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# PROCEEDINGS OF **WEBINAR SERIES**



Editors

Dr. R.K. Sohane

Dr. B.D. Prasad

Dr. Awadhesh K. Pal



**Bihar Agricultural University**  
Sabour, Bhagalpur

2020

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**WEBINAR SERIES**  
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**Bihar Agricultural University, Sabour**

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## Foreword

We all have experienced a truly unprecedented situation due to spread of corona virus COVID-19, a global pandemic situation, as it has affected every aspect of our lives, from how we teach and how we conduct our research. This pandemic situation has severely affected our traditional classroom teaching and learning processes as over 1.5 billion students affected by school/college/university closures due to the Covid-19 pandemic. The proposed seminars, conferences, workshops etc. were also cancelled, which further exacerbate the learning process. One of the biggest challenges we have faced or still facing to keep our teaching and learning process on board. These unprecedented situational has forced us to change the whole learning methodologies, which also includes a shift from traditional seminars to webinars. Turning traditional seminars into digital webinars at short notice has been a challenge for our faculties due to limited digital and ICT facilities. However, in such unprecedented and uncertain times our University showed the courage to organize webinars to give momentum in learning process in very limited time. Keeping these views of different stake holders like students, research scholar, NOGs, Govt. officials and faculty members during this difficult situation a series of webinar was organized on diverse topics to provide an excellent platform to exchange concepts and momentum in teaching and learning process.

I'm delighted that the all experts as well as participants of webinars agreed in perusing basic as well as applied research in the proposed webinar areas. All the webinars were also broadcasted online through Facebook live and university YouTube channel. I must acknowledge the efforts of Ex. Vice Chancellor Dr. A.K. Singh, all Deans, Directors, Registrar, Chairman, HoDs, organizers and faculty members for planning and successful organization of webinar series.

I hope proceedings of this webinar series will be quite useful for scientific communities, education stakeholders and policymakers aimed at improving teaching, research and extension quality in the field of agriculture.

(Ravindra Kumar Sohane)

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# WEBINAR SERIES

Bihar Agricultural University, Sabour

The unprecedented lockdown due to Covid-19 has struck the traditional methods of classroom teaching as the pandemic forces schools and learning spaces to shut down completely. The proposed seminars, conferences, workshops etc. were also cancelled, which further exacerbate the learning process. These unprecedented situational has forced use to change the whole learning methodologies, which also includes a shift from traditional seminars to webinars. Our visionary honorable Vice-Chancellor, Bihar Agricultural University, Sabour, Dr. A. K. Singh, and Director Extension Education-cum-Convener, Dr. R. K. Sohane, BAU, Sabour showed us the path to harness the power of video conferencing to showcase our expertise and generate leads through webinars. Bihar Agricultural University, Sabour has hosted series of interactive learning webinars on diverse topics to give momentum in learning process to different stake holders like students, research scholar, NOGs, Govt. officials and faculty members during this difficult situation. Several nationally and internationally renowned eminent scientists were participated and deliver plenary lectures in each webinar. At the end of each lecture, detailed discussion were made. The detailed lecture notes or power point presentation slides of plenary session were also shared to all participants via email. Participants were also encouraged to submit abstract. The abstract book for each webinar were made and published online. The proceedings of each webinar were also prepared and published. All the webinars were also broadcasted online through Facebook live and university YouTube channel. Details of each webinar are summarized in tabular form:

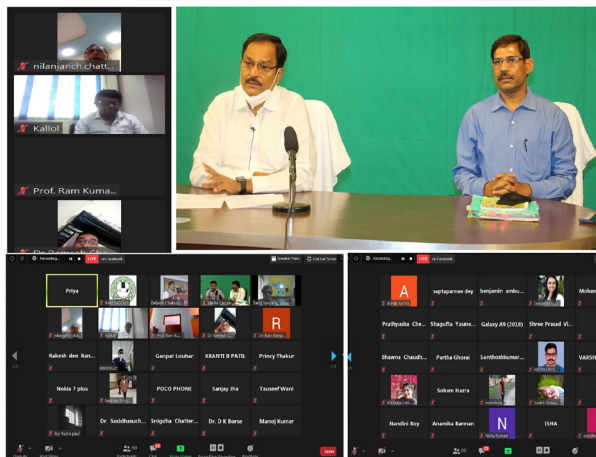


# Arsenic Mitigation: A Nexus Approach

29<sup>th</sup> May, 2020

## Key Recommendations

- ◆ Arsenic pollution in majority of cases is geogenic in nature and over exploitation of ground water for drinking and irrigation has been implicated as a main cause of its pollution. Hence, now soil also has been a major sink as well source of As in polluted areas.
- ◆ Merely determining the total arsenic concentration is insufficient for accurate risk assessment so speciation of As in soil and plant is need of the hour. The use of different techniques for separation of arsenic species like ion-exchange, ICP-MS and by octapole collision reaction system and also by microwave-assisted extraction (MAE) is an option for extracting As species from soil.
- ◆ Optimum conjunctive use of ground water in the contaminated areas and to increase the use surface water (ponds, lakes, rivers etc.) and recharge of groundwater resources.
- ◆ Irrigation of crops should be done with pond-stored groundwater. Prefer low-water requiring farmer-attractive cropping sequences (especially for the lean period).
- ◆ Increased use of FYM, vermicompost, sugarcane bagasse and other manures + green manure crops, inclusion of pulses/other legumes as well as application of appropriate amendments Zn/Fe/Si salts as and where applicable). Efficiency Order:  $FeSO_4 > ZnSO_4 > CaSiO_3$  irrespective of growth stages of crops.
- ◆ Identification/development of varieties /crops which accumulate less arsenic in the consumable parts & where ratio of inorganic to organic forms of arsenic is low.
- ◆ Cost-effective phyto- and bio-remediation options, identification of suitable microbes that can mitigate As in the agroecosystem.



## Eminent Speakers

Dr. S.K. Sanyal, Ex-Vice Chancellor, BCKV, W.B.

Dr. Ashok Ghosh, Professor and HoD Research, MCS & RC, Patna

Dr. Debasis Chakrabarty, Principal Scientist, CSIR-NBRI, Lucknow

Dr. Mahmud Rehaman, Scientist, University of Newcastle, Australia

Dr. Debopriya Mondal, University of Salford, UK

Dr. Debasis Golui, Scientist, IARI, New Delhi

Dr. Sheetal Sharma, Scientist II, Nutrient Management Specialist (South Asia) & others

# A decade of conservation agriculture in Eastern India – opportunities and challenges

4<sup>th</sup> June 2020

## Key Recommendations

- ◆ Conservation Agriculture (CA) based technologies has been transforming agriculture in India, delivering productivity increase alongside environmental sustainability.
- ◆ CA based management practices can address a number of challenges including soil health, water scarcity, low farm profitability and changing climate.
- ◆ Besides increasing the food grain productivity it is also essential to ensure the nutritional security which could be possible through better farming and maintaining the soil health.
- ◆ There is need to synthesize the knowledge of conservation agriculture management strategies across ecologies for better defining the recommendation domains.
- ◆ Conservation agriculture is not a single management practice but provides a basket of options that needs to be tailored based on the farming scenario. There is also need for establishing long term CA research platforms for strengthening of the recommendations.
- ◆ Since the agriculture in South Asia especially in India is dominated by small farm holders commercial availability of scale appropriate machinery is critical factor for success of adoption of CA practice.
- ◆ There is also need to increase the farmer participatory approach through on-farm research cum demonstration to better identify the bottle necks in CA adoption in a broader scale.
- ◆ The changes in the soil bio-physical properties brought around through CA management needs to be quantified for different ecologies and there is also need for quantification of the competition for the crop residue used as soil cover and livestock fodder needs.
- ◆ Adoption of CA can be made effective through enhanced capacity building of all stake holders including farmers, service providers and policy makers. This could be also made possible through development of scalable business models and regular interaction and knowledge sharing with farmers.



## Eminent Speakers

Dr. R K Malik, CIMMYT, India

Dr. A. R. Sharma, Rani Lakshmi Bai CAU, Jhansi, Uttar Pradesh

Dr. Mahesh Gathala, CIMMYT, Bangladesh

Dr. R. G. Singh, CIMMYT, Mexico

Dr. R. K. Jat, BISA, India

Dr. G. S. Panwar, Banda University of Agriculture and Technology, Banda, UP

# Locust Outbreak a wake-up call to the Indian Agriculture in changing climate scenario

15<sup>th</sup> June 2020

## Key Recommendations

- ◆ Locust is not a new pest but it is not studied well compared to other insects due to its rare occurrence.
- ◆ Collaboration of different ministries of Govt. of India is very much necessary as the locusts are international pests and need permissions from different ministries before taking up any work.
- ◆ The locusts are international pests and there should be co-ordination between adjoining states for better exchange of information
- ◆ The locust's studies are limited to only two or three institutes that needs to be widened as the locust problem is getting regular interval due to climate change
- ◆ Collaborative works with different institutes is the need of the hour and most of the post graduate students in many universities many be encouraged to conduct research on different aspects of locust and its management.
- ◆ Involvement of satellite data for effective sharing and control of the pests
- ◆ Use of drones can be maximised for the control of locusts
- ◆ The nymphal stage is very easy to control rather than adults before attaining gregarious stage.
- ◆ There should proper identification of locusts as many people confuse with different types of grasshopper due to many resemblances.



## Eminent Speakers

Dr. S. N. Sushil, Principal Scientist & Former PPA, IISR Lucknow

Dr. J. P. Singh, Joint Director (Entomology), DPPQS, Faridabad

Dr. K. Chandrashekhara, Former Professor & Head,  
Deptt of Entomology, GKVK, Bengaluru

Dr. Swaminathan R., Former Dean & Professor Emeritus, MPUAT, Udaipur

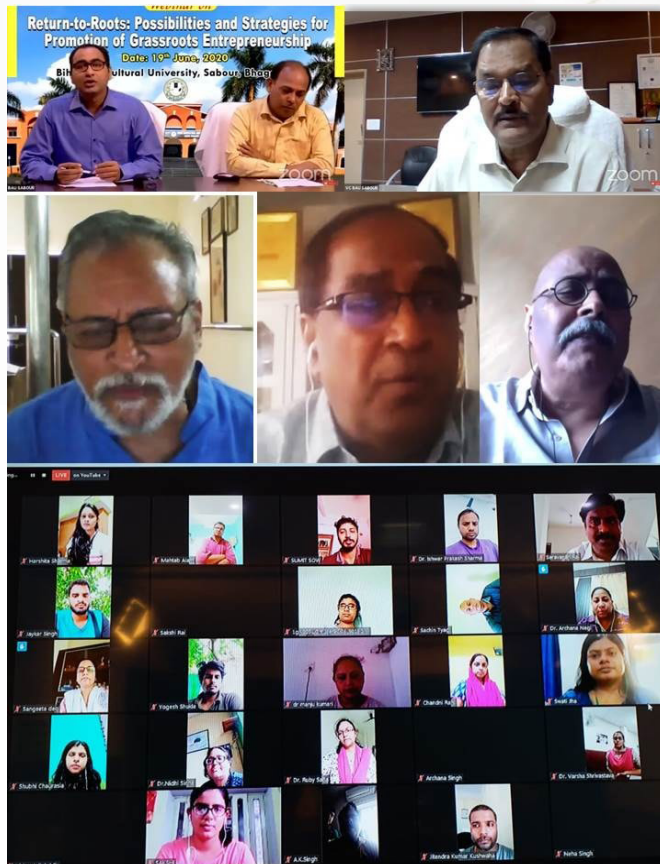
Dr. Paras Nath, Associate Dean cum Principal, BPSCoA, Purnea

