



अजैविक स्ट्रेस प्रबंधन समाचार

Abiotic Stress Management News

January to June 2024



भाकृअनुप- राष्ट्रीय अजैविक स्ट्रेस प्रबंधन संस्थान

बारामती, पुणे, महाराष्ट्र ४१३११५

ICAR-National Institute of Abiotic Stress Management

Baramati, Pune, Maharashtra 413115



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SEMINAR/WORKSHOP/TRAINING ATTENDED

PERSONALIA

Editorial Committee

- Dr Sachinkumar S Pawar (Chairman)
- Dr Bhaskar B Gaikwad (Member Secretary)
- Dr Sangram B Chavan
- Dr Gopalakrishnan B
- Dr Vijaysinha D Kakade
- Mr Ravi Kumar
- Dr Aliza Pradhan
- Dr Basavaraj PS

Published By

Dr K Sammi Reddy
 Director, ICAR-NIASM

From the Director's Desk

Greetings from ICAR-NIASM

I am happy to introduce the newest issue of the Institute's Newsletter, "Abiotic Stress Management News," which highlights the recent achievements and ongoing efforts at ICAR-National Institute of Abiotic Stress Management, Baramati for the duration January to June 2024. Our institute is dedicated to improving agricultural resilience and sustainability by tackling the various challenges associated with abiotic stresses. These stresses include extreme high and low temperatures, issues with water availability, soil-related stresses such as salinity, sodicity, acidity, heavy metals, nutrient deficiencies, and toxicity. These factors increasingly affect agricultural productivity and output. Our institute is instrumental in creating a comprehensive understanding of how these stressors impact plants, animals, and fish, and in developing technologies aiming climate-resilient agriculture.



The interdisciplinary research in the institute covers diverse areas for addressing climate resilient agriculture in crops, livestock and fisheries sector. We have also launched several projects and activities, which are summarised in this newsletter. As we navigate the complexities and potential of the agricultural sector, the research featured in this issue underscores our institute's commitment to excellence.

I extend my sincere gratitude to our dedicated scientists, collaborators, and staff for their relentless efforts in advancing our mission. I also want to thank the Editorial Board for their diligent work in producing this newsletter and all ICAR-NIASM staff for their valuable contributions to this edition. I hereby invite you to explore the newsletter and join us in celebrating the accomplishments of ICAR-NIASM.

K Sammi Reddy

30th June, 2024

(K Sammi Reddy)

RESEARCH HIGHLIGHTS

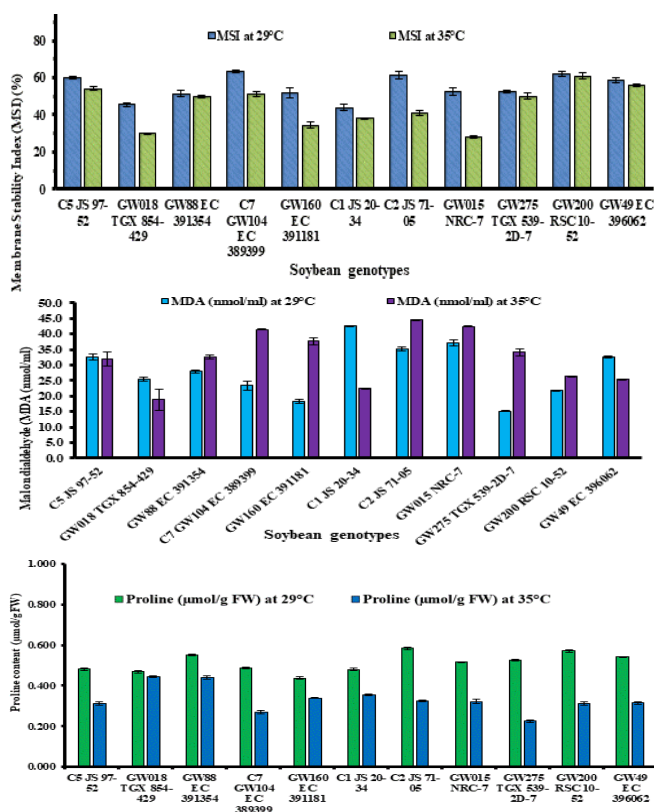
School of Atmospheric Stress Management

Response of soybean genotypes to elevated temperature

Singh AK

(Project: Genomics, genetic and molecular approaches to improve water stress tolerance in soybean)

Response of soybean genotypes to elevated temperature stress was analysed for malondialdehyde, membrane stability index, proline and chlorophyll content. Soybean genotypes JS-9752, EC-391354, JS-7105, NRC-7, RSC-10-52 were less impacted with increase in temperature as evidenced from MDA levels, membrane stability index, proline, and chlorophyll content.



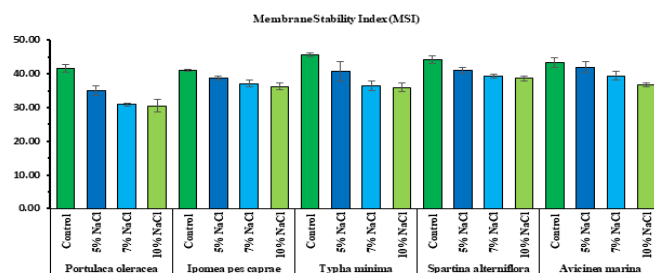
Physiological response of halophytes under saline conditions

Singh AK

(Project: Exploitation of halophytic plants and associated microbiome for amelioration of saline agricultural land of arid & semi-arid regions)

Halophytic plants *Portulaca oleracea*, *Ipomea pes carpa*, *Typha minima*, *Spartina alterniflora* and *Avicennia marina* were evaluated for physiological response in terms of MSI. It was observed that

membrane stability index was higher in *Avicennia marina* and *Spartina alterniflora* under saline conditions.



Herbal formulation feeding for alleviating multiple stress in goats

Kurade NP, Pawar SS, Nirmale AV

(Project: Adaptation and mitigation of atmospheric stress in crops, livestock, poultry and fishes for sustainable productivity and profitability)

The survey of goat farmers from the scarcity region of Maharashtra revealed exposure of goats to multiple abiotic stressors such as heat stress, nutritional stress, and walking stress during grazing. The field study revealed that anemia is an indicator of multiple abiotic stressors in goats, as a 67% prevalence was observed in field goats. Herbal formulation (HF) (Pellets) using 10 plants with medicinal properties was prepared and evaluated for the treatment of anemia in goats. The nutritional composition of each plant as per the available literature was used for the selection of plants. The selected 10 plants were available locally in the scarcity region, micro-nutrient rich, having anti-parasitic activity, protein-rich, and known for vitamins and polyphenol sources. The plants were shade dried, powdered, and mixed in equal quantities for preparation of the herbal formulation. Pellets were prepared by mixing HF at 25% and 50% proportions along with commercially available concentrate feed. Nutrient evaluation of herbal formulation prepared for goats revealed higher total ash, crude fiber and equivalent crude protein compared to concentrate feed. This herbal formulation was evaluated in 18 goats having low hemoglobin (<9 gm%). The goats were divided into three groups and fed with 25 and 50% herbal formulations replaced in concentrate feed. The control group received only the concentrate feed. Herbal formulation feeding in goats improved MCHC and RDW values in haematological studies. Herbal formulation feeding in goats also revealed enhanced growth performance.



Pelleted Herbal formulation

	Moisture	Crude Protein	Ether extract (Crude Fat)	Total Ash	Acid insoluble Ash	Crude Fiber
Herbal formulation	5.63	19.53	9.06	10.23	2.83	12.08
25 % HF	6.07	19.78	4.36	5.62	1.12	5.2
50 % HF	6.72	18.89	4.18	6.23	1.13	6.32
Concentrate feed	7.08	22.05	4.21	5.23	1.01	5.22

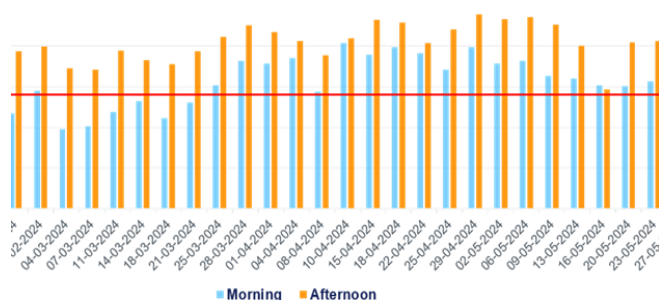
Evaluation of effect of heat stress on hematological parameters in goats

Pawar SS, Kurade NP, Kochewad SA, Nirmale AV

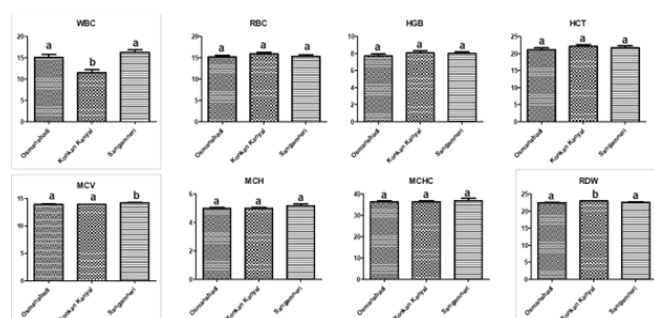
(Project: Adaptation and mitigation of atmospheric stress in crops, livestock, poultry and fishes for sustainable productivity and profitability)

The study was carried out to assess effect of heat stress on hematological parameters in indigenous goats breeds namely, Osmanabadi, Sangamneri & Konkan Kanyal from February to May. Temperature & Relative humidity inside the shed was recorded at hourly interval throughout the day. Degree of heat stress in goats was calculated using temperature humidity index (THI) as a indicator of heat stress. Goats were under variable degrees of heat stress throughout the experimental period. The THI levels in morning varied from ‘normal to severe heat stress, whereas, in afternoon varied from ‘heat stress to very severe heat stress’. Blood samples were collected from the experimental goats once in a week for hematological analysis. The following parameters were evaluated from the collected blood; WBC: White blood cells; RBC: Red blood cells; HGB: Hemoglobin; HCT: Hematocrit; MCV: Mean corpuscular volume; MCH: Mean corpuscular hemoglobin; MCHC: Mean corpuscular hemoglobin concentration and RDW: Red cell distribution width. In response to heat stress in goats, significant effect between breeds was observed for the parameters, namely,

WBC, MCV and RDL; while there were no significant difference in-between breeds for other parameters.



THI levels recorded in morning and afternoon



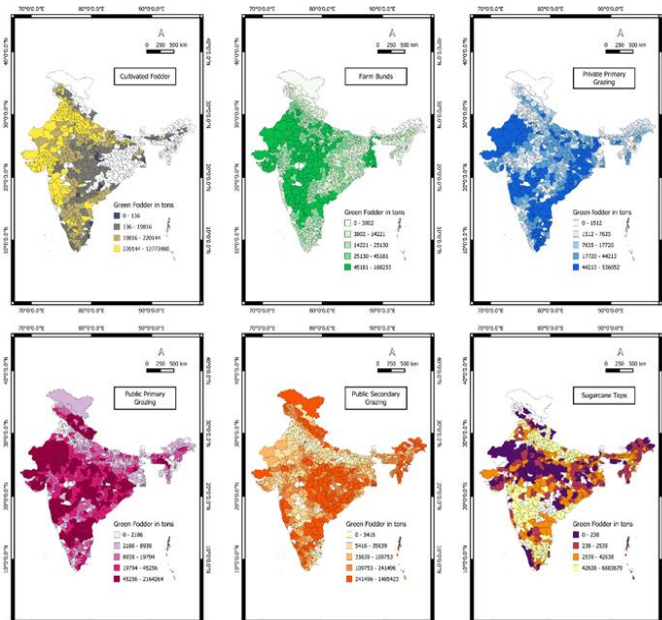
Hematological assessment under heat stress.

District level green fodder supply estimation

Gopalakrishnan B

(Project: Abiotic Stress Information System: Geo-spatial digital maps of multiple abiotic stresses, management options and future scenarios)

The district level availability or supply of green fodder was estimated as per the protocol established by ISPA, 1997. The following assumptions were made for the estimation of fodder availability. The area under cultivated fodder was assumed to have an average annual yield of 40 t/ha. About 2% of the gross cropped area excluding the area under fodder crops was considered as area under farm bunds with an average annual yield of 5 t/ ha. Current fallow land and other fallow lands were considered under private primary grazing areas with an average annual yield of 1 t/ha. Permanent pasture, miscellaneous tree crops, and cultivated wastelands were categorised under public primary grazing land with an annual average yield of 1 t/ha. Forest areas were included under public secondary grazing land and assumed that only 50% of the area was accessible for grazing with an annual yield of 3 t/ha. The total green fodder availability under each of the above categories was calculated and maps were generated.



