant contributions are:

Dr. Parvender Sheoran

Principal Scientist
ICAR-Central Soil Salinity Research Institute, Karnal

Dr. Parvender Sheoran, Principal Scientist, ICAR-Central Soil Salinity Research Institute, Karnal has been awarded Swami Sahajanand Saraswati Outstanding Extension Scientist Award 2021 for his outstanding contributions in the field of research/extension work being undertaken under the Farmer FIRST project. The Farmer FIRST Project (FFP) is an initiative to privilege the smallholder farmers inhabiting complex, diverse and risk prone Indian agriculture through "enriching knowledge" and "integrating technology". Farmer centric ICAR-CSSRI led FFP "Empowering farmers through selective interventions in salt affected agro-ecosystems of Ghaghar plains" significantly contributed in streamlining, validating and developing impact-oriented technological (agricultural and livestock based) modules and successfully transferring sustainable technology packages. Project outcomes through evidence based best bet technologies (ground water recharge, gypsum and press mud mediated soil reclamation, use of salt tolerant-tolerant, balanced fertilization, crop residue and soil health management, livestock healthcare etc.) in sodic agro-ecosystems would be of immense use in devising ecosystem–based approach viewing optimal resource use, improved ecological resilience with socio–economic development of distressed farming community and eventually achieving the goals of land degradation neutrality, food security and environmental protection. Partnerships and institute building with private/public agencies and other line departments suitably ensured capacity building among farmers and also the local-level accountability of extension workers to farmers. Desired scientist-farmers interface and participatory approach created positive influence in enriching farmers? knowledge, improving communication skills and adoption behaviour, and had substantial impact towards productivity enhancement and profit maximization.

Dr. Raj Kumar Singh Tomar

Principal Scientist & Head
Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya,
Datia, Madhya Pradesh

Dr. Raj Kumar Singh Tomar, Principal Scientist & Head, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Datia, Madhya Pradesh has been awarded Swami Sahajanand Saraswati Outstanding Extension Scientist Award 2021 for his outstanding contributions in the field of research and extension activities. He was the Principal investigator of the National initiatives/ innovations in climate resilience agriculture (NICRA) project during 2011-12 to 2020-21.NICRA project is a unique project for development of farming sector through integration all sectors of farming viz. crop production, horticulture, LPM and fisheries on a single platform. Proven climate-resilient technologies were demonstrated in NICRA villages of Datia district during 2011-to 2020. Climate-resilient technologies are promising tool to guard a farming system from climate variations. So, farmers need to intelligently adapt to the changing climate in order to sustain crop yields and farm income. Enhancing resilience of agriculture to climate risk is of paramount importance for protecting livelihoods of small and marginal farmers. Traditionally, technology transfer in agriculture has aimed at enhancing farm productivity. However, in the context of climate change and variability, farmers need to adapt quickly to enhance their resilience to increasing threats of climatic variability such as droughts and other extreme climatic events. Planned adaptation is essential to increase the resilience of agricultural production to climate change. Several improved agricultural practices evolved over time for diverse agro-ecological regions in India have potential to enhance climate change adaptation, if deployed prudently. Management practices that increase agricultural production under adverse climatic conditions also tend to support climate change adaptation because they increase resilience and reduce yield variability under variable climate and extreme events. Some practices that help adapt to climate change in rainfed agriculture are soil organic carbon build up, in-situ moisture conservation, residue incorporation instead of burning, water harvesting and recycling for supplemental irrigation, growing drought tolerant varieties, water saving technologies, location specific agronomic and nutrient management, improved livestock feed and feeding methods.

