



# IARI NEWS



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## RESEARCH

### Wheat Varieties Identified for Release

Two new wheat varieties, namely, HI 1612 and HI 8777, were identified for release during 56<sup>th</sup> All India Wheat and Barley Research Workers' Meet held at Banaras Hindu University, Varanasi during August 25-28, 2017.

HI 1612 is a bread wheat genotype identified for release under timely sown, restricted irrigation conditions of North Eastern Plains Zone. It is a significantly high yielding variety (3.76 t/ha) compared to checks K 8027 (3.36 t/ha), C 306 (3.10 t/ha) and HD 2888 (3.03 t/ha) under timely sown and restricted irrigation (RI) conditions with yield potential of 5.05 t/ha. It has shown excellent and wider adaptation and significantly superior performance across different irrigation regimes. It showed significantly high yield gain at one irrigation (32.4 %) and two irrigations (52.4%) over no



A bread wheat variety HI 1612

irrigation condition. It showed high levels of adult plant resistance to prevalent and virulent stripe rust pathotypes 46S119, 78S84 and 110S119; and leaf rust pathotypes 77-5, 77-9 and 104-2. It also showed good levels of resistance to leaf blight, Karnal bunt, *Fusarium* head blight and loose smut. It is a genotype with excellent *chapati* making quality (7.64), biscuit quality (7.39), high protein content (11.5%) and high sedimentation value (58 ml). It has high levels of essential micronutrients like iron (41.5 ppm) and zinc (35.5 ppm) contents.

HI 8777 is a *durum* wheat genotype identified for release under rainfed, timely sown conditions of Peninsular Zone. It is widely adapted and high yielding (1.85 t/ha), compared to checks AKDW 2997-16 (1.62 t/ha) and UAS 446 (1.62 t/ha) under rainfed, timely sown conditions with yield potential of 2.88 t/ha. It showed

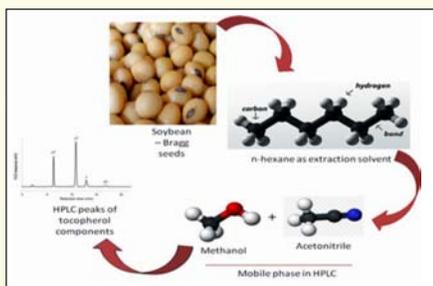


A durum wheat variety HI 8777

high 1000-grain weight (43.27 g). In isolated nurseries, HI 8777 showed high levels of adult plant resistance to prevalent and virulent stem rust pathotypes 40A and 117-6; and leaf rust pathotypes 77-5, 104-2 and 77-9. It also showed better resistance to Karnal bunt, loose smut, flag smut and foot rot than the checks and the qualifying variety MACS 4028. It has good levels of yellow pigment content, high levels of essential micronutrients, viz., iron (48.7 ppm) and zinc (43.6 ppm) with high overall acceptability (7.0), compared to *durum* checks.

### Standardization of Vitamin-E Extraction and Estimation Method

In plants, tocopherols (vitamin-E) are involved in intracellular signaling, stabilization of cell membrane and helps in improving the oil and protein quality. In humans, intake of vitamin-E leads to decreased risk for cardiovascular disease, cancer, and caducity, aids in immune function and prevents many degenerative diseases. In addition to enhancing the nutritional value of crops and human health benefits, increased levels of vitamin E compounds have tremendous potential to improve the shelf life of seeds, seed



Schematic diagram showing extimation of tocopherol using HPLC

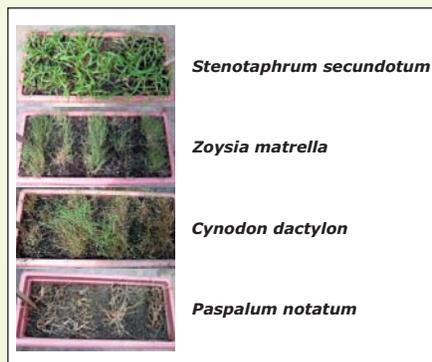
vigor and seed oil quality including plant performance under stressful conditions that are linked to reactive oxygen species. The Institute's Division of Biochemistry have standardized the tocopherol extraction and estimation method in soybean (var. Bragg) seeds.

