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ZTM & BPD Unit, ICAR-IARI won the Gold in Flame Awards Asia, 2016



For
**"Agricultural/Allied
Initiative of the year"**
by RMAI

ZTM&BPD unit, IARI won Gold in Flame Awards Asia, 2016 under the category of Agriculture/allied Initiative of the Year for the campaign **"Innovative Lab to Farm model for farm profits From Lab to Land"** for successful commercialization of inventions from lab to land. The award was conferred by the honorable rural marketing goliaths of Rural Marketing Association of India (RMAI) on March 11, 2016.

Launch of 'Pusa Krishi' Mobile App



Launch of 'Pusa Krishi' Mobile App by Hon'ble Union Agriculture Minister Shri Radha Mohan Singh during Krishi Unnati, National Agriculture Fair, 2016

Hon' Union Agriculture Minister Shri Radha Mohan Singh launched a new mobile app 'Pusa Krishi' during valedictory function of Krishi Unnati Mela on 21 March 2016 for farmers in order to take the technology to farm fields. The app is providing farmers with information related to new varieties of crops developed by Indian Council of Agriculture Research (ICAR), resource conserving cultivation practices as well as farm machinery and its implementation is helping in increasing returns to farmers. 'Pusa Krishi' mobile application has been developed to realize the mission of "Lab to Land" i.e. to disseminate information about these technologies to update its various stakeholders like farmers, industry, entrepreneurs and start ups. App has been downloaded and used by more than 20,000 people. The App can be downloaded from the following links

https://play.google.com/store/apps/details?id=in.gov.mgov.pusaagri_tech&hl=en

<http://mkisan.gov.in/downloadmobileapps.aspx>
iari.res.in, ztmbpd.iari.res.in

VEGETABLE VARIETIES

Cauliflower (Pusa Kesarivit A 1)

- Indigenously bred bio-fortified beta carotene (800 - 1000 µg/100 g) rich variety which attempts to tackle beta carotene deficiency related malnutrition problem in India.
- Curds compact, orange coloured, very attractive with semi-self blanching growth habit and weighing about 1.250 kg.
- Marketable Yield of 40.0 - 45.0 t/ha.



Bitter gourd (Pusa Rasdar)

- First fruit harvest 41-45 days.
- Recommended for growing through out year under protected condition. March-June (Summer) and July to November (Kharif) (under net house) December to April (Winter) (under poly house /green house).
- Fruits juicy, smooth, non-prickled with tender skin, fleshy.
- Average fruit weight 110 g.
- Average yield of 4.54 q under 100 sqm insect proof net-house and 4.07 q under 100 sqm polyhouse.



Carrot (Pusa Rudhira)

- Maturity in 75-90 days.
- Average root yield (32.63 tonnes/ha).
- High in health nutrient content like total carotenoid (7.60 mg/100 g), carotene (4.92 mg/100 g), lycopene (6.70 mg/100 g), zinc (10.70 µg/g) and iron (230 µg/g).
- Long, attractive obtriangular roots with self-core, juicy, sweet in taste.



Cucumber Pusa Seedless (Cucumber-6)

- First extra early variety (40-45 days for first fruit harvest).
- Improved variety of parthenocarpic gynoecious cucumber.
- Suitable for cultivation in protected condition.
- Fruits are attractive, uniform, dark green, glossy, cylindrical, straight, slightly ribbed, non-hairy, non-warty, slightly striped at blossom end and has tender skin & crispy flesh.
- Average fruit length 14.24 cm, Width 3.45 cm, Weight 105 g.
- Average fruit yield is 126 t/ha (1260 kg/ 100 m²) during winter season (off-season, November-March).



