



अजैविक स्ट्रेस प्रबंधन समाचार

Abiotic Stress Management News

April to September 2020



ICAR-National Institute of Abiotic Stress Management
Baramati, Pune, Maharashtra 413115



Abiotic Stress Management News

भाकृअनुप- राष्ट्रीय अजैविक स्ट्रेस प्रबंधन संस्थान

ICAR-National Institute of Abiotic Stress Management

बारामती-413 115, पुणे, महाराष्ट्र, भारत

Baramati-413 115, Pune, Maharashtra, India



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April to September 2020

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- Celebration of Constitution Day
- Review of Research Programmes by DDG (NRM)
- 8th Research Advisory Committee Meeting
- 10th IRC Meeting of ICAR-NIASM
- Training on e-office implementation
- Celebration of 74th Independence Day

LIST OF ONGOING PROJECTS

WEBINARS ORGANIZED

- National Webinar on Underutilized crops for augmenting farmers income in abiotic stress regions
- National Webinar on Abiotic Stress in Agriculture: Geospatial Characterization and Management Options
- Webinar on Farmers' Constraints in Dragon Fruit Cultivation
- National Webinar on Climate-Smart Integrated Farming System
- National Webinar on Halophytes for Alleviating Salinity Stress in Agriculture: Potentials and Problems
- 150th Mahatma Gandhi Birth Anniversary Webinar series

TRAININGS ATTENDED

PUBLICATIONS

VIDEOS

PERSONALIA

EDITORIAL COMMITTEE

Dr Manoj P Brahmane
Dr Dhananjay D Nangare
Dr Sachinkumar S Pawar
Dr Bhaskar B Gaikwad
Mr Mukesh P Bhendarkar

TECHNICAL ASSISTANCE

Mr Pravin More

From the Director's Desk.....

Greetings from ICAR-NIASM.

Management of abiotic stresses has been a greater challenge amid COVID 19 pandemic worldwide, that has compelled to revisit the approaches and reinforce the advances in dealing them, particularly with limited resources. Agriculture being the only sector registering positive growth rate in the Indian economy during COVID 19 pandemic, has reaffirmed the fact that "Everything can wait but not the agriculture". However, despite the fact, the much-needed resilience in agriculture can only be maintained and enhanced with continued research and extension efforts that are tailored to tackle the dynamic challenging situations arising particularly due to increasing climatic aberrations, shifting seasons and market price fluctuations of agricultural commodities. It is of utmost important to reorient the research for abiotic stress management in agriculture and allied sectors to tackle these increasing dynamic challenges and thus ascertain resilience for productivity and profitability.

Formulation of new umbrella and flagship research projects, renaming schools with reframed objectives, restructuring of institutional committees and online surveys to understand ground scenarios are some of the steps taken to reorient and strengthen research at ICAR-NIASM. This should lead to timely management solutions to anticipated abiotic stresses in agriculture. The research findings of higher PS II efficiency and canopy greenness of soybean genotype-TGX854-60; less tolerance of *P. hypophthalmus* to Cr, low pH and high temperature compared to *A. testudineus*; Wastewater treatment through constructed wetland and aquaponics; fruitfly management in dragon fruit using methyl eugenol; culture studies of black soldier fly as protein feed, significant changes in monthly, seasonal and annual rainfall of western Maharashtra over last 51 years and understanding on sentiments of farmers and fisheries sector during covid 19 lockdown are detailed in the Newsletter.

The challenging times of COVID 19 lockdown enabled quick adoption of online tools for office communications, complete implementation of e-office and several scientific discussions through the series of webinars conducted online with the newly formulated research projects. More than 1700 participants participated virtually across six research oriented webinars conducted by NIASM during this period. I congratulate the staff of NIASM for optimally utilizing the lockdown period for planning, executing and participating in several of the scientific discussions through webinars and online events. The smooth implementation and adoption of the new normal office workflow through e-office, covid safety measures across NIASM and its residential premises are the major steps in increasing efficiency, transparency and safety during office activities. Many other important events and activities such as celebrations of Constitution Day, 74th Independence day, Hindi pakhwada and Hindi workshop, webinar lecture series to celebrate 150th birth anniversary of Mahatma Gandhi, conduct of 8th RAC and 10th IRC of NIASM and monetary and humanitarian arrangements for migrant labours stuck due to Covid lockdown were carried out.

I thank the Editorial Board Members for their sincere efforts in bringing out the Newsletter. I place on record my thanks to all the staff members for their contributions for this issue of the Newsletter.



(Himanshu Pathak)

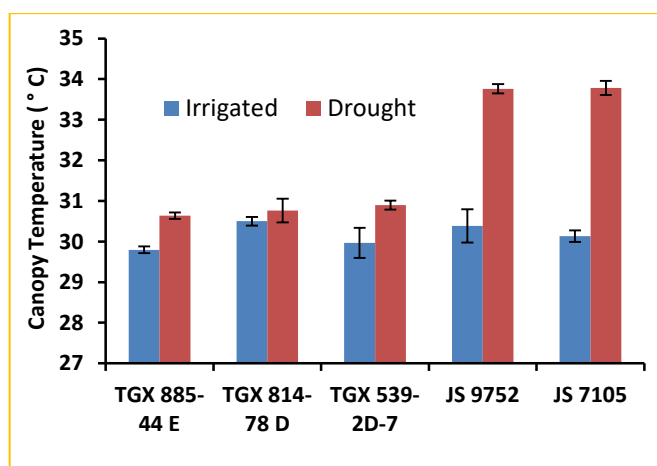
Date: September 30, 2020

RESEARCH HIGHLIGHTS

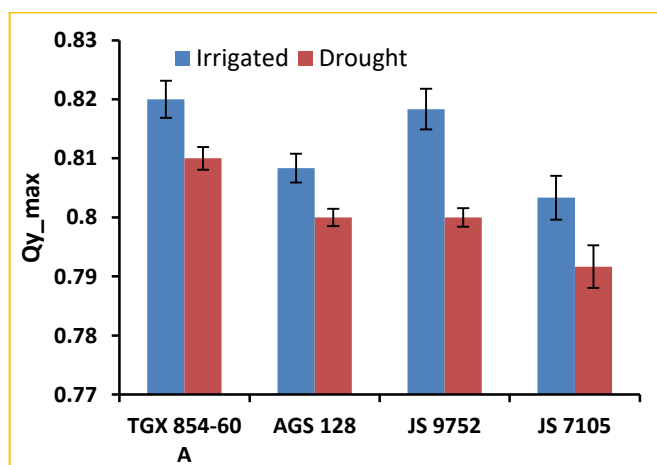
Evaluation of soybean germplasm for traits associated with adaptation to drought stress

(Ajay Kumar Singh)

A total number of 100 soybean genotypes along with check varieties i.e., JS-9752 (drought tolerant), JS-7105 (drought tolerant), were evaluated under greenhouse conditions for traits associated with drought tolerance. Drought stress was imposed by withholding watering for 48 hours at the flowering stage (R1) stage. Soybean genotypes along with check varieties were evaluated for NDVI (Normalized Difference Vegetation Index), canopy temperature using IR camera, and chlorophyll fluorescence (Fv/Fm) for the quantum efficiency of photosystem II. Soybean genotypes-TGX885-44E, TGX 814-78D and TGX539-20-7 showed cooler canopy compared to JS-9752 and JS-7105 under drought and irrigated conditions.

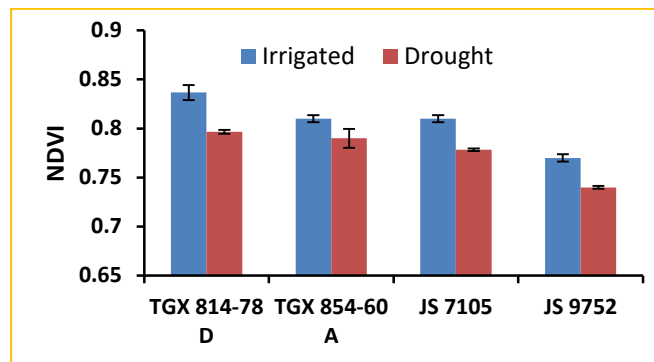


Genetic variability in canopy temperature under drought and irrigated conditions in soybean genotypes



Genetic variability in PS-II efficiency under drought and irrigated conditions in soybean genotypes

Soybean genotype-TGX854-60A revealed higher PS-II efficiency and canopy greenness than JS-9752 and JS-7105 under drought and irrigated conditions.