# Return to root-possibilities and strategies for promotion of grassroots entrepreneurship

19<sup>th</sup> June 2020

## Key Recommendations

- ◆ There is an urgent need for skill mapping and a road map for the growth of entrepreneurship can be planned accordingly.
- ◆ In addition to skill mapping, the knowledge mapping of grassroots people is also important for the development of entrepreneurship.
- ◆ The need to recognise local items, plants that could be marketed.
- ◆ There are several weeds that have medicinal value that could be used to grow value-added goods.
- ◆ There is also a need to develop a nutrient map of the soil and therefore fortified crops could be grown, which will help to achieve nutritional security.
- ◆ Innovation, Investment and Enterprise are the golden recipe for the growth of entrepreneurship.
- ◆ There are a number of local goods that need to be commercialized at grassroots level.
- ◆ This is a time to move 'land to lab to market'. Further focus needs to be put on the marketing skills of local entrepreneurs.
- ◆ Innovation is the secret to the growth of entrepreneurship. An effective eco-system needs to be built where local innovation could be created and promoted.



## Eminent Speakers

Sri Vijay Prakash, IAS, Ex-APC, Government of Bihar

Prof. S.P. Mishra, Ex-Vice Chancellor, Dev Sanskriti Vishwavidyalaya, Haridwar

Sri KPS Keshri, President, BIA, Patna

Sri. Raj K. Jha , Ex-National Creative Director, Ogilvy & Mather

Prof. Niraj Kumar, Senior Professor & Dean DMI, Patna

Dr. Saravanan Raj, Director (Agricultural Extension), MANAGE, Hyderabad

# Role of digital technologies in promotion of community based plant health management

26<sup>th</sup> June 2020

## Key Recommendations

- ◆ Ensuring proper implementation of plant protection measures under small and marginal farmers is challenging task and need more emphasis at both research as well as administrative level
- ◆ Ensuring holistic plant health is very important in order enhance the farmers income and also to secure food and nutritional security
- ◆ There various entrepreneurial opportunities arising out of emerging ICT ecosystem which need to systematically exploited
- ◆ The machine learning and artificial intelligence has huge potential to transform the entire agricultural sector especially the way plant health is being monitored and managed. The thorough research need to conducted at an accelerated speed to deliver specific solutions
- ◆ The used of Drones especially need more emphasis in term of validating package of practices for various crops in light of drone based operations.
- ◆ Digitalization and Data management will be important challenges in agriculture sector considering the complexity of system. There is need to develop systems for digitalization and data management in areas of plant health management
- ◆ The field level application like e-SAP needs to customised for various geographies/ regions
- ◆ In order promote climate smart and eco-friendly plant protection measures there is need explore digital tools extensively in various application like diagnosis, monitoring and management
- ◆ Community level pest management approaches like, Mating disruption, SIT etc, can be useful only if they are implemented at large scale with proper baseline data and real-time monitoring
- ◆ There is also need to have proper regulation of various mobile applications in the field agriculture in order to avoid misleading information loss to the farmers



## Eminent Speakers

Dr. M. K. Naik, Vice Chancellor, UAHS, Shivamogga  
Dr. Athula Ginige, Professor, Western Sydney University, Australia  
Dr. Pankaj Singh, Principal Scientist (Nematology), ICAR-IARI, New Delhi  
Dr. M. B. Patil, Professor & University Head (Plant Pathology), UAS, Raichur  
Dr. Gururaj Sunkad, Professor & Head (Plant Pathology), Coav. Gudi  
Dr. Prabhuraj, Professor & Head (Entomology) UAS, Raichur

# Managing Wetlands for Aquatic Crops: Opportunities and Challenges

29<sup>th</sup> June 2020

## Key Recommendations

- ◆ Organized market for organic produce should be developed and subsidy on organic inputs should be applied. Focus should be on the development of a robust supply chain management strategy for agriculture produce for their effective supply.
- ◆ Production per unit of water used can be increased by adopting makhana based cropping system. There is a need to work at micro level (at district and block level) for site specific estimation of soil health damages under wetland and also for management of resources.
- ◆ Water specific perennial plants should be included in waterlogged areas in integrated farming system by marginal farmers through Agroforestry to save environment, maintain sustainability and improve income from fallow and marginal bunds. There is an urgent need to save our natural resources.
- ◆ Makhana Crop residues are rich in various nutrients required for successive crop. Use of conservation agriculture and resource conservation technology is the need of the present day agriculture.
- ◆ Need of capacity building of women and youth in scientific methods of post-harvest practices and value addition of farm produce. The farmers should adopt makhana-cum-fish farming or makhana-cum-water chestnut farming, as this system of farming is remunerative for wetland area. There is a scope for research on some more intercropping system to get more from per unit of land area.
- ◆ Raised and sunken bed technique can be used in canal command area for the better management of wetland ecosystem.



## Eminent Speakers

Sri Vijoy Prakash, IAS, Ex-APC, Government of Bihar  
Dr. S. N. Jha, Assistant Director General, Process Engineering, ICAR, New Delhi  
Dr. V. N. Jha, Professor Botany, LNMU & Principal, MLSM, College, Darbhanga  
Dr. Ramani Kanta Thakuria, Chief Scientist, AICRP, on Irri. Water Mgmt., AAU, Jorhat  
Dr. V. K. Gupta, Principal Scientist & Head (Retd.), ICAR-RCER, RCM, Darbhanga  
Dr. I. S. Singh, P.S. and Head, ICAR-RCM, Darbhanga  
Smt. Samidha Gupta, Deputy General Manager & I/c RO, Kolkata, APEDA, Ministry of Commerce and Industry, GOI

# Agricultural biotechnology for mitigating climate change

03<sup>rd</sup> July 2020

## Key Recommendations

- ◆ Advanced biotechnological tools such as NGS in crop improvement programmes should be used. SNP chip may be used for identification of genes in pigeonpea improvement programme.
- ◆ Genome editing CRISPER tool may be used in developing climate resilient crops.
- ◆ There is a need for collaborative/ networking projects to meet out the demands of Indian agriculture towards mitigating climate. Scientists should work towards development of climate resilient crops.
- ◆ Adoption of climate-resilient crops, such as early-maturing cereal crop varieties, heat-tolerant varieties, drought-tolerant legumes or tuber crops, varieties with enhanced salinity tolerance, or rice with submergence tolerance, can help farmers to better cope with climate shocks.
- ◆ Climate resiliency at farm level is essential to achieve food security and improve livelihoods of rural communities, especially in countries and communities that depend on local agricultural production to ensure household income and achieve daily adequate caloric intake and balanced nutrition.
- ◆ The key dimensions need to be followed for promoting the sustainable agricultural practices by implementing a program of action covering both adaptation and mitigation measures through four functional areas, namely, research and development; technologies, products, and practices; infrastructure; and capacity building.
- ◆ The most prominent options are improved crop and grazing land management (e.g., improved agronomic practices, nutrient use, tillage, and residue management), restoration of organic soils that are drained for crop production, and restoration of degraded lands.



## Eminent Speakers

Dr. N. K. Singh, National Professor, ICAR-NRCPB, New Delhi  
Dr. Kuldeep Singh, Director, ICAR-NBPGR, New Delhi  
Dr. Sanjay Jambhulkar, Scientist, BARC, Mumbai  
Dr. Arvind Kumar, Director, IRRI South Asia Regional Centre  
Dr. Viswanathan Chinnusamy, Head, Div. Of Plant Physiology, IARI, New Delhi  
Dr. Daksha Bhatt, Technical Director, Aranya Agri Biotech, Vadodara, Gujrat  
Dr. Shelly Praveen, Senior Scientist, Division of Biochemistry, ICAR-IARI, New Delhi & others

# Opportunities of commercial exploitation of exotic fruits

04<sup>th</sup> July 2020

## Key Recommendations

- ◆ The northern eastern belt of India is best suited for some of the exotic subtropical and temperate fruits and for few tropical fruits as well.
- ◆ Several exotic fruits with their specific varieties such as Rambutan, Longan, Plum, Peach, Thai apple, strawberry, Dragon fruits, Mangosteen, Avocado, Kiwi etc may be tried for the purpose.
- ◆ Number of participants attached from different fields of our country showing their interest towards such webinar proves their necessities to explore their knowledge.
- ◆ People are expecting such activities from the related organisations which provide an occasion for the scientists as well as students of the fields for adding their knowledge in such an interesting way without going outside.
- ◆ Some varieties of pineapple may response better in the adjoining area of Kishanganj, Purnia, Araria etc.
- ◆ The yield and quality of dragon fruit may be enhanced by trying all cultivars of dragon fruit in the area by adoption of complete package and practices all ready adopted in Karnataka.
- ◆ The another fruits like Longan, Rambutan, Avocado, Avocado, Strawberry, Peach and plum may have better scope and these may be tried for cultivation in Bihar specially in the region of Kishanganj, Purnia and Araria districts of the state.
- ◆ The yield and quality of dragon fruit may be enhanced by trying all cultivars of dragon fruit in the area by adoption of complete package and practices all ready adopted in Karnataka.



## Eminent Speakers

Dr. Vishal Nath, Director, ICAR- National Research Centre on Litchi, Muzaffarpur, Bihar, India

Dr. Shailendra Rajan, Director, ICAR-Central Institute for Subtropical Horticulture, Lucknow, Uttar Pradesh, India

Dr. Vishwa Bandhu Patel, Principal Scientist, Division of Fruits and Horticultural Technology, Indian Council of Agricultural Research-Indian Agricultural Research Institute, New Delhi, India

Dr. G. Karunakaran, Principal Scientist, Central Horticulture Experiment Station, ICAR-Indian Institute of Horticultural Research, Hirehalli, Tumkur, Karnataka, India

# Good horticultural practices for quality production

10<sup>th</sup> July 2020

## Key Recommendations

- ◆ The activities related to production, harvesting, post-harvest operations, packaging, transportation, and storage must be as per the norm of the country as well as exporting country for better price and consumer confidence.
- ◆ The waiting period of commercial used pesticide in horticultural crops must be in the knowledge of growers. Plant architecture and canopy management in fruit crops should be popularized among the farmer for quality produce and for enhancing income generation.
- ◆ “Enripe”: an innovative product approved by FSSAI must be popularized among the local vendors for safe ripening of horticultural crops instead of carbide.
- ◆ The raw manure should be incorporated at least two week prior to planting or 120 days prior to harvest in the GAP system.
- ◆ The vertical farming with soilless hydroponics and aeroponics should be given priority for good horticultural produce.
- ◆ Under the Good Horticultural Practices (GHP), solarization is most impotent competent for better management of soil born disease.
- ◆ Promote low sugar grade potato under GHP for increasing farm income. Plot level traceability must be identify and marked on the boxes for better marketing in the country as well as outside of the country.
- ◆ ICT and wireless technology should be promoted to engaged younger generation in horticultural marketing
- ◆ Data bank of grower who are engaged in growing the horticultural commodities under GHP norm for smooth marketing.