Institutional interventions promote collective action and build resilience among communities. Capacity building by extensive participatory demonstrations of location specific agricultural practices helps farmers gain access to knowledge and provides confidence to cope with adverse weather conditions. In this project, an effort is made to marshal all available farm technologies that have adaptation potential and demonstrate them in farmers' fields in most vulnerable Datia districts in the participatory approach through NICRA project .We made a sincere attempt for the upliftment of economic status of farmers to improve the livelihood and mitigation of climatic variability through promotion of climate resilient techniques of agriculture and livestock production with "Overall increase in total annual income of Farm Family". The outreach of Krishi Vigyan Kendra in district is very effective through different extension activities like demonstrations, training, effective linkage of agriculture and allied departments, use of ICT (Kisan mobile alert, website, T.V. radio) for mass scale knowledge dissemination, Krishi Mahotsava, KVK-ATMA Linkage, strong relation to print media and district administration to disseminate the technologies. Krishi Vigyan Kendra, Datia had developed a faith among farming community, to create the change in livelihood through climate-resilient agriculture technologies. This could be explored to a great extent through a demand-driven technology development and its dissemination to farmers in an effective way with a focus on ensuring convergence of efforts at different levels for rendering and integrated service delivery to the farmers.

Award 2021

NATIONAL AWARD FOR APPLICATION OF AGRICULTURAL TECHNOLOGIES

NANAJI DESHMUKH ICAR AWARD FOR OUTSTANDING INTERDISCIPLINARY TEAM RESEARCH IN AGRICULTURAL AND ALLIED SCIENCES 2021

ICAR has constituted the Nanaji Deshmukh ICAR Award for Outstanding Interdisciplinary Team Research in Agricultural and Allied Sciences to recognize, encourage and promote the interdisciplinary research in the country. One award (across all streams of agricultural sciences) would be given annually. The award is not limited to National Agricultural Research System (NARS) and Agricultural Scientists outside NARS are also eligible. Award consists of a cash prize of ₹ 5.0 lakh besides, Memento, Certification and Citation. This year 51 eligible applications were received in response to the open advertisement. This year the award has been shared and the winners with their significant contributions are:

Dr. Gyanendra Pratap Singh
Principal Scientist & PI
ICAR-Indian Institute of Wheat & Barley Research, Karnal

Dr. Gyanendra Pratap Singh, Director (Team Leader), IIWBR, Karnal; Dr. Gyanendra Singh (Pr. Scientist & PI), IIWBR, Karnal; Dr. B S Tyagi (Pr. Scientist), IIWBR, Karnal; Dr. Amit Kumar Sharma (Pr. Scientist), IIWBR, Karnal; Dr. Hanif Khan (Sr. Scientist), IIWBR, Karnal; Dr. Satish Kumar (Sr. Scientist), IIWBR, Karnal; Dr. Chandra Nath Mishra (Sr. Scientist), IIWBR, Karnal; Dr. K Gopalareddy (Scientist), IIWBR, Karnal; Dr. S C Bhardwaj (Pr. Scientist &Incharge), IIWBR-RS, Shimla; Dr. Sudheer Kumar (Pr. Scientist & PI), IIWBR, Karnal; Dr. Arun Gupta (Pr. Scientist), IIWBR, Karnal; Dr. Mamrutha HM (Sr. Scientist), IIWBR, Karnal; Dr. R S Chhokar (Pr. Scientist), IIWBR, Karnal; Dr. Poonam Jasrotia (Pr. Scientist), IIWBR, Karnal; Dr. Sewa Ram (Pr. Scientist & PI), IIWBR, Karnal; Dr. R Sendhil (Sr. Scientist), IIWBR, Karnal (associates)has been awarded Nanaji Deshmukh ICAR Award for Outstanding Interdisciplinary Research In Agricultural And Allied Sciences 2021. The multidisciplinaryteam executed a well-designed research project entitled, "Developing high yielding and climate-resilient wheat varieties," emphasizing varietal development along with resource conservation technologies and weed management for developing appropriate cost-effective technologies to harness the maximum yield potential from new genotypes under the changing climate scenario aiming at ensuring food and nutritional security to the growing population.