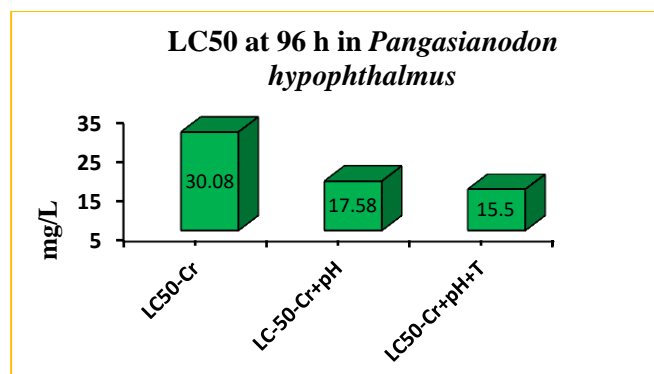


Genetic variability in canopy greenness under drought and irrigated conditions in soybean genotypes

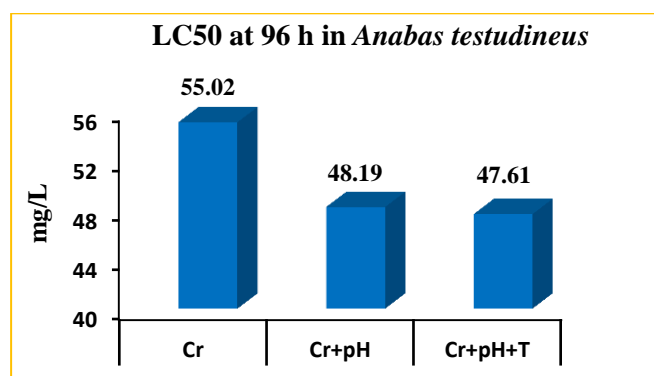
Acute toxicity of chromium, low pH and high temperature in *Pangasianodon hypophthalmus* and *Anabas testudineus*

(Neeraj Kumar)

The experiment has been conducted to determine the acute toxicity of chromium (Cr), low pH (6.5) and high temperature (34 °C) in *Pangasianodon hypophthalmus* and *Anabas testudineus*. The acute toxicity in terms of lethal concentration (LC₅₀-96 h) of Cr, low pH and high temperature at 96 h has been evaluated in both fishes. In case of *P. hypophthalmus* the LC₅₀ at 96 hr determined as 30.08, 17.58 and 15.5 mg/L in exposure group of Cr alone, concurrently exposed to Cr and low pH as well as Cr, low pH and high temperature, respectively.



The median lethal concentration of Cr, low pH and high temperature in *P. hypophthalmus*



The median lethal concentration of Cr, low pH and high temperature in *Anabas testudineus*

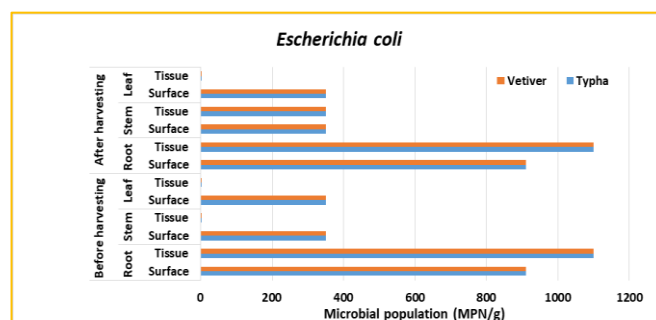
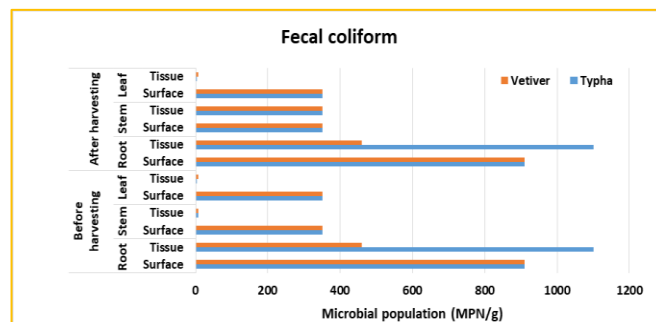
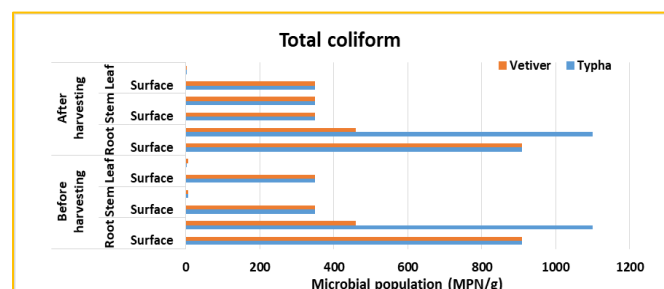
While, in case of *Anabas testudineus* the LC₅₀ at 96 hr estimated as 55.02, 48.19 and 47.61 mg/L in Cr exposed group, Cr and low pH and Cr, low pH and high-temperature exposure group respectively. The results demonstrated that *P. hypophthalmus* has less tolerance to Cr, low pH and high temperature as compared to *A. testudineus*.

Wastewater treatment synergizing with integrated approach of constructed wetland and aquaponics

(Paritosh Kumar)

NIASM septic tank wastewater is loaded with microbial contaminants mainly coliform bacteria and *Escherichia coli*. Their population represented at 95% confidence level as the most probable number (MPN) in 100 ml of water was greater than 1600. Their dissolved oxygen was less than the safe limit (<5.0 mg/l) and biochemical oxygen demand (BOD) was higher than safe limit (>30 mg/L) for their reuse in agriculture as irrigation water. A pilot-scale Vertical subsurface-flow constructed wetland system filled with different layers of gravels and planted with *Typha latifolia* and *Vetiver zizanioides* along with unplanted control tanks were used to treat these septic tank wastewaters in triplicate. After two years of continuous running of these systems, harvesting of wetland plants has done by cutting 6 inches from the wetland surface to maintain the pollutant sink. Translocation of microbial pollutants in different components of these wetland systems viz. sediment, root, stem and leaf were assessed before and after harvesting. The average microbial population of total coliform, faecal coliform and *Escherichia coli* in the different components of the wetland system is presented in Fig (a), (b) and (c). In different planted system microbial population was found in the order as Sediment > Root > Stem > Leaf.

In sediment bacterial population was found maximum >1100 MPN/g each for total coliform, faecal In wetland plant root microbial population was found 910 MPN/g each on the surface while 1100 and 460 MPN/g in the tissue of both Typha and Vetiver, respectively. Their population was found unchanged after harvesting because plant cutting was done above 6 inches from the surface that left the root intact in the wetland system.



(a) Total coliforms (MPN/g), (b) Faecal coliforms (MPN/g) and (c) *Escherichia coli* (MPN/g) content in different components of VSSF-CWs before and after plant harvesting

Similarly, in wetland plant leaf microbial population was also unchanged after harvesting and found 350 MPN/g each on the leaf surface while 3.6 MPN/g in Typha leaf tissue and 3.6-7.4 MPN/g in vetiver leaf tissue, respectively for Coliform and *Escherichia coli* in both planted and unplanted systems, before and after harvesting.

However, in case of plant stem microbial population was found constant 350 MPN/g on the stem surface while increases 47.30 times each for total and faecal coliform and 97.22 times for *E. coli* in stem tissue after harvesting. This occurred mainly because of the higher activity of microbes in tender plant tissue compared to matured plant tissue. However, the removal capacity for different treatment parameters was found unchanged after harvesting. This is because of the higher role of media in removal or accumulation/degradation of pollutants than plants.

Management of fruit fly in Dragon fruit

(Rajkumar)

Ten Parapheromone (Methyl eugenol) traps were erected for monitoring of fruit flies (FF) in the dragon fruit orchard. During July and August-2020, four species of FF were recorded i.e. *Bactrocera dorsalis*, *B. zonata*, *B. correcta* and *B. cucurbitae*. *B. dorsalis* was found abundant followed by *B. correcta* and *B. zonata* for all the three weeks. An interesting observation was recorded in dragon fruit. Generally, melon fly, *B. cucurbitae* is a pest of vegetables and is attracted to "Cuelure" but not the "Methyl eugenol". The traps impregnated with "Methyl eugenol" recorded a good number of *B. cucurbitae* during July and August-2020.



Insects as an alternative source of proteins for poultry and fisheries

(Rajkumar, MP Brahamne, Mukesh Bhendarkar, SS Pawar, NP Kurade, AV Nirmale, BB Gaikwad)

Black Soldier Fly (BSF), *Hermetia illucens* (Family: Stratiomyidae Order: Diptera) is a harmless insect with a potential to solve “two of modern agriculture’s growing problems” namely; serve as an alternative “Protein” source for animal feed (Poultry and Fish) and help in converting organic wastes into a “fortified, complete manure” for agriculture. The insect is indigenous to the warm tropical and temperate zones. The BSF larvae are considered an important candidate species to be used for animal feed due to its ability to convert “food waste” (Fruits, vegetables, Agri-waste and animal tissues) into “high-quality protein”. BSF larvae/pupae contain “Protein-40% and Lipids-30%”. The work on the above concept has been initiated. Initially, the culturing of BSF was done in the laboratory for its further multiplication.