## Eminent Speakers

Dr. R. K. Pal, Former Director, National Research Centre on Pomegranate and Former Head, Division of Post Harvest Technology, IARI, New Delhi

Dr. S. Rajan, Director, Sub-Tropical Horticulture Research, Lucknow

Dr. Visal Nath, Director, National Research Centre on Lithi, Muzaffarpur

Dr. S. K. Singh, Head Division of Fruit and Fruit Technology, IARI, New Delhi

Mr. Nand Kishor, Director Horticulture, Government of Bihar, Patna

Dr. M. Feza Ahmad, Associate Director Research, BAU, Sabour

### Key Recommendations

- ◆ There is an urgent need for exploring different statistical techniques in view of the agricultural field experiment.
- ◆ Multi Objective Programming is an useful tools in the experimental research in social science which needs to be elaborates among the social science researchers.
- ◆ Application of multiple criteria decision making (MCDM) approach in social sciences is another aspect in current research in social science which can be used in different areas.
- ◆ In addition to exploring different statistical tools different sources of knowledge bases are available which needs to be explore in a planned and systematic ways among the researchers especially in the Agricultural research system.
- ◆ Possibilities of Experimental Research in Extension Education need to be explored among the extension scientists.
- ◆ Need of knowledge on quasi Experimental Design is another important aspect. A quasi-experimental design is one that looks like an experimental design but lacks the key ingredient - random assignment.
- ◆ Sometimes we have to use correlation which also needs to be used in experimental research with respect to agricultural research.
- ◆ What is the confounding variable in this research? This is an important but neglected statistical discussion which also needs to be incorporate in our research design in agricultural as well as social sciences research.



### Eminent Speakers

Dr. Rajender Parsad, Principal Scientist, Division of Design of Experiments, Indian Agricultural Statistics Research Institute, New Delhi.

Dr. Anurup Majumder, Professor, Department of Agricultural Statistics, Bidhan Chandra Krishi Viswa vidyalaya

Dr. P. S. Badal, Professor and Ex- Head, Department of Agricultural, Economics, Banaras Hindu University, Varanasi (U.P.)

Dr. Sanjit Maiti, Scientist, Dairy Extension Division, ICAR- NDRI, Karnal

# Challenges and recent initiatives on sustainable management on fall armyworm

16<sup>th</sup> July 2020

## Key Recommendations

- ◆ For management of Fall armyworm (FAW), an app developed by FAO against FAW i.e. FAMEWS, which will be quite helpful to know the incidence pattern of Fall armyworm (FAW) and also helps to generate MAP.
- ◆ Ecological management options against FAW are as follows:
  - Tillage operation: Zero tillage operation is unfavourable for FAW
  - Deep Ploughing
  - Mulching: Minimum tillage operation especially when associated with surface mulch reduce FAW incidence
  - Intercropping: Intercropping of maize with pulse based crops like pigeon pea/ black gram minimize the FAW infestation.
  - Trap cropping: Napier can be used as a trap crop with maize against FAW. 3-4 rows of trap crops around maize field helps to minimize the infestation of FAW.
- ◆ Varietal selection: cultivation of maize hybrids with tight husk cover may reduce the ear damage by FAW.
- ◆ Regarding management through bio-control agent like parasitoid is concern, augmentative release of *Trichogramma pretiosum* or *Teleonomus remus* in the early crop growth stage @ 50,000 per acre is highly effective against FAW. Among the entomopathogens, *Metarrhizium anisopliae* @ 5 g/l, *Nomuraea rileyi* @ 3g/l and *Bacillus thuringiensis* var *Khurstaki* @ 2 g/l shows promising results against FAW. Bio-pesticides are highly effective at early whorl stage (15-25 DAS).
- ◆ A total of eight commonly used insecticides were used against FAW and those are Spinetoram, Spinosad, Chlorantraniliprole, Lambda cyhalothrin, Emamectin benzoate, Thiodicarb, *Bacillus thuringiensis*, Azadirachtin, Broflanilide and Fluxametamide. Last two chemical insecticides are under registration. Two combination products including Lufenuron + emamectin benzoate and Novaleuron + emamectin benzoate are also performed well against FAW.



## Eminent Speakers

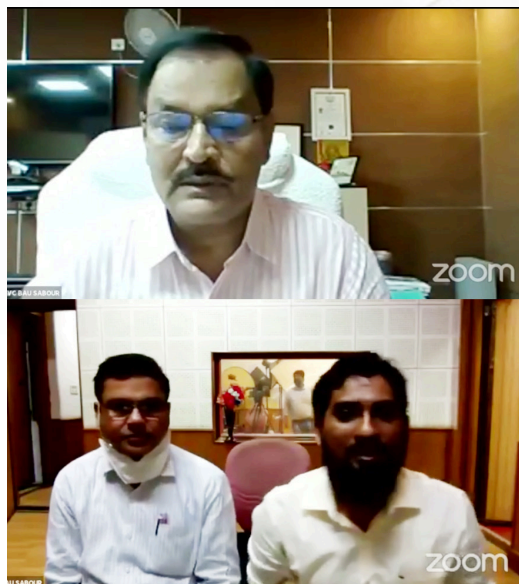
Dr. Murali Mohan, Associate Professor, UAS, Bangalore  
Dr. Nripendra Laskar, Associate Professor & Head, UBKV, Coochbehar, West Bengal  
Dr. Ganapati Mukri, Senior Scientist, ICAR-IARI, New Delhi  
Dr. T. Venkatesan, Principal Scientist, NBAIR, Bengaluru  
Dr. Sharnabasappa Deshmukh, Assistant Professor, UAHS, Shivamogga, Karnataka  
Dr. Ajay K. Sood, Principal Scientist, CSKHPAU, Palampur, H.P. & others

# Recent trends in processing technologies for food quality and safety

20<sup>th</sup> July 2020

## Key Recommendations

- ◆ There are huge postharvest losses (>30%) in crops in developing and underdeveloped world resulting in huge monetary loss.
- ◆ Research and development for reduction of postharvest loss in agri-horticultural crops should be strengthened.
- ◆ To ensure product safety and quality eco-friendly postharvest treatment must be standardised in which edible coating could be an efficient option.
- ◆ To curtail the food loss and wastage, different processing industries should be established with proper support regarding technical know-how for better quality and safe products.
- ◆ Considering health and environment, different physical treatments such as cold plasma should be standardised and promoted.
- ◆ The cold plasma treatment has been reported to minimise the pesticidal residues in fresh products however should be further explored.
- ◆ Pulsed electric field is one of the recent processing techniques. The pulsed electric field is presently being explored and confined to beverage based processed products.
- ◆ There are different rules and regulations have been developed by the FSSAI, New Delhi and also being updated in a timely manner.
- ◆ There is need of the awareness regarding food safety norms among the entrepreneurs involved in food processing.
- ◆ The quality of raw materials plays an integral role for safe products. To have the quality products GAP should be promoted.
- ◆ In the post CoVID era, food processing industries should ensure sanitization of equipment, building, and workers to ensure safety and quality of products.



## Eminent Speakers

Dr Asgar Ali, Professor, University of Nottingham, Malaysia Campus, Malaysia

Dr N. N. Misra, Adjunct Faculty, Dalhousie University, Nova Scotia, Canada

Dr Khalid Gul, Senior Researcher, Shanghai Jiao Tong University, Shanghai, China

Dr Sanu Jacob, Director, Food Safety and Standard Authority of India, New Delhi, India

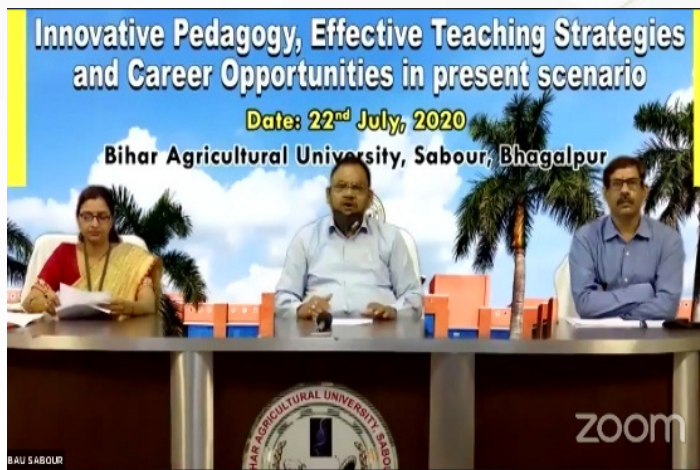
Dr Vasudha Bansal, Assistant Professor, Punjab University, Chandigarh, India

# Innovative Pedagogy and Effect Teaching Strategies and Carrier Opportunities in Present Scenario

22<sup>nd</sup> July 2020

## Key Recommendations

- ◆ E-material prepared by ICAR and available for agricultural subjects should be exploited to its fullest. Students, researchers can use sodh-ganga, e-granth for their knowledge improvement and search for new research vistas.
- ◆ There is an urgent need of the virtual lab for each subject in order to strengthen practical aspects.
- ◆ Training for teachers are required to make the lectures more interesting and interactive so that students can perceive the lectures without classroom interaction.
- ◆ Maintaining regular routine for yoga, exercise and all other day to day activities including attending classes, study time is the first and foremost aspect during the COVID situation.
- ◆ Teacher can see an opportunity during pandemic with present education system by preparing e-materials for different courses. There are many government portals where one can use the opportunity by preparing new e-material in the form of audio as well as videos.
- ◆ For enhancing the career opportunities of Agri. Students a linkage must be created among organisations and the Universities.
- ◆ The situation of pandemic has opened new vista globally for both teachers and students. A number of eourses are available for teachers to improve their teaching skills, proficiency and knowledge as well. Similarly job oriented courses are also available for students. Thus this situation may be taken as opportunity both by learners and learned and the situation may gainfully be utilised by students and teachers.