The project team has made a significant contribution as evident from the development and release of a total of (thirteen) 13 wheat varieties for different zones and production conditions. WB 2, the first biofortified zinc-rich wheat variety was developed and released for cultivation in 2017. Karan Vandana (DBW187), a high yield potential variety released for cultivation revolutionized the wheat production scenario with a huge demand for this variety among the farming community. In the view of this demand, MoAs with private seed growers were initiated and more than 488 companies have entered this memorandum of understanding for production and distribution of seeds of DBW187, DBW222, and DBW303. Further, Improved varieties possessing tolerance to terminal heat stress (DBW90, DBW107, DBW173, DBW303), water stress ((DBW93, DBW110, DBW252, DDW47(d), and DDW48(d)) were released for cultivation. Additionally, a total of 67 genetic stocks of wheat were developed during breeding new genotypes and have been identified for different traits and registered with the Plant Germplasm Registration Committee (PGRC), NBPGR, New Delhi. Also, the team discovered that the Leaf rust resistance gene (Lr80), extracted from Common wheat landrace Hango-2, collected from the Himalayan area of Hango, District Kinnaur, in Himachal Pradesh in 2006 exhibited a very low infection type (IT;) at the seedling stage to all Indian Puccinia triticina (Pt) pathotypes, except the pathotype 5R9-7. The high-yielding varieties released for conventional systems were also suitable for zero tillage as well as conservation agriculture. Rotary Disc Drill developed at ICAR-IIWBR Karnal is efficient for seeding in loose crop residue like Happy Seeder. The research team has also identified two SNPs (Single Nucleotide Polymorphism) in the Accase gene conferring herbicide resistance in Phalaris minor resistant populations.

Dr. Ashok Kumar Singh
Director
ICAR-Indian Agricultural Research Institute (IARI), New Delhi

Dr. Ashok Kumar Singh (Team Leader), Director, ICAR-Indian Agricultural Research Institute (IARI), New Delhi; Dr. Gopala Krishnan S, Principal Scientist (Plant Breeding), ICAR-IARI, ICAR-Indian Agricultural Research Institute (IARI), New Delhi; Dr. M. Nagarajan, Principal Scientist, ICAR-IARI-Rice Breeding & Genetic Research Centre, Tamil Nadu; Dr. KK Vinod, Principal Scientist (Plant Breeding), New Delhi; Dr. Prolay Kumar Bhowmick, Scientist, New Delhi; Dr. Haritha Bollinedi, Scientist; Dr. Ranjth Kumar Ellur, Scientist; Dr. Kalyan K. Mondal, Principal Scientist, Pusa, New Delhi; Dr. Bishnu Maya Bashyal, Senior Scientist, ICAR-IARI, New Delhi; Dr. G. Prakash, Scientist, ICAR-IARI, New Delhi; Dr. Rakesh Seth, Principal Scientist, IARI Regional Stational, Karnal; Dr. Chandu Singh Rathod, Scientist, ICAR-IARI, New Delhi; Dr. Subhash Chander, Principal Scientist, ICAR-IARI, New Delhi; Dr. Dinesh Kumar, Principal Scientist, ICAR-IARI, New Delhi; Dr. Madan Pal, Principal Scientist, ICAR-IARI, New Delhi; Dr. NK Singh, Project Director, NIPB; Dr. TR Sharma (DDG (CS)/NIPB); Dr. SV Amitha Charu Rama Mithra, Scientist, NIPB (Associates) has been awarded Nanaji Deshmukh ICAR Award for Outstanding Interdisciplinary Research In Agricultural And Allied Sciences 2021. The inter-disciplinary team executed a well-designed in house-project entitled "Improving resilience, productivity and quality in rice through genetic and genomic approaches (CRSCIARISIL2014002), operational during the relevant period," with the primary objective of improving rice, particularly Basmati rice. During the operation, eight rice varieties were released by Central Sub-Committee on Crop Standards Notification & Release of varieties for agricultural Crops and Horticultural Crops including seven Basmati, and one medium slender grain rice cultivar. ICAR- IARI share of breeder seed indent among the total Basmati varieties cultivated in India during 2016-21 is 97.9% thereby contributing to the Basmati rice revolution in India.