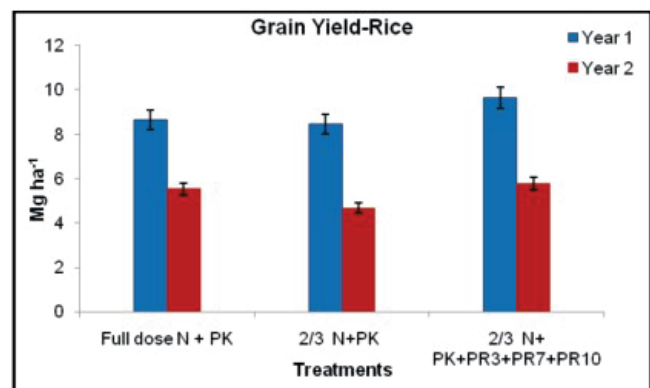
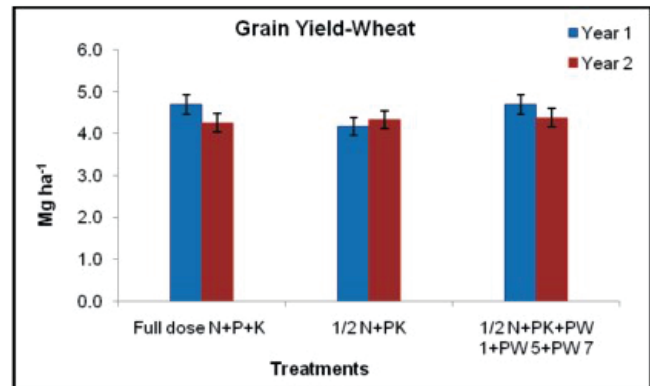
Biofertilizer Technology

BIOFORT

- Microbial formulation for effective micronutrient mobilization to grains.
- 13 - 40% increase in Fe, Zn and Mn concentration in rice and wheat grains.
- Enhanced plant growth and nutrient uptake.
- 10-15% increase in yields.
- 40-60 kg N savings/ha.

UNIQUE SELLING PROPOSITIONS

- Promising environment friendly formulation for rice and wheat crops.
- Already tested for more than 5 years and promising in the rice and wheat cropping system.
- Micronutrient enrichment in grains and plant parts, beneficial for human consumption or use as fodder.
- Can provide 40-60 kg N savings/ha and enhance N, P content of plant.
- Compatible with chemical fertilizers.
- Can be used as seed dressing or seedling dip or mixed in soil before sowing/transplanting.
- Application rate is 300 g/acre.



No microbial formulation leading to micronutrient biofortification available in the market; mostly biofertilizers for improving plant growth or N savings.

These consortia have proved promising as a PGP and biofortifying agents in the rice-wheat cropping sequence at IARI, leading to savings of 40-60 kg N ha⁻¹ (equivalent to the application of 100-150 kg Urea) savings in nitrogenous fertilizers, 10-15% increase in yields and 13 - 40 % in Fe, Zn, Cu and Mn concentrations respectively in rice and wheat grains.

Four (4) PCT applications, three (3) new patent applications with four (4) renewals of existing patents has been filed, along with three (3) responses to First Examination Report (FER) and one (1) hearing and one (1) amendment. The details are as follows:

Table: IP Management of ZTM&BPD Unit

PCT Application filed		
Application/ Registration No.	Name of Innovation/ Technology/ Product/ Variety	Date of Filing/Registration
PCT/IB2015/000433 Based on 959/DEL/2014	Nanofabrication process involving clay minerals as receptacles for manufacturing advanced nanomaterials including novel fertilizers	April 01, 2015
PCT/IB2015/000439 Based on 989/DEL/2014	Nanofabrication of phosphorus on kaolin mineral receptacles	April 02, 2015
PCT/IB2015/000437 Based on 1042/DEL/2014	Beneficiation of phosphate rock for the segregation of phosphorus containing heavy metal free minerals	April 02, 2015
PCT/IB2013/060946	Beneficiation of phosphate rock for the segregation of phosphorus containing heavy metal free minerals	April 02, 2015
Patent Application Filed		
2395/DEL/2011	"Digital Soil Test and Fertilizer Recommendation (STFR) Meter"	May 16, 2015
1608/DEL/2015	Device for recommending A crop yield enhancer	June 03, 2015
2432/DEL/2015 (Provisional application)	Plant transformation vector for suppressing MIPS gene expression and method for culturing low phytate soybean	August 07, 2015
3364/DEL/2015	A method for the control of Nematodes in Plants	June 12, 2015
PPVFR Application filed		
REG/2016/668	Extant variety cauliflower 'Pusa Snowball K-25'	June 02,2016