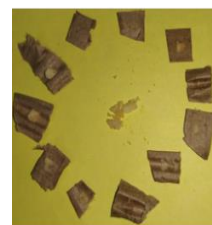
Collection of Pupae



Rearing of BSF



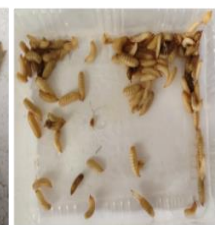
Oviposition by BSF in Eggies



Egg Collection



Feeding Early Instars of BSF



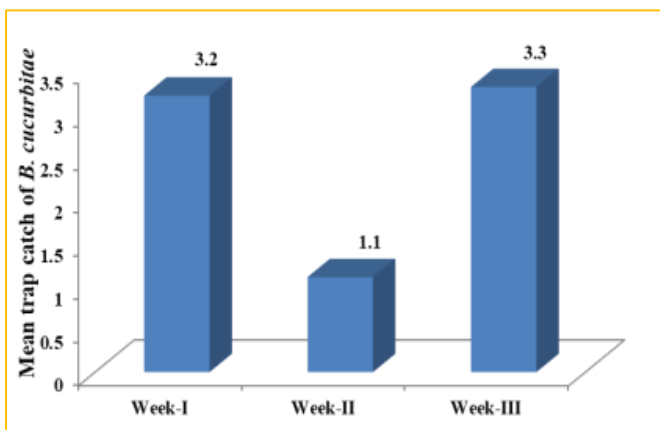
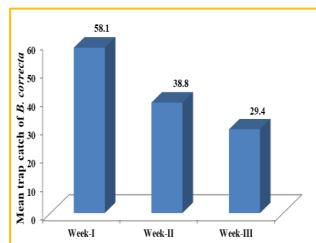
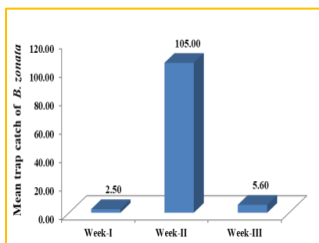
BSF Larvae

Culturing of BSF

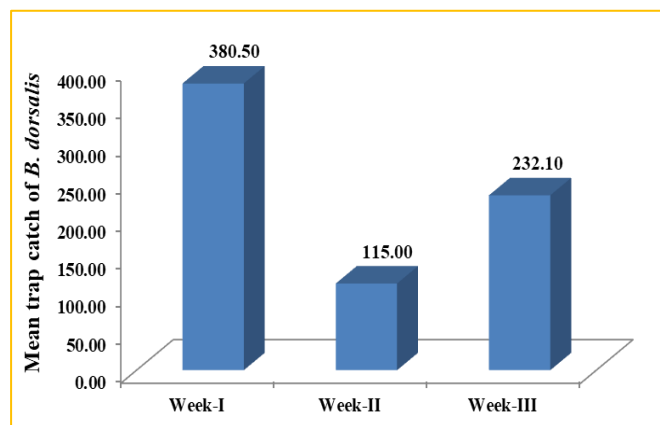
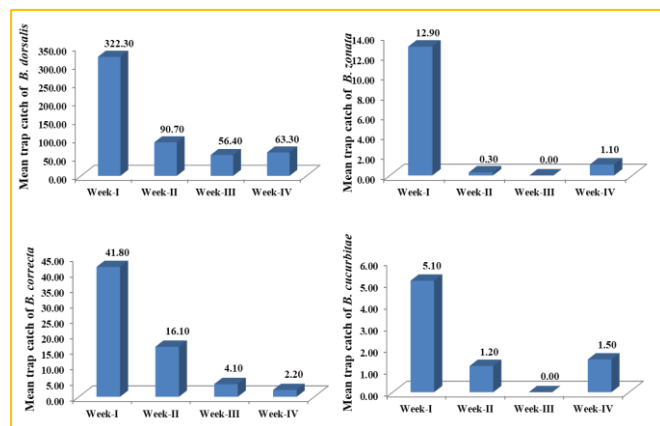
Innovative trend analysis of 51 years rainfall in relation to soybean productivity over scarcity zone of western Maharashtra

(RN Singh)

This study examined and compared the new innovative trend analysis (ITA) of monthly, seasonal and annual rainfall with traditional trend analysis methods in relation to the soybean crop in western Maharashtra. Rigorous trend detection was done for 51 years of rainfall data considering the effect of serial correlation. Spearman’s rank correlation, Mann-Kendall and its 6 different modifications were used to analyse the trends of rainfall, whereas Spearman’s rho, simple linear regression and Sen’s slope with two different modifications were employed to quantify the magnitude of trends at 10%, 5% and 1% level of significance. The results are compared with the ITA method. Autocorrelation coefficient was calculated at lag-1 and



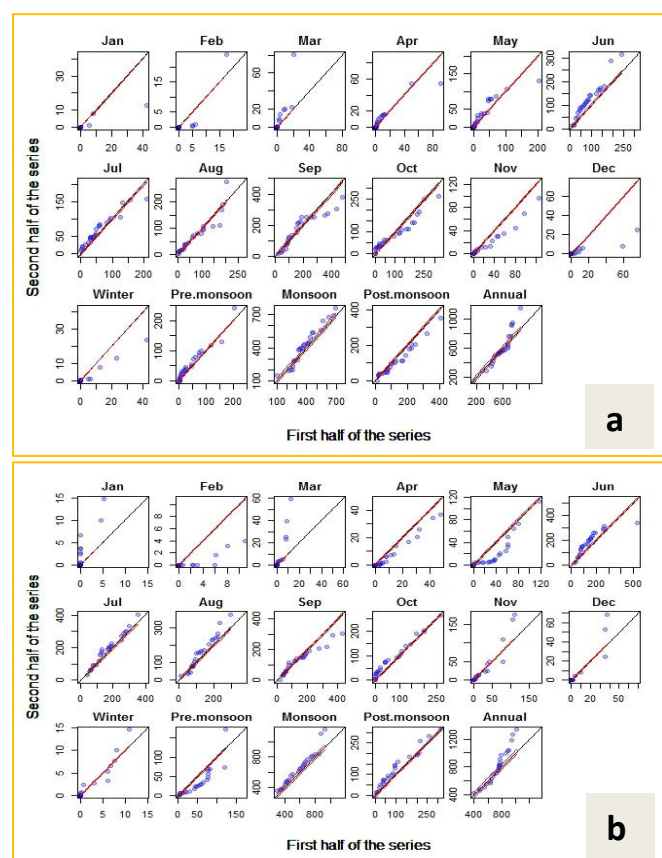
Population dynamics of fruit flies during July-2020



Population dynamics of fruit flies during August-2020

tested at 5% level of significance. Rainfall variability is very high ($CV > 30$) in all the months and seasons with positively skewed rainfall distribution. The study reveals significant changes in monthly, seasonal and annual rainfall series in the study area during the past 51 years.

- Considering MK, MMK, SRC and SLR tests: Baramati has increasing rainfall in June, July, pre-monsoon season while in the post-monsoon season it has decreasing trends. Shivajinagar has decreasing rainfall in February, April, May, September and pre-monsoon, whereas the rainfall in June has increasing trends.
- Considering ITA method: Baramati has increasing rainfall trends in March, June, July, pre-monsoon, monsoon as well as annual scale while in January, September, October, November, Winter and post-monsoon the rainfall is decreasing. In, Shivajinagar



Results of ITA for rainfall of a) Baramati and b) Shivajinagar

February, March, May, September and pre-monsoon has decreasing trends and rest of the monthly, seasonal and annual rainfall have increasing trends. (Fig 1)

- Along with the trends in 11-time series which are detected by MK, MMK, SRC and SLR tests, ITA also detected significant trends in 17-time series that was not detected by any of the aforementioned tests, which indicates ITA is a more powerful test for trend detection.

