



From Director Desk...



In this quarter, our major research highlights included improved technology for extraction of bioactive capsaicin from hot chillies and its enrichment in the rice bran oil for production of nutraceutical designer oil. The net ecosystem exchange of carbon dioxide in the rice-wheat system partitioned into gross primary productivity to correlate with the environmental variables. The role of zeaxanthin in photoprotection of developing grains of late sown wheat was established. Significant achievement was made in the development of CRISPR/Cas9-based genome edited plants in Arabidopsis for improving resistance to root-knot nematode. We celebrated many important events such as ICAR-IARI Foundation Day, World Environment Day and International Yoga Day. The Institute established a Regional Honey Testing laboratory for checking the quality of honey. The NAAC Peer Review Team visited IARI during this period for accreditation of the Institute. The 37th Virtual Scientific Advisory Committee meeting was organized to prepare the action plan for next year. Seed kits of basmati varieties were distributed to the farmers to create awareness about the profitability of these varieties. Under the Lab to Land initiative, we filed and renewed patents of IARI technologies. The capacity building programmes for extension personnel and farmers, on soil, water and crop management were organised through training programmes, Kisan Goshtis, exhibitions and demonstrations. UPJA and ARISE programmes were organized to nurture early-stage innovators and entrepreneurs. We have established 'Pusa Agri Krishi Haat' an innovative model of a market platform for the farmers to sell their agri-products to urban consumers. PILA and PGGSU at IARI organized a promotional cultural event on the premises of the Haat, which attracted a large audience. During this period, a number of ICAR-IARI technologies were also showcased to international and national delegates on their visit to the Institute.

I am sure that the information included in the newsletter would be useful to the farmers and stakeholders. I wish to congratulate all the scientists and staff of publication unit for bringing out the newsletter in time.

Ashok Kumar Singh
Director, IARI

IARI Foundation Day

ICAR-Indian Agricultural Research Institute, New Delhi celebrated its Foundation Day on April 01, 2023 in Dr. B. P. Pal auditorium in the august presence of staff, students and farmers. Dr Himanshu Pathak, Secretary DARE and Director General, ICAR and speaker of the session graced the occasion as the Chief Guest of the function. Dr. H.S. Gupta, Former Director, ICAR-IARI and Dr. R.B. Singh, Former Director, ICAR-IARI and Former Chairman ASRB were also present as the Guest of Honor and Chairman of the session, respectively. At the outset, Dr. A.K. Singh, Director, ICAR-IARI welcomed all the dignitaries along with staff, students and farmers who joined the program through offline and online mode.

On the occasion, Dr. A.K. Singh informed about the different programmes organized by the Institute to celebrate the Foundation Day. He also briefed about significant research activities carried out by the Institute in the year 2022-23 for the benefit of different stakeholders. A short film was screened to give a glimpse of efforts, achievements and various activities of the Institute held for the staff, students and stakeholders at different occasions. The farmers from the clusters of SC SP program shared their views and experience regarding different activities being held at village level. The Guest of Honor, Dr. H.S. Gupta, Former Director, ICAR-IARI shared his experiences during his association with the Institute and also highlighted the present challenges being faced by Indian agriculture. It was followed by the formal introduction of the Chief Guest and speaker of the session Dr. Himanshu Pathak, Secretary DARE and Director General, ICAR by Dr R.B. Singh, Former Director, ICAR-IARI and Chairman of the session. Dr. Himanshu Pathak delivered the Foundation Day Lecture on "Indian Agriculture in the Amrit Kaal- Initiatives of ICAR". In his address, he pointed out the challenges faced by Indian agriculture, such as decreasing water availability, degrading soil, increasing pests and diseases, climate change and changing aspirations. He highlighted the projections and targets to be achieved in the field of agriculture. He mentioned about the initiatives for resilient, secondary and digital agriculture in the field of modern agriculture and its integration with traditional knowledge to achieve maximum benefits.

News Index

Research	02
Education	04
Extension.....	05
Capacity Building	08
Miscellaneous	09

Compilation Committee (Publication Unit)

Joint Director (Research): Dr. C. Viswanathan;
Incharge: Dr. Anjali Anand; **Associated Incharge:** Dr. Atul Kumar; **Technical Assistant:** Dr. Sunil Kumar; **Technician:** Smt. Jyoti Tomer
Website : <http://www.iari.res.in>



Dr. Himanshu Pathak delivered the Foundation Day Lecture

Division of Genetics, Agricultural Chemicals, Soil Science & Agricultural Chemistry and Microbiology. It was followed by felicitation of the students from different schools who won prizes in competitions held from March 27-29, 2023 to celebrate the Foundation Day of the Institute.

The technical, administrative and supporting staff was also felicitated by the dignitaries for their contribution towards the growth of the Institute. The team of Pusa Samachar of the Institute was also felicitated by the Chief Guest. The program ended with the formal vote of thanks by Dr. R.N. Padaria, Joint Director (Extension), ICAR-IARI, New Delhi for the successful organization of the function.