ITMC Meetings

The ITMC meetings were conducted under the chairmanship of competent Authority in ZTM &BPD Unit; for redressal of unsolved issues, formulation of terms and conditions of the technology ready for commercialization as well as for the formulation of new policies of ICAR-IARI. In FY 2015-16, six (6) ITMC meeting were organized by the unit to for the finalization of terms and conditions for various technologies out for commercialization as well as addressing myriad issues in the interest of ICAR-IARI.

Capacity Building Activities

Three Week Training Programme on "Intellectual Property Rights in Agriculture" had been organised by financial support of Ministry of MSME from August 12 to September 01, 2015. Thirty Two (32) participants including academicians, representatives from Industries, KVKs and NGOs from across the agricultural organizations and Institutes participated for getting an in-depth knowledge of the state of art IP-systems, and to build an overall IP-awareness during their professional tenure.

Training was inaugurated at the NRL Auditorium, ICAR-IARI, on Wednesday, August 12, 2015, at 9.30 AM, in presence of the Chief Guest Dr. Rita Sharma, Former Secretary to GoI, Ministry of Rural Development, and the Guest of Honour Mr. S. R. Samuel, Joint Development Commissioner, Ministry of MSME, GoI, along with Dr. K. V. Prabhu, Joint Director (Research), ICAR-IARI, Dr. J. P. Sharma, Joint Director (Extension), ICAR-IARI, Dr. Neeru Bhooshan, Course Director for the Training Programme and Incharge, ZTM & BPD Unit, ICAR-IARI.

Dr. G. S. Jaiya, Head, SME Section, WIPO, delivered lecture through teleconferencing. Dr. K. V. Prabhu, Joint Director (Research), Dr. S. Kochar, Former National Coordinator, NAIP-ICAR, and Dr. Neeru Bhooshan, Course Director & Incharge, ZTM & BPD Unit, ICAR-IARI, were present along with the trainees and participants. This wonderful lecture ended with in depth discussion and analysis between the resource persons and participants.



Three Weeks Training on 'Intellectual Property Rights in Agriculture'

a) **Panel Discussions:** under the training programme two panel discussion for IARI Scientist along with trainees were organized. On 14-7-15, Panel discussion on 'Patenting in Agricultural Biotechnology and Life Forms' at the NRL Auditorium, ICAR-IARI, were organized. Panellists were Dr. Neeti Wilson, Partner, Anand&Anand IPR Law Firm, Ms. Kanika Malik, Editor, Journal of Intellectual Property Rights and Senior Scientist, CSIR-NISCAIR, Dr. S. Kochar, Former National Coordinator, NAIP-ICAR, Dr. Gurinder Randhawa, PS, ICAR-NBPGR, and Dr. Vivek Kashyap, Lexorbis IPR Law Firm. They discussed the different aspects of Patenting and clarified the doubts of scientists.