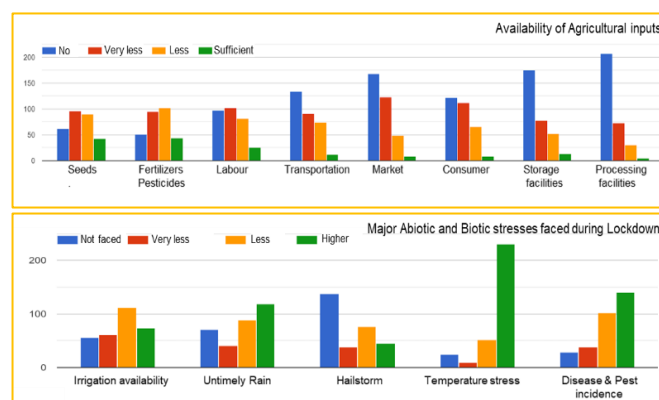
- The increasing trends of monsoon and annual rainfalls in western Maharashtra will help improve the productivity of agricultural crops in the region.

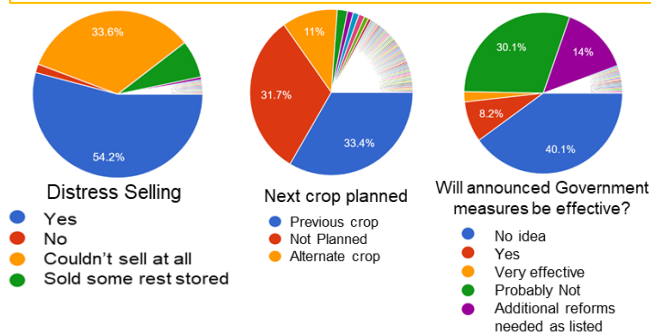
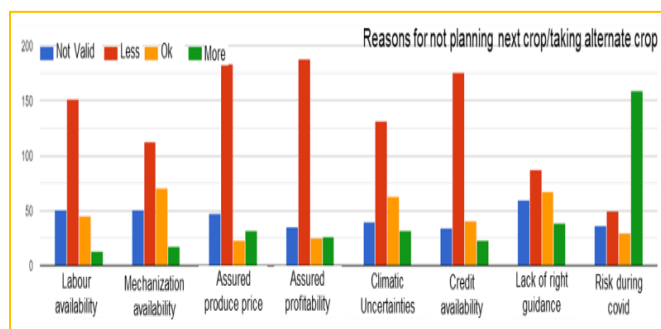
An online survey of farmers sentiments during Covid Lockdown

(MP Brahamne, BB Gaikwad, Rajkumar)

An online survey was conducted to understand the farmers sentiments during Covid Lockdown period in the state of Maharashtra. A questionnaire form was created using google form in Marathi language. Responses of 392 farmers were collected using the snowball sampling technique by circulating questionnaire on several online social networking platforms during May 19-25, 2020. 375 responses were filtered after removing partially answered responses. 43.9% of respondents were from the red zone, 41.7 % from the orange zone and remaining (14.4%) from the green zone. The inferences deduced from the response of the farmers are as following:

- Majority of farmers had no agriculture produce processing and storage facilities, had no market and transportation available during lockdown. Challenges of non-availability of seeds, fertilizers, labour and consumers were also faced by majority of the respondents.
- Temperature stress, Disease and pest incidence were the major abiotic and biotic stresses faced during lockdown period. Challenges of Irrigation unavailability and untimely rains were also faced by the respondents
- Majority of the farmers did not plan taking next crop due to less assured produce price, profitability; credit non-availability; labour non-availability and more risk of Covid infection. Challenges of climatic uncertainties and less mechanization were also reported by the respondents as reason for not planning next crop/ taking alternate crop.
- Majority of respondents (40.1%) had no idea of the government measures taken to facilitate agriculture during covid lockdown. Also 30% responded felt that the measures taken will be not be effective in addressing the challenges faced by agriculture sector.





- v) The strategies used by farmers to cope up with the lockdown situation in Maharashtra were a) Sale of farm produce at the local level at whatever price was offered, b) Reliable income generation through selling milk and milk products for livelihood, c) Involving family members including children for all agricultural activities.

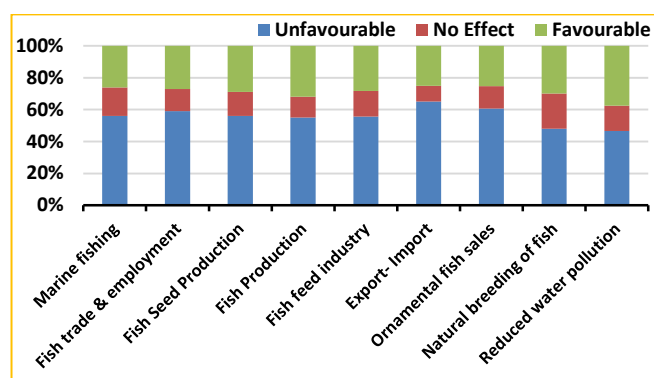
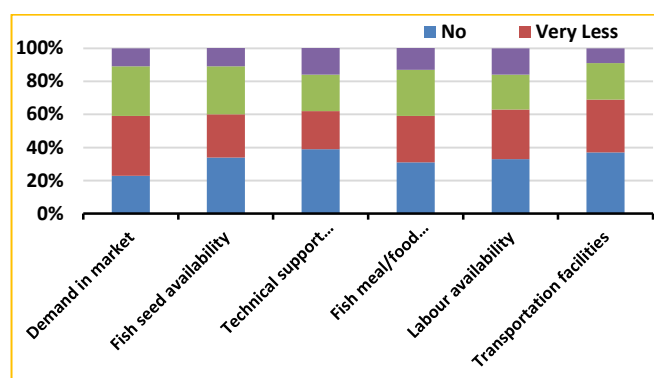
Several suggestions were also received for State/Central Govt. and Research Organizations as listed a) Further facilitate the sale of produce or Government should buy directly from the farmers b) Issue mobile-based agricultural advisory for adverse conditions, c) Agri-input shops should be kept open or given free of cost, d) APMC local market/Vegetable mandis should be kept open with proper covid containment measures e) Natural disaster package should be given upon survey for various commodities, f) Make provision for processing of commodities near villages to minimize the monetary loss, g) Govt. officials seldom visit the farmer's field to advise on various issues, h) Research institutes to find an immediate solution in managing recent viral disease outbreak in tomato, i) Extension of Agricultural research should be further strengthened.

An online survey of sentiments of fisheries businesses during Covid Lockdown (Mukesh Bhendarkar, BB Gaikwad)

An online survey was conducted to understand the sentiments during Covid Lockdown period of people involved in fisheries as business in India. A questionnaire form was created using google form in Hindi and Marathi language. Responses of 586 farmers were collected using the snowball sampling technique by circulating questionnaire on several online social networking platforms during July 11-31, 2020. 568

responses were considered for analysis after removing duplicate and largely unanswered responses. 28.5% of the respondents were from the red zone, 35.7 % from the orange zone, 33.2% from the green zone and remaining did not answer it. 51.3 % respondents were from Maharashtra, 11.5% from Jharkhand, 8.8% from Gujarat, 8.2% from Chhattisgarh are remaining from 16 states of India. The inferences deduced from the response of the respondents are as following:

- Major problems reported were a) Lack of transportation facilities (91%), b) Less demand in the market (89%), c) non-availability of fish seed (88%), d) non-availability of fish meal & other equipment (86%), e) labour unavailability (84%), and f) technical support not available(83%).
- Majority of the respondents (56%) anticipated negative impact as against positive (29%) or no impact (15%) on Fisheries sector after the lockdown to be lifted. The anticipated unfavourable, favourable and no effect of lockdown lifting on fisheries sector is given in graph below.



Research Farm Management Activities

Major works carried out during this period were back pruning in grape, canopy management operations in various orchards, farmyard manure application in orchards, plant protection and weed management and irrigation management. Despite prevailing lockdown due to COVID-19 issues, the Kharif season sowing and inter culture operations in experimental fields were looked after by engaging minimum manpower.



Plant protection operations in grape after back pruning



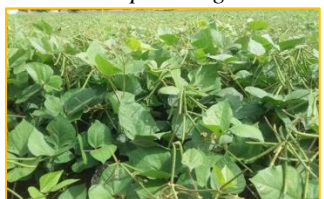
Shoot thinning operation in grape



Field preparations for Kharif crop sowing



Sowing of research crop in Kharif season



Mungbean crop growth Kharif 2020 season at the research farm



Incorporation of dhaincha (green manure) in field



Research field during Kharif 2020



Bumper flowering dragon fruit crop experienced during August 2020

Maize, wheat, chickpea of the previous season and cluster bean, okra and mung bean of the ongoing season from South farm were available for disposal during this period. Amla, pomegranate, dragon fruit, sweet orange, custard apple, Acid lime and Drumstick from North farm were harvested during this period. The produce was initially sold at the campus and remaining produce was sent to APMC, Market. Drumstick seeds were sent to the Forest Department, Bhopal. Total farm produce sale of Rs. 2,14,323/- was obtained from research farms of NIASM.