Dignitaries releasing the publications of the Institute

He also suggested the initiatives taken up by ICAR to deal with frequent challenges in agriculture. It included certifying production and protection of technologies, rightsizing ICAR and improving governance, revitalizing ASRB, collaboration with industry and global organization. He shared ICAR's vision on the generation of a new climate friendly roadmap for development, where the developing countries would play a crucial role through low carbon, nitrogen, water and energy; and integration of rural and urban youth equipped with new skills. Later, the dignitaries released the publications developed by the

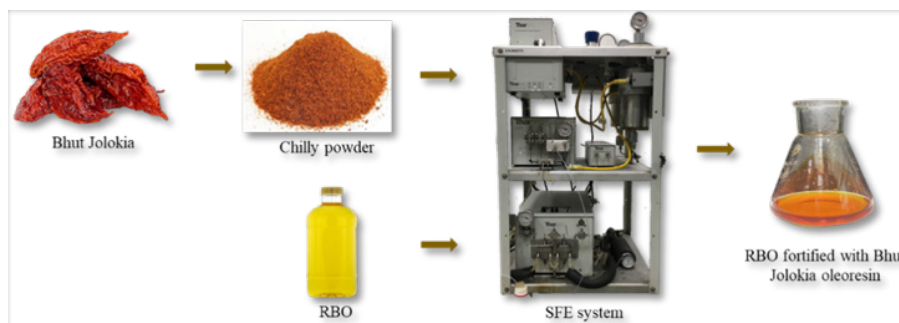
RESEARCH

One pot extraction and enrichment of capsaicin in rice bran oil using clean solvent free extraction

An innovative process employing supercritical fluid extraction (SFE) has been optimized for the extraction of bioactive capsaicin from hot chillies (*Capsicum chinense* cv. Bhut Jolokia) using rice bran oil as a co-solvent. Maximum capsaicin yield of 201 mg/mL and gamma oryzanol content of 9.01 mg/mL was

achieved at optimized conditions of SFE: temperature (70°C), pressure (225 bar), and time (110 min). The optimized extract had a total phenol

content of 410 mg GAE/100 g and high antioxidant activity 24.59 μmol TE/g, respectively. The process brings mix of phytochemicals



Supercritical fluid extraction of capsaicin from *Capsicum chinense* cv Bhut Jolokia using rice bran oil as a co-solvent

including capsaicin, carotenoids, phenolics, and gamma oryzanol in blend oil, to qualify as a nutraceutical designer oil for health. It can be used as a cooking oil for certain group of consumers with special needs especially for obesity, cancer, diabetic, and muscular dystrophy patients, or as ingredient in special designer foods for the general public.

Net ecosystem exchange of carbon dioxide in rice-wheat system

Rice growing under anaerobic conditions followed by spring wheat under an aerobic environment differentially impact the net ecosystem exchange (NEE) of carbon dioxide (CO_2) in rice-wheat systems of the north-western Indo-Gangetic Plains (IGP). The NEE was estimated in a rice-spring wheat sequence *via* the eddy covariance technique, and was partitioned into gross primary productivity (GPP) and ecosystem respiration (RE) and correlated with the environmental variables. Higher CO_2 uptake of $-10.43 \text{ g C m}^{-2} \text{ d}^{-1}$ was observed in wheat during heading stage as compared to $-7.12 \text{ g C m}^{-2} \text{ d}^{-1}$ in rice. The net uptake of CO_2 was 25% lower in rice. The average daily NEE over the crop season was -3.74 and $-5.01 \text{ g C m}^{-2} \text{ d}^{-1}$ in rice and wheat, respectively. The RE varied from 0.07 – $9.00 \text{ g C m}^{-2} \text{ d}^{-1}$ in rice and from 0.05 – $7.09 \text{ g C m}^{-2} \text{ d}^{-1}$ in wheat. The RE was positively correlated with soil temperature at 5 cm depth ($0.543, p < 0.01$) in rice and with air temperature ($0.294, p < 0.01$) in wheat. The GPP was positively correlated with air temperature ($0.129, p < 0.05$) and negatively correlated with vapour pressure deficit (VPD) ($-0.315, p < 0.01$) in rice. In wheat, GPP was positively correlated with air temperature

($0.444, p < 0.01$) and soil moisture ($0.471, p < 0.01$). The rate of GPP over the crop duration was nearly the same in both rice and wheat, however, the RE was higher in rice as compared to wheat, thus, the ratio of cumulative RE/GPP was 0.51 in rice and much lower at 0.34 in spring wheat. Rice contributed 46 and 43% to the annual totals of RE and GPP, respectively, while spring wheat contributed 36 and 51%. The NEE of CO_2 was higher in spring wheat at $-576 \text{ g C m}^{-2} \text{ d}^{-1}$ as compared to $-368 \text{ g C m}^{-2} \text{ d}^{-1}$ in rice. Thus, wheat may be a moderately stronger sink of CO_2 as compared to rice in the rice-wheat system.