Another Panel Discussion on 'IP and Technology Commercialization - DARE/ ICAR Perspective' was conducted taking stalwarts like Dr. K. V. Prabhu, Joint Director (Research), Dr. S. Mauria, ADG, IP & TM Unit, ICAR, Dr. Ravinderjit Singh, CEO, Agrinnovate (DARE), Dr. Sanjeev Saxena, Former CEO, Agrinnovate (DARE), and Dr. Neeru Bhooshan, Course Director & Incharge, ZTM &

BPD Unit, ICAR-IARI. The speakers discussed the different modes of technology management and commercialization in the ICAR systems and how the efficient system evolved with time.

b) **Practical Session:**

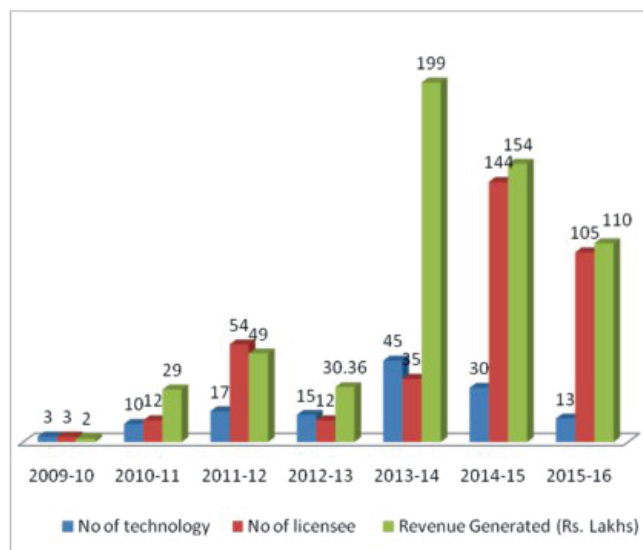
Practical session on "Prior Art search " and Drafting of Patent Application were conducted during the training programme.

c) **Field Visit:**

Field visit of Patent Office, New Delhi, PPVFR, Science Museum , NASC Complex, IARI fields and Gene Bank of NBPGR, New Delhi and PPVFRA, New Delhi were organized to provide the better understanding of the subject.

Technology Commercialization

During financial year 2015-16, under Lab to Land Initiative, 13 innovative technologies from North Zone -1 of ICAR were transferred to 105 industry partners resulting in generation of around Rs. 110 lakhs revenue. Following the success of last year, wheat Variety HD 3086 was in great demand and was licensed to 83 Industry Partners in FY 2015-16, followed by new entrant Wheat variety HD 3118, Rice Variety Pusa 1612, Pusa Mustard Variety 30, STFR Meter, Biofertilizer technologies; NPK Liquid Biofertilizer, VAM Technology, PHT Technologies; Pusa Vita and Pusa Soyanut, Vegetable varieties; Bittergourd gynoecious line and Mango varieties; Pusa Peetamber and Pusa Pratibha.



Technology Commercialization from last five years

B2B Meetings

- ZTM&BPD Unit organized Business meet with M/s Reliance Industries, Mumbai on November 19, 2015 for showcasing ICAR-nano technology basket available for commercialization and for seeking avenues for collaboration between IARI and Reliance Industries. In this meet scientists from IARI, PAU, CAZRI and BITS Pilani showcased their technologies in the fields of Nano-Fertilizer and Agricultural Chemicals.
- B2B Meeting with Indo Gulf Fertilizers was organized by ZTM&BPD unit, IARI on February 03, 2016 to showcase the potential technologies of IARI available for licensing. The Management of Indo Gulf Fertilizers showed their interest in licensing of varieties, Biofertilizer and agri Chemical technologies developed by IARI, New Delhi.

Industry Partnership Day

- 'ZTM & BPD Unit organized the "Industry Partnership Day" with participation from across Small and Medium Enterprises (SMEs) in North Zone, working with seeds and/or breeding materials of the likes. On 29 July 2015, a total of twenty two (22) Licensing Agreement for only a single technology in one go for Wheat Variety HD 3086 were signed with SMEs after depositing the prescribed licensing fee.



Industry Partnership Day

Carrot Field Day

- 'ZTM & BPD Unit organized "Carrot Field Day" was organized by ZTM&BPD Unit on February 24th, 2016. This event was primarily geared towards showcasing "Performance of New Hybrids of Carrot at field level" developed by "Division of Vegetable Science" at IARI. The programme benefited 35 industry partners which included substantial number of seed companies. Dr. P. Kalia, Head, Division of Vegetable Science, IARI apprised the participants about the new varieties/hybrids of carrots.