Here direct solvent extraction method was adopted using various combinations of solvents used for extraction as well as mobile phase in HPLC. Using hexane as extraction solvent and methanol: acetonitrile in the ratio of 50:50 as mobile phase solvent, highest amount of tocopherols; 83.5 ppm of total tocopherols was found as compared to the rest of the solvents and their ratios.

### Turf Grasses against Salt Stress

Four species of turf grasses, i.e., *Cynodon dactylon*, *Zoysia matrella*, *Stenotaphrum secundatum* and *Paspalum notatum* have been evaluated for salt tolerance. Grasses have been planted in window planter with soilless media (sand: cocopeat: vermiculite-2:1:1). *Stenotaphrum secundatum* was found to be highly salt tolerant at highest concentration (500 mM NaCl) followed by *Zoysia matrella*, while *Paspalum notatum* was least salt tolerant. At higher conc. (500

mM NaCl) *Stenotaphrum secundatum* recorded 80.00% RWC while *Paspalum notatum* recorded least 36.51% RWC. *S. secundatum* and *Zoysia matrella* maintained higher amount of total chlorophyll under salt stress with marginal reductions compared to other turf species. Maximum leaf firing (100%) was observed in *P. notatum* at 500 mM. while minimum leaf firing was found in *S. secundatum* (15%). At higher conc. (500 mM NaCl) *Stenotaphrum secundatum* recorded 70.17  $\mu\text{mol/gfw}$  proline content, while *Paspalum notatum* recorded least 25.47  $\mu\text{mol/gfw}$  of proline.



### Field Demonstration of Tractor Mounted Fertilizer Broadcaster

A field demonstration of commercially available Tractor Mounted Fertilizer Broadcaster was organized at IARI research farm on July 26, 2017 by the Institute's Farm Operation Service Unit (FOSU). The machine was also tested for broadcasting of *dhaincha* (*Sesbania bispinosa*) seed. The machine has a tank capacity of 600 kg and can be operated with 35 HP tractor through PTO. The field capacity is estimated to about 5-6 ha/h as it can be operated at 5-7 km/h forward speed covering



Tractor Mounted Fertilizer Broadcaster

swath of 12 m. The machine for fertilizer broadcasting can save human power (97.5 %) and cost of operation (95%) with respect to conventional method. The uniformity of fertilizer application in field was significantly higher than that of conventional method of fertilizer broadcasting. It was observed that it could be used for application of basal dose as well as up to early stage of major field crops efficiently and economically.

### Institute Research Council Meetings

The Institute Research Council (IRC-II 2017) meetings were held from September 12 to 23, 2017 under the Chairpersonship of Dr. A.K. Singh, Director (Additional Charge), IARI and Co-Chairpersonship of Dr. K.V. Prabhu, Joint Director (Research), IARI. In the IRC-II, presentations were made school-wise, wherein, the Coordinator of the particular school presented the Action Taken Report of the recommendations of IRC-2016. This was followed by the presentations of all the in-house research projects as well as the Flagship programmes of the concerned school by the respective Project Investigators of the projects. Eminent Resource Persons were invited for the IRC-II meetings for



Institute Research Council (IRC-II 2017) meeting on School of Social Sciences is in progress

all the Schools, who offered valuable and critical inputs for further improvement and strengthening of the research programmes of the Institute.

## EDUCATION

### Teachers' Day Lecture -2017

IARI organized Teachers' Day Lecture-2017 on September 5, 2017 at Dr. B.P. Pal Auditorium of the Institute to pay tribute to Dr. S. Radhakrishnan, the former Hon'ble President of India and a great educationist. Dr. R.K. Jain, Dean & Joint Director (Education) emphasized the significance of the



Dr. K.M. Paknikar, Director, Agharkar Research Institute, Pune, delivering Teachers' Day Lecture-2017

Teachers' Day and the lecture series. Dr. A.K. Singh, Director (Additional Charge), IARI introduced the Chairperson of the function, Dr. H.S. Gupta, former Director, IARI, New Delhi. Dr. K.M. Paknikar, Director, Agharkar Research Institute, Pune, delivered the Teachers' Day Lecture on the topic "Bioinspired Innovation in Nanotechnology". Dr. H.S. Gupta, highlighted the new initiatives in agricultural education in India. The program ended with a formal vote of thanks by Dr. Vinod, Professor, Division of Genetics, IARI.