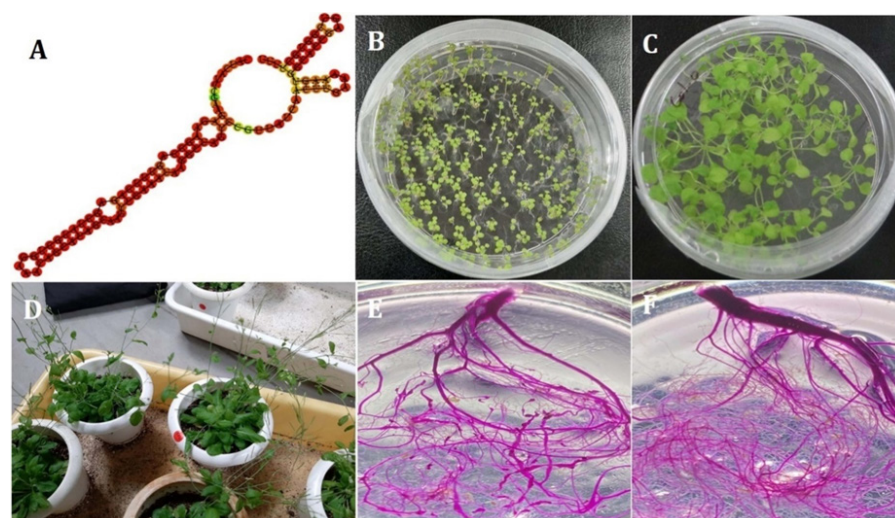
CRISPR/Cas9-based genome editing in plants for improving nematode resistance

The susceptibility (*S*) gene, *HIPP27*, that facilitates nematode parasitism in a host plant, was overexpressed in *A. thaliana*, using overexpression vectors and its role in increasing plant susceptibility to root-knot nematode *Meloidogyne incognita* was validated. At least two guide RNAs for *HIPP27* were designed and synthesized *in vitro*.

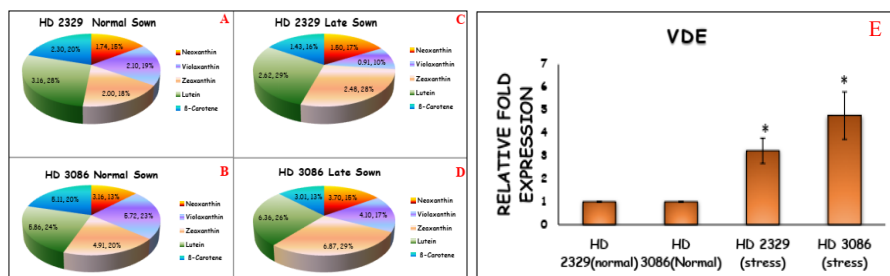
Two gRNA cassettes containing *HIPP27* were cloned into the Cas9 editor plasmid pHEE401 *via* Golden Gate cloning method. Directional cloning was confirmed *via* Sanger sequencing. Arabidopsis plants were transformed with CRISPR/Cas9 components by floral dip method. Plants were grown on MS media supplemented with hygromycin. The mutant plants were genotyped using PCR (primers flanking the target region) and sequenced. A number of deletion mutants were identified in T_0 generation followed by selfing to generate T_1 and T_2 plants. A number of transgene-free mutants were identified in T_2 generation. Phenotyping of the mutants showed increased resistance to *M. incognita*. Further, number of *S* genes are being validated in tomato-*M. incognita* pathosystem.

Role of zeaxanthin cycle pigments in photoprotection of developing grains of wheat under heat stress

Photosynthetic pigments play an important role in the protection of photosynthetic machinery under heat stress (HS). Developing green grains of wheat have photosynthetic



Genome-edited Arabidopsis plants exhibited increased nematode resistance. (A) Secondary structure of *HIPP27* guide RNA; (B-C) Generation of transformed plants from T_0 seeds in MS media supplemented with hygromycin; (D) Generation of mature plants in pots in Phytotron; (E) heavy galling in control roots; (F) lower galling in roots of the edited plant



Proportion of Carotenoids ($\mu\text{g g}^{-1}$ FW) (A-D) and expression of *TaVDE* gene (E) in developing grains of wheat varieties HD 2329 and HD 3086 under normal and late sown heat stress condition

pigments that actively take part in photosynthesis. A study was conducted by subjecting contrasting varieties namely HD 2329 (HS sensitive) and HD 3086 (HS tolerant) to heat stress by late sowing. Under heat stress the developing (14 days after anthesis) grain of tolerant variety exhibited lesser ROS production and maintained higher level of photosynthetic pigment than the sensitive one. Further, lesser reduction in violaxanthin and higher enhancement in zeaxanthin level, increased non-photochemical quenching and higher expression of violaxanthin de-epoxidase (*TaVDE*) gene in the grain of tolerant variety indicated the involvement of zeaxanthin cycle pigments in photoprotection under HS.