Category	Green fodder availability (in Million tons)
Cultivated fodder	215.44
Area under farm bunds	21.22
Private primary grazing	23.56
Primary public grazing	25.14
Public secondary grazing	110.24
Sugarcane tops	101.11
Cassava foliage	1.48

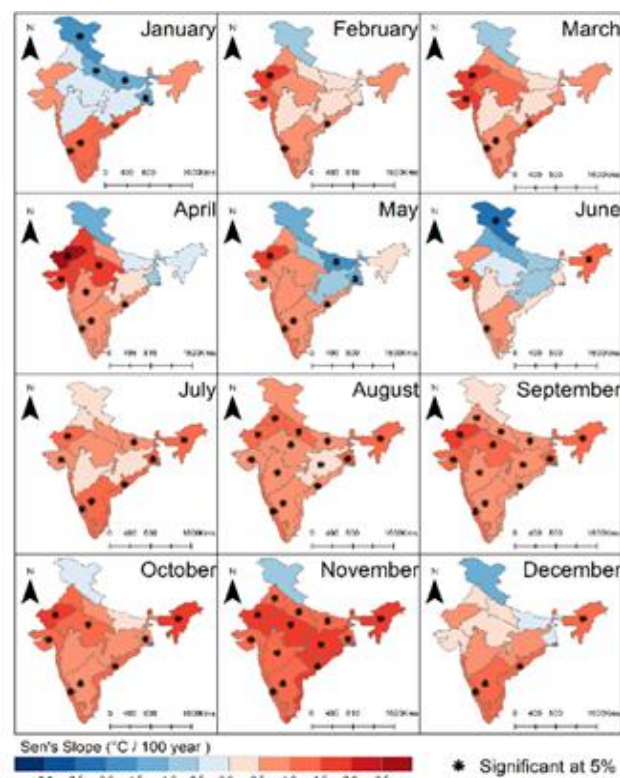
Long-term trends of temperature and rainfall teleconnections in agro-climatic zones of India

Singh RN

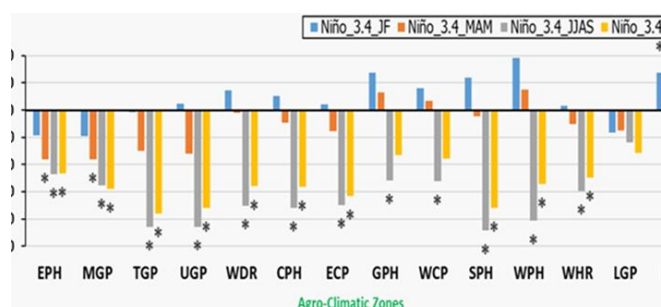
(Project: Climate variability, teleconnections and their impact on selected crops of India)

Long-term spatiotemporal temperature trends in various Agro-climatic zones (ACZ) of India were performed using newly introduced Innovative Polygonal Trend Analysis (IPTA) and Innovative Trend Analysis (ITA) along with traditional Mann-Kendall (MK) or modified Mann-Kendall (m-MK) tests to analyse and map the trends of monthly maximum, minimum and average temperatures from 1951 to 2022. The results revealed significant trends in a substantial number of ACZs and the findings were mapped. Apart from this, to study teleconnections of rainfall in various ACZs of India, the rainfall data is processed along with the derivation of ocean atmospheric indices including Niño 1+2, Niño 3, Niño 4 and Niño 3.4 at monthly, seasonal and annual time scales to study the correlations. Significant correlations were observed during 1901-2022 period in various

ACZs of India and best teleconnections indices were identified for ACZs of India.



Spatial variations of trends of average temperature in ACZs of India during 1901-2022



Teleconnections of monsoon rainfall in ACZs of India with ENSO during 1901-2022 depicted using Niño 3.4

School of Water Stress Management

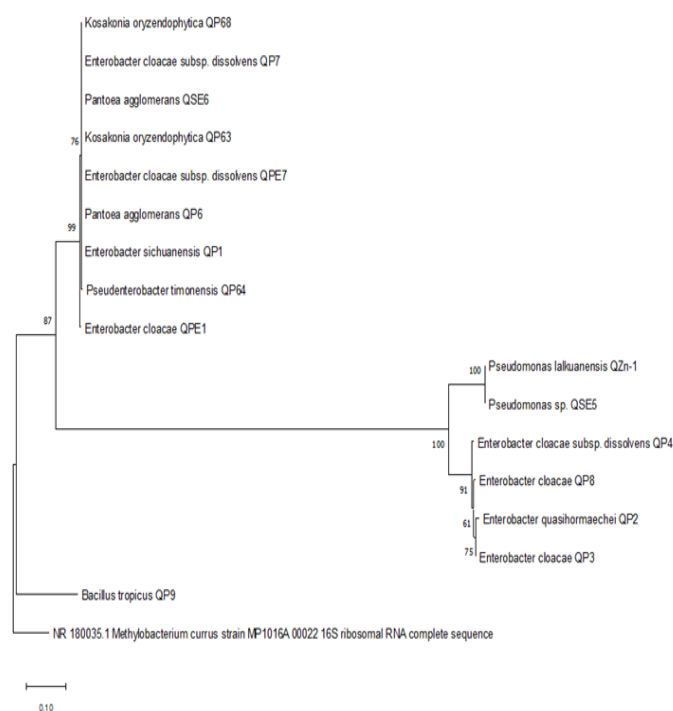
Isolation, characterisation and identification of phosphate solubilizing bacteria of quinoa

Pal KK, Aliza Pradhan, Rinku Dey

(Project: New Crops: Exploiting under-utilised crops (ex. Quinoa) for augmenting income in water scarce regions- Flagship Project)

To identify potential phosphate, potash and Zn-solubilizing bacteria for enhancing availability and uptake of these nutrients, microbes were isolated from rhizosphere, rhizoplane and endorhizosphere of quinoa grown under drought stress conditions. Accordingly, sixteen potential phosphate

solubilisers were isolated, characterised, diversity studied and evaluated to ascertain plant growth promoting traits in vitro. All the 16 phosphate solubilisers, belonging to the genera *Pseudomonas*, *Pantoea*, *Enterobacter*, *Bacillus*, *Kosakonia*, *Klebsiella*, etc., were evaluated in pots and five selected isolates viz. *Enterobacter cloacae* subsp. *dissolvens* QPE7, *Bacillus tropicus* QP9, *Pseudomonas lalkuanensis* QZn-1, *Enterobacter sichuanensis* QZnPK, *Enterobacter hormaechei* subsp. *xiangfangensis* QP2, were evaluated in field condition with 40 and 60 kg P₂O₅/ha. Application of *Enterobacter cloacae* subsp. *dissolvens* QPE7 with 40 kg P₂O₅/ha gave at par yield with 60 kg P₂O₅/ha and thus 20 kg P₂O₅/ha can be saved with application of QP2, a phosphate solubilizing bacterium. Results will be validated in pots and field again.



Screening and identification of mungbean genetic resources for drought tolerance

Basavaraj PS

(Project: Phenotyping of pulses for enhanced tolerance to drought and heat- NICRA Project)

A set of 296 minicore collections were collected from Worldveg, Hyderabad centre and checks from different centre were collected. This germplasm panel along with checks were evaluated from 2022-2024 for drought tolerance under field and potted conditions which led to the identification of traits specific genetic resources for drought tolerance in mungbean.

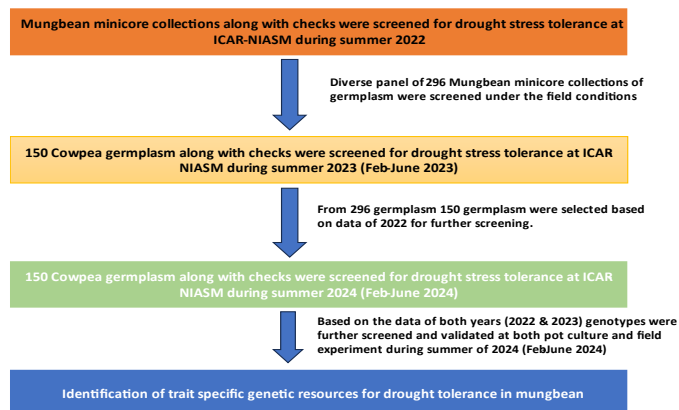


Fig. 1. Stepwise screening and identification of mungbean genetic resources for drought tolerance

Traits	Genotypes identified
Higher number of Pods per plant under Stress (>25 pods /plant under stress)	VI001556BG, VI000188A-BLM, VI003337BG, VI001406BG, VI003560BG, VI003465BG, VI001535BG, VI000578AG
Higher Pod length (>9 cm under stress)	VI000470AG, VI002063BG, VI000020AY, VI001244AG, VI002432AG, VI003235AG, VI001096AG, VI001066BG, VI001126BG, VI003440AG
Higher Quantum efficiency of PSII under Stress (>0.8)	VI000020AY, VI000164BG, VI000203B-BR, VI000554AG, VI000723AG, VI000766BG, VI000852AG, VI001023BG, VI001096AG, VI001126BG, VI001162AG, VI001191BG, VI001221AG, VI001268BG, VI001282AG, VI001385AG, VI001859BG, VI002051BG, VI002432AG, VI002469AG, VI002487AG, VI002859BG, VI002934AG, VI002993BG, VI003019A-BLM, VI00322AG, VI003232AG, VI003329AG, VI003379BG, VI003407AG, VI003413BG, VI003440AG, VI003455AG
Higher Net Photosynthetic rate under stress (>6 $\mu\text{molm}^{-2}\text{s}^{-1}$)	VI000020AY, VI000099AG, VI000316AG, VI000319AG, VI000380AG, VI000554AG, VI000766BG, VI000938AG, VI000942AG, VI001126BG, VI001284AG, VI001400AG, VI001520A-BLM, VI001548AG, VI001820BG, VI003019A-BLM, VI003057BG, VI00322AG, VI003337BG, VI003440AG, VI005030BY,
Test weight (>7.3 g/100 seed under stress)	VI001124 AG, VI002739AG, VI001244AG, VI001385AG, VI002523AG, VI000470AG, VI001096AG, VI002432 AG, VI002537AG, VI002063 BG
Grain yield (>8.5 g/plant under stress)	VI004096BG, VI004811BG, VI004006A-GM, VI003685AG, VI003560BG, VI003455AG, VI003337BG, VI002195AG, VI002537AG, VI002051BG
Higher canopy greenness (High NDVI)	VI000559AG, VI000942AG, VI001191BG, VI001385AG,

value under Stress)	VI001579BG, VI001612AG, VI001652BG, VI001728AG, VI001806AG, VI002051BG, VI002487AG, VI002529B-BL, VI002537AG, VI002569BG, VI002739AG, VI003187BG, VI003744AG, VI003957AG, VI004933AG, VI004968AG,
Cooler Canopy than checks under stress conditions	VI000559AG, VI001411AG, VI001471AG, VI001490AG, VI001556BG, VI001806BG, VI001820BG, VI002051BG, VI002173AG, VI003251A-BL, VI003455AG, VI003560BG, VI003642AG, VI003685AG, VI003720BG, VI004096AG, VI003685AG, VI003720BG, VI004096AG

Screening and identification of photo-thermo-insensitive with high temperature stress tolerant cowpea germplasms

Basavaraj PS

(Project: Phenotyping of pulses for enhanced tolerance to drought and heat- NICRA Project)

A set of 250 diverse cowpea germplasm accessions were collected from NBPGR, New Delhi. Screening across the three locations, viz., ICAR-NIASM, Baramati; NBPGR, Jodhapur; and NBPGR, New Delhi led to the identification of trait specific germplasm accessions for high temperature stress tolerance.

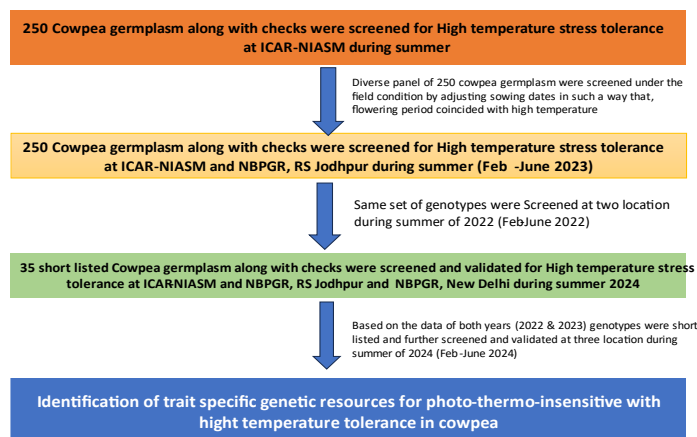


Fig. 2. Stepwise screening and identification of cowpea genetic resources for high temperature tolerance and photo-thermo insensitivity.