### Y.M. Upadhyaya Memorial Lecture

A lecture series has been initiated at the Regional Station, Indore in the fond memory of late Dr. Y.M. Upadhyaya, legendary wheat breeder who laid the technical foundation of the Station, and immensely contributed to the realization of green revolution in central India. Dr. Vineet Kumar, Principal Scientist, ICAR-Indian Institute of Soybean Research, Indore delivered a lecture on "Overcoming Processing Constraints by Intervention at Seed

Level". He stressed on major problems being encountered by processing industries in crops like soybean, maize and potato. He also discussed some other important developments in this field like QPM maize, chips quality potato, etc.

## EXTENSION

### Field Days

The *Krishi Vigyan Kendra*, Shikohpur organized two field days on: i) "Pearl Millet" on September 22, 2017 in Daboda village in which 92 farmers and farm women participated; and ii) "Pigeon Pea" on September 15, 2017 in Borakalan village in which 62 farmers and farm women participated.

### World Honey Bee Day

The Institute's *Krishi Vigyan Kendra*, Shikohpur, Gurugram celebrated the World Honey Bee Day on August 19, 2017 which was attended by 60 farmers of the area. During the programme, Dr. J.P. Sharma, Joint Director, Extension, IARI told the farmers that the beekeeping vocation has vast area of self employment and livelihood, i.e., preparation of bee boxes and different implements related to this vocation.



World Honey Bee Day celebrated at KVK, Shikohpur

## National Nutrition Week

The Institute's Division of Agricultural Extension organized "National Nutrition Week" to promote and spread awareness about nutrition and healthy habits on September 6, 2017 at Faculty Club, IARI, Pusa New Delhi. The program started with the lecture on Healthy eating habits in today's modern life by Dr Premlata Singh, Head (Acting), Division of Agricultural Extension. In this event, a significant number of children and their mothers participated enthusiastically. The programme encompassed various activities like nutrition quiz, poster competition on nutritionally rich healthy foods, information session regarding nutrition & healthy eating habits and discussion about the serious concerns of food habits. This session also included information and presentation of nutrient-oriented IARI technologies through poster presentation to create awareness about less consumption of junk foods and to promote minimally processed nutritionally rich food products.

## Participation in Exhibitions

- ❖ Participated in International Agri-Horti expo and Food Technology Expo, 2017 at Pragati Maidan, New Delhi from July 14 to 16, 2017. The event was organized by NNS Media Group.
- ❖ Participated in exhibition during conference on 'Digitalization of Agriculture for Enhancing Farm Income' on September 8, 2017 at India

Habitat Centre (IHC), New Delhi.

- ❖ Participated in 'North-East Calling' during DoNER event on September 9-10 2017 at Vigyan Bhawan, New Delhi.
- ❖ Participated in *Kisan Mela* at YFA Campus, Rakhra, Punjab on September 16, 2017.
- ❖ Participated in Agricultural Exhibition from September 22 to 25, 2017 at Mathura (U.P.) on the occasion of birth centenary of Pandit Deendayal Upadhyay.

## Sankalp Se Siddhi Programme

The Krishi Vigyan Kendra, Shikohpur, Gurugram organized a programme on New India Manthan: *Sankalp Se Siddhi* on August 25, 2017 at its campus. The programme was inaugurated by the Chief Guest, Hon'ble Union Minister of State for Agriculture and farmers welfare Shri Sudarshan Bhagat. He informed that the Government of India has taken so many steps for the benefit of farmers and launching a number of schemes for the benefit of

farming community of the country like production of Neem Coated Urea, *Pradhan Mantri Fasal Bima Yojna* and *Pradhan Mantri Sinchai Yojana*, etc. Dr. Amitabh Gautam, Joint Secretary, Ministry of Agriculture and Farmers Welfare elaborated about how to double the income of farmers up to 2022. He also advised the farmers to adopt other vocations also like poultry, fisheries, beekeeping and dairy development programmes. Two hundred seventy two farmers and farm women of the district Gurugram participated in the programme.

## CAPACITY BUILDING

### Trainings/Summer Schools

The Institute's Division of Agronomy organized two Summer Schools on: i) "Integrated Farming Systems for Farmers Empowerment and Entrepreneurial Development" (June 23 to July 13, 2017); and ii) "Waste to Wealth: Bio-compost Production and Utilization Innovations in Organic Agriculture" (August 10 to 30, 2017).