EDUCATION

30th Dr. B.P. Pal Memorial Lecture

The 30th Dr. B.P. Pal Memorial Lecture, was organized by the Graduate School, ICAR-IARI, New Delhi and the Genetics Club of IARI, on June 19, 2023, at the Dr. B.P. Pal Auditorium, ICAR-IARI, New Delhi. Dr. Swapan Kumar Datta, a distinguished speaker, graced the event. Dr. Datta is the former Founder Vice-Chancellor of Biswa Bangla Biswabidyalay, Bolpur, and the former Vice-Chancellor of Viswa-Bharati University, Santiniketan, West Bengal. He has also served as

the former DDG (Crop Science) at ICAR, New Delhi. His insightful lecture enlightened the audience. The event was presided over by Dr. Himanshu Pathak, Secretary, DARE and Director General, ICAR. Dr. Anupama Singh, Joint Director (Education) & Dean, ICAR-IARI, extended a warm welcome to all the dignitaries and invitees. Dr. A.K. Singh, Director, ICAR-IARI, New Delhi, introduced Dr. Pathak to the audience and highlighted his significant contributions to the ICAR-IARI, and national human resource development. Dr. Pathak welcomed the distinguished guests present in the auditorium, introduced Dr. Datta to the audience, and provided an in-depth overview of his notable achievements in the field of Plant Biotechnology, Agricultural Sciences and Global Agriculture Policy, including Intellectual Property Rights.



Inauguration of Dr. B.P. Pal Memorial Lecture

Dr. Datta delivered a lecture on “Human Face of Agriculture: Genome Changes with Time”. He presented a comprehensive

overview of agriculture, highlighting its profound connection to the history of civilization. He discussed the concept of the evolutionary expanding genome and its implications, emphasizing the potential of genome editing as a valuable tool in plant breeding for the rapid evolution of new traits. Dr. Datta emphasized the crucial role of India in improving the Global Hunger Index and drew attention to Shri Rabindranath Tagore’s literary contributions on agriculture and cooperative farming. Collaborating with Dr. P.C. Mahalanobis, Tagore made notable predictions on water flooding, excess water storage and usage, and land consolidation and mechanization. The lecture stressed the significance of effective policies in facilitating the diffusion of agricultural technology. The pressing issue of malnutrition, both at a global and national level, was underscored in his talk as a matter of great importance. Furthermore, Dr. Datta emphasized the need to accelerate genetic gain to enhance crop yield and other desired traits.

The conservation and characterization of germplasm were also discussed as essential aspects of agricultural advancement. Millets were highlighted as nutri-rich foods with significant importance for the future. The lecture recognized the success of IARI in developing varieties using modern tools and shed light on the role of GMOs in India. The development and deployment of novel traits through genome editing were discussed, alongside the growing importance of AI in Agri-Food Systems in the country. Finally, Dr. Datta cautioned the necessity of caring for and improving the genome, which serves as the fundamental architect of future agriculture.



Dr. Swapan Kumar Datta delivered a lecture

The function ended with the vote of thanks to the Chair, the Speaker, and the dignitaries present in the function by Dr. S. Gopala Krishnan, President, Genetics Club and Head, Division of Genetics, ICAR-IARI, New Delhi.

EXTENSION

Tribal Farmers' Training

The Division of Agricultural Extension, ICAR-IARI New Delhi organized "Tribal Farmers' Training" programme in Milakpur village of Bharatpur district of Rajasthan on May 08, 2023 under the Tribal Sub Plan (TSP) programme. The importance of the training programme was to create awareness on ICAR-IARI technologies for enhancing the tribal farmers' income in the tribal dominated regions of Rajasthan. The training programme

highlighted the ICAR-IARI farming technologies for enhanced profit and entrepreneurship development process in tribal farming systems of Rajasthan. The training team with the members as Dr. J.R. Mishra, Dr. Nawab Singh and Dr. G.S. Mahara also emphasised the importance of ICAR- IARI "Pusa Samachar" You Tube channel for dissemination of ICAR-IARI technologies and other farming related information and extension services, Self Help Group for the enhancement of women-centric livelihood, ICAR-IARI Toll free service, ICAR-IARI seed availability etc. The training programme was attended by 108 tribal farmers and farm women. The progressive tribal farmers of the village supported the farmers' mobilization for the programme. KVK, Bharatpur also collaborated in the programme and highlighted



Training programme on "IARI Technologies for Tribal Empowerment" at Milakpur Village, Bayana, Bharatpur, Rajasthan

the role of KVK in agricultural development. Finally, the ICAR-IARI's Kitchen Garden Vegetable Seed kits were distributed to the tribal farmers as an outreach activity.