Traits	Genotypes/accessions identified
Very early (Escape Mechanism) 15 days earlier than checks	EC-724484, EC-724740, EC724484, EC-723684, IC-488084, IC488077, EC-243999, IC-259159, IC410043, IC554414
Photo-thermo-insensitive	EC240920, IC488085, IC488270, IC488185, IC488264, EC240924,

	EC243927, IC402159, IC410043, IC420660, IC418505, IC488095, IC 433448, IC 472254, IC488272
High grain yield with low percent yield reduction under stress conditions	EC 240920, IC 488085, IC 488270, IC 488185, IC 488264, EC 240924, EC 243927, IC 402159, IC 410043, IC420660, IC418505, IC 488095, IC 433448, IC472254, IC488272
Genotypes with cooler canopy	EC 240890, EC 724740, EC 724484, EC 724905, EC 724805, IC 548288, IC 507157, IC 560916, EC 240801, EC 724764-B
High leaf PS-II (Fv/Fm) (>0.79-0.8), high pod fluorescence (>0.79-0.8), high yield under both conditions (>43.5 g/plant)	EC 724764-B, IC 560916, IC 548288, EC 240966-A, EC 724905, EC 724484, EC 240989-A, EC 241058, IC 402097, EC 240868, IC 548860, IC 507157, EC 724805, IC 488185, IC 418505, IC-402161
Higher biomass (fodder yield under stress and control (>23 q/ha)	EC 240891, EC 107182, EC 240917, EC 240875, EC 240890, EC 240801, IC 488112, IC 488119, IC 488131, IC 488085,
Higher leaf area	IC 548288, EC 240868, IC 259159, EC 723684, EC 240989-A, IC 402161

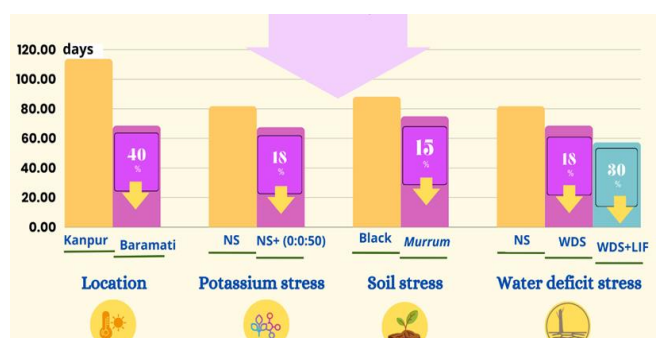
An innovative generation advancement technique for accelerated chickpea generation turnover

Gurumurthy S

(Project: Genetic garden and gene bank for abiotic stress tolerant plants, animals and fisheries for food security and sustainability- Umbrella project)

The slow breeding cycle presents a significant challenge in legume research and breeding. While current speed breeding (SB) methods promise faster plant turnover, they encounter space limitations and high costs. Enclosed environments risk pest and disease outbreaks, and supplying water and electricity remains challenging in many developing nations. Here, we propose an innovative generation advancement approach to achieve two generation cycles per rabi season under natural open field conditions in chickpea. This cost-effective, environmentally friendly method offers a location-specific advantage for generation advancement. Two field experiments were conducted. In the first, 11-day-old fresh immature green (FIG) seeds showed an 80% germination rate, reducing the duration by 14%. In the second, abiotic stresses such as atmospheric, nutrient, soil, and water stresses reduced duration by 40%, 18%, 15%, and 18%, respectively.

Despite the shortened generation time, we consistently obtained a minimum of 6 pods per plant, ensuring continuity in the subsequent cycle. Our investigation revealed that the combination of this location advantage (40%) with the sowing of FIG seeds (14%) enables Baramati to generation advancement 1.5 years with two generation cycles per rabi/cool season. Use of this technique can save 3 years marking a notable reduction from the conventional six-year timeline. Moreover, incorporating additional abiotic stresses mentioned above will further reduce the generation advancement time. Therefore, this technique has the potential to hasten varietal improvement time at a low cost.



AVT (DTIL) trial in chickpea was conducted during 2023-24 under drought stress condition. The total six entries were studied (1. G1: C-23701; 2. G2: C-23702; 3. G3: C-23703; 4. G4: C-23704; 5. G5: C-23705; 6. G6: C-23706) and same sent to the project coordinator chickpea.

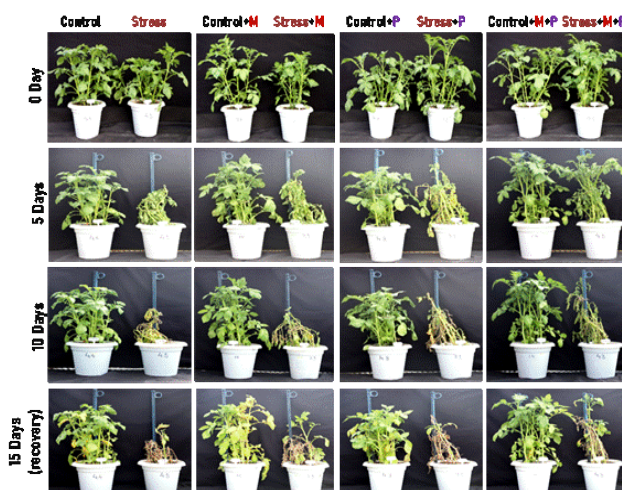
Synergistic effect of melatonin and proline on growth, physio-biochemical and yield traits on potato under water deficit stress: a novel technique

Changan SS

(Project: Mitigating water stress effects in vegetable and orchard crops)

The present study was conducted to evaluate the synergistic effect of melatonin and proline on potato under moisture-deficit stress. The treatments included a spray of water (control), melatonin, proline, and a combination of melatonin and proline. Moisture-deficit stress was imposed at the tuber initiation stage of potato (var. Kufri Surya) by withholding irrigation for upto 10 days. Samples were collected at 0, 5, and 10 days after withholding of water, and after re-watering. Various morphological and physio-biochemical parameters were studied. The results showed that the combination of melatonin and proline

significantly improved yield, photosynthetic and other physiological and biochemical parameters as compared to the other treatments.

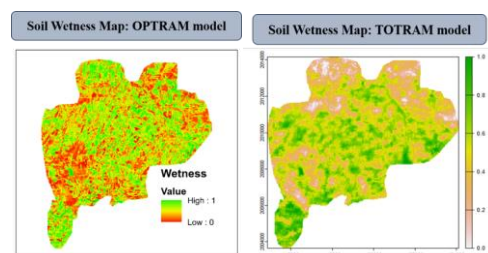


Quantifying the extent of water stressed soybean and cotton areas in Vidarbha region using remote sensing in relation to meteorological variables

Sonam, Singh RN, Bappa Das, Pal KK, Reddy KS

(Project: Quantifying the extent of water stressed soybean and cotton areas in relation to meteorological variables in Vidarbha region using remote sensing)

A preliminary investigation was conducted in Baramati to evaluate soil moisture mapping using remote sensing techniques. Satellite data in Synthetic Aperture Radar (SAR) and optical wavebands were used to retrieve surface soil moisture, validated with ground truth data from three visits. Optical Trapezoid Model (OPTRAM) and Thermal-Optical TRAapezoid Model (TOTRAM) approaches were used for optical and thermal data. Also, backscatter coefficients from SAR data, along with their Grey Level Co-occurrence Matrix (GLCM) texture combinations and radar indices, were utilised in machine learning models to retrieve soil moisture. Soil moisture maps are being generated from these analyses.



Soil wetness map using (a) OPTRAM Model and (b)TOTRAM Model

School of Soil Stress Management

Effect of waterlogging on growth and yield of cowpea at different growth stages on vertisols

Halli HM

(Project: Germplasm conservation and management Genetic garden and gene bank for abiotic stress tolerant plants)

Studies on the stage-wise response of cowpea growth, and yield parameters to waterlogging were conducted for two years (2022 and 2023) at ICAR-NIASM during kharif season. The aim was to understand the effect of varied durations of waterlogging (1 to 25 days) at three growth stages (15 DAE; Days After Emergence, 25 DAE, and at 50% flowering) of cowpea. Results revealed that maximum reduction in crop growth and grain yield (62.90%) was observed at early growth stages of cowpea (15 DAE) over control. Similarly, 17 to 25 days of waterlogging stress considerably reduced root morphological features and crop growth, thus causing the highest reduction in grain yield (71.32–81.64%). Notably, plants at early growth stages produced a greater number of lengthier aerial roots with increasing waterlogging durations after 7 days. Whereas, the interaction of 1 day waterlogging at 25 DAE reported minimal yield reduction (~ 0.36%). In conclusion, cowpea was found to be highly sensitive at early growth stages (15 DAE) after three days of waterlogging stress on vertisols of semi-arid tropics.

Table 1. Influence of waterlogging on yield attributes of cowpea under pot conditions

Treatment	100 seed weight (g)	Increase in canopy temperature (°C)	Grain yield (g plant ⁻¹)	Per cent yield reduction	Mortality at harvest (%)
Growth stages (GS)					
15 Days after emergence	5.60 c†	2.25 c	2.56 c	62.90 a	28.75
25 Days after emergence	7.35 b	3.50 b	3.72 b	48.07 b	11.76
50% flowering	8.45 a	3.83 a	5.06 a	31.67 c	0
p value	<.0001	<.0001	<.0001	<.0001	-
Duration of waterlogging (D)					
1 day	9.34 a	1.30 g	6.93 a	3.26 h	0
2 days	8.75 a	1.94 fg	6.52 ab	8.98 g	0

3 days	8.36 a	2.66 ef	6.26 ab	12.59 fg	0
5 days	8.56 a	2.88 de	5.57 bc	22.37 ef	0
7 days	8.18 a	3.08 c-e	4.95 cd	30.87 de	0
9 days	7.68 a	3.66 a-d	4.29 d	40.20 d	0
11 days	8.27 a	3.24 b-e	3.14 e	56.81 c	0
13 days	7.43 ab	3.61 a-d	2.52 ef	65.27 bc	1.58
15 days	7.94 a	3.74 a-c	2.39 ef	67.17 bc	6.06
17 days	4.77 c	4.17 a	2.10 fg	71.32 ab	36.85
20 days	5.06 bc	4.03 ab	1.85 fg	74.80 ab	37.40
25 days	2.61 c	4.02 ab	1.35 g	81.64 a	66.66
Control	9.61 a	<.0001	7.18 a	-	-
p value	<.0001	1.30 g	<.0001	<.0001	-
Interaction effect; Growth stages × Duration of waterlogging (GS × D)					
p value	<.0001	<.0001	<.0001	<.0001	-

†Means followed by the same letter (s) within the column are not significantly differed (p < 0.05).

Development of effective techniques for rapid multiplication of quality planting materials in Bajra-napier hybrid

Halli HM

(Project: Development of effective mass propagation technique for rapid multiplication and easy transportation of quality planting material in Bajra X Napier hybrid)

The studies were conducted at ICAR-NIASM Baramati, during kharif 2023 to identify the variability in rooting of bajra napier stem cuttings and their response to growth hormone (IBA). Results revealed that top portion stem cuttings can be directly used for planting without any treatment. Whereas, sprouting of middle portion cuttings could be improved up to 85% with IBA soaking at 100-150 ppm for 15-30 minutes. IBA-treated stem cuttings showed better and early establishment under field conditions. This improvement under field conditions was possibly due to better root activity of stem cuttings in response to IBA treatment at 100-150 ppm. Further we need to decipher the physiological changes due to different methods of establishment and use of growth hormones in napier stem cutting.



Fig. 3. Root growth of top and middle stem cuttings of Bajra napier hybrid at 50 days after planting

Red/Bronzy fennel genotype-A unique and first ever pigmented genotype in fennel

Harisha CB

(Project: Germplasm conservation and management Genetic garden and gene bank for abiotic stress tolerant plant)

A bronzy/red colour pigmented fennel genotype having pigmentation on the stem, leaves, and seeds was identified and selected from a single plant in the spice cafeteria in 2018. This trait is unique and not available in any germplasm collection. It was advanced to select the pure lines during, 2021-22, 2022-23 and 2023-24 by selfing the individual plants and also allowing the pigmented plants for open pollination. The third generation, the selfed and open-pollinated seeds, were sown separately in shallow basaltic soils of the ICAR-NIASM farm (2023-24). In selfed plants, 2.7% segregation was observed. Whereas green plants showed no segregation with respect to colour marker. The morphological characters of bronzy/red type and green type fennel recorded during 2023-24 are given in the table below.

Table 2. Morphological characters of bronzy/red and green type fennel

Characters	Red plant s	S.D	C.V %	Green plant	S. D	C.V %
Segregation % (selfing)	2.7			0.0		
Plant height (m)	1.9	0.2	10.7	1.8	0.3	14.2

Primary branches	22.0	2.1	9.5	18.7	1.5	8.1
Secondary branches	26.3	2.7	10.1	27.7	4.5	16.3
Days to flower appearance	60.3	2.7	4.5	55.3	4.1	7.4
No. of Umbel	35.5	3.2	9.0	31.3	1.6	5.2
Umbellets/ umbel	35.2	3.9	11.0	23.3	2.2	9.3
Seeds/ umbellete	34.7	5.0	14.3	29.2	8.0	27.5
Seed yield/ plant (g)	16.2	1.0	6.2	13.4	1.7	13.0
Days to maturity	165.3	4.4	2.7	163.8	8.0	4.9



Fig. 4. Bronzy pigmented fennel plants and inflorescence

Canopy management in dragon fruit

Kakade VD

(Project: Environment-friendly, economically viable, state-of-the-art model farm for abiotic stressed regions)

The study examined the impact of canopy management and shading on dragon fruit growth, physiological changes, flowering, fruiting, and the incidence of sunburn and diseases. Key findings indicated that pruned canopies improved chlorophyll content and NDVI, increased new sprouts and fruitful cladodes, and reduced sunburn by 67.68% and 69.05% in 2022 and 2023, respectively. Disease incidence decreased by 43.23% and 81.51%. Light and moderate pruning led to a yield increase of 11-48% during the second year, compared to a 2.8% increase in un-pruned plants. It is recommended to maintain 120-160 cladodes/plant or 12-14 cladodes/square meter with light pruning in a mop-top training system.

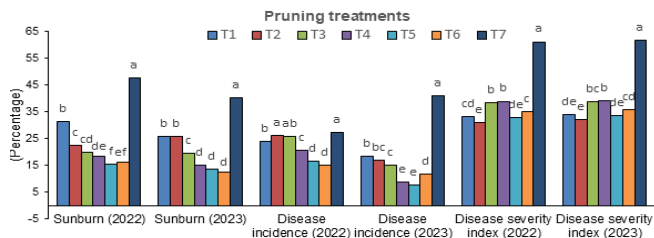


Fig. 5. Effect of pruning treatments on sunburn, disease incidence and severity index in dragon fruit.