Carrot Field Day

Mustard Day

- ZTM & BPD Unit, IARI organized 'Mustard Field Day' on February 26th, 2016 at "Field No. 2 C, Division of Genetics," IARI, Pusa campus, New Delhi. This event was primarily geared towards showcasing 'Brassica Improvement Program' developed at "Division of Genetics", IARI.



Mustard Field Day

The main highlights of this event were :

- Introduction of New Mustard variety Pusa Double Zero Mustard 31 by Dr. DK Yadav.
- Demonstration of other Mustard varieties at field level.
- Interactive session between Scientists and participants.

This was an attempt to bring the research community and the industry partners one step closer. Through this event, we intend to create meaningful relationship with the industry so that our technologies could reach and benefit the society and farmers. Thirty Eight (38) different seed industry/ firms participated in the event including companies like Sakata Seeds, Rallis India Ltd, Ganga Kaveri seeds, Advanta India Ltd, Rasi seeds, Tata Chemicals Ltd, Bayer Bio Sciences Ltd, Mahyco and Panacea Crop Sciences etc.

a) Under MSME project, Five Incubates have received the last installment from MSME under the Scheme "Support for Entrepreneurial and Management Development of SMEs through Incubators" through ZTM & BPD Unit out of which three (3) incubates had graduated, the details are as follows:

Table: List graduated incubates

Name of the Company	Name of the Incubatee	Name of the Project
M/s Jai-Biotech & Research Centre	Mr. Jaideep Pareek	Manufacturing of Bio-fertilizers and Bio-pesticides
M/s Nature's Lap	Ms. Tuba Siddiqui	Utilization of Waste Mango Kernel for Extraction of Rich Mango Kernel Butter oil
M/s Society for Farmer Development	Mr. Bhopinder Mehta	Biscuit Making from Nutritionally Rich Traditional Millets in Combination with wheat flour

During FY 2015-16, Physical Incubation support has been extended to Eight (8) start up companies. Under the virtual incubation support three (3) incubates have signed MoA for availing the IARI incubation facilities.

Table: List of Projects Proposal and name of the incubates

Name of the Company	Name of the Incubatee	Name of the Project
M/s Sickle Innovation	Mr. Nitin Gupta	Cotton Harvesting Machine (Supported by MSME)
M/s Arpan seed Pvt Ltd	Mr. Raju Ram	Double Mustard: Commercialization of Zero Erucic Acid Mustard (Brassica juncea) for Enhancing the Competitiveness of Domestic edible oil Industry in India. (Supported by MSME)
M/s Unison Agrico	Mr. Abhay Kumar Verma	Instant Millets Mix for Breakfast, Soups, Shake, etc. (Supported by MSME)
M/s Enzys Gobindji Biotech Pvt Ltd	Mr. Amit kumar Roy	Enzys Translational Research and Application Centre (enTRAC) (Supported by MSME)
Criyagen	Mr. Basavaraj Girenavar	Enterprising Integrated Nutrient Management (INM) & Integrated Pest Management
M/s Tripura Bio-tech limited	Mr. K. Phani Raj kiran	Enterprising Integrated Nutrient Management
M/s Vaishnavi Bio-Tech limited	Mr. K. Suryanaryana Murthy	Enterprising Integrated Nutrient Management
StellerGene Technologies	Mr. Kapil and Dr. Aparna	Genomic Consultancy & Services Using GWAS and Molecular Markers in Agrigenomic and Humans
VIRTUAL INCUBATION		
W.S Telematics	Mr. W. Dahyia	Manufacture of STFR Meter
Eco Inputs	Mr. Sanjeev Malhan	Manufacturing of Biofertilizers