Visit Report of Scientists' Team and interaction with farmers

A team of scientists under the leadership of Dr. M.C. Meena, Senior Scientist, Division of Soil Science & Agricultural Chemistry, ICAR-IARI, visited village Nangal Meena and Jatwara of tehsil Mandawar, Samlety and Sayapur of tehsil Mahuwa, Sikarai and Manpur of Sikarai, Lalsot tehsil and nearby villages of Dausa district, Rajasthan under Tribal Sub Plan (TSP) scheme. The scientists interacted with the farmers to know the cropping systems and practices for *kharif* crops. After interaction, it was decided to conduct Field Level Demonstrations (FLDs) at farmer's field for vegetables, pearl millet, cluster bean, sesamum etc.

The team also interacted with the authorities of one FPO and its members for business planning and preparation of road map for future activities.



Interaction of Scientists with Progressive Farmers and FPO at Dausa District, Rajasthan

World Environment Day

Water Technology Centre, ICAR-IARI, New Delhi organized a public awareness camp on "Water Conservation for Environmental

Security” on June 05, 2023 on the occasion of World Environment Day at Baroji Village, Nuh, Haryana. Scientists Dr. Khajanchi Lal, Dr. Anil Kumar Mishra, Dr. Susama Sudhishri and Dr. V.K. Prajapati explained the importance of water conservation, water harvesting, Government programmes for water conservation and its effective utilization, improving soil and water quality, micro-irrigation systems and their implementation. Also, they motivated the farmers to conserve environment and the Aravalli hills by planting trees on field bunds, kitchen garden and on community lands. Banner with slogans on water conservation and ‘Per drop more crop’ (PDMC) were also displayed on IARI campus.



Water Conservation Campaign for Environmental and Water Security

KVK Gurugram also celebrated World Environment day on June 05, 2023 at KVK campus by planting 100 plants of Jamun and drumsticks. A cleanliness drive was also conducted at the KVK campus.



Plantation on World environment day at KVK campus

International Day of Yoga 2023

IARI and Krishi Vigyan Kendra, Gurugram celebrated 9th International Yoga Day on June 21, 2023 with the participation of staff, students and farmers. During the event, different types of Yoga mudras and Asanas were practised.

Farmers' Training demonstration programme of Pusa Basmati rice varieties

The Division of Agricultural Extension, ICAR-IARI, New Delhi organized a Farmers' Training and Extension demonstration programme of ICAR- IARI's improved Pusa Basmati rice varieties in Nuh and Palwal districts of Haryana on June 14, 2023 under the Scheduled Caste Sub Plan (SC-SP) programme with the participation of more than 40 farmers. The importance of the training programme was to create awareness on ICAR-IARI technologies as well as climate resilient technologies for climate smart agriculture. The training programme highlighted the enhanced yield and profit of Pusa Basmati rice varieties like Pusa 1692, Pusa 1637, Pusa 1718 for the livelihood system of the farmers. The team distributed seed kits of

Pusa 1692, Pusa 1637, Pusa 1718 to the scheduled caste farmers to boost climate smart agricultural practices and outreach activity.

Exhibition on Role of KVKs in Aspirational District Programme

A one-day exhibition was conducted by KVK Gurugram at Dr. Ambedkar International Centre, New Delhi on April 28, 2023. Different activities under aspirational district programme were exhibited for more than 800 participants under Krishi Kalyan Abhiyan.

Kisan Goshthi

• Natural Farming

A *Kisan Goshthi* on natural farming was organized at village Faruukhnagar on April 20, 2023. The 100th episode of *Mann Ki Baat* Programme was also telecast for the participants. A total of 92 farmers participated in the event.

• Kisan Goshthi-cum-Field Day

Kisan Goshthi-cum-Field Day was organized by Division of Soil Science and Agricultural Chemistry, ICAR-IARI, New Delhi on May 12, 2023 in the village Nangal Meena, Tehsil-Mandawar, District-



Distribution of seed kits of Pusa 1692, Pusa 1637, Pusa 1718 to the farmers



Distribution of minor implements to tribal farmers during field day

Dausa, Rajasthan under TSP-IARI Scheme with the collaboration of State Agriculture Department, Dausa District, Government of Rajasthan. Approximately 500 farmers (mostly tribal) attended the program. Farmers were informed about new technologies/concepts in agriculture, government schemes for enhancing their livelihood. Minor implements were also distributed to tribal farmers.

• Soil Health Management

A one-day *Goshthi* on different aspects of Soil Health Management was organized at KVK Shikohpur, Gurugram on May 25, 2023. During the programme soil testing, soil test-based fertilizer application, use of organic fertilizers, natural farming practices etc. were discussed with the participants.



Soil conservation campaign

• Rain Water Harvesting and its efficient use

A one-day *kisan goshthi* on Rain Water Harvesting and its efficient use was organized at KVK Shikohpur, Gurugram on May 30, 2023. The farmers were made aware about the technologies like drip

irrigation, sprinkler system, micro sprinklers, laser sprinklers, water saving crops etc. and motivated to adopt the technologies to save water for future. A total of 88 farmers participated in the programme.