NEW INITIATIVES

‘Project Coordinator’ Publication

A monthly update on all the ICAR-NIASM projects was conceptualized to provide brief information on research teams, achievements during last month and targets for the next month along with sections on ‘Insights from global research’ and ‘A leaf from History’ on historical developments in abiotic stress management. It is being published online every month since July 2020.



Investigations on Small scale fisheries model for rainfed and dryland areas

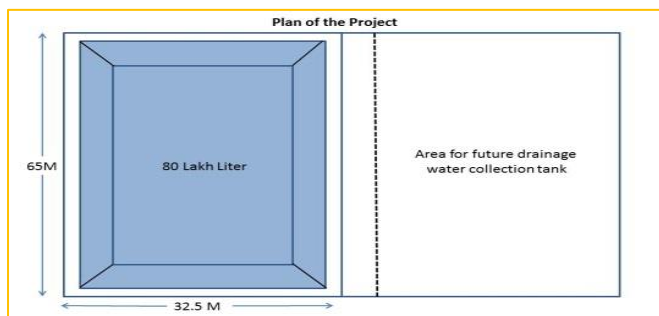
Marathwada and Vidarbha are some of the rainfed and dryland regions area in Maharashtra which suffers water shortage for agriculture. To resolve the requirement of water during critical stages of agriculture, small ponds can be constructed which can be also used for aquaculture for additional income generation. To investigate this concept nine small scale fisheries pond were constructed at ICAR-NIASM fisheries unit.



Small scale fisheries pond

Development of Water Storage Tank

Considering the irrigation water requirements, the development of storage tank at the southern end of NIASM campus was planned and executed with approval to convert existing pit structure into a water storage tank. The work included earthwork, soil laying for cushioning and HDPE sheet lining. The development work was inaugurated on 24th May 2020 at the hands of the Director, ICAR-NIASM. Initially, the bottom portion was deepened with the help of poklain breaker. The excavated material was used to prepare sidewall slopes. As the bottom portion was very hard, the depth was restricted to 5.25m and bottom levelling work carried out by maintaining a 1% slope towards the south-west corner for cleaning purpose. Due to continuous rains, outsourced black soil supply was not available.



Plan of Water Storage Tank



Initiation of work by the Director, ICAR-NIASM



Water Storage Tank

Therefore, the fine soil from campus was used to line the slopes and bottom of the structure. It was rolled two times with an innovative rolling technique to make the walls firm and smooth enough for laying plastic sheet. UV-resistant HDPE geomembrane of 500-micron thickness was used for lining. After the development of 'water storage tank', water filling has been started since 15th August 2020. On complete filling, subsequent loosening and fixing of sheet carefully in border trenches was carried out. Besides maintaining buffer storage of water during canal closure periods, this tank is going to serve as the location for secondary pumping station for on-going lift irrigation project. Further, it is planned to replicate the same exercise in the adjoining area to develop a storage tank for water collection through drainage networking.

Initiatives to fight Covid-19 at ICAR-NIASM

The committee was formulated to look after the day-to-day implementation of the COVID-19 prevention measures. Multiple sessions were organized for creating awareness amongst farm labourers, security and other staff regarding precautions to be taken by them by

involving authorised Medical Doctor. Security persons were informed about preventing unknown persons or persons with likely symptoms of the disease. Medical Doctor was employed on contract during this period. The system is set in place to monitor the entry of personnel entering the campus. All personnel entering the Institute campus undergo thermal screening and sanitization of hands with hand sanitizer. Provision to sanitize vehicles entering campus at entry gate and provision of foot-operated Hand-Sanitizer dispensers at multiple key locations in the campus has been made. Also, necessary arrangements were made to provide farm labourers, security and other staff with protection items like face mask and sanitizers. Scientists are interacting with farmers and other stakeholders telephonically on regular basis. Online meeting platforms have become a routine method for interaction between staff members. The institute has also offered its guest house facilities if needed for accomplishing the task of checking community spread of COVID. Nearly Rs 1.5 lakh has been contributed by NIASM staff to support Hon'ble Prime Ministers initiative to check COVID. Institute came forward to help the migrant labourers stuck amid COVID lockdown. The monetary contribution was made by all the staff to distribute grocery items to migrant labourers. Director, Dr Himanshu Pathak interacted with the village accountant to understand the situation and promised in extending the help under emergency in future.



Sanitizing vehicles



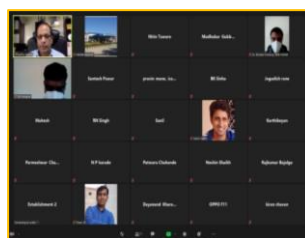
Providing hand sanitizer



Thermal screening



Sanitizer dispensers



Video conferencing



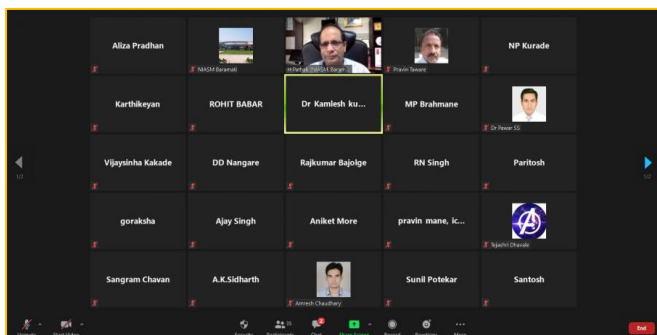
Help to migrant labourers

MAJOR EVENTS

हिंदी दिवस एवं हिन्दी पखवाड़ा

राष्ट्रीय अजैविक स्ट्रेस प्रबंधन संस्थान में हिंदी भाषा को बढ़ावा देने के हेतु से 14 सितंबर 2020 को हिन्दी दिवस और 14 से 28 सितंबर 2020 तक हिन्दी पखवाड़ा ऑनलाइन तरीके से मनाया गया। हिन्दी दिवस तथा हिन्दी पखवाड़ा कार्यक्रम की शुरुआत 'आईसीएआर गीत' तथा 'नियाम सम गीत' से की गयी। राजभाषा कार्यान्वयन समिति के सदस्य डा एलिजा प्रधान ने सभी सदस्यों का स्वागत और कार्यक्रम का सूत्रसंचालन किया। संस्थान के अधिकारियों ने हिन्दी भाषा को बढ़ावा देने हेतु अपने विचार रखे। संस्थान के निदेशक तथा राजभाषा कार्यान्वयन समिति के अध्यक्ष डा. हिमांशु पाठक जी ने संस्थान के विविध विभागों को दिशा निर्देश देते हुए हिन्दी भाषा में अधिक से अधिक कार्य करने का आवाहन किया। डा प्रवीण तावरे (सदस्य सचिव, राजभाषा कार्यान्वयन समिति) ने समिति के पिछले वर्ष के उपलब्धियों का ब्योरा दिया तथा हिन्दी भाषा के प्रचार-प्रसार हेतु भविष्य की योजनाओं को प्रस्तुत किया। हिन्दी पखवाड़े में आयोजित किए जानेवाले कार्यक्रमों का संक्षिप्त विवरण देते हुए सभी के सहभाग की अपेक्षा रखी।

हिन्दी पखवाड़ा 2020 के दौरान कई कार्यक्रमों का ऑनलाइन तरीके से आयोजन किया गया। जिसमें हिन्दी निबंध लेखन, घोष वाक्य तथा काव्य वाचन और वादविवाद प्रतियोगिताओं का आयोजन किया गया। निदेशक की अनुरोध से इन प्रतियोगिताओं में संस्थान के वैज्ञानिक, कर्मचारी, राजभाषा कार्यान्वयन समिति के सभी सदस्य तथा यंग प्रोफेशनल, एस आर एफ, अन्य सभी कर्मचारियों ने अपने परिवार जनों के साथ बड़ चढ़कर हिस्सा लिया। हिन्दी पखवाड़े का समापन का आयोजन गांधी जयंती समारोह के अवसर पर किया गया। प्रतियोगिताओं के पुरस्कारों का आबंटन भी ऑनलाइन तरीके से ही किया गया और सभी कर्मचारी कार्यक्रम में उत्साह से शामिल हुए।



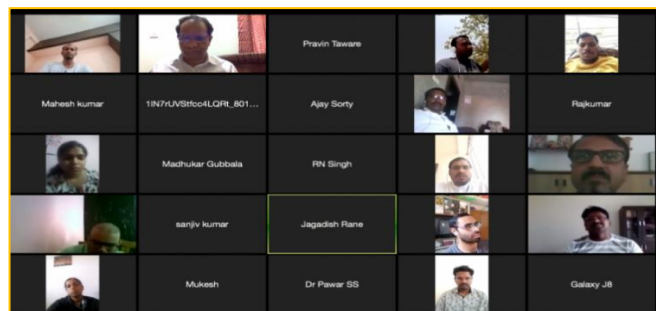
10th Pre-IRC Meeting of ICAR-NIASM

Pre-Institute Research Council (IRC) (10th) meeting of ICAR-NIASM was held on April 08-10, 2020 through video conferencing. The meeting was chaired by Dr Himanshu Pathak, Director. Heads and scientists of all the school and senior Technical staff of the ICAR-NIASM attended the meeting. The meeting was started

with a brief presentation about the purpose and expectations by the Director and was followed by the presentation of achievements during 2019-2020 by Heads of four Schools on April 08, 2020. The 23 scientific staff participated in meeting through video conferencing.