Marketing and Networking Platforms

- i) **International Trade Fair, 2015** : ZTM&BPD Unit, ICAR-IARI facilitated and provided space to Ananya Seeds Pvt Ltd and KAD Bioresources Pvt Ltd, incubates of ZTM&BPD Unit, to put up their stalls in the Agriculture Pavillion in '35th India International Trade Fair' from November 14 to 27, 2015 to promote and market their products.
- ii) **National Innovation Foundation Exhibition at Rashtrapati Bhawan**: Four incubates of ZTM&BPD Unit (M/s Unison Agrico, M/s Arpan Seeds, M/s Kad Bio-resource Pvt. Ltd and M/s Ananya seeds Pvt Ltd) exhibited their stall in National Innovation Foundation Exhibition at Rashtrapati Bhawan on 17 March, 2016 to showcase their innovative products and technologies.
- iii) **National Agriculture Fair, Krishi Unnati, 2016**: ZTM&BPD Unit put up the stall in exhibition in National Agriculture Fair, Krishi Unnati, 2016, with its Seven (7) Incubates.

Honorable Prime Minister Shri Narendra Modi visited the stall of ZTM&BPD unit and Dr. Neeru Bhooshan I/c ZTM&BPD unit apprised him about the activities of the Unit, introduced the incubates of the Unit and briefed the technologies developed by the incubates. Honorable Prime Minister interacted with the incubates and appreciated the technologies developed by them.

During the Fair, **Honorable Union Minister for Agriculture, Shri Radha Mohan Singh** visited the stall and encouraged the incubates. **Union Agriculture Ministers for State, Shri Sanjeev Kumar Balyan and Shri Mohan Bhai Kundariya** also appreciated the efforts of the incubates.



Upcoming Events: Arise Launch Pad of Agri Start ups



I. Arise: Encouraged by the success of its first AgriBiz Incubation Program in 2014, ZTM & BPD, IARI is pleased to launch the second edition of its AgriBiz Incubation program - "**Arise, Launch Pad for Agri-Startups**" in association with ICAR Institutes & State Agricultural Universities of North India.

Arise is an initiative in sync with the Govt. of India policy of "Start-Up India" and "Skill India" and aims to provide a platform for budding agripreneurs to provide innovative solutions to today's market needs. **Arise** would identify young entrepreneurs / ideas at various stages of their development (Ideation / Prototype development / Expansion stage) and provide the much needed mentoring support and Industry exposure to develop a viable business proposition.

II. Zonal Workshop: ZTM&BPD Unit is organizing '**Zonal Workshop and Arise Launch Day**' on 9th June, 2016 to discuss the accomplishments and challenges faced by different ITMUs of the North zone. During the Zonal Workshop a panel discussion on '**Launch Pad for Agri Start-**

Corporate Membership

To create strong and meaningful relationship with industry so that the technologies of IARI can reach and benefit the society and farmers, ZTM & BPD Unit welcomes partnership through 'Corporate Membership'. **One Hundred Twenty Two (122)** new corporate members have been enrolled, with **Eighty Eight (88)** renewals of existing memberships. This created a total number of **Two hundred and Ten (210)** corporate members, generating a revenue of **Rs. 408000/- only**.



I am very happy to put the Annual Issue of 'Taksay' in the hands of readers by apprising about the achievements and activities of ZTM & BPD Unit, ICAR-IARI.

As India is heading towards becoming the manufacturing hub, agricultural value chain serves its dual purpose of remaining in the primary sector and generating employment and income being in the secondary sector. ICAR-IARI through its ZTM & BPD Unit, is extending support to the primary sector by making the technology available to the farmers through its technology commercialization activity. On the other hand, it strengthens the secondary sector under its business incubation vertical. PPP, Incubation, Entrepreneurship Development Programs, Crop field days, Mobile app launching, organizing and participating in different fairs, exhibitions and seminars etc are few activities which reflect the way in which we are moving to make our country realize the dream of becoming self reliant in each and every aspect. Stay reading!!!!!!

Dr. Neeru Bhooshan

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