• Natural farming

Two *Kisan goshthi* on Natural farming were organized by KVK Shikohpur, Gurugram, at village Darbaripur on June 01, 2023 and at KVK campus on June 05, 2023. During the programme various methods of Natural Farming were discussed. Preparation of vermi-compost, vermi wash, Jeevamrut, Ghan Jeevamrut, Panchgavya. etc. were explained by KVK experts. A total of 140 farmers and farm women participated in both the programmes.



Kisan Goshthi on Natural farming

Scientific Advisory Committee Meeting

The 37th Virtual SAC meeting was organized on May 11, 2023 under the Chairmanship of Dr. A.K. Singh, Director and Vice-chancellor, ICAR-IARI, New Delhi at KVK, Sikohpur. A detailed report

was presented by the Head, KVK for the period April, 2022 to March, 2023 with the Action Plan for the year 2023-24. The meeting was also attended by the Joint Director, (Extension), Heads/officials of different divisions like, Agriculture, District Industrial Centre, Fishery Division, RUDSET, Animal Husbandry, Seed Production Unit (IARI), ATIC (IARI), CATAT (IARI) who gave their valuable suggestions for improving the working of KVK.

Awareness on *Swacchata* and crop residue management

Awareness on *swacchata*, crop residue management and conversion of farm waste to wealth during *Swachhata abhiyan* was organized by KVK, Gurugram at village Sakatpur on May 22, 2023. Farmers were advised to refrain from burning crop residue and instead use it for composting.

Seed Treatment Campaign

Five campaigns on seed treatment for the duration of one day each were organized by KVK, Gurugram, in different villages of Gurugram district on May 02, 2023 at Kankrola, May 12, 2023 at Turkapur, May 18, 2023 at Tripari, May 22, 2023 at Sakatpur, May 26, 2023 at Darbaripur. During the programme, awareness and methods of seed treatment in *Zaid* and *Kharif* season crops were discussed and demonstrated by the SMS at KVK.

Method demonstration-cum-awareness programme on Agricultural Drone Spray

A method demonstration on Agricultural Drone Spray was conducted at KVK Shikohpur, Gurugram under Mission LIFE. During the demonstration, nano urea was sprayed by drone on different



Demonstration on nano urea spray by drone

crops. Farmers observed the activity with keen interest. A total of 88 farmers participated in the event.

Exhibition on Natural farming in Organic Expo, Greater Noida

An exhibition was setup on natural farming by KVK Shikohpur, Gurugram during Organic Expo held at Greater Noida from June 02-04, 2023. During the exhibition, various methods of natural farming like preparation of vermicompost, vermish, Jeevamrut, Ghan Jeevamrut, Panchgavya. etc. were discussed by KVK experts. Approximately 700 farmers, farm women and general public attended the programme.



Exhibition on natural farming at Organic Expo, Greater Noida

One-day state level Seminar on Climate Resilient Agriculture sponsored by NABARD

One-day state level Seminar on Climate Resilient Agriculture sponsored by NABARD was organized by KVK Shikohpur,

Gurugram. During the programme discussions were held on climate resilient agriculture, climate change and its effect on agriculture, soil and water conservation, natural farming for sustainable agriculture, etc. A total of 98 farmers, farm women and officials participated in the programme.

CAPACITY BUILDING

Training on Promotion of Organic Farming and Vermicompost Production Technology

A one-day training programme to change the attitude of farmers towards organic farming and vermicompost production technology was organized by KVK Gurugram, at village Tripari, on June 20,

2023. During the programme various methods used in organic farming were discussed. Method of vermicompost preparation and unit establishment was elaborated to the farmers.

Training on INM in pearl-millet

KVK, Gurugram organized training program on “INM in pearl-millet” at Khakhadi village on June 28, 2023. During the program, the participants were apprised about INM in pearl-millet with the use of green manuring, farm yard manure, bio-fertilizers.

DG Visit and Cultural Evening Liven Up Pusa Agri Krishi Haat

Dr. Himanshu Pathak, Hon'ble Secretary DARE & Director General, ICAR, along with Dr. A.K. Singh, Director, ICAR-IARI, New Delhi and other dignitaries visited “Pusa Agri Krishi Haat” an innovative model of a market platform created by IARI for the farmers to sell their agri-products, on May 05, 2023. Dr. A.K Singh stated that ICAR-IARI, New Delhi, established the Pusa Agri Krishi Haat at its campus near ATIC, to empower and facilitate the agri-preneurs as well as farmers and farm women in marketing their



Farmers Participating in the Seminar on Climate Resilient Agriculture



Director General, ICAR Visit Pusa Agri Krishi Haat and Liven Up Cultural Evening



fresh as well as value added farm products through direct linkage with urban consumers. The Haat has been made operational, and to provide a wider publicity among the consumers, initiatives of media coverage and campaigns have been made and, in this regard, a cultural evening, presented by the Pusa Institute Ladies Association (PILA) and the Post Graduate School Students Union, was organized on May 05, 2023 on its premises. Director General, ICAR interacted with the farmers and farm women entrepreneurs who have set up their shops of value-added products at the Haat.