The Basmati rice varieties PB 1692, PB1718, PB 1728, and PB 1637, which were released from 2016-to 2020, have gained significant popularity among the Basmati rice varieties with a cumulative breeder seed indent of 103.7 quintals (42.5% of the total breeder seed indent) in 2021, thereby contributing significantly towards the annual foreign exchange earnings of the country. Three improved Basmati rice varieties with resistance to both bacterial blight and blast diseases namely Pusa Basmati 1847, Pusa Basmati 1885, and Pusa Basmati 1886 developed during the period and released in 2021 will not only help in reducing the use of pesticides but also strengthen the Basmati rice export and thus will play an important role in doubling Basmati rice Farmer's income. The research team also contributed to identifying donor germplasm for distinct traits in rice. During the operational period, three genetic stocks of Rice, namely NL44 (INGR2101) with tolerance for reproductive stage heat stress; Pusa Rice Restorer 402 (INGR21012), an elite restorer line with high and stable restoration potential; Karuppunel (INGR21006) with high Zn content have been registered with Plant Germplasm Registration Committee, ICAR, New Delhi. In addition to other significant achievements, for the first time, a high-throughput protocol for screening the genotypes of Bakane resistance was developed and two major QTLs qBK 1.1 and qBK 1.2, and two minor QTLS qBK1.3 and qBK3.1 were mapped on to chromosome 1 and 3. Novel alleles of the Lipoxygenase 3 ((LOX3) gene associated with low rancidity of rice bran have been identified and validated.

BEST ANNUAL REPORT AWARD 2020-21
(Large Institute Category)

ICAR-CENTRAL ARID ZONE RESEARCH INSTITUTE, JODHPUR, RAJASTHAN

ICAR-Central Arid Zone Research Institute, Jodhpur, Rajasthan has been awarded **Best Annual Report Award 2020-21 in Large Institute Category** which it shares with ICAR-Central Marine Fisheries Research Institute, Kochi, Kerala. ICAR-Central Arid Zone Research Institute (ICAR-CAZRI) is among the first few institutes in the world devoted to arid zone research and development. The institute has conducted Spatial assessment of wind erosion in western Rajasthan and foundWind erosion to be the dominant form of land degradation in Jaisalmer district affecting 32,667 km^2 area (94% area) which includes 8,426.2 km^2 (25% area) area under very severe category. Further, a remote sensing based algorithm was developed to detect dust load in atmosphere, specifically over the Indian Thar desert. The adopted method can be helpful in implementing an operational system for detection and monitoring of dust storms. The institute also conducted Survey of Cultivated soils of Jhunjhunu district and found very high P adsorption index and the reversibility potential varied greatly depending upon management practices. However, it was also found that about 32 to 39% of the residual soil P has the potential for its reversible availability and about 8 to 13% has very high degree of reversible availability for plant nutrition in these soils. The institute has operationalized a sewage treatment plant and the treated water is used for production of fodder crops like Napier hybrid, moringa, etc. The content of Fe, NO3, PO4 and Mn were reduced by 69, 75, 83 and 88% respectively in the treated water. In addition, tribal Sub Plan activities were carried out in Five adopted villages of Ladakh by RRS, Leh. Vegetable Seeds, garden/ horticulture tools, livestock medicines, low tunnel rings and UV resistant polythene for mulching were distributed to beneficiaries. The SC-Sub Plan activities were undertaken in four districts of Rajasthan and one of Gujarat during 2020.Important arid zone *Kharif* and *Rabi* crops were grown in 'Crop Cafeteria' to demonstrate their comparative performance and characteristics to various stakeholders. During the year, 426 farmers benefitted from six *GyanChoupals* organized through Google Meet platform. In addition, two patents were granted by Indian Patent Office during 2020.