A programme on New India Manthan: *Sankalp Se Siddhi*

CATAT organized seven training programmes each for 25 extension staffs and farmers sponsored by Development Department of NCR, Delhi on: i) “Kharif Crops” on July 13 - 14, 2017; ii) “Organic Farming Certification” on July 21, 2017; iii) “Grading, Packing and Post-harvest Management” on July 28, 2017; iv) “Good Agricultural Practices on Flowers and Vegetables” on August 4, 2017; v) “Diversification on Agriculture Due to Climate Change” on August 25, 2017; vi) “Preservation of Fruits & Vegetables” on September 8, 2017; and vii) “Safe Judicious Use of Pesticide for Food Safety and Quality with Reference to Food Standards of Other Countries” on September 15, 2017. The Centre also organized a training on “Improved Crop Production Technologies for Cereals and Pulses” sponsored by ATMA, Naguar, Rajasthan from September 19 to 25, 2017. Thirty farmers attended the training programme.

The Institute’s Division of Microbiology organized two training programmes on: i) “Production Technology of Blue Green Alga – *Spirulina*” from July 18 to 21, 2017 at the Centre for Conservation and Utilization of Blue Green Algae (35 participants from Hanumangarh, Rajasthan attended); and ii) “Basic Microbiological Techniques for Studying Microbes” from July 24 to 31, 2017.

The Institute organized a training cum farmer-scientist interaction meet on “Nutritional Security and Capacity Building of

Women Farmers” on July 29, 2017 in Katesara village, Palwal, Haryana. About 50 women from Amarpur, Katesara and Dadhota villages participated in the programme. A farmers-scientist interaction meet under the theme “Safety Issues and Drudgery Reduction in Agriculture” was also organized and provided information on safety gadgets of chaff cutter and other drudgery reducing farm mechanization.

Institute’s *Krishi Vigyan Kendra* (KVK), Shikohpur organized three vocational training programmes on: i) “Plant Protection and Pest Control Services” from August 26 to September 7, 2017 in Tripari village (15 rural youth participated); ii) “Beekeeping” from September 12 to 22, 2017 (10 youths and Farm women from different villages of Gurugram district participated); and iii) “Dairy Farming” from September 15 to 25, 2017 at KVK campus (41 rural youth/farm women from Gurugram, Rewari, Jhajjar and Mahendergarh districts participated). The KVK also organized an in-service training programme on “Integrated Pest Management (IPM) in *Rabi* Crops” on September 8, 2017 at Gurugram for ADOs of Department of Agriculture, Gurugram. In this training programme, 25 ADOs participated.

The Institute’s Division of Agricultural Extension organized a CAFT training programme on “Extension Strategies for Nutrition Sensitive Agriculture to Address Sustainable Development Goals”

from September 2 to 22, 2017 at IARI. Assistant professors from SAUs, KVKs subject matter specialists and scientists from ICAR Institutes participated in the training. The Division of Agricultural Extension also organized 12 training programmes in collaboration with UNDP under Disha programme for 600 trainees from Mewat, Sonipat and Jhajjar districts of Haryana to empower the farm women to enhance their family income through entrepreneurship and ensure nutritional security through agriculture.

The Division of Agricultural Engineering organized a training programme on “Precision Agriculture Technologies” for technical staff from September 18 to 23, 2017. Sixteen participants from five different ICAR Institutes and one from corporate sector participated in the training programme.

## Workshops

The Division of Agricultural Extension organized a workshop on “Extension Strategies for Strengthening Agri-Nutri Linkages” on September 21, 2017. This workshop had three open house discussions. The first session was on Agri-led Nutrition (Technological Options), moderated by Dr. H.S. Gupta, former Director, IARI; the second was on Nutri-Agri Pathways: Research priorities, moderated by Dr. Prema Ramachandran, former Planning Commission Adviser for Health, Nutrition and Population; and the third session was on Extension Strategies and Policies

for Agri-Nutri Synergetic Convergence, moderated by Dr. P.N. Mathur Adjunct faculty, ICAR-IARI and Dr.Malavika Dadlani, former Joint Director (Research), IARI. The workshop was focused on building better strategies, strengthening the policies, promotion of nutrition driven technologies in agriculture, making the platform beneficial for the farmers, etc.