He exhorted them to focus upon quality of produce and competitive prices. Addressing the media as well as the officials of IARI and the visitors, he emphasized upon scaling up the model to attract the larger footfalls from the city and also on replicating the model at other places in order to support the farmers by linking them directly with consumers. He also appreciated the efforts of the President, PILA, Dr. Renu Singh, for arranging the promotional event by engaging the staff and students of IARI. Besides Dr. Himanshu Pathak, Mrs. Sumita Pathak, Dr. A.K. Singh, the cultural

evening was also attended by Dr. D.K. Yadav (ADG, Seeds), Dr. R.R. Burman (ADG, Extension), Dr. C. Viswanathan (Joint Director, Research), Dr. Anupama Singh (Dean & Joint Director, Education), Dr. R.N. Padaria (Joint Director, Extension), Shri Pushpendra Singh (Joint Director, Administration) and Dr. N.V. Kumbhare (Incharge, ATIC) along with audience of Pusa Campus as well as nearby localities from Inderpuri and Naraina.

Virtual inauguration of Regional Honey Testing Laboratory

Shri Narendra Singh Tomar, Hon'ble Union Minister of Agriculture & Farmers Welfare, Government of India, inaugurated the Regional Honey Testing Laboratory funded by the National

Bee Board, Ministry of Agriculture and Farmers Welfare, through virtual mode, on May 20, 2023 on the occasion of "World Bee Day". The same laboratory was personally inaugurated by Dr. Anupama Singh, Dean and Joint Director (Education), ICAR Indian Agricultural Research Institute, New Delhi, in the Division of Agricultural Chemicals, IARI. This laboratory would prove beneficial for the farmers in checking the quality of honey.

MISCELLANEOUS

Externally Funded Projects Sanctioned and Implemented

- A project entitled "Development of sensor based low volume target sprayer for disease control in vegetable crops"



Inauguration of Regional Honey Testing Laboratory

under the PI, Dr. Roaf Ahmad Parray, Scientist, Division of Agricultural Engineering, IARI was funded by DST for an amount of ₹ 38.83 lakhs for three years.

- A project entitled “Standardization of nitrogen management options for various crop establishment protocols under rice- wheat system” under the PI, Dr. Kapila Shekhawat, Senior Scientist, Division of Agronomy, IARI was funded by IARI for an amount of USD 13,500 for two years.

Contract Research Projects

- The contract research project entitled “Evaluating biochar and digested sludge for enhancing productivity, profitability and nutrient usage in different crops” under the PI, Dr. S.S. Rathore, Principal Scientist, Division of Agronomy was funded by Shell India Limited, at a total cost of ₹ 1.26 crores for duration of two years.
- The contract research project entitled “Bio-efficacy evaluation of new phytochemicals in apple (*Malus x domestica*)” under the PI, Dr. Santosh Watpade, Scientist, ICAR-IARI Regional Station, Amartara Cottage, Shimla was funded by UPL Limited, at a total cost of ₹ 30.80 Lakhs for duration of two years.

Technology Commercialization

During April-June 2023, under Lab to Land Initiative, 11 technologies of ICAR-IARI were commercialized to 28 companies, resulting in a total revenue

generation of ₹ 93,04,064.

IP management

Patent	2 Filed 1 Renewed
Copyright	1 Filed
Trademark	2 Trademark Hearing

ITMC Meeting

During this quarter, Two ITMC meetings were organized on May 12, 2023 and June 6-7, 2023 to discuss the agendas of technology commercialization and IP protection for the technologies of IARI and its regional stations.

Incubation Activities

Startup Masterclass series

Startup Masterclass series was organized from April 24 -May 18, 2023. The startups got an opportunity to interact with domain-specific lecturers and influencers who can aid them as they travel the challenging path of entrepreneurship during the master class series. More than 300 startups applied for the programme from 50 ABICs of ICAR and twelve R-ABI of RKVY-RAFTAAR, Ministry of Agriculture.

Agri India Meet 3.0

The third edition of the Agri India Meet was organized by ICAR-IARI’s Meta Incubator- Pusa Krishi, under the “Azadi Ka Amrit Mahotsav” theme. There were deliberations between different stakeholders and invited talks on several key topics within the agriculture domain.

The first session of Agri India Meet 3.0 was organized on May 03, 2023. The topic of the session was “Agriculture Infrastructure Fund

(AIF): How is AIF strengthening the Agri & Allied startups”. The meet was attended by approximately 200 startups.