## Eminent Speakers

Dr. P. S. Pandey, ADG (EP&HS), ICAR, New delhi

Dr. B. Kumar, Expert in Communication Skills Training, Teachers' Skills

Dr. Ranjit Kumar , Head Agribusiness Management Division, ICAR-NAARM, Hyderabad

Dr. Ashok B. Hadapad, Scientific Officer-F, BARC, Mumbai

Dr. Sudarshan Dutta, Scientist, APNI, Morocco

Dr Sandeep Kumar, Associate Professor, Department of Psychology, BHU

# Stored product production in Era of Climate Change

23<sup>rd</sup> -24<sup>th</sup> July 2020

## Key Recommendations

- ◆ The research on rapid detection techniques of stored grain insect pests as well as mycotoxin in stored commodity and low cost storage structure should be made for farmers of Bihar.
- ◆ Research on Eco-friendly approaches for management of stored grain insect pests should be carried on.
- ◆ Implementation of Information and Communication Technology, Nanotechnology, Artificial Intelligence, preparation of resource map for stored product research.
- ◆ The coordinated research on postharvest management of cut flowers and also suggest the selling of cut flowers will play in doubling the farmer's income.
- ◆ Postharvest losses should be minimized for increasing farmers' incomes. Low cost techniques for enhancement of shelf life of horticultural produces should be practiced.
- ◆ X-ray and NIR methods for commercial scale detection of stored grain insect pests should be utilized.
- ◆ Formulation of nano emulsion and nano pesticides should be used for combat the problem of stored grain insects' pests. Behavioural management of insect pests is also important.
- ◆ Locally available materials for packaging and transportation of stored commodity. Low cost packaging techniques should be employed at farmer's level.



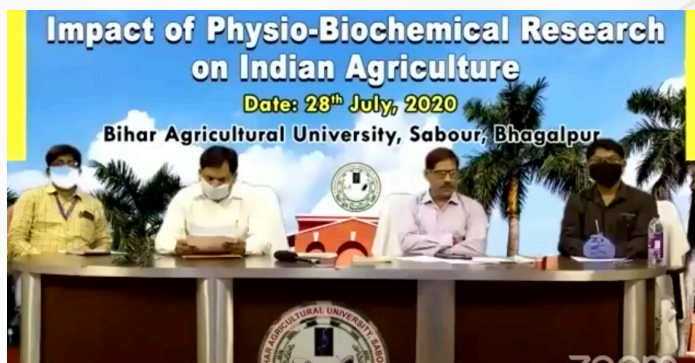
## Eminent Speakers

Dr. P. S. Pandey, ADG, HS& EP, ICAR, New Delhi  
Regional Manager, CWC, Patna, Bihar  
Dr. Ujwal Kumar, United Phosphate Limited, Mumbai  
Dr. J. Bhatia , United Phosphate Limited, Mumbai  
Md. Hazi Mohamad, United Phosphate Limited, Mumbai  
Dr. Dr. S. N. Ray, Chairman, Entomology, BAU, Sabour  
Dr. Ramanuj Vishwakarma, Assistant Professor-cum-Junior Scientist, BAU, Sabour  
Dr. Wasim Sidhiquii, Assitt. Prof. FST, BAU, Sabour  
Dr. Sanjay Pathak, Prof. & Head, Department of Fruit Scientist, NDUAT, Ayodhya  
Er. Pandit Parag, Assitt. Prof. PHT, NAU, Gujrat

28<sup>th</sup> July 2020

## Key Recommendations

- ◆ Critical understanding of the basic and fundamental plants life using modern approaches like soil less culture, aeroponics, hydroponics, phytotonics and phenotyping techniques should be incorporated to make crop varieties more productive, resilient against a wide range of stresses and to solve the constraints of decreasing land for cultivation.
- ◆ High throughput phenotyping of plants involves high throughput, non-destructing, genomics, phenomics big data by using different image based sensor and computer vision phenotyping must be utilized.  
Understanding the physiology of pathogenesis and signalling mechanism especially those of quorum sensing among the bacterial pathogens and silencing these signalling among pathogens may stop their spread at root level. Understanding the pathogenicity determinants of Rhizoctonia is another approach for controlling the disease.
- ◆ Phytochemical substances from plant sources when used as biopesticides or insecticides save us from most of the tragic issues raised with conventional agriculture and thus are best suited for sustainable agriculture.
- ◆ Adoption of Hi-Tech agriculture including Hi-throughput phenotyping, phytotonics, underground cultivation, vertical cultivation, light based modification of crop production and soilless cultivation has immense importance and business opportunity in agriculture.
- ◆ Phytotonics support agriculture in improving productivity of cereals, pulses, oilseeds and horticultural crops through better understanding and thus must be employed in agriculture.



## Eminent Speakers

- Dr. Chinnusamy Viswanathan, Principal Scientist & Head, IARI, New Delhi  
Dr. Ashwani Pareek, Professor, JNU, New Delhi; and Adjunct Professor, Univ. of Western Australia  
Dr. A. Hemantranjan, Professor, BHU, Varanasi  
Dr. D. B. Parakh, Ex-Principal Scientist, NBPGR, New Delhi  
Dr. Dinesh Singh, Principal Scientist, IARI, New Delhi  
Dr. Akshay Talukdar, Principal Scientist, IARI, New Delhi  
Dr. Anil Kumar Singh, Senior Scientist, ICAR-IIAB, Ranchi  
Dr. Gopaljee Jha, Scientist V, DBT-NIPGR, New Delhi  
Dr. Karan Acharya, Mahindra HZPC Pvt. Ltd., Chandigarh and Jv M&M-HZPC, Netherlands

# Breeding of Oilseeds: A challenge for Self-Sufficiency

29<sup>th</sup> July 2020

## Key Recommendations

- ◆ Increasing oilseed production through incorporation of high yielding varieties.
- ◆ Public awareness regarding daily recommended consumption in order to reduce over consumption
- ◆ Emphasis on oilseed crops, following proper package of practices, providing sufficient nutrition and irrigation, correcting deficiencies etc
- ◆ Government initiative to confirm food security in oilseeds through subsidies
- ◆ There is an urgent need to increase Seed Replacement Rate (SRR) with new variety
- ◆ Increasing seed production & distribution of newly released variety
- ◆ Promotion of new variety through minikits/Front Line Demonstration (FLD)
- ◆ Area expansion under protected irrigation
- ◆ Area expansion through rice fallow and intercropping
- ◆ Low cost technologies with high impact on productivity resulting in higher income
- ◆ Improve oil processing facility
- ◆ Technologies with high impact that involve reasonable investment with high return on investment (ROI) with emphasis on eco friendliness, high input use efficiency
- ◆ Quality improvement and value addition leveraging technologies with a bearing on the employment through skill development
- ◆ Association of ICAR-KVKs/SAUs in technology transfer
- ◆ Increase Minimum Support Price (MSP) for promotion of grower and reduction of price risk



## Eminent Speakers

- Dr. D.K Yadav, ADG (Seed), ICAR, New Delhi  
Dr. A. Vishnuvardhan Reddy, Director, ICAR- IIOR, Hyderabad  
Dr. R. K. Mathur, Director, IIOPR, Andhra Pradesh  
Dr. Tapas Das Gupta, Dean, School of Agri. and Rural Development, R.K. Mission, Kolkata  
Dr. M Sujatha, Head & Principal Scientist, IIOR, Hyderabad  
Dr. Sanjay Singh, Principal Scientist, ICAR-NIPB  
Dr. Naveen Singh, Principal Scientist, ICAR-IARI  
Prof. P.K. Singh, Department of GPB, C.S Azad University of Agriculture and Technology

# Plant Biological interventions for climate smart agriculture

30<sup>th</sup> July 2020

## Key Recommendations

- ◆ Conservation agriculture based sustainable intensification of cropping systems can help reduced cost, increased incomes and make agriculture more sustainable for small farmers and the environment.
- ◆ Drought related problems of rice crop can be met by strengthening root phenotyping systems determining different stage drought. Roots show more dynamic responses in terms of osmotic gene expression responses that can be further explored using advanced molecular technology.
- ◆ A multidisciplinary approach is the only possible way to developed climate resilient crop and can only give world's food security.
- ◆ For weed management herbicides are not only option but optimizing crop efficiencies and intensification of crop system has potentials to mitigate changes in climate.
- ◆ Advancement in the physiological research has marked to increased crop potential and development of changing climate resilient crop through photosynthetic enhancement under raising CO<sub>2</sub> and temperature.
- ◆ Pulse breeding imperatives could be enhanced with more advanced interaction of traits defining components of environment and combining multiple stress research based on changing climate.
- ◆ The emergence of next-generation sequencing based high-throughput genotyping approaches have sufficient marker density and can be used successfully in crops for accelerating genomics-assisted breeding programs.
- ◆ Artificial intelligence (AI) is a novel and rapid methods for the timely detection of pests and diseases can/will guide surveillance strategies and have control measures applied in a more targeted and timely manner. Tumaini AI-powered app can help farmers in early identification of pest and diseases and their management.



## Eminent Speakers

Dr. Kavita Shah, Professor, IESD, BHU, Varanasi  
Dr. M L Jat, Principal Scientist, CIMMYT, NAAS Complex, New Delhi  
Dr. Ravi Gopal Singh, Cropping Systems Agronomist, CIMMYT, Mexico  
Dr. Anita Babbar, Professor, JNKVV, Jabalpur  
Dr. Ranjan Das, Professor, AAU, Jorhat  
Dr. Amelia Henry, Senior Scientist, IRRI, Philippines  
Dr. Rupesh Deshmukh, Ramalingaswamy Fellow, NABI, Mohali  
Dr. Hena Dhar, DST-Inspired Faculty, NABI, Mohali  
Dr. S. Elayabalan, IIAT, Trichy, Tamil Nadu

# Maize Improvement for Stress Tolerance & Bio Fortification in Climate Smart Agriculture

04<sup>th</sup> August 2020

## Key Recommendations

- ◆ Promoting maize as a more impactful crop for mitigating the impact of climate change & meeting the demand of food, feed & livelihood security.
- ◆ Adoption of single cross hybrid technology in diverse types of maize ( Sweet corn, Babycorn, Pop corn,QPM ) is helpful in releasing stresses due to climate change
- ◆ Enhancing emphasis on biofortification, value addition of crop & promotion of nutritionally enriched maize varieties
- ◆ Creation of greater awareness about quality protein maize (QPM), high kernel Zn, iron and provitamin A-enriched maize hybrids
- ◆ Promoting maize as a more impactful crop for mitigating the impact of climate change & meeting the demand of food, feed & livelihood security.
- ◆ Adoption of single cross hybrid technology in diverse types of maize ( Sweet corn, Babycorn, Pop corn,QPM ) is helpful in releasing stresses due to climate change
- ◆ Enhancing emphasis on biofortification, value addition of crop & promotion of nutritionally enriched maize varieties
- ◆ Creation of greater awareness about quality protein maize (QPM), high kernel Zn, iron and provitamin A-enriched maize hybrids.
- ◆ Creation of awareness and collaboration among stakeholders for the deployment and use of biofortified maize and other technologies to mitigate the increasing challenges of malnutrition by strengthening “Agriculture-to-Nutrition Pathway.