IARI and IIT, Kanpur launched a workshop on “Establishment of Design Innovation Centre (DIC)” on August 21, 2017 at the Division of Agricultural Engineering. A Design Innovation Centre was established under hub and spokes mode for innovative product and process development. The focus of DIC is on the innovative application of technology and functional prototype of the design. Dr. A. K. Singh, Deputy Director General (Agricultural Extension), ICAR and Director (Additional Charge), IARI, Dr. K. Alagusundaram, Deputy Director General (Agricultural Engineering), ICAR, Padma Shri Dr. Manindra Agrawal, Deputy Director, IIT, Kanpur along with Prof. Satyaki Roy and Dr. Shantanu Bhattacharya graced the occasion.



A workshop on “Establishment of Design Innovation Centre (DIC)” at the Division of Agricultural Engineering



Release of a technical bulletin entitled “Enhancing Demand of Pearl Millet as Super Grain” during the Brain Storming Session

### Brain Storming Session

ICAR-AICRP on Pearl millet, Jodhpur and Division of Biochemistry jointly organized a Brain Storming Session on “Developing Strategies to Enhance Demand of Pearl millet as Health Food” on July 26, 2017 to address various issues related to popularization of pearl millet as nutria-cereal. On this Occasion, a technical bulletin entitled “Enhancing Demand of Pearl Millet as Super Grain” highlighting the current status of pearl millet production and its usage with a focus for future avenue was released by Dr. Trilochan Mohapatra, Director-General, ICAR and Secretary, DARE.

## MISCELLANEOUS

### New External Funded Projects Launched

- ❖ “Impact of conservation agriculture on soil ecosystem services in Karnal district of
- ❖ “Taxonomy and molecular characterization of the selected potential insect pests of

Haryana” funded by NRDMS, DST. Amount: ₹ 18.37 lakhs for eighteen months. Principal Investigator: Dr. Pragati Pramanik, Scientist, Division of Agricultural Physics.

- ❖ “Integration of plant and parasite omics to decipher the interactions and identify molecular targets for the management of root knot disease of rice” funded by DBT. Amount: ₹ 239.53 lakhs for 3 years. Principal Investigator: Dr. Uma Rao, Head, Division of Nematology.
- ❖ “Networking projects on revival of village ponds through scientific interventions in water scarce region of Haryana” funded by DST. Amount: ₹ 28.82 lakhs for two years. Principal Investigator: Dr. Susama Sudhishri, Principal Scientist, Water Technology Centre.

- ❖ Lepidoptera group in Ladakh region” funded by DIHAR, DRDO. Amount: ₹ 9.66 lakhs for eighteen months. Principal Investigator: Dr. P.R. Shashank, Scientist, Division of Entomology.
- ❖ “Begomovirus based transient gene delivery system for genome editing in Solanaceous plants” funded by SERB, DST. Amount: ₹ 27.11 lakhs for three years. Principal Investigator: Dr. Anirbon Roy, Senior Scientist, Division of Plant Pathology.
- ❖ “Geochemistry of boron and its availability in soils of Indo-Gangetic plains under predominant cropping systems” funded by DST. Amount: ₹ 34.40 lakhs for 3 years. Principal Investigator: Dr. Ruma Das, Scientist, Division of Soil Science & Agricultural Chemistry.
- ❖ “Development and evaluation of thermotolerant mutant in bread wheat by augmenting source and sink efficiency through mutagenesis” funded by DAE-BRNS. Amount: ₹ 34.00 lakhs for 3 years. Principal Investigator: Dr. Ranjeet R. Kumar, Scientist, Division of Biochemistry.
- ❖ “Options enabling agricultural education for entrepreneurial skill development, employment generation and sustainable agriculture in India” funded by ICAR. Amount: ₹ 3.96 lakhs for one year. Principal Investigator: Dr. Amit Kar, Head, Division of Agricultural Economics.
- ❖ “Analyzing reasons for low preference of agricultural education and not pursuing career in agricultural sector thereafter” funded by ICAR. Amount: ₹ 4.21 lakhs for one year. Principal Investigator: Dr. Atul Kumar, Senior Scientist, Division of Seed Science & Technology.
- ❖ “Analyzing cases of successful agricultural graduate entrepreneurs” funded by ICAR. Amount: ₹ 5.21 lakhs for one year. Principal Investigator: Dr. Amit Kumar Goswami, Senior Scientist, Division of Fruits & Horticultural Technology.
- ❖ “All India Coordinated Project on Pearl Millet (Lead Centre-AICPR on Pearl Millet, Jodhpur)” funded by ICAR. Amount: ₹ 1.20 lakhs. Principal Investigator: Dr. R.S. Bana, Scientist (SS), Division of Agronomy.