Celebration of Constitution Day

The constitution day was celebrated on April 14, 2020, through video conferencing. Dr H. Pathak, Director read the preamble of our constitution. All the staff of NIASM attended the function.



Review of Research Programmes at ICAR-NIASM by DDG (NRM) ICAR

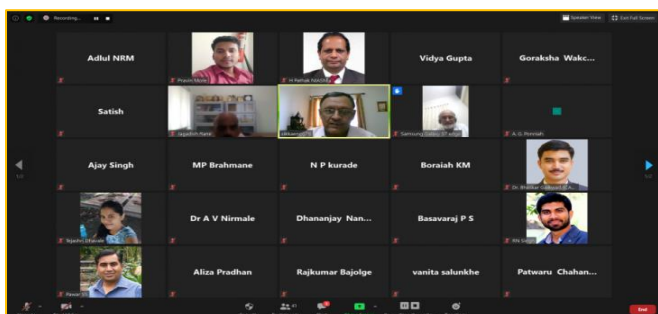
Research Programmes at ICAR-NIASM reviewed by DDG (NRM) ICAR on May 22, 2020. The achievements and proposed future programmes of ICAR-NIASM, Baramati was reviewed by Dr S.K. Chaudhari, DDG(NRM), ICAR in presence of the Directors of all the research Institutes in the NRM Division of ICAR and other Institutes. About 160 scientists and researchers from various ICAR Institutes participated in the review meeting.



8th Research Advisory Committee Meeting

Research Advisory Committee (RAC) meeting was held on June 12, 2020, through video conferencing. The meeting was chaired by Dr A.K. Sikka, Ex-DDG (NRM), ICAR & IWMI Representative-India & Principal Researcher along with other RAC members Dr J.S. Parihar, Ex-Deputy Director, Space Applications Centre- ISRO, Ahmedabad; Dr A.G. Ponniah, Ex-Director, CIBA & NBFGR, Chennai; Dr. (Mrs.) Vidya Gupta, CSIR-National Chemical Laboratory; Dr Adul Islam, ADG (I/C), Soil and Water

Management, NRM, ICAR; Dr H. Pathak, Director, ICAR-NIASM, Baramati, Pune; Dr Jagadish Rane, Head and Principal scientist ICAR-NIASM. RAC members emphasized the need for including water, energy and agri-input dimensions in the context of climate-resilient agriculture and abiotic stress management in future research. The Head of all schools and institute scientist also participated in RAC meeting through video conferencing.



Celebration of 150th Mahatma Gandhi Birth Anniversary

On the occasion of 150th Mahatma Gandhi Birth Anniversary, a webinar series was organized from 25th September to 2nd October 2020. The topics and speakers were: 'Poverty alleviation' by Dr Neeraj Hatekar, 'Women's empowerment' by Mrs Nilima Bhendharkar, 'Gandhian Principles and agriculture' by Dr Rajendra Khimani, 'What to learn from Mahatma' by Dr Himanshu Pathak, 'Gram Swaraj' by Prof. Rukaiya Joshi. All the staff of NIASM along with family members and staff of other institutes also participated in webinar series.

10th IRC Meeting of ICAR-NIASM

The 10th Institute Research Council (IRC) meeting of ICAR-NIASM was held on June 18, 2020, through video conferencing. The meeting was chaired by Director NIASM, Dr Himanshu Pathak. All Heads of the Schools, scientists and technical staff of the Institute attended the meeting.

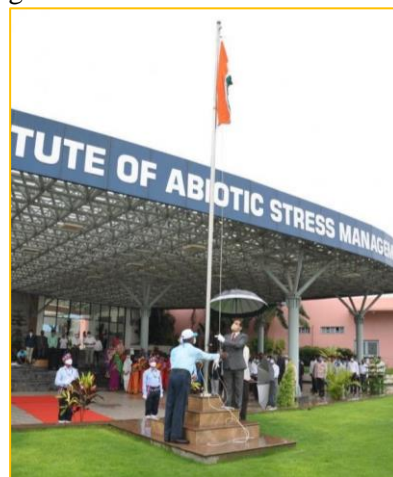
Training on e-office implementation

As per the guidelines of Council, ICAR-NIASM organized one-day E-Office implementation training through Video Conference facility for all the institute staff on June 25, 2020. Mr Pravin More and Mr Madhukar Gubbala gave training to all staff.

Celebration of 74th Independence Day

ICAR-NIASM celebrated 74th Independence Day on 15th August 2020. All staff including scientist, technical, administrative, SRF, JRF, YP and contractual were present for the event. On this occasion Dr

Himanshu Pathak, Director, ICAR-NIASM hoisted the national flag and addressed the staff of ICAR-NIASM.



LIST OF ONGOING PROJECTS

Umbrella Projects

1. Abiotic Stress Information System (ASIS): Geo-spatial digital maps of multiple abiotic stresses, management options and future scenarios.
2. Germplasm Conservation and Management (GCM): Genetic garden and gene bank for abiotic stress tolerant plants, animals and fisheries for food security and sustainability.
3. Model Green Farm (MGF): Environment-friendly, economically viable, state-of-the-art model farm for abiotic stressed regions.
4. Climate-smart IFS (CIFS): Climate resilient integrated farming system in semi-arid region.

Flagship Projects

1. Atmospheric Stress Management: Adaptation and mitigation of atmospheric stress in crops, livestock, poultry and fishes for sustainable productivity and profitability
2. New Crops: Augmenting farm income in water scarce regions with alternative crops
3. Bio-saline Agriculture: Exploitation of halophytic plant and associated microbiome for amelioration of saline agricultural land of arid & semiarid regions
4. Technology Targeting and Policy: Targeting prospective technologies for abiotic stress resilience in rainfed and dryland regions

Externally Aided Projects

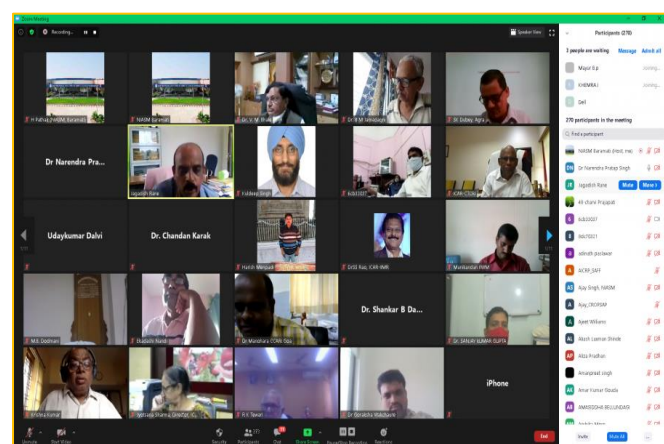
1. Genomics strategies for improvement of yield and seed composition traits under drought stress conditions in soybean (Funded by: ICAR-NASF)
2. Phenotyping of pulses for enhanced tolerance to drought and heat (Funded by ICAR-NICRA)

3. Climate Smart Management Practices (Funded by: IRRI)
4. Evaluation of halotolerant rhizobium and PGPB based biomolecules for alleviation of drought and salt stress (Funded by: AMAAS, NBAIM, Mau)
5. Conservation Agriculture for Enhancing Resource-Use Efficiency, Environmental Quality and Productivity of Sugarcane Cropping System (Funded by: CA Platform ICAR)
6. Abiotic stress detection from field to landscape scale in different crops using remote sensing tools (Funded by ISRO-SAC)
7. Establishment of model herbal garden for medicinal and aromatic plants (Funded by NMPB)