## Eminent Speakers

Dr. S. Dass, Former Director Maize, DMR (ICAR), New Delhi  
Dr. P. H. Zaidi, Principal Scientist, Global Maize Program, CIMMYT, Hyderabad  
Dr. B. S. Vivek, Principal Scientist, Global Maize Program, CIMMYT, Hyderabad  
Dr. Sujay Rakshit, Director, ICAR-Indian Institute of Maize Research, Ludhiana  
Ramesh Kumar Phagna, Principal Scientist, ICAR-Indian Inst. of Maize Research, Ludhiana  
Dr. S. Geetha, Director, Centre for Plant Breeding & Genetics, TNAU, Coimbatore  
Dr. Jyoti Kaul, Principal Scientist, IARI, New Delhi  
Dr. N. Senthil, Professor, Biotechnology, TNAU, Coimbatore  
Dr. Usha Singh, Professor, Department of Food & Nutrition, RPCAU, Pusa, Bihar

# Ensuring Food safety, security and sustainability through crop protection

05<sup>th</sup> -06<sup>th</sup> August 2020

## Key Recommendations

- ◆ Push-Pull is just the kind of technology necessary to support the 'green revolution' that Africa needs because it increases productivity without requiring extra resources for hybrid seeds, crop protection and soil improvement.
- ◆ New discoveries relating to control of aflatoxin, fall army worm, soil health improvement, climate change mitigation, and drought resilience represent greater opportunities for further enhancing the effectiveness of the Push-Pull technology, extending its appeal to a wider range of farmer profiles in different agro-ecologies throughout Africa and beyond.
- ◆ Integration of vegetables and other high value crops to intensify push-pull farming system will make it highly attractive to youth. Increasing on-farm agricultural productivity, job creation and income generation will mitigate youth migration to cities and out of Africa.
- ◆ Integrated Pest Management: Judicious integration of appropriate technologies without any bias. Biotech crops are compatible with all other technologies. So, it can be a major component of IPM.
- ◆ Plant microbiome could be manipulated with probiotics to create crops that require less fertilizer and pesticides. Plants and their microbial symbionts need to be co-propagated as life-long partners in future strategies for plant breeding. Bottom-up approach to co-propagate the co-evolved, the plant along with the target microbiome.
- ◆ Nanoparticles and nanoscale processes need to be explored in developing improved formulations and delivery of pesticides.



## Eminent Speakers

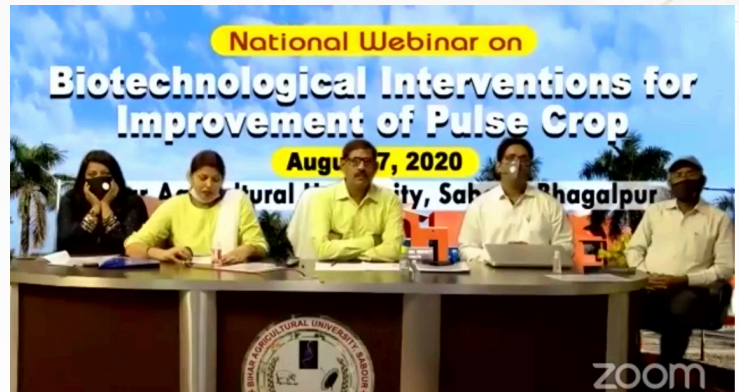
Dr JF Ayala-Zavala, Centro de Investigación en Alimentación y Desarrollo, AC, Mexico  
Dr Francisco Sautua, University of Buenos Aires, Viamonte 430, CABA, Argentina  
Dr Nancy P Castilla, International Rice Research Institute, Philippines  
Dr Zeyaur R Khan, International Centre of Insect Physiology and Ecology, Nairobi, Kenya  
Dr BK Sarma, Banaras Hindu University, Varanasi, Uttar Pradesh, India  
Dr Kaushik Banerjee, ICAR-National Research Centre for Grapes, Pune, Maharashtra, India  
Dr RK Kole, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, West Bengal, India  
Dr Pankaj, Indian Agricultural Research Institute, New Delhi, India  
Dr Anil, CCS Haryana Agricultural University, Hisar, Haryana, India  
Dr Suhrid R Barik, Corteva Agriscience (South Asia), Hyderabad, Telangana, India  
Dr Ujjwal Kumar, Asia Sale Head, United Phosphate Ltd., Mumbai, Maharashtra, India

# Biotechnological Interventions for Improvement of Pulse Crops

07<sup>th</sup> August 2020

## Key Recommendations

- ◆ Lathyrus improvement programme should be started as it has vast potential to occupy rice fallow of Bihar.
- ◆ Genetic base of pulse crops should be enhanced and use of advanced technology like gene editing and speed breeding in pulse crop improvement programme should be implemented.
- ◆ There is need to reset the research priorities and strategies for the improvement of the pulse crops. Designing systemic research was emphasized for checking feasibility of short and medium duration pigeonpea varieties and hybrids in Bihar as farmers are losing interest in cultivation of long duration pigeonpea.
- ◆ Wild species of chickpea for mining of genes for drought tolerance should be explored.
- ◆ Molecular markers and genomics tools for the improvement of chickpea should be used in the breeding programmes for enhancing the pace of pulse crop improvement.
- ◆ Genetic gain in pigeonpea should be enhanced. Short and medium duration hybrid pigeonpea should be developed.
- ◆ Transgenic approach of Helicoverpa resistance in pigeonpea may be approached using wild relatives of pigeonpea for exploring genes for tolerance to pod borer.
- ◆ Research needs to be focused towards development of early abd heat tolerant chickpea and lentil to occupy rice fallow area of Bihar.
- ◆ Germplasm and wild relatives of pulses should be explored for identification of major disease tolerant sources.



## Eminent Speakers

- Dr. N. P. Singh, Director, IIPR, Kanpur
- Dr. Rajeev Kumar Varshney, Director-Genetic Gains, ICRISAT, Hyderabad
- Dr. T. R. Sharma, Director, ICAR- IAB, Ranchi
- Dr. S. K. Chaturvedi, Dean (Agriculture), Central Agricultural University, Jhansi
- Dr. Pooran M Gaur, Research Program Director, ICRISAT, Hyderabad
- Dr. C. Bhardwaj, Principal Scientist, IARI, New Delhi
- Dr. C. V. Sameer Kumar, Principal Scientist, PJTSAU, Hyderabad
- Dr. A. K. Singh, Senior Scientist, NIASM, Baramati, Pune
- Dr. Khlea Ram Soren, Scientist, IIPR Kanpur

# Advances in genomics tools for rice breeding

12<sup>th</sup> August 2020

## Key Recommendations

- ◆ Wild germplasm must be exploited to assess novel QTLs for stress tolerance and yield. SNPs should be utilised in preparation of a high-density linkage maps, diagnosis of predisposition of genetic diseases in animals, diversity analysis and fingerprinting of genotypes, evolutionary studies, association studies and markers assisted selection.
- ◆ Emphasis should be given on understanding the issues properly and then designing the breeding strategy.
- ◆ Use of chemical fertilisers and pesticides induce stress on the plant rhizosphere and influence the important site for biological interactions. Over expression of 2-AP pathways genes by genetic engineering can be targeted to enhance the 2-AP content in aromatic rice.
- ◆ Genome editing has unprecedented ability to generate targeted and specific mutant every locus. These simple, versatile and efficient tools must be incorporated to accelerator of rice improvement programme.
- ◆ Whole genome re-sequencing of elite rice varieties and landraces is highly required to decipher the haplotype diversity, phenotyping of elite lines/landraces at targeted phenotypic environment which will benefit to find out the stable and consistent haplotype, haplotype based backcross breeding can be used for transferring superior halpotype.
- ◆ There is a need to develop high throughput phenotyping facility, low cost high throughput markers and genotypic centres and reduce tha plant breeders-molecular biologist gap for molecular plant breeding programs.



## Eminent Speakers

Dr. H. S. Dhaliwal, Vice-Chancellor, Eternal University, Himachal Pradesh  
Dr. N. K. Singh, National Professor and Director, ICAR-NIPB, New Delhi  
Dr. A. K. Singh, Director, ICAR-IARI, New Delhi  
Dr. Satish B. Verulkar, Professor, IGKV, Raipur  
Dr. Altafhusain B. Nadaf, Professor, SPPU, Pune  
Dr. R. M. Sundaram, Principal Scientist, ICAR-IIRR, Hyderabad  
Dr. Kutubuddin Ali Molla, Scientist, ICAR-NRRI, Cuttack  
Dr. Pallavi Sinha, Scientist, IRRI South Asia Hub, Hyderabad  
Dr. Raviraj Banakar, Head of Genome Editing, Avesthagen Limited, Bangalore

# Recent Advancement in soil microbiological research with a special thrust to biofertilizer technology

25<sup>th</sup> August 2020

## Key Recommendations

- ◆ There are tremendous opportunities to extend biofertilizer usage more vigorously to stressed ecosystems, particularly into rainfed agriculture.
- ◆ Policy initiatives like promotion of organic farming in niche areas, general desire for a gradual reduction of chemical fertilizer usage, support through various government schemes for manufacture of biofertilizers as well as supply to farmers, have contributed to a steady rise in demand.
- ◆ Composting is a microbiological, non-polluting and safe method to recycle agricultural wastes to manure and its application enhance the soil health, biodiversity and improve carbon storage in a long-run.
- ◆ The in-situ decomposition of rice and wheat residue could be achieved within 30 days and for sugarcane trash within a period of 45 days.
- ◆ A novel formulation comprising two promising lignocellulolytic fungi namely *Coprinopsis cinerea* and *Cyathospora coreus* has also been developed for accelerated in situ degradation of paddy straw with additional promise in improving soil health.
- ◆ Novel bioformulations of phosphorus and potassium using low-grade P and K-bearing mineral along with phosphate and potassium solubilizing microorganisms could be used as alternate fertilizers for sustainable crop production and soil health when India is relying wholly on imports to meet the P and K demand of the crops.
- ◆ Phytoremediation approach is a gentle and green cure technology and is a slow process.
- ◆ Therefore, development of new hyper accumulating plant genotypes by biotechnological approaches along with efficient agronomic management practices can make the process faster and efficient.



## Eminent Speakers

Dr. S. K. Chaudhari, Deputy Director General, NRM, ICAR, New Delhi  
Dr. D. L. N. Rao, ICAR-Emeritus Scientist, IISS, Bhopal, M.P.  
Dr. A.K. Saxena, Director, NBAIM, Kushmaur, U.P.  
Dr. Ramesh Chandra, Professor, Soil Science, GBPUAT, Pantnagar, Uttarakhand.  
Dr. J.C. Tarafdar, Ex-ICAR Emeritus Scientist, CAZRI, Jodhpur, Rajasthan  
Dr. D. R. Biswas, Sectional President (Agriculture & Forestry Sciences), ISCA  
Dr. T.J. Purakayastha, Principal Scientist, SSAC, ICAR-IARI, New Delhi  
Dr. Lata Nain, Principal Scientist, Microbiology, ICAR-IARI, New Delhi & others

# Women in Science & their role in Sculpting modern Agriculture

26<sup>th</sup> August 2020

## Key Recommendations

- ◆ Role of women in modern society will be excel when expand investment in Women's Education with goal to achieve parity with men
- ◆ Reward women's achievements outside of marriage and children and encourage married women to work by developing high quality child care programs
- ◆ Recognizing and addressing to social inequalities is necessary to design technologies and interventions that are both socially and technically robust
- ◆ Gender responsive budgeting, process of entailing a gender-based assessment of budgets, incorporating a gender perspective at all levels of budgetary process and through partnering in value chain will promote gender equity in agriculture.
- ◆ Exclusive components of the student READY programme such as experiential learning (business mode), hands on training (skill development), rawe, internships, student projects etc are interactive and conceptualized for building skills in project development, decision making, problem solving etc.
- ◆ Agriculture has an exceptionally high impact in terms of its potential to reduce poverty in low income developing countries but this growth in agriculture could only come from effective reduction in gender disparities.
- ◆ Therefore, making public administration more gender-responsive, increasing the participation of women in local councils and promoting women in community-based organization will be the reasons behind modernization of society with gender equality.