### IP Management

- ❖ Copyright Registered: Design of Micro Irrigation System (DOMS)
- ❖ Variety Protected under PPV&FRA : Pusa Double Zero Mustard 31

### Technologies Commercialized

The Institute commercialized the following technologies which generated a revenue of ₹ 2,20,000 during this quarter:

- ❖ Chilli-Pusa Jwala licensed to M/s Mark field Hybrid Seeds
- ❖ Onion-Pusa Red licensed to M/s Mark field Hybrid Seeds

- ❖ Pusa Compost Turner Cum Mixture & Pusa Compost Sieving Machine licensed to M/s Farm Implements (India) Pvt. Ltd.

### Corporate Membership

In this quarter, twenty two (22) new members were registered and Three (3) corporate memberships were renewed, generating a revenue of ₹ 1,18,000/-

### Hindi Chetna Mass (Hindi Awareness Programmes)

The Institute celebrated “Hindi Chetna Mass” from September 1 to 30, 2017. The function was inaugurated on September 1, 2017 at CESCRA auditorium. On this occasion, a Hindi essay writing competition was organized. A large number of scientific, technical and administrative staff members participated in this competition. During *Hindi Chetna Mass*, 10 competitions were organized for all categories of the staff for promoting the use of Hindi. A general knowledge competition was also organized only for the skilled supporting staff of the Institute.

Different divisions/regional stations of the Institute also organized Hindi *Pakhwara/Saptah/Diwas* as a part of month long Hindi awareness programme and conducted different Hindi competitions.

### Swachhta Programme on “Swachhta Hi Seva”

The Institute conducted a *Swachhta* Programme on ‘*Swachhta Hi Seva*’ from September 15, 2017 to October 2, 2017. Dr. A.K. Singh,

Director, IARI, administered an oath to officials and employees of Directorate towards cleanliness. The programme was initiated by IARI's divisions, sections and regional stations. Staff of the Institute participated with full zeal and gave their full support of this programme. On this occasion foundation of a new toilet was laid at the disadvantage area near the Inderpuri gate. IARI also participated in cleaning the outside areas of the campus, i.e., outside the boundary wall towards DTC Bus Stand on both gates (Rajendra Nagar & Inderpuri). IARI also participated in *Swachhta Abhiyan* at Birla Mandir. Residents of Janak Vihar/Krishi Kunj cleaned their residential area during the programme.

## Environmental Awareness Campaign

IARI Regional Station, Pune and Eternus Solutions Private Limited, Pune organized a "Go Green" campaign on July 8, 2017. Eternus is a software company in the neighbourhood. A 'Bicycle Treasure Hunt' was organized for their employees to instill a feeling of environmental awareness. Finale Ceremony of Go-Green Bicycle Campaign was organized at IARI campus. In the spirit of the event, potted plants were awarded to the winners.

## Honours/Awards

- ❖ Dr. R.R. Burman, Principal Scientist, Division of Agricultural Extension, Dr. J.P. Sharma, Joint Director (Extension), Dr. S. K. Dubey, Principal Scientist, ATARI, Kanpur and Dr. K. Vijayraghavan, former Joint Director (Extension), IARI were awarded with Hari Om Ashram Trust Award for the biennium 2014-2015 by ICAR.
- ❖ Dr. Man Singh, Project Director (Acting), Water Technology Centre was conferred the title of Senior Professional Engineer by the Engineering Council of India.
- ❖ Dr. Reshma Gills, Scientist, Division of Agricultural Extension was awarded with Jawaharlal Nehru Award for Post Graduate Outstanding Doctoral Thesis Research in Agricultural and Allied Science 2016 for Best Thesis by ICAR.
- ❖ Dr. C. B. Singh, ex-Senior Scientist, Dr. J. P. Sharma, Joint Director (Extension) and Mr. Ranbeer Singh, Senior Technical Officer, Agricultural Engineering were awarded Dr. Rajendra Prasad Puruskar for writing of technical books in Hindi in Agricultural and Allied Sciences by ICAR.

## Visitors from Abroad

During the period July-September, 2017, two delegations – one each from Ethiopia and UAE visited the Institute.



UAE delegation with IARI team

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