BEST ANNUAL REPORT AWARD 2020-21
(Large Institute Category)

ICAR-CENTRAL MARINE FISHERIES RESEARCH INSTITUTE, KOCHI, KERALA

ICAR-Central Marine Fisheries Research Institute, Kochi, Kerala has been awarded **Best Annual Report Award 2020-21 in Large Institute Category** which it shares with ICAR-Central Arid Zone Research Institute, Jodhpur, Rajasthan. ICAR-Central Marine Fisheries Research Institute (CMFRI) has estimated Marine fish landing for the year 2020 and found 2.73 million tonnes with a decline of 23.45% compared to the year 2019. Tamil Nadu topped the list followed by Gujarat and Karnataka contributing 20.51, 19.51 and 13.75% respectively to the overall tally. Biomass dynamic modelling studies indicate that 34.1% of the assessed fish stocks in the country are sustainable, 36.3% overfished, 26.5% recovering and 3.1% is overfished. In the area of genetics and genomics, the institute has characterized complete mitogenome of Randall's threadfin beam, *Nemipterusrandalli*. Also, whole genome sequencing of Indian oil sardine, Sardinellalongiceps using Illumina and PacBio platforms was completed. Molecular information for the new species of deep water eel Xyriasanjaalai was generated. Genetic studies in genus Scomberomorus distributed along the Indian coast resulted in identification of five distinct species using CO1 gene. Estimation of marine stocks, fish population diversity of Kumaragom backwaters was studied using eDNA based approach. In marine fish nutrition, black soldier fly protein was used to replace fish meal in the feeds for pompano. Towards developing fish waste degrading fish consortia, quantitative assays for fish oil degrading microbes were optimised and validation of fish oil degrading activity of positive isolates was completed through optimized assays. Disease investigations in finfishes indicated that, prevalence of myxosporean infection ranged from 29% to 91% in marine food fishes. Detailed morphology, morphometry and molecular analyses of myxospores revealed that six species of myxosporeans infecting food fishes were new. A new species of Myxobolus parasitizing the gill filaments of the largescale mullet, *Planilizamacrolepis* from Cochin backwaters, is described. A new species of acanthocephalan parasite, named *Neoechinorhynchus (N.) cephalic n.* sp. Infecting the flathead grey mullet *Mugilcephalus* has been identified and described. For the first time, complete characterization of ferritin gene from *Pernaviridis* was completed and a platform for biomonitoring and disease management of *P. viridis* was created. In addition, the Fisheries Development Index (FDI) as a corollary to Human Development Index (HDI) was constructed including variables such as fisheries growth and development, economic welfare, social wellbeing, resource sustainability and technology/ infrastructure support. Agricultural Technology Information Centre (ATIC) of ICAR-CMFRI organized 23 offline training programmes benefitting 250 participants and 27 online training programmes benefitting 390 participants, generating a revenue of Rs. 2,32,164/- through the sale of various products and services.

BEST ANNUAL REPORT AWARD 2020-21
(Small Institute Category)