## Eminent Speakers

Dr Uma J. Lele, President Elect, IAAE, USA & Visiting Scholar, Institute of Economic Growth, India  
Dr Usha Barwale Zehr, Director and Chief Technology Officer, MAHYCO, India  
Dr Isabel Vales, Lead, A&M Potato Breeding and Variety Development Program, Texas, USA  
Dr Pooja Bhatnagar Mathur, Theme Leader - Cell, MBGE, Genetic Gains Program, ICRISAT, India  
Dr Mamta Sharma, Theme Leader - Integrated Crop Management Asia Program, ICRISAT, India  
Dr Hom Gartaula, Gender and Social Inclusion Specialist, CIMMYT, Mexico  
Dr Lipi Das, Principal Scientist, Agricultural Extension, CIWA, Bhubaneswar, India  
Dr Nidhi Verma, Principal Scientist, Agricultural Education Division, ICAR, New Delhi, India

# Mushroom Production: An Emerging Avenue for Rural Youth & Self Employment

26<sup>th</sup> August 2020

## Key Recommendations

- ◆ Lack of availability of quality spawn among the mushroom growers, thus, there is an urgent need to develop extensive and effective technology to ensure the production of high quality mushroom spawn.
- ◆ Development of better packaging material for fresh mushroom fruit for long term storage and distant marketing of mushroom.
- ◆ A Marketing Intelligence System (MIS) needs to be developed. The MIS should be preceded by a study linked with their feasibility and possibilities for implementation.
- ◆ Scientists may be advised to organize a scientists-farmer's interaction meeting at farmer's mushroom growing sites to explore the difficulties faced by them subsequently scientists would provide the possible feasible and cheap scientific remedial measures to the farmers to overcome on their problems.
- ◆ Extensive governmental support in the mushroom sector is little attention; therefore, the government may be informed to take necessary steps to strengthen the scientific cultivation of mushroom and marketing channel.
- ◆ Improvement of tools available to the breeder, decoding mushroom fungus genome and commercial pressure facing the industry can propel efforts for new strain development in the future.
- ◆ Strengthening and establishment of storage facilities and promotional activities of mushroom in new areas should be explored.
- ◆ Need to be develop mushroom based industry, creates a scope to export mushroom products, thus it can generate employment opportunity for unemployed.



## Eminent Speakers

Dr. V.P. Sharma, ICAR-Directorate of Mushroom Research, Solan, H.P.  
Dr. M. P. Thakur, Indira Gandhi Agricultural University, Raipur, Chhattisgarh  
Dr. Dayaram, Dr. Rajendra Prasad Central Agricultural University, Pusa, Samastipur, Bihar  
Dr. Meera Pandey, Indian Institute of Horticulture Research, Bengaluru, Karnataka  
Dr. Ram Chandra, Banaras Hindu University, Varanasi, U. P.  
Dr. S. K. Biswas, Chandra Shekhar Azad University of Agriculture & Technology, Kanpur, UP  
Dr. M. K. Biswas, Institute of agriculture, Visva-Bharti Santiniketan, Birbhum, West Bengal  
Dr. Gireesh Chand, Central Agricultural University, Imphol, Manipur  
Dr. Sailbala Dei, Bihar Agricultural University, Sabour, Bihar & others

# Sustainable pest management of organic Banana: Need of climate Smart Agriculture

31<sup>st</sup> August 2020

## Key Recommendations

- ◆ For management of Banana corm weevil, *Cosmopolites sordidus*.
- ◆ Monitor the weevil activity in a garden by keeping longitudinal split banana pseudostem traps @ 10-15/acre. Once weevil is attracted to the laid traps, keep the longitudinal split banana traps @100/ha with biocontrol agents like, *Beauveria bassiana* (10g per trap) the biocontrol agent can be smeared on the stem traps and keep the cut surfaces facing the ground.
- ◆ Install pheromone trap, *Cosmolure* @ 5 traps/ha. the trapped weevils remain there they will die. Change the position of traps once in a month.  
For management of Banana stem weevil, *Odoiporus longicollis*
- ◆ After the harvest of banana bunch cut the tree at base and treat it with 100 ml of *Beauveria bassiana* (3ml/litre)
- ◆ Monitor banana weevil activity in a garden by banana stem traps i). Longitudinal split trap (30 cm) ii). Disc-on –stump trap at the rate of 100 traps/ha. The attracted weevils to be collected daily and killed.
- ◆ For management of Banana fruit scarring beetle, *Nodostoma viridipenne* Jac Tie bunch sleeve at the time of shooting. The bunch sleeve made out of 100 gauge thickness polythene having 6 % ventilation.
- ◆ For management of Banana aphid (*Pentalonia nigronervosa* Coq.)  
The virus-affected plant should be rouged out. Ratoon and inter crops should not be taken up Collect planting material from healthy plants.
- ◆ To control aphids spray *Neemazal* (2.5ml per litre) or or entomopathogenic fungus, *Verticillium lecanii* (2 ml/litre).



## Eminent Speakers

Dr. B. Padmanaban, ICAR- National Research Centre for banana, Trichirapalli, Tamilnadu  
Dr. D. K. Mishra, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal  
Dr. R. G. Parmar, Anand Agricultural University, Anand, Gujarat  
Dr. Gireesh Chand, Central Agricultural University, Imphal, Manipur  
Dr. Amitava Banerjee, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, W.B.  
Dr. S. B. Sah, Assis. Professor, Entomology, Bihar Agricultural University, Sabour, Bhagalpur

# Biodiversity in vegetable crops for healthier life & livelihood

27<sup>th</sup> - 28<sup>th</sup> August 2020

## Key Recommendations

- ◆ Vegetable biodiversity helps ensure not only a stable and sustainable supply of sufficient quantities of food, energy and protein but also plays a major role in ensuring its quality.
- ◆ Underutilized horticultural crops could come up as potential crops for improving nutrition and food security having high medicinal values as well as playing significant role in diversification leading to farm income as well as of aesthetic value.
- ◆ Accentuating urban and peri-urban horticulture through home gardening, roof top gardening, organic production, protected and hydroponic production. Following good agricultural practices (GAPs) to improve vegetable produce quality and safety.
- ◆ Opening the avenue of horticultural tourism which could create opportunities for the farmers in India and provide revenues for horticultural products and environmental preservation.
- ◆ Developing a habit of eating organic vegetables through grow your own vegetables to have vegetables free from pesticides and fertilizers residue as well as conserve local indigenous vegetable biodiversity.
- ◆ Characterization and documentation of Indian chillies were utmost important for breeding point of view.
- ◆ Vegetable research in public-private partnership was necessary to cope up with the different challenges faced by the farming community.
- ◆ Conservation of farmers' variety was necessary which could serve as a vital resource for global food security.



## Eminent Speakers

Dr. M.L. Chadha, Former Director, AVRDC-The World Vegetable Centre, Taiwan  
Dr. Ramakrishnan M. Nair, AVRDC - The World Veg. Centre: South and Central Asia, Hyderabad  
Dr. Silvana Nicola, University of Turin, Department, Largo Paolo Braccini, Grugliasco (TO), Italy  
Dr. Narinder Dhillon, Kamphaeng Saen, East and Southeast Asia, Thailand  
Dr. Pranab Hazra, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal, India  
Dr. Pritam Kalia, ICAR-Indian Agricultural Research Institute, New Delhi, India  
Dr. Sanjeet Kumar, AVRDC-ICRISAT Project, Station de Sadoré/Niamey-Niger  
Dr. A.T. Sadashiva, ICAR-Indian Institute of Horticultural Research, Bengaluru, Karnataka  
Dr. Rajesh Kumar, ICAR-Indian Institute Of Vegetable Research, Varanasi, U.P. & others

# Cultivation of Medicinal and Aromatic Plants (MAPs): An Innovative Effort towards Sustainable Development

01<sup>st</sup> September 2020

## Key Recommendations

- ◆ Medicinal & Aromatic Plants (MAPs) are botanical raw materials. They are also known as herbal drugs and must be used for the therapeutic, aromatic and/or culinary purposes such as components of cosmetics, medicinal products, health foods and other natural health products.
  - ◆ MAPs are the reservoirs of useful bioactive compounds which are responsible for their remarkable potential properties/activities.
  - ◆ MAPs can be an easily accessible and cost effective source of promising therapeutic agents that can be used in combating horrible diseases such as cancer and other infectious diseases caused by drug-resistant microorganisms etc.
  - ◆ Policy documentation should be promoted in wide range areas for MAPs production.
  - ◆ Exploring the role of different MAPs such as Cinnamon, clove, lemongrass, oregano, thyme, nutmeg, basil, etc. and plants-derived commercially available bioactive compounds used in agri-food industries, pharmacy etc., among the growers in wide range.
  - ◆ Encouraging the MAP growers to adopt a holistic approach to manage the rich heritage of medicinal and aromatic plant wealth.
  - ◆ Promoting the agri-business opportunities through cultivation and processing of medicinal and aromatic plants in the country for boosting the farmer's income.
  - ◆ Strengthening and development of storage facility of MAPs and their products.
- Lastly, looking in to different acts of biopiracy exploiting indigenous knowledge on herbal products without recognition of the owner country, there is need for bioprospection of Indian flora for novel formulations to be used in agriculture as well as pharma sector.



## Eminent Speakers

- Dr. N. K. Dubey, Professor, Department of Botany, Faculty of Science, BHU, Varanasi, U.P.  
Dr. Sanjay Kumar, Principal Scientist, CSIR-CIMAP, Lucknow, U.P.  
Dr. S.K. Tewari, Chief Scientist & Professor, CSIR-NBRI, Lucknow, U.P.  
Dr. Ajay Arora, Principal Scientist, Department of BCP, IARI, PUSA, New Delhi.  
Dr. A.K. Trivedi, Principal Scientist, ICAR-CISH, Rehmankhera, Lucknow, U.P.  
Dr. Poonam Singh, Professor, Zoology Section, MMV, BHU, Varanasi, U.P.