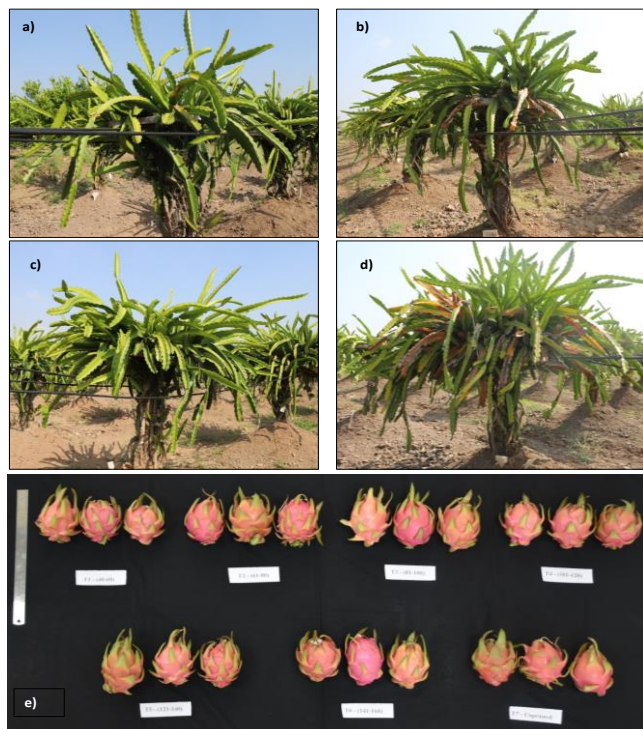


Fig. 6. Comparison of plant canopies and disease incidence in different pruning treatments a) severe, b) moderate, c) light and d) un-pruned control. Comparison of fruit size in pruning treatments (e).

Heat stress management in dragon fruit through artificial shading

Kakade VD

(Project: Environment-friendly, economically viable, state-of-the-art model farm for abiotic stressed regions)

In terms of shading, the use of green, white, and black shade nets with 35% and 50% shade factors reduced incoming solar radiation by 40-70% and lowered canopy temperature by 3-7 °C. Shading significantly reduced sunburn by over 96% and decreased disease incidence and severity. It also enhanced new sprouts by 28-84%, increased total chlorophyll by 28-79%, and improved NDVI. White and black 50% shading increased flower bud production by 33% and 27%, respectively, and reduced flower bud drop. Yield increased by 67% under white and 53% under black at 50% shading

compared to open conditions. While shading reduced total soluble solids, white 50% shading increased total phenols and flavonoids, and white 35% shading enhanced vitamin C in the fruit pulp. Overall, the findings conclude that white and black 50% shading are more suitable for preventing heat stress damage in dragon fruit in hot and dry semi-arid climates, promoting sustainable yield and fruit quality.

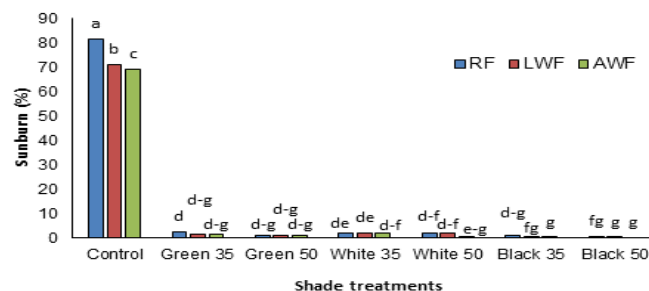


Fig. 7. Average sunburn (%) under shading treatments in dragon fruit genotypes during May (b) month (RF: Red fleshed; LWF: Local white fleshed; AWF: Andaman white fleshed)



Fig. 8. Comparison of fruit size of three genotypes under different shading treatments

Salinity and drought tolerance studies in Mango (Mangifera indica L.)

Morade A.S., Kakade V. D., K. M. Boraiah, Sushil Changan, Sangram Chavan and Neeraj Kumar

(Project: Salinity and drought tolerance studies in Mango (Mangifera indica L.))

About 800 fruits of 26 mango local germplasm were collected and analysed for quality parameters. Mean seedling germination was 70% and seedlings of L10M8 and JM-4 were most vigorous while L3M3 had highest leaf area. Ten genotypes were screened for salinity tolerance at 0, 50 and 100 mM of NaCl irrigation in pot experiment. Based on morpho-physio-biochemical observations, genotypes L11M5, L5M5, and MP were relatively salinity stress-tolerant, whereas NT and Kesar were identified as stress-sensitive.



Fig. 9. Symptoms of salinity injury in mango seedlings

Evaluation of Ambrionics Pot in Alleviating Drought Stress in Tomato

Morade A.S., Kakade V. D., P. S. Khapte, Sangram Chavan, D. D. Nangare and K. S. Reddy

(Project: Evaluation of Ambrionics Pot in Alleviating Drought Stress in Tomato)

Completed field trial on summer tomato to evaluate Ambrionics pot against drought stress induced through deficit irrigation. Pot cultivation found 2.36 times more expensive than the popular system of single use plastic mulching. Tomato seedlings grown in pot had higher shoot biomass but significantly reduced root biomass. While the number of fruits and per plant yield were highest in mulching, the highest average fruit weight was recorded in pots. The highest fruit yield (24 t/ha) was recorded in mulching with 100% ETc irrigation. Under deficit irrigation, pot cultivation had 40% yield increment than mulching and control. Irrigation regimes and planting systems did not statistically influence fruit TSS, acidity, and firmness. The highest soil temperature was recorded under mulching system. Under water deficit and heat stress, the pot system is suitable for cultivating summer tomato.

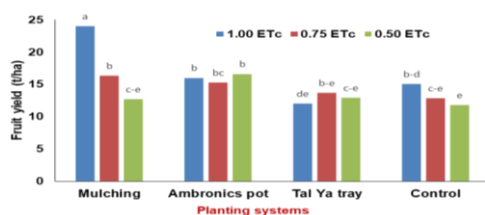


Fig. 10. Comparison of tomato yield among planting system at different irrigation levels

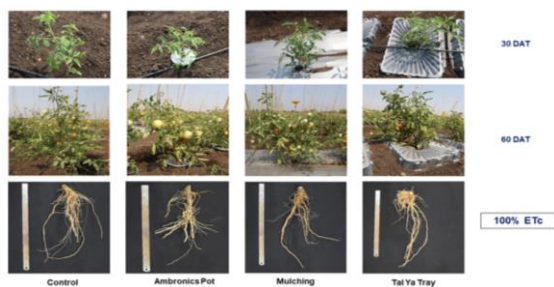


Fig. 11. Comparison of plant and root growth in different planting systems under 100% ETc

Remediation of marginal quality water by NIASM-designed constructed wetland and integrated aquaponics system grown with Aromatic herbs and ornamental fish

Paritosh Kumar, Neeraj Kumar, Harisha CB

(Project: Marginal quality water remediation by constructed wetland and integrated aquaponics/ Aromatic herbs based Constructed wetland for wastewater treatment and their polishing in ornamental fish aquaponics)

Under this in-house project a constructed wetland and integrated aquaponics system has designed using growing cum filtration media for simultaneous wastewater treatment, aromatic crops cultivation and ornamental fish rearing. The designed system shown removal capacity of Organic load (BOD) >80%; heavy-metals (Fe, Mn, Zn, Cu, Ni, Cd) >90%; Pathogenic microbes (Faecal coliform and Escherichia coli) >95%; while in saline groundwater EC-25%, sodium-38%, Ca+Mg-34%, bicarbonate-83%, chloride-43%, nitrate-74% in 2-days. In these wetland system screening of various aromatic herbs & grasses viz. Vetiver (*Chrysopogon zizanioides*), Lemongrass (*Cymbopogon citratus*), Citronella (*Cymbopogon nardus*), Palmarosa (*Cymbopogon martini*), Sweet flag (*Acorus calamus*), Geranium (*Pelargonium graveolens*), Patchouli (*Pogostemon cablin*), Rosemary (*Salvia Rosmarinus*), Marjoram (*Origanum majorana*), and Brahmi (*Centella asiatica*). While in aquaponics system screening of ornamental fish viz. Goldfish (*Carassius auratus*), Widow tetra-fish (*Gymnocorymbus ternetzi*) and Molly fish (*Poecilia spheps*) is going on in association with aromatic herb Brahmi (*Centella asiatica*) etc. For the remediation saline groundwater composite media are designing and which has shown removal of up to sodium-44%, bicarbonate-339%, sulphate-73%, Chloride-30%, Ca+Mg-98%, pH & EC-32%.



Efficacy evaluation of ICAR-CIRCOT Nano ZnO as nano-fertiliser in paddy and chickpea crops

Paritosh Kumar

(Project: Efficacy evaluation of ICAR-CIRCOT Nano-ZnO as nano-fertilizer in field crops)

ICAR-CIRCOT developed Nano-ZnO powder and liquid-suspension were tested their performance in Paddy (Telangana Sona) and Chickpea (Vijay) in comparison to recommended ZnSO₄ (25kg/ha, 21%Zn) as control with various doses 0%, 5%, 10%, 25% and 0%, 1%, 5%, 10%, respectively. In Paddy crop after soil-application; soil total-Zn was found constant but bioavailable-Zn and grain-Zn has increased with maximum in 25%-Nano-ZnO-plot (2.96mg/kg, 45.5mg/kg). While after foliar-application soil bioavailable-Zn and grain-Zn was decreased and found maximum in 5%-Nano-ZnO-plot (1.46mg/kg, 33.4 mg/kg). Among all highest grain yield was harvested from 25%-Nano-ZnO applied plots (5.51g/plant) in both soil and foliar-applications. In chickpea crop after 50% soil+50% foliar-application; both soil total-Zn and soil bioavailable-Zn was found constant. Among all highest grain yield and grain Zn was found in 1%-Nano-ZnO applied-plot (870.8g/plot, 26.7mg/kg). In both crops Zn translocation was found in order as Grain > Shoot > Root and grain was found safe for human consumption.



Collection of Rhizofiltration plants for remediation of polluted water and wastewater from different locations of Baramati

Paritosh Kumar

(Project: Marginal quality water remediation by constructed wetland and integrated aquaponics/ Aromatic herbs based Constructed wetland for wastewater treatment and their polishing in ornamental fish aquaponics)

Identified and collected 21 various Rhizofiltration plants for remediation of polluted water and wastewater from different river, canal, pond, sewage site of Baramati regions. These plants have found various published reports for remediation of pollutants (salts, heavy metals, organic loads, toxic

chemicals etc.) and improving water, soil and environment quality and utilising these plants in our research for further exploration, potential and applications e.g. Broadleaf cattail (*Typha latifolia*), Common Reed (*Phragmites australis*), Giant Reed (*Arundo donax*), Vetiver (*Chrysopogon zizanioides*), Sweet flag (*Acorus calamus*), Water hyacinth (*Eichhornia crassipes*), Duckweeds (*Spirodela*, *Landoltia*, *Lemna*, *Wolffia*, and *Wolffiella*), Water lettuce (*Pistia stratiotes*), Water spinach (*Ipomoea aquatica*), Sago pondweed (*Potamogeton pectinatus*), Mosquito fern (*Azolla pinnata*), Frogbit (*Hydrocharis dubia*), Purple nut-sedge (*Cyperus rotundus*), Flat-sedge (*Cyperus odoratus*), Yellow Nut-sedge (*Cyperus esculentus*), Umbrella-sedge (*Cyperus eragrostis*, *Cyperus alternifolius*), Pygmy water-lily (*Nymphaea tetragona*), Bulrush (*Schoenoplectus californicus*), Spike-rush (*Eleocharis palustris*, *E. equisetina*, *E. acicularis*), Soft-rush (*Juncus effusus*) and Spiny rush/Sharp rush (*Juncus acutus*).

Assessment of Spiny rush (*Juncus acutus*) collected from Karhavagaj village (Baramati) in remediation of saline groundwater

Paritosh Kumar

Identified & collected a salt tolerant halophytic plant Spiny rush (*Juncus acutus*) from a saline field near Karhavagaj village, Baramati and grown this plant in horizontal wetland system with cocopeat media in triplicate and tested their salt removal capacity. For this saline ground water were collected from Malegaon khurd having pH 8.8, EC 5.3 dS/m, bicarbonate 15.4 meq/L, chloride 20.1 meq/L, Ca+Mg 24.4 meq/L, sodium >458.1 mg/L, sulphate >126.1mg/L, nitrate 53mg/L. This Spiny rush plant has shown the removal of pH 11.4%, EC 41.5%, sodium 44%, sulphate 16.4%, Ca+Mg 21.3%, bicarbonate 50.1%, chloride 40.4% and nitrate 62.5%.



Evaluation of vermicomposting for rapid decomposition of different types of farm waste

Paritosh Kumar

(Project: Environment-friendly, economically viable, state-of-the-art model farm for abiotic stressed regions)

Under this project we evaluating the vermicomposting method for rapid decomposition of different types of farm waste using two earthworm species Red wiggler worm (*Eisenia fetida*) and African night crawlers (*Eudrilus eugenia*) and comparing their nutrient content. Last year about 1445kg vermi-compost produced of Farm weed (400kg), Soybean (130kg), Sugarcane leaf (140kg), Wheat straw (150kg), Quinoa (110kg), Sunflower (25kg), Geranium (25kg), Typha (20kg), Foxtail millet (10kg), Marigold (5kg), mixed biomass (430kg). The prepared vermicompost has found their pH in range between 6.79-8.54, EC 0.62-3.8 dS/m, nitrate 291.7-377.2 mg/kg, phosphate 58.3-286.6 mg/kg, potassium 215-1920.7 mg/kg, sodium 59.7-410.5 mg/kg, Ca+Mg 853.5-3167.8 mg/kg. Their composting time and recovery percentage varied between 2 months to 8 months and 35% to 95%. Last year evaluated the impact of mixing of farm weed to the crop biomass on vermi-compost production, compost quality, composting time and recovery percentage. For this wheat straw, sugarcane leaf and quinoa were composted separately and mixed 50% with farm weed. By sole vermicomposting about 150kg, 140kg and 110kg vermicompost collected, respectively. Mixing of wheat straw, sugarcane leaf and quinoa with farm weed reduced their composting time from 5 months to 4 months, 8 months to 6 months and 8 months to 5 months, respectively; while increases their recovery percentage from 80% to 85%, 35% to 65% and 50% to 65% by reducing their C: N ratio without changing much in compost quality. By their mixing about 130kg, 165kg and 135kg vermicompost produced, respectively.