WEBINARS ORGANIZED

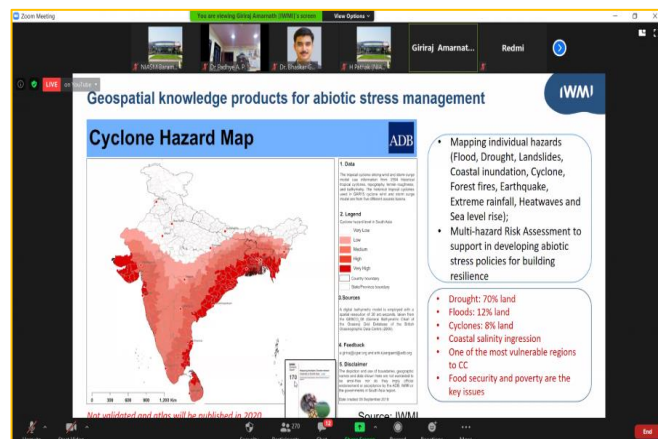
National Webinar on “Underutilized crops for augmenting farmers income in abiotic stress regions”

ICAR-NIASM in collaboration with Society for Abiotic Stress Research in Agricultural Sciences (SARAS) organized the national webinar on “Underutilized crops for augmenting farmers income in abiotic stress regions” on 10th August 2020. The aim was to explore the scope, identify the sources, build awareness and impart knowledge on underutilized crops for the regions affected by abiotic stresses such as drought, salinity and alkalinity. About 275 participants attended the webinar. (<https://youtu.be/0hsooMEvmMU>)



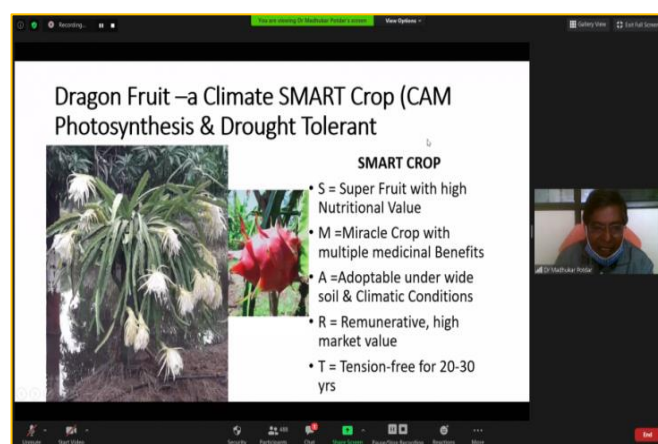
National Webinar on 'Abiotic Stress in Agriculture: Geospatial Characterization and Management Options

ICAR-NIASM organized the National Webinar on “Abiotic Stress in Agriculture: Geospatial Characterization and Management Options” on August 27, 2020. More than 370 participants including researchers from Public and Private Research Institutes, Post-Graduate Students, State department officials and other enthusiasts participated in the Webinar through multiple digital platforms. (<https://youtu.be/6gKsApfQHGM>)



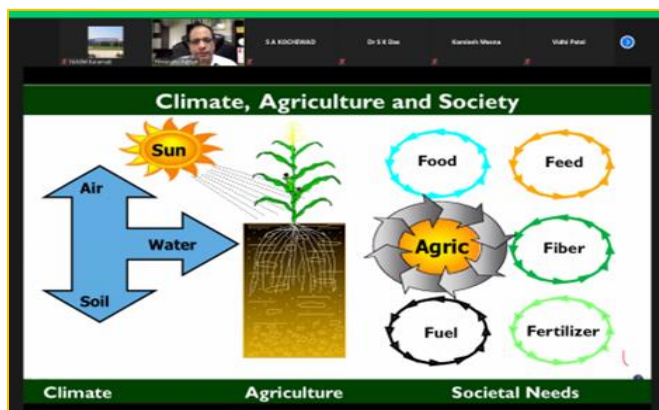
Webinar on Farmers' Constraints in Dragon Fruit Cultivation

ICAR-NIASM organized the webinar on “Farmers' Constraints in Dragon Fruit Cultivation” on 1st September 2020. The aim was to know the status of dragon fruit cultivation; identifying the farmers' constraints and their views on dragon fruit cultivation; also to shortlist researchable and policy issues, as a super crop for drought-prone semi-arid regions of India. More than 510 participants attended including dragon fruit farmers, scientists, entrepreneurs and students across the nation. (<http://www.niam.res.in/video-gallery>)



National Webinar on Climate-Smart Integrated Farming System

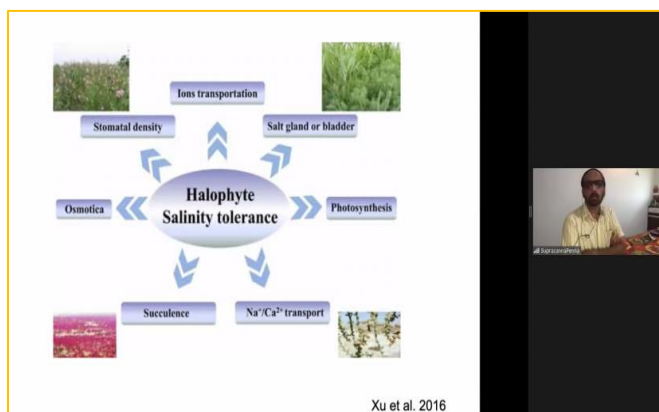
ICAR-NIASM organized a national webinar on “Climate-smart Integrated Farming System (CIFS)” on September 18, 2020, to explore the scope and identify the components for CIFS for the regions affected by abiotic stresses, to share experiences and learn lessons to integrate climate resilient components in IFS and to create awareness on CIFS for livelihood and nutritional security. More than 270 participants attended the webinar. (<https://youtu.be/GZHIRaFkct4>)



National Webinar on Halophytes for Alleviating Salinity Stress in Agriculture: Potentials and Problems

ICAR-NIASM organized the National webinar on “Halophytes for Alleviating Salinity Stress in Agriculture: Potentials and Problems” on 30th September 2020. The aim the webinar was to explore the scope for utilisation of halophytes under abiotic stress conditions; source of microbes and genes for abiotic stress tolerance; identifying major researchable issues in utilising coastal and inland halophytes as feed and fodder crop and to create awareness on the role and value of potential halophytes for diversification of Indian food. About 150 participants including scientists, entrepreneurs and students attended the webinar.

(<http://www.niam.res.in/video-gallery>)



TRAININGS ATTENDED

Dr Aliza Pradhan

- DST Sponsored 5 days online Training Programme on 'Climate Change: Challenges and Response' for women scientists from 05 to 09 October 2020.

Dr D D Nangare

- Online training programme on 'Remote sensing applications in Agriculture Water Management' organized by IIRS, Dehradun as outreach programme during August 3-7, 2020.

Dr Paritosh Kumar

- Five-day online Faculty Development Programme/Training on "Advances in Biological Wastewater Treatment Methods: Teaching and Learning Strategies" from September 7-11, 2020 organized by the Department of Biotechnology in association with the Teaching Learning Centre (TLC), National Institute of Technology (NIT) Warangal.

Dr Basavaraj P S

- Online training program on “Science communications for Smart Scholars” organized by ICAR-Central Institute of Fisheries Education during 12-25th May 2020.
- International online training on “Recent Physio-Molecular Digital Tools in Abiotic Stress Management for Crop Modelling” organized by (CAAST), Centre of Excellence for Digital Farming Solutions for Enhancing Productivity by Robots, Drones and AGVs, VNMKV, Parbhani (MS) during 29th June to 3rd July 2020.

Dr Pravin Taware

- Two days online training “Good Governance for Effective Implementation of Development Programmes” organized by V.V. Giri National Labour Institute, Sector-24, Noida, India during August 26-28, 2020.
- Online workshop with Distinction on “ABC of Writing” during August 18- September 2, 2020 organized by Krishi Vigyan Kendra Cuttak, Santhapur, ICAR- National Rice Research Institute, Cuttak.

PUBLICATIONS

Research Papers

- Bhattacharyya P, Bhaduri D, Adak T, Munda S, Satapathy BS, Dash PK, Padhy SR, Pattanayak A, Routray S, Chakraborti M, Baig MJ, Mukherjee AK, Nayak AK and Pathak H (2020). Characterization of rice straw from major cultivars for best alternative industrial uses to cutoff the menace of straw burning. Industrial Crops Products. <https://doi.org/10.1016/j.indcrop.2019.111919>
- Bhendarkar MP, Brahmane MP, Gaikwad BB and Singh NP (2020). The Status and Prospectus of Fisheries and Aquaculture in Maharashtra, India. Indian Journal of Geo Marine Sciences, Vol. 49 (04): 567-575
- Dubey R, Pathak H, Chakrabarti B, Singh SD, Gupta D and Harit RC (2020). Impact of terminal heat stress on wheat yield in India and options for adaptation. Agric Syst 181: doi.org/10.1016/j.agsy.2020.102826.