UPJA (Seed stage incubation programme) & ARISE (Pre-seed stage incubation programme) for agri-startups

UPJA and ARISE programme was launched on April 14, 2023 and a total of 839 applications were received, out of which 189 were called for RIC – I and finally 62 startups were selected for two-month incubation programme. Both UPJA and ARISE programmes provide funds up to ₹ 25 and 5 Lakhs per startup, respectively. They aim to nurture early-stage innovators and entrepreneurs to transform the future of agriculture. They provide technology validation, mentoring, guidance, pilot opportunities, go-to-market support, and industry linkage to startups with innovative solutions at MVP (Minimum Viable Product) stage.

Agripreneurship Development Programme

Agripreneurship development program on cultivation, harvesting and processing of Spirulina biomass for value-added product formulation was organized from April 10-12, 2023. This entailed three days of hands-on instructions on different facets of Spirulina cultivation, harvesting, drying and value-adding techniques. Lectures, exercises, and a site tour to a Spirulina cultivation facility in the national capital region were included in the training with 41 participants.

Agripreneurship Development Programme on entrepreneurship opportunity in agricultural and industrial waste management for environmental sustainability was

organized from May 15-19, 2023. This was organized to strengthen the skill and knowledge of Agri- based stakeholders for waste management to understand the critical points and basic problems while requiring waste management at field level.

Corporate Membership

In this quarter, the Unit enrolled nine new industry partners for membership and renewed the membership of 22 industry partners, generating a revenue of ₹ 1,51,500.

Awards

- Dr. M.S. Saharan, Head, Division of Plant Pathology

received Dr. R. Prasada Memorial Award from Indian Society of Mycology & Plant Pathology, Udaipur in National Conference on Plant Health Management: A Way Forward for Food Safety, Security and Sustainability organized by ISMPP, Udaipur held at GAU, Anand during May 10-12, 2023.

- Dr. R. Gogoi, Professor, Division of Plant Pathology received Prof. V.B. Bhide Memorial Award from Indian Society of Mycology & Plant Pathology, Udaipur in National Conference on Plant Health

Management: A Way Forward for Food Safety, Security and Sustainability organized by ISMPP, Udaipur held at GAU, Anand during May 10-12, 2023.

- Dr. Deeba Kamil and Dr. Bishnu Maya Bashyal received best oral paper presentation award in National Conference on Plant Health Management: A Way Forward for Food Safety, Security and Sustainability organized by ISMPP, Udaipur held at GAU, Anand during May 10-12, 2023.

National and International Visits at IARI

Visit of Dr. Himanshu Pathak, Secretary (DARE) & DG (ICAR) to ICAR-IARI's Regional Research Centre, Dharwad.

Dr. Himanshu Pathak, Hon'ble Secretary (DARE) & Director General (ICAR) visited IARI's RRC Dharwad on June 12, 2023. Dr. V. Venkatasubramanian, Director, ATARI Bengaluru, Dr. S.A. Gaddanakeri, Associate Director of Extension, Dr. Shripad Kulkarni, Nodal Officer, KVK, and Dr. Vittal Kuligod, Professor & Head, Department of Soil Science, UAS, Dharwad were also present on the occasion. The officer-in- charges of IGFRI SRRS, Dharwad and IIPR regional station Dharwad also accompanied the dignitaries. DG, ICAR along with other dignitaries visited the laboratory-cum-office building of the Centre. The varieties/hybrids developed and released by the centre and shuttle breeding were displayed in the form of posters and seed samples during the visit. The major breeding activities and off-season nursery facilities provided by the centre were briefed to Hon'ble DG (ICAR). During his brief visit DG, ICAR obtained birds eye view of the facilities, activities and achievements of the centre.



Dr. Himanshu Pathak, Secretary (DARE) & Director General (ICAR) visiting ICAR-IARI's RRC Dharwad

Professor Gideon Henderson, Chief Scientific Advisor, Department of Environment, Food and Rural Affairs (DEFRA), UK Visit to ICAR-Indian Agricultural Research Institute (IARI), New Delhi on April 14, 2023



UK delegation with IARI Team

Visit of Tanzanian delegation to ICAR-Indian Agricultural Research Institute, New Delhi on May 30, 2023



Tanzanian delegation at ICAR-IARI

Visit of Vietnamese delegation led by H.E. Le Minh Hoan, Minister of Agriculture & Rural Development, Vietnam to ICAR-Indian Agricultural Research Institute, New Delhi on June 14, 2023



Vietnamese delegation with IARI Team

Display of the technologies/products developed by Division of Biochemistry, IARI before the delegates from Vietnam, Uganda and members of NAAC committee during their visit in the month of June, 2023

Overseas Deputation

Dr. A. Kumar, Principal Scientist, Division of Plant Pathology IARI attended an international event on “Endophytic Microbes for Crop Nutrition: Reality or Myth,” organized by the Bill & Melinda Gates Foundation in Seattle, USA, on May 16-17, 2023.



Vietnam and Uganda delegation interaction with Director ICAR-IARI