Assessing the host-sandalwood interactions under abiotic stressed environment

Chavan SB

(Project: Assessing the host-sandalwood interactions under abiotic stressed environment for adaptability & income generation)

The current investigation concluded that water stress affects the physiological and biochemical

parameters of sandalwood plants. However, physiological processes and antioxidant mechanisms in sandalwood were primarily regulated by the host species, both in water stress and control conditions. Overall, sandalwood has a great potential for cultivation under degraded soil environment with a suitable host. Sandalwood plants had the highest chlorophyll content with *Terminalia mantaly* (3.96 $\mu\text{g}/\text{mg}$ FW) and the lowest with Grass and control sandalwood. They showed increased leaf area, thickness, and NDVI with *T. mantaly*, Teak + Dashrath, and Pigeon pea. Maximum RWC was found with *T. mantaly*, similar to Subabul and *Aegle marmelos*, while the lowest was in control sandalwood and Grass. Subabul hosts had the highest photosynthetic rates, and *T. mantaly* showed optimal stomatal conductance. Higher transpiration rates correlated with lower VPD, indicating a humid microenvironment. Proline and amino acids were highest in control sandalwood, indicating reduced stress with hosts.

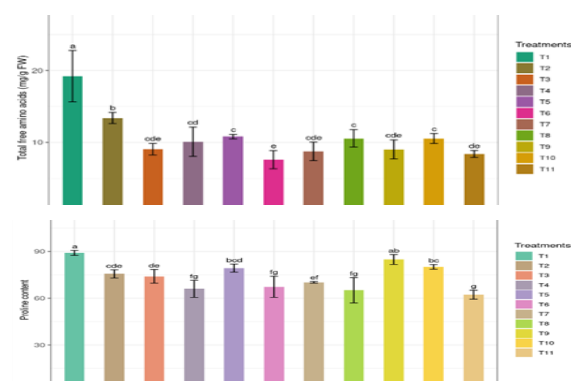


Fig. 12. Influence of different hosts on Total amino and proline content ($\mu\text{g mg}^{-1}\text{FW}$) of sandalwood

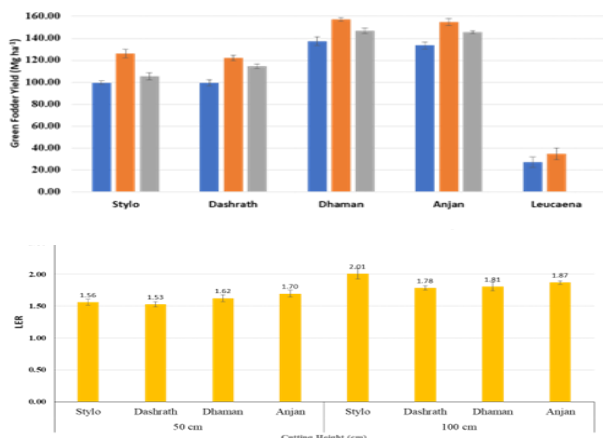
Effect of Cutting Heights on Fodder Productivity and Soil Health in Leucaena-based Silviculture Systems

Chavan SB

(Project: Model Green Farm (MGF): Environment friendly, economically viable, state-of-the-art model farm for abiotic stressed regions)

The study titled "Impact of Leucaena-based Silviculture Systems on Fodder Productivity and Soil Health under Degraded Soil Environments" studied the effects of varying cutting heights on green fodder yield and soil health in degraded soil conditions. In the study, we examined two cutting heights, 50 cm and 100 cm, and their impact on several intercropped species, including Stylo, Dashrath, Dhaman, Anjan, and Leucaena. At the

50 cm cutting height, the study observed the lowest productivity across most treatments. Yield reductions compared to the control ranged from 5.50% to 12.95%, indicating that a lower cutting height may not be suitable for maximising fodder yield in these systems. In contrast, the 100 cm cutting height showed the highest productivity for all intercropped species, with yield improvements ranging from 6.22% to 19%. This suggests that a taller cutting height is more effective in enhancing green fodder production. Consequently, the study recommends adopting a 100 cm cutting height to maximise green fodder yield in Leucaena-based silvipasture systems. Additionally, different combinations showed improved Land Equivalent Ratio (LER) at the 100 cm cutting height, indicating better land use efficiency. For instance, the LER of 2.01 for Stylo + Leucaena at the 100 cm cutting height demonstrates that 101% more land would be needed to produce the same amount of combined fodder biomass if grown as pure crops.



Development of agroforestry business model for long-term sustainability

Chavan SB, Kakade VD, Morade AS, K Ravi Kumar, Salunkhe VN, K Sammi Reddy

(Project: Development of agroforestry business model for long-term sustainability- Mitcon consultancy project)

A survey was conducted on 40 Mahogany plantations of various ages (1-18 years) in Maharashtra and Gujarat, gathering data on tree height, diameter, soil parameters, and cultivation costs. The study characterised the plantations based on age, spacing, tree density, and location, highlighting differences between younger block plantations (1-5 years) and older boundary plantations (7-18 years). Significant increases in biomass production and carbon storage were

observed with age, particularly in block plantations, showcasing their potential for carbon sequestration (total biomass ranging from 0.22 to 697.97 kg/tree and total carbon stock ranging from 0.12 to 328.04 kg/tree). Carbon sequestration rates (CSR) varied across different ages and densities, showing an increase from 1 year to 5 years in block plantations (0.12 to 3.07 Mg/ha/yr) and from 7 years to 15 years in boundary plantations (1.04 to 3.39 Mg/ha/yr). The economics of Mahogany-based agroforestry indicated decreasing cultivation costs (ranging from Rs 64,967 to Rs 311,488) and increasing returns per hectare (ranging from Rs 145,000 to Rs 210,000) over time, resulting in positive net income. The system's net present value is Rs 151,432, with a benefit-cost ratio of 1.311, an internal rate of return of 66%, and a land equivalent value of Rs 589,975 per hectare. Additionally, a one-day workshop on management techniques of Mahogany agroforestry systems was organised, and two extension folders were released under the project.

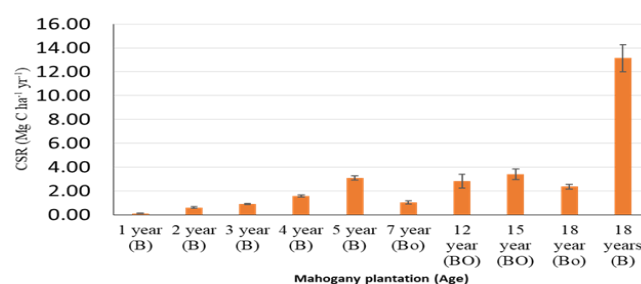


Fig. 13. Carbon sequestration rate (Mg C ha⁻¹ yr⁻¹) in block and boundary planted Mahogany

School of Social Science And Policy Support

Mapping and Assessment of Abiotic Stresses in Pune District, Maharashtra using Geospatial Techniques

Paul NC, Obi Reddy GP, Gaikwad BB, Nirmal Kumar, Reddy KS, Nangare DD, Patil NG

(Project: Pilot study on multiple abiotic stress mapping for western Maharashtra)

Abiotic stress is the term used to describe non-living factors in the environment that negatively impact crop growth, development, and overall productivity. Accurately mapping abiotic stresses is crucial for agricultural planning and resource management. This study presents a novel approach for abiotic stress mapping by combining various terrain, climatic, pedological and vegetation parameters using the analytical hierarchy process (AHP) and AHP-integrated machine learning (ML)

models for the Pune district located in the hot semi-arid ecosystem of western India. To quantify and map the abiotic stress, thematic layers and their sub-classes were given AHP-based weights and the final abiotic stress map was generated by integrating the selected reclassified thematic layers using the weighted sum approach. Furthermore, the result of AHP was used with other thematic layers to build AHP-integrated ML models. Using high-resolution Google Earth imagery, the generated map was validated at randomly selected locations to ensure robust validation. A receiver operating characteristic (ROC) curve has also been generated using these selected points to confirm the model's ability to effectively discriminate between different stress levels. The validation through Google Earth imagery indicates good agreement with the model output. The stress-prone areas were mainly noticed in the southern and south-eastern parts of the district, the majority of areas of the Purandar, Baramati, Indapur, and Daund tehsil come under very high and high-stress zones. These regions where drought, very shallow soil and very low rainfall (<550 mm) were noticeable. The study demonstrates the potential of the AHP and combined machine learning models in abiotic stress mapping and identification of hot spots with reasonable accuracy and the results of the study can be used in developing the combating strategies to minimise the impact of abiotic stress on agriculture systems.

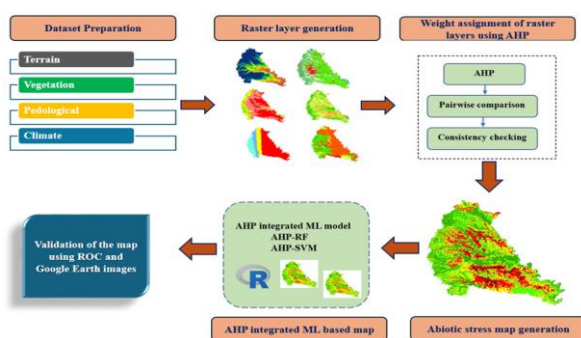


Fig. 14. Framework of the proposed methodology.

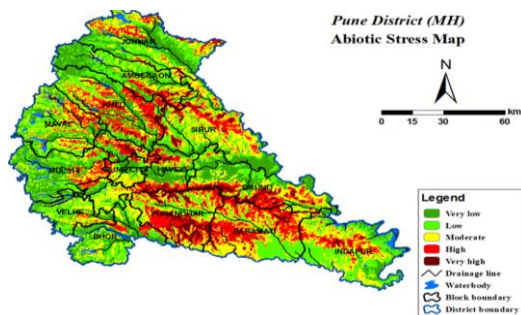


Fig. 15. Abiotic stress map of Pune district.

NEW INITIATIVES

MoU between ICAR-NIASM and Tradecorp Rovensa India Private Limited, Pune

ICAR-NIASM entered into a Memorandum of Understanding with Tradecorp Rovensa India Private Limited, Pune on 28th June 2024. Dr K Sammi Reddy, Director, ICAR-NIASM and Mr C Bonde, Development Coordinator of company signed the MoU. The primary focus of this collaboration is to evaluate the moisture retention and distribution capacity of Tradecorp Rovensa's products in tomato crop. The study will involve controlled field trials where different plots will be treated with the products ORO RZ and ORO TF. This MoU between ICAR-NIASM and Tradecorp Rovensa India Private Limited is a significant step towards integrating scientific research with practical agricultural solutions. It highlights the importance of public-private partnerships in addressing critical challenges in agriculture, such as water scarcity and the need for sustainable farming practices. By leveraging the expertise of ICAR-NIASM in abiotic stress management and Tradecorp Rovensa's innovative agricultural products, this collaboration aims to make meaningful contributions to the agricultural sector, particularly in enhancing the productivity and sustainability of tomato cultivation. The project team including Drs Vijaysinha Kakade, Amrut Morade, Pratapsingh Khapte, Harisha CB, Aliza Pradhan, Nangare DD, Sangram Chavan, and KS Reddy. Dr Rinku Dey, I/C Head, SSSM; Neeraj Kumar, PME in-charge; Charlse Ekka, CAO and Trilok Saini, AAO of the institute were present during the event.



MAJOR EVENTS

Organisation of NABARD-BIRD, Lucknow Sponsored Training Programme

The ICAR-National Institute of Abiotic Stress Management, in collaboration with the Bankers

Institute of Rural Development (BIRD), NABARD, Lucknow, and the National Bank Staff College, NABARD, Lucknow, organised an on-site training program on "Environmental and Social Impact Assessment and Gender Mainstreaming in Developmental Projects" during 8-10 January 2024, at ICAR-NIASM, Baramati. A total of 35 participants from various regional offices of NABARD, nationalised banks, NGOs, FPOs, and state field functionaries actively participated in the comprehensive training programme. The programme encompassed a series of lectures, group activities, and field visits. During his inaugural address, Dr K Sammi Reddy, the Director of ICAR-NIASM, commended the training activities organised by BIRD-NABARD and highlighted the institute's innovative technologies for addressing abiotic stresses in agriculture. Mr. Prashant Dubey elucidated the objectives of training programme and BIRD-NABARD's ongoing activities. Participants expressed their appreciation for the valuable support and guidance provided by the Director, ICAR-NIASM, course directors from BIRD-NABARD (Mr Prashant Dubey and Dr Parul Gurjar), course coordinators from ICAR-NIASM (Drs. Vijaysinha Kakade, Amrut Morade, Sangram Chavan), and course co-coordinators (Drs. Aliza Pradhan, Sushil Changan, Ms. Navyasree) in organising this on-location training program at ICAR-NIASM.