ICAR-NATIONAL RESEARCH CENTRE ON PIG, GUWAHATI, ASSAM

ICAR-National Research Centre on Pig, Guwahati, Assam has been awarded **Best Annual Report Award 2020-21 in Small Institute Category** which it shares with ICAR-Central Agroforestry Research Institute, Jhansi, Uttar Pradesh. ICAR-National Research Centre on Pig (ICAR-NRC) is relentlessly working during the last 18 years with the vision to bring in excellence in pig production, health and product processing through innovative research in order to provide technology backstopping for quality germplasm, enhanced pork production, employment generation and poverty reduction among socially and economically weaker sections through medium of pig husbandry. The institute has conduced generation-wise genetic evaluation of Rani Crosses for 8 generations and found that breed characters of Rani cross bred was stabilized for consistent cross breeding of several generations. Phylogenetic analysis of pig mitochondrial genome sequences of native pig of North East India, revealed that native pig of Northeast was only recently diverged from each other and distinctly different from exotic European pigs. Also, the institute has concluded that Guava fruit waste can be supplemented at 10% level in grower crossbred pigs for better nutrient utilization and also to reduce the feed cost. Pork based ready to eat functional pork products was developed through the addition of critical ingredients to cater the needs of the health-conscious consumers. Food quality management database has been designed and developed for handling the analytical samples with traceability. The institute is coordinating 15 All India Coordinated Research project on Pig and seven Mega seed centres on pig, located in different parts of the country to study the performance of pigs in different agro-climatic condition, to develop region specific package of practice including quality germplasm and to conserve the indigenous germplasm. Under the mega seed project on pig, improved variety of piglets were produced and distributed to the farmers. In addition, a total of 11 numbers of copyrights were granted during the year 2020. Also, the institute has filled 02 numbers of patents and 02 number of copy right applications during the reported period. Institute has established a state of the art ABI centre and induced 07 number of incubates during the year 2020. Institute has regularly conducted activities under "Swachh Bharat Abhiyan" with the resolution to work towards realizing the Mahatma Gandhi's dream of Swachh Bharat. In order to extend the scientific expertise for the benefit of farmers, the institute has implemented Mera Gaon-Mera Gaurav Programme.The Krishi Vigyan Kendra of ICAR-NRC on Pig has conducted On Farm Trials (OFT) and Front Line Demonstrations (FLD) under various disciplines to promote the technology transfer. For capacity building of farmers, rural youth and extension functionaries, a total of 99 training programmes were conducted covering 2858 number of participants during the year 2020.

BEST ANNUAL REPORT AWARD 2020-21
(Small Institute Category)

ICAR-CENTRAL AGROFORESTRY RESEARCH INSTITUTE, JHANSI, UTTAR PRADESH

ICAR-Central Agroforestry Research Institute, Jhansi, Uttar Pradesh has been awarded **Best Annual Report Award 2020-21 in Small Institute Category** which it shares with ICAR-ICAR-National Research Centre on Pig, Guwahati, Assam. ICAR-Central Agroforestry Research Institute (ICAR-CAFRI) has the largest germplasm collection of neem and other agroforestry tree species and provides opportunities for explorative research for superior germplasms. The institute has developed and documented more than 80 agroforestry models for different agro-climatic regions and NABARD has recently identified 4 of those as bankable agroforestry models. As part of landscape level transformative field research, the Institute is working on KISAN MITrA project (consortium of ICAR-CAFRI and ICRISAT, Hyderabad) for scaling up initiative, eight pilot sites covering about 40,000 ha area across the seven districts of Bundelkhand are being developed. The emphasis has been on establishing agroforestry models, controlling land degradation through large-scale field bunding upstream and the construction of various ex-situ water harvesting structures downstream reviving and rejuvenating traditional water harvesting structures in target sites. During this year, under ICAR-ICRAF work plan, about 25,000m3 rainwater harvesting created at Tara Village in Bolangir district and about 7000m3 rainwater harvesting capacity created in Boirbhadi village in Nuapada district. In-situ rainwater harvesting through field bund preparation has been done in Tara and Boirbhadi villages. Field bund plantation and block plantation of various agroforestry tree species have been done in Bolangir and Nuapada districts. These success stories enhanced the Institute's visibility therby registering its potential to be a nodal agency for technology backstopping to the sub-mission on Agroforestry Offices located in different states that implements the provisions of the National Agroforestry Policy-2014 in the country. At AICRP level, agroforestry is being experimented in its 37 centres across the country located primary in state agricultural universities mostly. These centres are being mentored for providing technical inputs to the Sub-Mission on Agroforestry units in respective states. In addition, the Institute has launched *'FarmTree'* Mobile app for Agroforestry Farmers of India.


भाकृअनुप
ICAR