- Fagodiya RK, Pathak H, Bhatia A, Jain N, Kumar A and Malyan SK (2020). Global warming impacts of nitrogen use in agriculture: an assessment for India since 1960. *Carbon Management* 11: 291-301.
- Harisha CB, Altaf Thummanakatti, Shankar Prasad KS (2020). Amritha- A Devine Herb of Backyards, 7(11):25-27.
- Harisha CB, Singh NP, Meena KK and Nikam DM (2020). Ajwain- Miracle Spice of Dry Lands. *Kerala Karshakan*, 7(10):31-34.
- Harisha CB (2020). Mexican Coriander - An Alternate for Coriander. *Kerala Karshakan*, 7(11):22-24.
- Kumar R, Bhatnagar PR, Kakade V & Dobhal S (2020). Tree plantation and soil water conservation enhances climate resilience and carbon sequestration of agro ecosystem in semi-arid degraded ravine lands. *Agricultural and Forest Meteorology*, 282-283:107857. <https://doi.org/10.1016/j.agrformet.2019.107857>
- Kumar S, Paul D, Bhushan B, Wakchaure GC, Meena KK and Shouche Y (2020). Traversing the “Omic” landscape of microbial halotolerance for key molecular processes and new insights. *Critical Reviews in Microbiology*, 1-23.
- Meena KK, Bitla UM, Sorty AM, Singh DP, Gupta VK, Wakchaure GC and Kumar S (2020). Mitigation of salinity stress in wheat seedlings due to the application of phytohormone-rich culture filtrate extract of methylotrophic actinobacterium *Nocardioide* sp. NIMMe6. *Frontiers in microbiology*, 11.
- Padhy SR, Bhattacharyya P, Dash PK, Reddy CS, Chakraborty A and Pathak H (2020). Seasonal fluctuation in three mode of greenhouse gases emission in relation to soil labile carbon pools in degraded mangrove, Sundarban, India. *Science Total Environment* 705: <https://doi.org/10.1016/j.scitotenv.2019.135909>
- Raj Kumar, Bhardwaj AR, Rao BK, Vishavkarma AK, Bhatnagar PR, Patra S, Kumar G, Kakade V, Dakshin Dinesh, Pande VC, Singh G, Dobhal S and Sharma NK (2020). Development of degraded ravine lands of Western India using Sapota (*Achras zapota*) plantation with terracing vs. trenching on-slope-based conservation measures. *Land Degrad Dev.*; 1–11. <https://doi.org/10.1002/ldr.3691>
- Wakchaure GC, Minhas PS, Meena KK, Kumar S and Rane, J. (2020). Effect of plant growth regulators and deficit irrigation on canopy traits, yield, water productivity and fruit quality of eggplant (*Solanum melongena* L.) grown in the water scarce environment. *Journal of Environmental Management*, 262, 110320.

Review Papers

- Bhattacharyya P, Padhy SR, Padhi PP and Pathak H (2020). Integrated nutrient management for climate change mitigation and adaptation. *Indian J Fert* 16(4): 262-266.
- Khanam R, Anjani Kumar, Nayak AK, Shahid M, And Pathak H (2020). Metal(loid)s (As, Hg, Se, Pb and Cd) in paddy soil: Bioavailability and potential risk to human health. *Science Total Environment* 699:1-19.
- Kumar A, Medhi K, Fagodiya RK, Subrahmanyam G, Mondal R, Raja P, Malyan SK, Gupta DK, Gupta CK and Pathak H (2020). Molecular and ecological perspectives of nitrous oxide producing microbial communities in agro-ecosystems. *Rev Environ Sci Biotechnol* doi.org/10.1007/s11157-020-09554-w.
- Ladha JK, Jat ML, Stirling CM, Chakraborty D, Pradhan P, Krupnik TJ, Sapkota TB, Pathak H, Rana DS, Tesfaye K and Gerard B (2020). Achieving the sustainable development goals in agriculture: The crucial role of nitrogen in cereal-based systems. *Adv. Agron.* 163:39-116.

Book

- Gonde AD, Rajkumar V and More SA (2020). *An Outline of Beneficial Insects*. By AgriBioVet Press, New Delhi
- Bhattacharyya P, Pathak H and Pal S (2020). *Climate Smart Agriculture: Concepts, Challenges and Opportunities*. Springer, Singapore; p 193+XVIII. ISBN: 978-981-15-9132-7.

Book Chapters

- Meena KK, Shinde AL, Sorty AM, Bitla UM, Meena H and Singh NP (2020). Application of Microbial Products for Enhancing the Nutritional Quality. *Microbial Interventions in Agriculture and Environment: Volume 3: Soil and Crop Health Management*, 331.
- Kumar S, Bhushan B, Wakchaure GC, Meena KK, Kumar M, Meena NL and Rane J (2020). Plant Phenolics Under Water-Deficit Conditions: Biosynthesis, Accumulation, and Physiological Roles in Water Stress Alleviation in Plant Phenolics in Sustainable Agriculture: Vol-01-451-465
- Lenka S, Lenka NK and Pathak H (2020). Reducing emission of greenhouse gases from fertilizer use in India. In *Soil and Fertilizers*. CRC Press, pp. 169-182.
- Chatterjee D, Saha S, Swain B, Chakraborty D, Nayak AK, Pathak H and Singh MP (2020). Monitoring and impact assessment of climate change on agriculture using advanced research techniques. pp. 33-53. In: Rakshit A, Ghosh S, Chakraborty S, Philip V, Datta A. *Soil Analysis:*

Recent Trends and Applications Springer, Singapore. p. 338+xv. <https://doi.org/10.1007/978-981-15-2039-6>.

Technical Bulletin

- Singh RN, Potekar SV, Chaudhary A, Das DK, Rane J and Pathak H (2020). Climatic Trends in Western Maharashtra, India. Technical Bulletin No. 44. ICAR-National Institute of Abiotic Stress Management, Baramati, Pune, Maharashtra 413 115, India.
- Pathak H, Kumar GAK, Mohapatra SD, Gaikwad BB and Rane J (2020). Use of Drones in Agriculture: Potentials, Problems and Policy Needs, Publication no. 300, ICAR-NIASM, pp 13+iv.
- Singh AK, Kumar M, Kumar N, Rane J, Singh NP and Pathak H (2020). NIASM-A Decade of Service. Bulletin No. 45. ICAR-National Institute of Abiotic Stress Management. Baramati, Pune, Maharashtra, pp 1-65.
- Nangare DD, Taware PB, Singh Y, Kumar PS, Bal SK, Ali S and Pathak H (2020). Dragon Fruit: A Potential Crop for Abiotic Stressed Areas. Technical Bulletin No. 46. ICAR National Institute of Abiotic Stress Management, Baramati, Pune, Maharashtra, India, p 24.

Popular Article

- सुनिल पोतेकर आणि राम नरायण सिंह(2020). पश्चिम महाराष्ट्रातील अवर्षणप्रवण क्षेत्रासाठी पावसाशी संबंधित आपत्कालीन पीक व्यवस्थापन, शेतकरी मासिक एप्रिल 2020 (1), कृषि आयुक्तालय, पुणे महाराष्ट्र :40-41.

VIDEOS

- NIASM Geet
- NIASM Farm Development
- NIASM Institute Profile
- NIASM Laboratories
- NIASM Plant Phenomics
- NIASM Building, Conference Halls & Auditorium
- NIASM Guest House, Hostel & Residence

PERSONALIA

Awards / Recognitions

1. Mr Mukesh Bhendarkar, Scientist (Fisheries Resource Management) was awarded Netaji Subhas ICAR International Fellowship.
2. Dr. Neeraj Kumar, Scientist (Fish Nutrition and Biochemistry), received ICAR "Lal Bahadur Shastri Outstanding Young Scientist Award".

New Joining

1. Dr Basavaraj PS, Scientist (Genetics Plant Genetics) joined ICAR-NIASM on 25/07/2020.

2. Dr VijaySinha Kakade, Scientist (Fruit Science) joined ICAR-NIASM on 03/08/2020 after transfer from ICAR-IISWC, Dehradun.
3. Dr Sangram Chavan, Scientist (Agroforestry) joined ICAR-NIASM on 10/08/2020 after transfer from ICAR-NRCAF, Jhansi.
4. Dr Pratapsingh Suresh Khapte, Scientist (Vegetable Science) joined ICAR-NIASM on 13/08/2020 after transfer from ICAR-CAZRI, Jodhpur.
5. Dr Gurumurthy S. Scientist, (Plant Physiology) joined ICAR-NIASM on 17/08/2020 after transfer from ICAR-IIPR, Kanpur.

Transfer

1. Dr Priya George, Senior Technical Assistant transferred to Indian Institute of Spices Research, Kozhikode, Kerla on 26th August, 2020.