Training cum Technology Demonstration on "Preparation of Mixed Silage of Sugarcane Tops"

ICAR-National Institute of Abiotic Stress Management organised a Training cum Technology Demonstration on the "Preparation of Mixed Silage of Sugarcane Tops" on January 11, 2024 under the Development Action Plan for Scheduled Castes (DAPSC) 2023-24. Dr K Sammi Reddy, Director, ICAR-NIASM graced the occasion as chief guest. At the beginning of the programme, Dr NP Kurade (Chairman, DAPSC

Committee) briefed the farmers about various interventions under the DAPSC scheme. Chief guest of the programme Dr K Sammi Reddy, in his inaugural address, emphasised to beneficiaries for adoption of the technology of mixed silage of sugarcane tops for improving livestock production during scarcity periods. During the training, the farmers were guided on various aspects of livestock management; General Management of various classes of Dairy Animals by Dr SA Kochewad, the importance of a balanced diet and the significance of mixed silage in dairy animal production by Dr AV Nirmale, Important diseases and their control in Dairy Animals by Dr NP Kurade and summer management of dairy animals by Dr SS Pawar. A vote of thanks was proposed by Dr SS Pawar (Member Secretary, DAPSC Committee). A highlight of the event was the field demonstration of the mixed silage-making process, allowing participants to witness firsthand the practical application of the techniques discussed during the lecture sessions. About 75 dairy farmers were benefitted through this programme. The Dairy kits comprising 100 kg concentrate feed, 10 kg mineral mixture, two stainless steel buckets, milk can (10 ltr), milk measures (1 ltr and 0.5 ltr), deworming tablets and two plastic ghamelas were distributed to every participant farmer. The programme was organised and coordinated by DAPSC Implementation Committee members namely; Drs. NP Kurade, SS Pawar and AV Nirmale (Convenors) and Drs. DD Nangare, BB Gaikwad, SB Chavan, VD Kakade, Ravikumar, Rajkumar and Aliza Pradhan (Co-convenors).



Field day cum farmers scientist interaction meet with SC beneficiaries at Malad village

The ICAR-National Institute of Abiotic Stress Management organised a field day cum interaction meeting on 16.01.2024 at Malad village to discuss various need-based interventions for the Scheduled Caste residents. The meeting was attended by about 56 SC beneficiaries including gram panchayat sarpanch, other members of gram

panchayat, and village representatives. The purpose of the meeting was to identify and inform the SC beneficiaries about the different interventions and the qualifying criteria for the same. Dr NP Kurade, Chairman DAPSC implementation Committee, addressed the gathering and briefed about the institute and the importance of the DAPSC scheme. Dr DD Nangare, a Member DAPSC implementation Committee, briefed about the activities of ICAR-NIASM under the scheme along with success stories. Dr AV Nirmale, a Member DAPSC implementation Committee, explained the process of selecting the beneficiaries. The meeting concluded with a call for cooperation and support from the beneficiaries/villagers. Sarapanch, Mr. Kiran Gawade, and members of the DAPSC committee of ICAR-NIASM expressed their gratitude. The field day was organised and coordinated by Drs. AV Nirmale, DD Nangare, and NP Kurade as conveners and Drs., SS Pawar, BB Gaikwad, Rajkumar, SB Chavan, VD Kakade, Aliza Pradhan & Ravi Kure as co-conveners.



राजभाषा निरीक्षण समिति बैठक: 13 फरवरी, 2024

राजभाषा विभाग, गृह मंत्रालय द्वारा वार्षिक कार्यक्रम के अंतर्गत निर्धारित लक्ष्य के अनुसार प्रत्येक मंत्रालय/विभाग द्वारा अपने अधीनस्थ कार्यालय का निरीक्षण किया जाता है। आज १३ फरवरी, २०२४ को राजभाषा कार्यान्वयन समिति के अध्यक्ष एवं राष्ट्रीय अजैविक स्ट्रेस प्रबंधन संस्थान के निदेशक महोदय डॉ के सम्मि रेड्डी, निरीक्षण अधिकारी श्री मोहिंदर कुमार, परामर्शदाता, महानिदेशक, भारतीय कृषि अनुसंधान परिषद, श्री राम दयाल शर्मा, संयुक्त उपनिदेशक (राजभाषा) और श्री हरी ओम, प्रधान निजी सचिव, अपर सचिव एवं वित्त सलाहकार इनके उपस्थिति में राष्ट्रीय अजैविक स्ट्रेस प्रबंधन संस्थान, बारामती, पुणे में राजभाषा निरीक्षण समिति की बैठक सम्पन्न हुई। बैठक के शुर्वात में संस्थान के निदेशक महोदय ने राजभाषा संबंधित कार्य का ब्योरा प्रस्तुत किया। निरीक्षण अधिकारियों ने संस्थान में हो रही राजभाषा कार्यान्वयन संबंधित गतिविधियों के बारे में निरीक्षण किया। संस्थान के हिन्दी कार्यान्वयन संबंधित उपलब्धियों पर निरीक्षण अधिकारियों द्वारा समाधान जताया गया और बहुमूल्य मार्गदर्शन किया। इस बैठक में राजभाषा कार्यान्वयन समिति के सभी

सदस्य उपस्थित रहे। डॉ वनिता सालुंखे (पूर्व सदस्य सचिव, राजभाषा कार्यान्वयन समिति) ने बैठक का सूत्रसंचालन किया। डॉ प्रवीण तावरे एवं श्री त्रिलोक सैनी ने बैठक का आयोजन किया।



Unveiling of Selfie Point at ICAR-NIASM

The Selfie Point at ICAR-NIASM was unveiled by Dr B Venkateswarlu, Former Vice-Chancellor, VNMKV, Parbhani & Chairman QRT. The Director, ICAR-NIASM and members of the QRT committee were present during the occasion.



ICAR-NIASM participated in Shining Maharashtra 2024 Exhibition

ICAR-NIASM has participated in Shining Maharashtra Exhibition held at Phaltan, Satara district of Maharashtra from 19-21 February 2024. NIASM has displayed various climate resilient technologies such as Climate smart integrated farming system, Cultivation of Dragon fruit in degraded lands, Silage making through sugarcane tops, Cultivation of Chia crop, Stubble shaver, Off-bar, Root pruner cum Fertiliser drill (SORF) machine etc. Around 500 visitors consisting of students, farmers and other stakeholders had visited the institute exhibition stall and they were informed regarding activities of the institute in addressing abiotic stress in agriculture. ICAR-NIASM has been awarded as Best Exhibition Stall in agriculture category at the exhibition. The institute staff Dr DD Nangare, K Ravi Kumar and Rajesh Pawar have coordinated NIASM participation at the exhibition.

Celebration of 16th Foundation Day and ICAR-NIASM-KVK Interface Meeting

The ICAR-National Institute of Abiotic Stress Management (NIASM) celebrated its 16th Foundation Day on 21st Feb 2024. On this occasion ICAR-NIASM-KVK interface meeting aimed at fostering collaboration with Krishi Vigyan Kendras (KVKs) in Maharashtra and state agricultural departments. The event served as a platform to showcase the institute's cutting-edge agricultural technologies, to benefit farmers and advance farming practices. The inauguration program featured distinguished guests, including Dr KV Prasad, Director of ICAR-DFR Pune, as the chief guest, along with Dr CS Patil, Director of Extension Education, MPKV Rahuri, and Miss. Rashmi Joshi, Subdivisional Agricultural Officer, as esteemed guests of honour. Dr K Sammi Reddy, Director of ICAR-NIASM, provided a comprehensive overview of the institute's achievements and future initiatives, highlighting the recent initiation of a BSc agricultural program under IARI to enhance agricultural education. During the interface meeting, pivotal abiotic stress management technologies were demonstrated to KVKs and representatives of state agricultural departments. Miss. Rashmi Joshi, appreciated ICAR-NIASM's initiative in showcasing essential technologies to stakeholders and expressed wholehearted support for collaborative efforts. Dr CS Patil emphasised the crucial role of scaling up these technologies to farmers' fields, with KVKs playing a pivotal role in implementation. The event also witnessed the release of significant publications, including the Newsletter of ICAR-NIASM and technology bulletin, "Mitigating Abiotic Stress in Agriculture: Promising Technologies" in both English and Marathi. The technology bulletin outlined effective strategies for abiotic stress mitigation, addressing the challenges faced by the farming community. An award ceremony recognised outstanding scientists, technical, and administrative staff for their exceptional contributions to institute development. Chief Guest Dr K.V. Prasad commented on ICAR-NIASM's progress, expressing optimism for future achievements and acknowledging the technologies developed over the past 15 years as milestones in supporting farmers. In the post-inauguration technical sessions of the NIASM-KVK Interface Meeting, approximately 73 invitees from KVKs of Maharashtra and state agricultural departments

participated. The session focused on showcasing 15 innovative agricultural technologies, covering diverse topics such as barren land transformation, water-saving methods, climate-resilient farming, and novel practices like Kharif Chickpea cultivation and chia-based intercropping. These insights provided practical solutions for sustainable and resilient agriculture, particularly in Maharashtra's semi-arid region. During the valedictory session, the Chief Guest reiterated that the event had served as a valuable platform for knowledge exchange and collaborative efforts, emphasising ICAR-NIASM's commitment to enhancing climate-resilient agricultural practices for the betterment of farmers and the agricultural sector. Participants shared positive feedback, acknowledging the innovation and practicality of the showcased technologies, which are composed to enhance farmers' income in the semi-arid region. Dr NP Kurade, the Convener of the program, extended a vote of thanks to conclude the event.



ICAR-NIASM joins in organising National Conference on Novel Strategies for Mitigating Biotic and Abiotic Stresses for Agricultural and Environmental Sustainability

ICAR-National Institute of Biotic Stress Management, Raipur, Chhattisgarh in collaboration with ICAR-National Institute of Abiotic Stress Management, Baramati, Maharashtra & Amity University, Raipur, Chhattisgarh organised a National Conference on Novel Strategies for Mitigating Biotic and Abiotic Stresses for Agricultural and Environmental Sustainability during 28-29 February 2024. The

Chief Guest Dr S Ayyappan, Padma Shri awardee and former Secretary, Department of Agricultural Research & Education, and Director General, ICAR, underscored the institute's significant role in advancing One Health and food security with a focus on plant health. Dr PK Ghosh, Director, ICAR-NIBSM, Raipur highlighted the importance of understanding the biotic and abiotic stresses to increase farmers' income and reduce the risk in line with the national objective of doubling the farmers' incomes. Dr K Sammi Reddy, Director, ICAR-NIASM, spoke about the development of an abiotic stress information system and facilitating NIASM-KVK interaction for neglected areas in Maharashtra and Chhattisgarh. Prof Piyush K Pandey, Vice-Chancellor, Amity University Chhattisgarh, Raipur, outlined the university's global presence and its local presence in Chhattisgarh. Dr SN Puri, former Vice-Chancellor of CAU, Manipur, emphasised the origins of the NIBSM and NIASM as deemed universities of national importance, aiming to strengthen capabilities of graduate and postgraduate student. The Special Session on Academia-Industry Interaction allowed industry partners to showcase their products and exchange perspectives. A Panel Discussion on novel strategies for mitigating biotic and abiotic stresses featured distinguished speakers. About 250 distinguished scientists, industry partners and students attended the event.



International Women's Day

On the occasion of International Women's Day, a Health Camp was conducted at ICAR-NIASM on March 14th 2024. Dr K Sammi Reddy, Director of the National Institute of Abiotic Stress Management in Malegaon, Baramati emphasised the significance of employee health in enhancing organisational productivity. The event commenced with the acknowledgment of esteemed guests, Dr Vikas Lonkar (MD Medicine) from Jagannath Hospital, Baramati, and Dr Vanita Kokare (BAMS, DGO) from Sae Maternity and General Hospital, Malegaon. The Health Camp provided various

health assessments including weight, blood pressure, pulse rate, blood sugar levels, CBC blood tests, and ECG tests, all conducted free of charge. A total of 200 staff members, comprising scientific, administrative, technical, and farm personnel, availed themselves of the services. Dr Lonkar and Dr Kokare actively engaged with the staff, offering consultations and guidance. Dr Vanita Salunkhe, Smt. Purnima Ghadage, Dr Aliza Pradhan, and Dr Harisha successfully coordinated the program under the guidance of the Director, NIASM, Baramati.



SERB sponsored High End Workshop (KARYASHALA) on Advanced Instrumentation in Abiotic Stress Management

ICAR-NIASM organised a SERB sponsored high end workshop (Karyashala) on "Advanced Instrumentation in Abiotic Stress Assessment, Monitoring and Management for Sustainable Agriculture" (11-20 March 2024). 25 students (5 MSc and 20 PhD) comprising 13 boys and 12 girls from 16 Universities of India covering 11 different disciplines participated in the workshop. The 10-day long workshop included technical sessions on basics and principles as well as hands on training on advanced instruments related to nanotechnology, micronutrient and heavy metal extraction of soil and plant samples, gene silencing, thermal imaging, plant phenotyping, biotic and abiotic stress interactions, crop water production functions, spectral radiometer, weather forecasting, floral biology, soil carbon and moisture estimation, post-harvest quality management. It also included sessions on statistical designs and publication ethics. Dr K Sammi Reddy, Director, ICAR-NIASM was the Chief Guest for valedictory session on 20th March 2024. Dr Reddy in his concluding remarks highlighted the significance of the workshop in professional growth of students and emphasised on acquiring the skills and their practical applications in their respective research areas. Guest of Honour, Dr KK

Pal, HoS, SWSM emphasised the program's importance and the benefits it will offer to the participants in their future prospects. Certificates were distributed to the trainees. Vote of thanks was proposed by Dr Amrut Morade, Course Co-Director. ICAR-NIASM duly acknowledged the funding support from SERB (accelerate Vigyan) platform.