# Soil Health management for Sustainable Crop Productivity

07<sup>th</sup>-08<sup>th</sup> September 2020

## Key Recommendations

- ◆ Implication of nutrition sensitive agriculture and food system in practice for improving the public health challenge due to malnutrition.
- ◆ Crop management such as use of cover crop, crop rotation and residue management as well as soil management such as organic forms of nutrient to improve soil health.
- ◆ Characterization of basic resources like soil, water and biodiversity problem for optimizing land use.
- ◆ Biochar application in the field helps in increasing the soil fertility and crop production.
- ◆ Assessment of nutrient mining under variable climate-soil-crop management domain.
- ◆ Strategies that need to be emphasize include land care and soil quality improvement through conservation agricultural practices, integrated nutrient management and adoption of integrated farming system for soil health management.
- ◆ The integrated approach need to be followed which include adoption of suitable crop, agro-technique, cultural practices and bio-agent enhancing the productivity of pulse crop under abiotic stress condition.
- ◆ To prevent the excessive accumulation of salt in the root zone, irrigation water must be applied in excess of that needed for the evaporation of the crops.
- ◆ Adoption of STCR approached for precise quantitative adjustment of fertilizer doses under varying soil test values and responses for targeted levels of crop production.
- ◆ Development of agronomic and physiological strategies to enhance micronutrient in soil-plant-animal/human continuum.



## Eminent Speakers

- Dr. S. K. Sanyal, Former Vice-Chancellor, BCKV, Mohanpur, West Bengal.
- Dr. Arvind Kumar, Vice-Chancellor, RLBCAU, Jhansi, UP.
- Dr. Biswapti Mandal, Department of Soil Science and Agricultural Chemistry, BCKV, W.B.
- Dr. Sati Shankar Singh, Director Extension Education, RLBCAU, Jhansi. UP.
- Dr. A. P. Singh, Department of Soil Science, IAS, BHU, Varanasi, UP
- Dr. Ravi Gopal Singh, Cropping System Agronomist, CIMMYT.
- Dr. R. K. Yadav, Head, Division of Soil and Crop Management, CSSRI, Karnal, Haryana.
- Dr. Ranjan Laik, Chairman, Department of Soil Science, DRPCAU, Pusa, Samastipur, Bihar.
- Dr. A. K. Dwivedi, Department of Soil Science and Agricultural Chemistry, JNKVV, Jabalpur, MP.
- Dr. A. K. Shukla, Project Coordinator (Micronutrient), IISS, Bhopal, MP.
- Dr. Pallab Kumar Sarma, Chief Scientist, Department of Soil Science, AAU, Assam.
- Dr. Anshuman Kohli, Senior Scientist, Department of Soil Science, BAU, Sabour, Bhagalpur, Bihar
- Mr. Vijay Bharat, Director, Mobile Agricultural School and Services, Ranchi, Jharkhand

# Augmenting vegetable productivity through recent techniques

9<sup>th</sup>-10<sup>th</sup> September 2020

## Key Recommendations

- ◆ Good agricultural practices (GAP) comprising of raising healthy seedlings through portray/protected structures, raised bed cultivation of vegetable crops, mulching, proper training-pruning, foliar nutrient application for correction of deficiency is extremely important for increasing vegetable production and productivity.
- ◆ Cultivation of high value vegetables like tomatoes and cherry tomatoes, capsicum, seedless cucumber can enhance the economic returns and thus provide livelihood security to farmers. Protected cultivation of vegetables can also enable offseason cultivation of these crops and enable fetching premium price.
- ◆ Adoption of micro irrigation in vegetable not only saves water but also improves productivity and quality of vegetables.
- ◆ Grafting in vegetables, specially solanaceous and cucurbits for overcoming biotic stress and enhancing quality. In cucurbits particularly, grafting can be effectively used for control of Fusarium wilt and root knot nematode. In brinjal for grafted crop, two ratoon crops could be allowed and the ratoon could be taken when the first crop was 6-7 months old (after transplanting).
- ◆ Organic farming could act as a mitigation strategy towards climate change as well as for assuring food security.
- ◆ Land races of vegetable crops are sources of important traits and should be utilized in breeding programmes particularly for biotic and abiotic stress resistance and quality enhancement.
- ◆ The aim of modern breeders is breeding for functional foods, i.e., vegetables rich in phytochemicals and bioactive compounds.  
Underexploited and minor vegetables should be explored since they are highly nutritious.



## Eminent Speakers

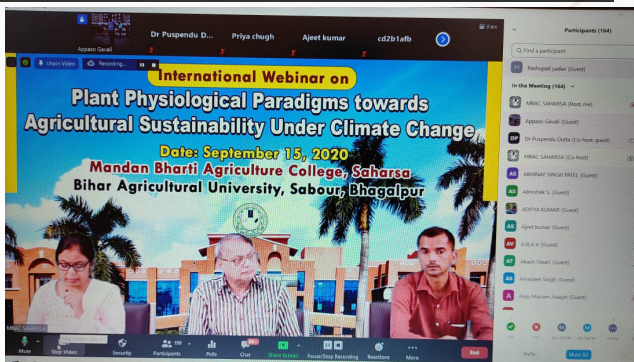
Dr. K.V. Peter, Former Vice Chancellor, KAU & President, Indian Society of Vegetable Science, Varanasi.  
Dr. Kamlesh Narayan Tiwari, Emeritus Professor, Indian Institute of Technology, Kharagpur, W.B.  
Dr. Ashwani Kumar Sharma, Former Head & Professor, Dr. Y.S. PUHF, Nauli, Solan, H.P.  
Dr. T. Pradeepkumar, Director of Planning & Professor & Head, Deptt. of Veg. Science, KAU, Kerala.  
Dr. L. Pugalendhi, Dean, HCRI, Tamil Nadu Agricultural University, Coimbatore, T.N.  
Dr. P. G. Sadhan Kumar, Member QRT (Vegetables) & Former-Professor, COH, KAU  
Dr. C. Narayanan Kutty, Professor & Associate Dean, COH, Kerala Agricultural University  
Dr. Arup Chattopadhyay, Professor, Dept. of Veg. Science, Faculty of Horti., BCKV, Nadia, W.B. & others

# Plant Physiological Paradigms towards Agricultural Sustainability Under Climate Change

15<sup>th</sup> September 2020

## Key Recommendations

- ◆ Climate change has become a reality established beyond doubts, and is now considered as the single gravest threat to global food security, with India being recognized among the worst-hit countries of the world.
- ◆ The management of plant nutrients is very helpful in reducing the detrimental effects of drought. Better plant nutrition can be helpful to utilize the available water more efficiently by a number of mechanisms
- ◆ The micronutrients like Fe, B, Mn and Mo alleviate the adverse effects of drought indirectly by activating the physiological, biochemical and metabolic processes in the plants.
- ◆ Some of the most important guiding principles include equal emphasis on the management of natural resources, appropriate institutional and financial mechanisms, and improving preparedness of stakeholders to engage in well-informed actions.
- ◆ Warming directly affects rate of plant respiration, photosynthesis, and other biogeochemical processes. In the future it is thought that the increase in CO<sub>2</sub> and other greenhouse gases will cause an increase in global mean temperature, with larger increases at high latitudes than elsewhere and larger increases during winter than summer.
- ◆ Currently, vulnerable to hunger and under malnutrition supports the need for considerable investment in adaptation and mitigation actions toward a “climate-smart food system” that is more resilient to climate change influences on food security.
- ◆ This Webinar takes a broader view and explores the multiple effects that global warming and climate change could have on food production and food security and what actions can be taken to increase agriculture productivity, build resilience, and reduce
- ◆ Green House Gas (GHG) emissions and increases global CO<sub>2</sub> concentrations through enhancing climate-smart agriculture (CSA), both in policies and practices. Recently there has been a growing concern about the effects of climate change due to global warming.



## Eminent Speakers

- Dr. P.S. Pandey, ADG, HS & EP, ICAR, New Delhi
- Dr. Viswanathan Chinnusamy, Principal Scientist, NDPPC, IARI, New Delhi.
- Dr. P.S. Basu, Head & Principal Scientist, Division of Basic Science, ICAR-IIPR, Kanpur (U.P.)
- Dr. Manish K. Pandey, Senior Scientist- Applied Genomics, ICRISAT, India & USQ, Australia
- Dr. Renu Munjal, Professor & Head, Deptt. of Botany & P. Physiology, CCSHAU, Haryana
- Dr. Raju Bheemanahalli, Assis. Prof., Deptt. of Plant & Sci., Mississippi State Uni.. (U.S.A.)
- Dr. Koushik Chakraborty, Scientist, ICAR-NRRI, Cuttack, Orissa
- Dr. Puspendu Dutta, Assistant Professor, U.B.K.V. Pundibari, Cooch Behar, (W.B.)

# Role of Agricultural Sector in resilience of Indian Economy amid COVID-19 Pandemic

25<sup>th</sup> September 2020

## Key Recommendations

- ◆ Strengthening the laws and institutions that support small and medium enterprises including agri-business industries.
- ◆ Infrastructural investments are an effective way to boost Indian economy and create jobs.
- ◆ Strengthening regional and global value chains. Important steps have to be taken to make India a less fragmented domestic market.
- ◆ Establishment of APMCs (Agricultural Produce Market Committee), Apni Mandis in Bihar.
- ◆ Linkages to input markets are still weak which needs to be strengthened. With respect to fertilizers (i.e. urea) HYV seeds informal channels are still mainly used.
- ◆ Effective use of by-products.
- ◆ Effective utilization of human resources in agriculture. Promotion of ICT in e-marketing.
- ◆ Emphasis on the production, marketing and supply chain of medicinal and aromatic plants.



## Eminent Speakers

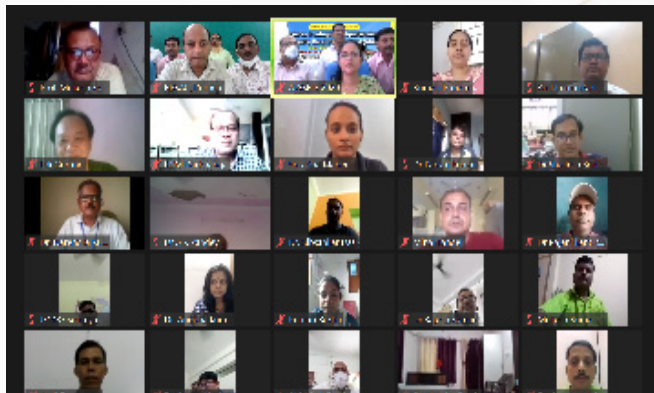
- Dr. M. P. Thakur, Indira Gandhi Agricultural University, Raipur, Chhattisgarh  
Dr. K. M. Singh, Dr. Rajendra Prasad Central Agricultural University, Pusa, Samastipur, Bihar  
Dr. Shuchi Mathur, AD, CCS, NIAM, Jaipur, Rajasthan  
Dr. Ranjit Kumar, Principal Scientist & Head, ABM Division, ICAR-NAARM, Hyderabad  
Dr. J. P. S. Dabas, Incharge, CATAT, IARI, Pusa, New Delhi  
Dr. S. S. Kalamkar, Director, AERC, Gujarat  
Dr. Sanjay Kumar, Principal Scientist, CSIR-CIMAP, Lucknow, U.P

# Advances in Integrated Aquafarming for Sustainable Rural Development" (AIASRD-2020)

29<sup>th</sup> to 30<sup>th</sup> September, 2020

## Key Recommendations

- ◆ Require valuable research on Fish production, Fish diversity, especially Indian Major carp and fish based Integrated aqua farming system for sustainable production.
- ◆ Need for the development of aqua culture zonation, agro ecological zones, global production of salmon and tilapia, ornamental fishes fish feed, fish aqua culture like fisheries etc..
- ◆ Technology of freshwater pearl culture can be very much useful to the farmers, entrepreneurs, researchers and students of the country in order to develop technical expertise and popularization of freshwater pearl culture technology.
- ◆ It is very much helpful to the farmers to focus on culture of Indigenous carps and also aqua culture is extending in wet land areas in Developing countries.
- ◆ Culture and seed production of Freshwater Prawn Technology can be very useful to develop the entrepreneurship in rural areas for sustainable development.
- ◆ Integrated fish farming systems (IFFS) can hold special positions as in this system nothing is wasted, the by-product of one system become the input for other. India has a considerable livestock, poultry population and crop wastes. IFFS is a promising approach for increasing overall productivity and profitability through recycling farm by products and efficient utilization of available resources.
- ◆ Integrated Makhana based Cropping System under wet land areas can be developed including makhana based farming system mode of food production system, . Technonlogy refinement of Integration of air-breathing fish, carp fish in both system of makhana cultivation.