One-day Workshop on Management Techniques of Mahogany Agroforestry System

On March 23, 2024, ICAR-NIASM and MITCON Pune jointly organised a one-day workshop on "Management Techniques of Mahogany Agroforestry Systems" aimed to enhance the understanding and skills of plantation officers regarding Mahogany-based agroforestry systems, thereby contributing to sustainable agricultural practices and rural development in Maharashtra. A total of 25 field agronomists from across the state and Mahogany farmers attended the workshop. Dr K Sammi Reddy, Director, ICAR-NIASM, graced the function as chief guest. Shri Tushar Chavan, Deputy Conservator of Forest (Wildlife), Pune, was the special guest, and Dr Atul Ayare, Vice President of Climate Change and Sustainability at MITCON, Pune, was the guest of honor. Dr Sangram Chavan, Senior Scientist (Agroforestry) and convener of the workshop, provided an overview of the program, highlighting scientific techniques from planting to harvesting of mahogany agroforestry to enhance farmers' income. Dr Atul Ayare emphasised the vital role of agroforestry in mitigating climate change and informed about Mahogany's potential in carbon credit programs. Shri Tushar Chavan shared valuable insights on government schemes related to the Agroforestry sector, mentioning that Mahogany plantations do not require permits from the forest department for planting, harvesting, and transportation in Maharashtra. Dr K Sammi Reddy, Chief Guest, elaborated on how agroforestry can improve India's degraded land and significantly contribute to increasing farmers' income. He also stressed the importance of developing a complete value chain to increase adoption and achieve the net-zero target of carbon emissions. During the workshop, technical bulletins on Scientific Pruning Techniques of Mahogany and Mahogany agroforestry were released. In the technical session, Dr Sangram Chavan presented detailed scientific information on Mahogany agroforestry systems, constraints faced by farmers, and the role



Organised State Level Workshop (SLW) on Commercial Dragon Fruit Farming

On 17.03.2024, ICAR-NIASM, organised a one-day state-level workshop (SLW) on 'Commercial Dragon Fruit Farming' in collaboration with SILLC, Agrowon, and Sakal Media Group in Sakalnagar (Pune). Around 25-30 progressive farmers and entrepreneurs participated throughout Maharashtra. Mr Amol Birari, AGM, SILLC briefly introduced the experts and organising team from ICAR-NIASM, Baramati. Dr Wakchaure, Senior Scientist (AS&PE), gave a lecture on "Scope, Constraints, Marketing, and Postharvest Opportunities in Commercial Dragon Fruit Farming from Water Scarce and Degraded Land" and then demonstrated the various value-added products (Dragon fruit juice, peel candy, jelly, etc.). Dr Boraiah KM, Scientist (Plant Breeding) briefed about the status and constraints of varietal/hybrid development, and supplementary pollination to prevent yield loss associated with rainfall during the anthesis period for enhancing the productivity and quality in dragon fruit. Dr Vijay Kakade, Scientist (Fruit Science), spoke briefly about soil, planting materials, nursery management, pruning, sunburn, irrigation, intercropping, and pest and disease management. After technical sessions, the questions/answers round was held to allow farmers to exchange knowledge and problems faced in dragon fruit farming and processing. All participants and SILLC personnel complimented the support of Dr K Sammi Reddy, Director, ICAR-NIASM for organising the workshop.

of plantation managers. Following this, field training on pruning and protection aspects of Mahogany was organised for participants at a nearby Mahogany plantation. Twenty-five plantation managers from MITCON Nature Based Solutions representing different parts of Maharashtra, and a couple of farmers attended the training. The program was anchored by Dr Amrut Morade, Scientist (Fruit science) and concluded with a vote of thanks by Dr Vijay Kakade, Scientist (Fruit Science).



Awareness Program on Conservation Agriculture and Distribution of Household Inputs

As part of the Consortia Platform on Conservation Agriculture (CRPCA), the ICAR-National Institute of Abiotic Stress Management, Baramati, Pune, organised an Awareness Programme on Conservation Agriculture and distributed household inputs to scheduled caste (SC) beneficiaries from Malegaon, Mekhali and Pimpali villages in Baramati Tahsil on March 29, 2024. Dr K Sammi Reddy, Director (NIASM) graced the occasion and advised the SC women beneficiaries to best utilise household inputs and sewing machines for uplifting livelihood. Dr KK Pal, Head SWSM briefed about the SCSP scheme and appreciated efforts of the CRPCA team for organising the event. Dr GC Wakchaure, PI and Senior Scientist (ASPE) explained of benefit of implementing conservation agriculture in terms of residue management, crop diversification, and minimal soil disturbance in ratoon sugarcane. The program was ordained by CRPCA team members Dr GC Wakchaure, Dr Aliza Pradhan, Dr Paritosh Kumar, and Mr Bhushan Gawhale. A total of 30 beneficiaries participated in the events.



ICAR-NIASM meeting with TechnoServe India

A meeting of delegates from TechnoServe India (Ashwattha Advisors Pvt Ltd) and Scientists of ICAR-National Institute of Abiotic Stress Management, Baramati, Pune was held on Tuesday, April 16th, 2024 to explore Partnership in advancing natural resource management, student internships and campus hiring. Dr K. Sammi Reddy, Director ICAR NIASM welcomed the delegation from TechnoServe India (Ashwattha Advisors Pvt Ltd) for a collaborative engagement focusing on resource management, student internships, campus hiring, and knowledge exchange within the realms of agriculture and allied domains. The delegation, comprising Sridhar Shankar, Senior Manager Human Resources, Rupesh Mukherjee, Senior Program Manager; Shifali Sharma, Assistant Manager from the Dairy Value Chain program; Dr Sham Londhe, consultant and Tejashree Khedekar, HR Operations Specialist; engaged in fruitful discussions with scientific staff and interaction with PG students of ICAR-NIASM for internship opportunities. TechnoServe India briefed about its ongoing projects and expressed keen interest in synergising with the scientific expertise of the institute. They extended internship opportunities to students, offering involvement in live projects to assess gaps within dairy partners' milksheds and devise viable solutions. Dr K Sammi Reddy, underscored the significance of this collaboration in enhancing student placements and furthering the institute's objectives. He entrusted Dr Bhaskar Gaikwad, Senior Scientist and Chairman of the placement cell and Ms. Ponnaganti Navyasree, Scientist and Convener of the training and placement cell, with liaising with students regarding internship opportunities and maintaining communication with Technoserve India for future collaborations. The event, anchored by Dr Nitin P Kurade, Principal Scientist (Veterinary Pathology), concluded with the vote of thanks delivered by Dr Bhaskar Gaikwad, Senior Scientist (Farm Machinery and Power).



Celebration of World Environment Day

ICAR-NIASM has celebrated World Environment Day on 5th June 2024 and various activities were carried out to create awareness about importance of environment as per guidelines issued by council. Before 26th May build-up phase for the development of social media creatives, a competition was organised to make pictures and videos on the theme of World Environmental Day among staff and students of ICAR-NIASM. Several students and staff members participated in the competition. Prizes for the same were distributed to 1st, 2nd, and 3rd best creative entries during the function. The logos of ICAR, NIASM, LiFE, and Prakriti for co-branding Mission LiFE were incorporated into such creatives. The social media plan was implemented by uploading selected creatives on various MoAFW and ICAR-NIASM social media platforms. On 5th June, World Environment Day was organised at the institute auditorium, ensuring the participation of farmers (DAPSC beneficiaries), students, other villagers, and NIASM staff. Farmers, students, and staff also carried out tree plantation activity. Lectures on Tree plantation by Dr Sangram Chavan and on drought resilience and soil amendments by Dr Aliza Pradhan were organised. The soil amendments based on soil health cards distributed in the village on Soil Health Day (under DAPSC 2024-25) last year. During his remarks, Dr K Sammi Reddy, Director, ICAR-NIASM narrated about the LiFE mission, to create awareness among participants about environment conservation. He also gave the LiFE mission pledge to the participants. Officials from KVK and the Agriculture Department also participated in the awareness activity.



Organisation of Blood Donation Camp

A Blood Donation Camp was organised at ICAR-NIASM, on the occasion of World Blood Donor Day on 14 June 2024, in collaboration with the NIASM Cultural and Recreation Club (NCRC) and

Akshay Blood Bank, Solapur. This camp was inaugurated by Dr K. Sammi Reddy, Director NIASM, Sh. Aditya Kate, Sarpanch, Malegaon Kh. and Sh. Sunil Shirke, Former Sarpanch, Malegaon Kh. On this occasion, a total of 80 individuals, including staff, students, YPs, SRFs, RAs, field staff, and family members of the staff, donated blood with much enthusiasm and solidarity. The camp was coordinated by Sh. Dayanand Kharat, General Secretary of NCRC, under the supervision of Dr S. K. Das, Chief Finance & Accounts Officer, and Dr N. P. Kurade, Vice-President of NCRC, with able guidance and encouragement from Dr K. Sammi Reddy. The blood bank issued certificates to all the donors and assured to provide blood free of cost for a period of life time to all the donors and their family members in case of emergency situations in the future. A team of around 10 members, including health professionals from Akshay Blood Bank, Solapur, and AMAs of ICAR-NIASM, ensured the event was conducted flawlessly. The Director also acknowledged the services of the volunteers and the NIASM Cultural and Recreation Club (NCRC). Lastly, the team leaders of Akshay Blood Bank praised the efforts of ICAR-NIASM in achieving such a great response from the donors and presented a trophy as a token of appreciation to ICAR-NIASM, Baramati.



Capacity Building Program on “Efficient Administrative and Financial Management for the Administrative Personnel of KVKs in India”

The ICAR-NIASM successfully organised the inaugural programme on 19 June 2024 on "Capacity Building Program on Efficient Administration and Financial Management" tailored for the administrative personnel of Krishi Vigyan Kendras (KVKs) across India. The program saw the enthusiastic participation of 175 individuals who joined virtually representing 141 KVKs from 20 states and 11 ATARIs, with a gender distribution of 85% male (148) and 15%

female (27). The event was graced by several eminent guests: Dr Suresh Kumar Chaudari, Deputy Director General (Natural Resource Management), ICAR, who joined virtually as the Chairman of the program, Dr K Sammi Reddy, Director of ICAR-NIASM, Dr A K Singh, Principal Scientist and Head, SASM, and HRD Chairman of ICAR-NIASM, Dr S K Das, Chief Finance and Accounts Officer (CFAO) and Program Director, ICAR-NIASM, Dr Hanamant Halli, Scientist, SESM, HRD Nodal Officer, ICAR-NIASM, Dr Aliza Pradhan, Scientist, SDSM, ICAR-NIASM, and Program Co-ordinator. The program commenced with an insightful introduction by Ms. Navyasree, Scientist, ABM, and Dr Sonam, Scientist, Agricultural Meteorology, setting the stage for the day's proceedings. The gathering then resonated with the ICAR and ICAR-NIASM song, fostering a sense of unity and purpose among the participants. The formal inauguration involved the symbolic watering of plants, signifying growth and sustainability. Dr Aliza Pradhan, Scientist (Agronomy) & Programme Coordinator extended a warm welcome to the dignitaries and participants. Dr S K Das, Chief Finance and Accounts Officer (CFAO) and Program Director provided a comprehensive briefing on the objectives and structure of the program, underscoring its importance in enhancing administrative and financial management skills. Dr A K Singh, Principal Scientist & Head and HRD Chairman offered an overview of the program, sharing valuable insights into its significance and anticipated outcomes. Dr K Sammi Reddy,

Celebration of International Day of YOGA – 2024

International Yoga Day (June 21, 2024) celebrations were organised with practicing of YOGA by all the staff of ICAR-NIASM from 8.00 am to 9.30 am in ATIC Hall at Admin Building. Dr Pravin Taware (ACTO) introduced the program with brief information on 'Common Yoga Protocol' designed by the Ministry of AYUSH, Govt. of India. He demonstrated the various loosening exercises, asanas, pranayama and dhyana. The Director, Dr K. Sammi Reddy, in concluding remarks, highlighted the importance of Yoga in everyday life. The Director also advised to arrange such awareness programs for staff and students at

Director, ICAR-NIASM, emphasised the critical aspects of efficient budget utilisation, PFMS /TSA, GeM procurement, and good governance, covering all key topics succinctly. Dr Suresh Kumar Chaudari, DDG (NRM), ICAR and Chairman of the program, joining virtually, delivered the concluding remarks, stressing the importance of the program and its potential impact on improving administrative efficiency. He further accentuated as KVKs are the integral part of ICAR system, such type of capacity building programme will enhance the efficiency of the personnel attending the programme which will result in augmenting the organisational efficiency. Dr Hanamant Halli, Scientist & HRD Nodal Officer expressed heartfelt gratitude to all dignitaries, participants & coordinators. The programme was successfully coordinated by the Programme Coordinators Dr Sonam, Scientist (Agricultural Meteorology) Ms. Navyasree, Scientist (Agri Business Management), Dr Nobin Chandra Paul, Scientist (Agricultural Statistics) and Course Coordinators Shri Dayanda Pendurang Kharat, AAO and Shri Trilok Saini, AAO. The program concluded with the National Anthem, instilling a sense of pride and unity among the attendees.



frequent intervals. Total 58 members of NIASM staff comprising of the Scientists, Technical and Administrative personnel along with Research scholars, Young Professionals and Students participated the program with enthusiasm.



LIST OF PROJECTS

Umbrella Projects

1. Abiotic Stress Information System (ASIS): Geo-spatial digital maps of multiple abiotic stresses, management options and future scenarios (IXX15659).
2. Germplasm Conservation and Management (GCM): Genetic Garden and gene bank for abiotic stress tolerant plants, animals and fisheries for food security and sustainability (IXX15674).
3. Model Green Farm (MGF): Environment-friendly, economically viable, state-of-the-art model farm for abiotic stressed regions (IXX15700).
4. Climate-smart IFS (CIFS): Climate resilient integrated farming system in semi-arid region (IXX15697).

Flagship Projects

1. Adaptation and mitigation of atmospheric stress in crops, livestock, poultry and fishes for sustainable productivity and profitability (IXX15676).
2. Augmenting farm income in water scarce regions with alternative crops (IXX15656).
3. Bio-saline Agriculture: Exploitation of halophytic plant and associated microbiome for amelioration of saline agricultural land of arid & semiarid regions (IXX15657).
4. Targeting prospective technologies for abiotic stress resilience in rainfed and dryland region (IXX15699).

Institute Projects

1. Wastewater treatment synergising with integrated approach of constructed wetland and aquaponics (IXX14228)
2. Nutrient and gene interaction approaches through nutrigenomics in response to multiple stressor (IXX15014)
3. Mitigating water stress effects in vegetable and orchard crops (IXX16553).
4. Genomics, genetic and molecular approaches to improve water stress tolerance in soybean and wheat (IXX15660)
5. Climate resilient agriculture practices for enhancing food grain production from low soil available water storage capacity areas of Deccan Plateau region (IXX20120)

6. Assessing the host-sandalwood interactions under abiotic stressed environment for adaptability & income generation.
7. Marginal quality water remediation by integrated constructed wetland and aquaponics (IXX19881)
8. Exploring morpho-physiological, biochemical, and molecular traits in onion and its wild relatives for tolerance to combined waterlogging and anthracnose.
9. Pilot study on multiple abiotic stress mapping for Western Maharashtra (IXX20117)
10. Salinity and drought tolerance studies in Mango (*Mangifera indica* L.) (IXX20121).
11. Climate variability, teleconnections and their impact on selected crops of India (IXX20119)
12. Quantifying the extent of water stressed soybean and cotton area in relation to meteorological variables in Vidarbha region using remote sensing
13. Marginal quality water remediation by integrated constructed wetland and aquaponics
14. Climate resilient agriculture practices for enhancing food grain production on the low soil available water capacity area of Pune district.

External/Contractual/Consultancy Projects

1. Phenotyping of pulses for enhanced tolerance to drought and heat (OXX01737: ICAR-NICRA).
2. Conservation agriculture for enhancing resource-use efficiency, environmental quality and productivity of sugarcane cropping system (OXX03355: ICAR-CRPCA).
3. Establishment of model herbal garden for medicinal and aromatic plants (OXX4927: NMPB, New Delhi).
4. Climate smart management practices (OXX4928: IRRI).
5. Studies on N-(n-butyl) Thiophosphoric Triamide (NBPT) as a Urease Inhibitor for Improving Nitrogen Use Efficiency in major cropping systems in India (OXX4926: CIMMYT).
6. Genomics strategies for improvement of yield and seed composition traits under drought stress conditions in soybean (OXX4929: ICAR-NASF).
7. Development of Nano-based delivery system to mitigates arsenic pollution, ammonia and

temperature stress on growth and immune related gene expression in fish (OXX5181: LBS Award).

8. Agri Drone Project (OXX5501: Central Sector Scheme, Ministry of Agriculture and Farmers Welfare, GOI).
9. Efficacy of bio-stimulants in alleviating drought stress in tomato (*Solanum lycopersicum* L.) (OXX5500: Yara Fertilizers India Pvt. Ltd.).
10. Investigating the impact of varying nutrient composition on morphometric, physiological and yield traits in Potato. (OXX6276: Novem Solutions Pvt Ltd, Hospet, Karnataka).
11. Atlas of Climate Adaptation in South Asian Agriculture (ACASA): interconnections between climate risks, practices, technologies,

and policies. (OXX7240: Funded by Bill and Melinda Gates Foundation, anchored by BISA-CIMMYT).

12. Development of Nano-based delivery system to mitigate arsenic pollution, ammonia and temperature stress on growth and immune related gene expression in fish (OXX5467: SERB-DST).
13. Development of effective mass propagation techniques for rapid multiplication and easy transportation of quality planting material in Bajra-Napier Hybrid (Funded by National Livestock Mission, MOFAHD, GOI).
14. Genome Editing for Improvement of Yield under Water and Salinity Stress Conditions in soybean through Targeted Knockout of Negative regulators (Funded by ICAR-EFC).

SEMINAR/WORKSHOP/SYMPOSIA/TRAINING ATTENDED

Name of staff	Title of Seminar/Workshop/Symposia/Conference/Training attended	Venue	Organised by	Dates
ICAR-NIASM Scientific Staff	IP Awareness Training Programme	Online	IP&TMU, ICAR New Delhi	20-26 Jun 2024
Dr KK Pal	National Conference 'Novel strategies for mitigating biotic and abiotic stresses for agricultural and environmental sustainability'	ICAR-NIBSM, Raipur	ICAR-NIBSM, ICAR-NIASM and Amity University	28-29 Feb 2024
	National Conference on 'Expanding the horizons of Microbial Research in Agriculture'	ICAR-NBAIM, Mau	ICAR-NBAIM and Association for Conservation of Microbes and Application	10-11 Jun 2024
Dr DD Nangare	Mega Exhibition 'Shining Maharashtra 2024'	Phaltan	Sansa Foundation	19-21 Feb 2024
	52 nd meeting of Joint Agresco	Dr PDKV Akola	Dr PDKV Akola	07-09 Jun 2024
	Training Programme on "Current Methodologies for Water Footprint Estimation and Techniques for Water Saving"	Online	ICAR-Indian Institute of Water Management, Bhubaneswar	18-20 Mar 2024
Dr Rinku Dey	Pedagogy Development Programme (Training) on "Enhancing Pedagogical Competencies for Agricultural Education" at	NAAS, New Delhi	NAAS, New Delhi	29 Jan 29 - 02 Feb 2024
	National Conference 'Novel strategies for mitigating biotic and	ICAR-NIBSM,	ICAR-NIBSM, ICAR-NIASM and	28-29 Feb 2024

	abiotic stresses for agricultural and environmental sustainability’	Raipur	Amity University	
Dr SS Pawar	Training Programme on “Bioinformatics Advances in Genomics Data Analysis”	Online	ICAR-IASRI, New Delhi from	24-28 Jun 2024
Dr VN Salunkhe	National Conference on ‘Novel strategies for mitigating biotic and abiotic stresses for agricultural and environmental sustainability’	ICAR-NIBSM, Raipur	ICAR-NIBSM, ICAR-NIASM and Amity University	28-29 Feb 2024
Dr Harisha CB	3 rd Indian Horticulture Summit-Cum International seminar 2024	RARI, Jaipur	Society for Horticulture Research and Development, Ghaziabad and SKNAU, Jobner	01-03 Feb 2024
Dr Gopalakrishnan B	International Webinar on “Functional Phenomics for Improved Climate Resilience in Tropical Agriculture”	Online	ICAR-Central Tuber Crops Research Institute, Thiruvananthapuram	04 Jan 2024
	Webinar on “Harnessing Remote Sensing for Sustainable Resource Management: Opportunities and Challenges”	Online	SRM University, AP and APSAC, Andhra Pradesh	15 Jan 2024
Dr Gurumurthy S	National Symposium on “Transforming IARI into a global leader in agricultural research and education”	NASC, New Delhi	IARI Alumni Association, ICAR, NAHEP, ICAR-IARI	22 Jun 2024
Dr Paritosh Kumar	Pedagogy Development Programme on "Enhancing Pedagogical Competencies for Agricultural Education"	NAAS, New Delhi	NAAS, New Delhi	04-08 March 2024
Dr Aliza Pradhan	International conference on “Sustainability: challenges and opportunities in global sugar industry”	VSI, Pune	VSI, Pune	12-14 Jan 2024
	National Conference ‘Novel strategies for mitigating biotic and abiotic stresses for agricultural and environmental sustainability’	ICAR-NIBSM, Raipur	ICAR-NIBSM, ICAR-NIASM and Amity University	28-29 Feb 2024
	Training on “Current methodologies for water footprint estimation and techniques for water saving”	Online	ICAR-IIWM, Bhubnaeshwar	18-20 Mar 2024
	5 th Global Food Security Conference towards equitable, sustainable and	Leuven, Belgium	Elsevier, KU Leuven,	09-12 Apr 2024

	resilient food systems		Wageningen University	
Dr RN Singh	National Seminar on “Smart Technologies for Sustainable Agriculture and Environment”	ICAR-CRIDA, Hyderabad	ISAP and ICAR-CRIDA	22-23 Feb 2024
Dr Basavaraj PS	National Conference ‘Novel strategies for mitigating biotic and abiotic stresses for agricultural and environmental sustainability’	ICAR-NIBSM, Raipur	ICAR-NIBSM, ICAR-NIASM and Amity University	28-29 Feb 2024
	2 nd International Conference On “Modernized Technologies for Climate Change in Agriculture (ICMTCA- 2024)	Mother Terasa College of Agriculture, Pudukkottai, Tamil Nadu	Mother Terasa College of Agriculture, Pudukkottai, Tamil Nadu	21 May 2024
Dr SS Changan	Training on “Advances in applications of nanotechnology”	ICAR-Central Institute for Research on Cotton Technology, Mumbai	ICAR-Central Institute for Research on Cotton Technology, Mumbai	29 Jan - 08 Feb 2024
Dr NC Paul	Training programme on "Enhancing Pedagogical Competencies for Agricultural Education"	NAAS, New Delhi	NAAS, New Delhi	01-05 Apr 2024
	Training programme on " Geospatial Technologies & Applications"		NRSC (ISRO), Hyderabad	01-05 Jul 2024
Ms Ponnaganti Navyasree	Training programme on "Enhancing Pedagogical Competencies for Agricultural Education"	NAAS, New Delhi	NAAS, New Delhi	01-05 Apr 2024

PERSONALIA

Awards

1. **ICAR-NIASM** received Best Exhibition stall in Mega Exhibition ‘Shining Maharashtra 2024’ held at Phaltan from 19 to 21 Feb 2024.



2. **Dr SB Chavan** received Eminent Scientist Award-2022 from Society for Climate Change and Sustainable Environment, New Delhi on 3rd Jan 2024.

3. **Dr Harisha CB** was awarded the Best poster award for an article entitled “Stress indices and photosystem II revealed the deficit moisture stress tolerant genotypes of fennel.” In 3rd Indian Horticulture Summit-Cum International Conference-2024 held at RARI, Durgapura, Jaipur during 1-3 Feb 2024.
4. **Dr Harisha CB** was awarded the “Best popular articles award” during 16th Foundation of ICAR-NIASM, Baramati during 21st Feb 2024.
5. **Dr Aliza Pradhan** received SERB financial grant for conducting high-end Karyshala on “Advanced Instrumentation in abiotic stress assessment, monitoring and management for sustainable

6. agriculture” from 11-20 March, 2024 at ICAR-NIASM.
7. **Dr RN Singh** received the KN Syngal Memorial Gold Medal for best PhD thesis in NRM by ICAR-IARI, New Delhi (Feb 2024).
8. **Dr RN Singh** received the PD Mistry Award for best PhD thesis in Agricultural Meteorology by Association of Agrometeorologists (AAM), Anand, Gujarat (Feb 2024).
9. **Dr RN Singh** received the IARI merit medal for best PhD work by ICAR-IARI, New Delhi (Feb 2024).



10. **Dr RN Singh** received the SS ray best doctoral thesis award for best PhD thesis in Agrophysics by the Indian Society of Agrophysics (ISAP), New Delhi (Feb 2024).



11. **Dr Basavaraj PS** received Best oral presentation award at 2nd International Conference on “Modernised Technologies for Climate Change in Agriculture (ICMTCA-2024) held on 21st May 2024 organised by Mother Teresa College of Agriculture, Pudukkottai, Tamil Nadu.
12. **Dr SS Changan** received top performer trainee award during a ICAR short course training on “Advances in applications of nanotechnology” held during 29th January to 8th February 2024 at ICAR-Central Institute for Research on Cotton Technology, Mumbai.
13. **Dr SS Changan** was awarded the “High Rated Publication Award” on 16th Foundation Day of ICAR-NIASM, Baramati on 21st February 2024.
14. **Dr NC Paul** received Best Oral Presentation Award in 74th Annual Conference of Indian Society of Agricultural Statistics on “Harnessing Statistics and Artificial Intelligence for Sustainable and Smart Agriculture” organized by Department of Agricultural Statistics, N.M. College of Agriculture, Navsari Agricultural University, Navsari, Gujarat from 02-04 February, 2024.

Joinings and Foreign Visits

Joinings

1. Mr Dinesh Tekwani, joined as Administrative Officer (AO) on 20.04.2024
2. Mr Junaidkhan Jafarkhan Pathan, joined as Administrative Officer (AO) on 24.04.2024
3. Mr Ashutosh Chandra, joined as Technician (T-1) on 03.06.2024
4. Mr Durub Kumar, joined as Technician (T-1) on 25.06.2024

Foreign Visits

1. Dr Aliza Pradhan participated in 5th Global Food Security Conference 2024, held at Ku Leuven, Belgium from 09 to 12 April 2024 (SERB-International Travel Support and INSA Travel Grant).





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ICAR-National Institute of Abiotic Stress Management

(समतुल्य विश्वविद्यालय)

बारामती, पुणे, महाराष्ट्र ४१३ ११५

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