## Eminent Speakers

Dr. Dilip Kumar, Former Co-Director/ VC, ICAR-CIFE Mumbai; Int. Civil Service (FAO of UN)

Prof. A. P. Sharma, Vice-Chancellor, G.B.P.U., A&T, Pantnagar

Prof. B. N. Pandey, President (Z S I), Former Dean Faculty of Science, M.U. Bodh Gaya

Dr. D. R Kanaujia, Former, Pr. Scientist & Head, Prawn Culture Unit, CIFA, Bhubaneswar

Dr. A. K, Pandey, ICAR, NBFGR, Lucknow (Working President SLS)

Prof. P. K. Pandey, Dean, College of Fisheries, CAU, Tripura

Prof. Ram Kumar, Professor Dean of Centre of Environmental Science, CUSB, Gaya

Dr. Indu Sekhar Singh, P.S. & I/c, Head, ICAR-RCER, Research Centre for Makhana, Darbhanga

Prof. N. C. Ujjainia, Fisheries Resource Management, V. N. South Guj. Uni., Surat & others

# Enhancing Livestock Productivity for Food Security through Advanced Genetics and Reproductive Techniques

30<sup>th</sup> September, 2020

## Key Recommendations

- ◆ Training on scientific management and production of livestock must be organised by the concerned organisation to enhance the productivity.
- ◆ Traditional method of breeding must be supported by advanced technologies and accordingly awareness programme should be launched.
- ◆ Wide awareness programme on climate based forecasting of disease, hygiene and their control & management should be operated among farmers.
- ◆ Farmer's friendly easy diagnostic & treatment system should be developed and farmer should be trained.
- ◆ There is need to capitalise burning technologies such as Bio-metric sensor, Marker Assisted Selection etc. for the improvement of livestock.
- ◆ There is a need to integrate new technologies in assisted reproduction such as Cryogenics, Sex semen, Artificial insemination and the transfer of in- vivo and in-vitro derived embryo etc.
- ◆ Infra-Red Thermography technology should be promoted over other non-invasive systems for the management of health of cattle.
- ◆ There must be emphasis over conservation of endangered breed of cattle, so that their germplasm may be used in wide crossing programme leading to development of breed of desired trait.
- ◆ There must be dissemination of knowledge of precision feeding as it promotes eco-friendly and economic way of livestock production.
- ◆ Estrus synchronisation and artificial Insemination should be promulgated among farmers for easy management and rapid production of cattle.



## Eminent Speakers

Dr. Umesh Singh, Principal Scientist, Animal Genetics & Breeding, ICAR-CIRC, Meerut  
Dr. Vikas Vohra, Principal Scientist, Animal Genetics & Breeding, ICAR-NDRI, Karnal  
Dr. T. K. Mohanty, Principal Scientist, Animal Reproduction, ICAR- NDRI, Karnal  
Dr. Rafeeqe. R. Alyeathodi, Scientist, Animal Genetics & Breeding, ICAR- CIARI, Port Blair  
Dr. Mukesh Bhakat, Sr. Scientist, Livestock Production & Management, ICAR- NDRI, Karnal  
Dr. Pankaj Kumar Singh, Department of Animal Nutrition, BASU, Patna  
Dr. Rajesh Kr. Singh, Veterinary Doctor, Editor in Chief, Pashudhan Praharee, Jharkhand  
Dr. Sanjay Kumar Ravi, Scientist, Animal Reproduction, ICAR- CIARI, Port Blair

# Fundamental Concepts and Applications of Research Methodology

06<sup>th</sup> to 07<sup>th</sup> October, 2020

## Key Recommendations

- ◆ Write research article emphasizing a big, relevant problem with clear figures presenting the right amount of data.
- ◆ Choose the journals as per your field and follow the journal guidelines meticulously.
- ◆ Be aware of predatory and payable journals while selection.
- ◆ The purpose of this step is to state the actual time to take the samples. For instance, if the frequency were determined to be daily, what time of day should the sample be taken—in the morning at 8:00 am, around midday, or late in the day around 5:00 pm
- ◆ This is important because inconsistent timing between data gathering times will lead to data that is unreliable for further analysis.
- ◆ Identify an appropriate impact evaluation method.
- ◆ Use of time-series models and methods in the analysis of agricultural field.
- ◆ Data collection is a methodical process of gathering and analyzing specific information to proffer solutions to relevant questions and evaluate the results. It focuses on finding out all there is to a particular subject matter. Data is collected to be further subjected to hypothesis testing which seeks to explain a phenomenon.
- ◆ In advanced studies, a researcher may approach his topics quantitatively, qualitatively or with the use of a mixed methodology. When opting for a qualitative approach, researchers have several options in analyzing the data. The use of matrices, charts, tables and other visual displays are common tools used. With visual displays, the researchers can pare down the often abundant subjective data that has been gathered and determine what will be useful variables in his qualitative data analysis.



## Eminent Speakers

Dr. Puskur Raghuvver Rao, Principal Scientist, Plant Physiology, ICAR-IIRR, Rajendranagar, Hyderabad (Telangana)

Dr. Pramod Kumar, Principal Scientist, Division of Agri. Economics, IARI, New Delhi

Dr. M. Elangovan, Principal Scientist, Plant Genetic Resources, ICAR-IIMR, Rajendranagar, Hyderabad (Telangana)

Dr. Manesh Choubey, Professor, Department of Economics, Sikkim Central, University, Gangtok, Sikkim

Dr. Ranjit Kumar, Principal Scientist & Head, Agribusiness Management Division, ICAR-NAARM, Rajendranagar, Hyderabad (Telangana)

Dr. Dwijesh Chandra Mishra, Scientist, ICAR-IASRI, New Delhi

# Trash to Treasure: Managing crop residues into winning investment

05<sup>th</sup> November, 2020

## Key Recommendations

- ◆ Authentic data required on amount of Crop residue generated including horticultural crops.
- ◆ Promotion of in-situ management of crop residues.
- ◆ Diversified use of crop residues like charcoal, gasification, power generation, bio ethanol production and packaging materials.
- ◆ Capacity building and awareness generation regarding adverse effects of crop residue burning.
- ◆ Formulation of policy measures on crop residue management.
- ◆ Database generation on the potential use of paddy straw in different sectors for its efficient and planned utilization of crop residues and its consumption.
- ◆ Increasing the non fossil fuel based capacity for energy generation through utilization of crop residues in ethanol production.
- ◆ Promotion of sugarcane cultivation for production of ethanol and closed sugar mills maybe reopened and converted into ethanol production units.
- ◆ Establishment of village level ex-situ crop residue cold storage facilities from where crop residues can be supplied for different sectors like ethanol production plants, briquetting units for conversion to commercial products.
- ◆ Develop schemes in line with the central govt. for implementation of CRM strategies in the state.
- ◆ The extent of adoption of Zero tillage in Bihar is less than 2%. This can be increased through establishment of custom hiring service providers.
- ◆ Establishment of community rice nurseries could be done through rice entrepreneurs.
- ◆ Evaluation and validation of Pusa Decomposer for rapid decomposition of rice residues in-situ under Bihar conditions where farmers have no alternate uses of rice straw residues.



## Eminent Speakers

Dr. A. K. Singh, Ex DDG (NRM), ICAR  
Dr. ML Jat, CIMMYT, India  
Dr RK Malik, CIMMYT  
Dr. Nguyen Van Hung, Postharvest & by-product management, IIRI  
Dr. K Annapurna, Principal Scientist, IARI  
Dr. Alka Kumari, Scientist, IICT  
Dr. Raj Kumar Jat (Cropping Systems Agronomist)  
Mr. Pankaj Jha, SIETZ Technologies  
Mr. Ankur, CEO, Kriya Labs, New Delhi

# Sustainable Fodder Production for Improving the Livelihood of Small and Marginal Farmers

26<sup>th</sup> November, 2020

## Key Recommendations

- ◆ Research and Development programmes for fodder and feed resources should involve stakeholder participation as well as target youth for creating employment opportunities and rural livelihoods.
- ◆ The identified viable fodder based cropping systems and technologies should be popularised and provided institutional support for providing cheap and quality fodder for development of dairy industry.
- ◆ The problem of fodder scarcity during the lean season could be targeted through hydroponics, appropriate silage and hay making technologies and utilization and development of non-conventional feeds and fodders such as aquatic weeds, tree fodders and Azolla.
- ◆ There is a need to develop and popularize technologies for drought and flood stress mitigation including appropriate nutrient management for stressed conditions.
- ◆ Good quality green-fodder should be produced using various combinations of intercropping cereals with legumes, incorporating various exotic and hybrid fodder crops, both annual and perennial.
- ◆ Exploration of non-traditional avenues for fodder production such as cultivation on marginal lands and soil less fodder production should be taken on priority basis. Besides technological advancements, the farmer specific constraints in this sector need to be identified and addressed.



## Eminent Speakers

Dr. Ajay Kumar Roy, FNAAS, ICAR-IGFRI, Jhansi, U.P.  
Dr. R.K. Sohane, Director Extension Education, BAU, Sabour  
Dr. R.K. Aggrawal, Principal Scientist, ICAR-IGFRI, Jhansi, U.P.  
Dr. Rakesh Raikwar, Business Head, Animal Nutrition Farm, Rajasthan  
Ashok Kumar Verma, Kemin Industries South Asia Pvt LTD. Chennai  
Dr. PN Dwivedi, Principal Scientist, Animal Nutrition, ICAR-IGFRI, Jhansi, UP  
Dr. Anoop Kumar Dixit, Division of Crop Production, ICAR-IGFRI, Jhansi, U. P.  
Dr A K Jha, Deptt. of Soil Science and Agricultural Chemistry, BAU, Sabour  
Dr. Dharmendra Kumar, SMS, Animal Science, KVK, Banka, BAU, Sabour, Bihar



# Bihar Agricultural University

Sabour, Bhagalpur



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