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भाकृअनुप
ICAR

राअस्ट्रैप्रसं
NIASM

# FARM COORDINATOR

## ... कृषि तकनीकी समन्वय पत्र

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ICAR-NATIONAL INSTITUTE OF ABIOTIC STRESS MANAGEMENT

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# FARM COORDINATOR

... कृषि तकनीकी समन्वय पत्र

भाकृअनुप ICAR

राअस्ट्रैप्रसं NIASM

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**निदेशक के लेखनी से...**

विभिन्न अनुसंधान और सामान्य क्षेत्रों में खरीफ सीजन की बुवाई पूरी हो चुकी है और खरपतवार प्रबंधन, पौध संरक्षण, पोषण और सिंचाई के लिए रखरखाव गतिविधियाँ प्रगति पर हैं। इस महीने केवल 72.4 मिमी बारिश हुई, वह भी दूसरे सप्ताह के दौरान। नहर बंद होने के बावजूद आवश्यक सिंचाई का प्रबंधन खेत के तालाबों में जमा पानी के माध्यम से किया जा सका है। बागों में, पौधों की सुरक्षा के साथ चंदवा प्रबंधन प्रमुख गतिविधियाँ थीं। 'भाकृअनुप स्थापना दिवस' के अवसर पर वृक्षारोपण कार्यक्रम के रूप में, अन्य वृक्षारोपण गतिविधियों के साथ परिसर में एक 'नक्षत्र उद्यान' की स्थापना की गई है। नक्षत्र उद्यान का उद्देश्य जैव विविधता संरक्षण करना है जिसमें गोलाकार व्यवस्था में लगभग 42 विभिन्न प्रजातियों के पेड़ लगा दिए गए। इसने पारंपरिक ज्ञान का उपयोग करते हुए परिसर में नवाचार निर्माण किया गया है।

अगस्त माह के लक्ष्यों में स्थायी उत्पादन के लिए खेतों की फसलों और बगीचों में प्रौद्योगिकियों के उन्नत पैकेज का विकास और कार्यान्वयन शामिल है। जैविक और पौष्टिक रूप से समृद्ध खाद के उत्पादन के माध्यम से कृषि-अपशिष्ट के कुशल उपयोग को लक्षित करना होगा। बेहतर सौंदर्य के लिए परिसर में रखरखाव गतिविधियों को तेज करने की भी आवश्यकता है।

मैं डॉ. प्रविण तावरे और उनकी टीम को इस प्रकाशन को प्रकाशित करने और नक्षत्र उद्यान जैसे कई नवाचारों को आजमाने में उनके समर्पण और निरंतरता के लिए धन्यवाद देता हूं। मुझे पूरी उम्मीद है कि आईसीएआर-एनआईएएसएम के सभी कर्मचारियों के ऐसे एकत्रित प्रयासों से अनुसंधान प्रक्षेत्र के प्रबंधन में सुधार होगा और इसे कहीं और दोहराने के लिए यह 'मॉडल फार्म' विकसित होगा।

**From Director's Desk...**

Kharif season sowing in various research and general fields has been completed and maintenance activities through weed management, plant protection, nutrition and irrigation are in progress. This month experienced only 72.4 mm rains that too mostly during 2nd week. In spite of canal closure required irrigation could be managed through water stored in farm ponds. In orchards, canopy management along with plant protection were the major activities. On the eve of ICAR Foundation Day as a part of 'Tree Plantation Programme', a Naxatra Udyan has been established at the campus along with other plantation activities. The Naxatra Udyan is aimed at biodiversity conservation by planting trees of about 42 different species in circular arrangement. This has added to the innovations at the campus utilizing traditional knowledge.

The targets for the month of August include development and implementation of improved package of technologies in field crops and orchards for sustainable production. Efficient utilization of agro-wastes has to be targeted through production of biologically and nutritionally enriched compost. Campus maintenance activities need to be intensified for better aesthetics.

I thank Dr. Pravin Taware and his team for their dedication and sincerity in bringing out this publication and trying out several innovations such as the Naxatra Udyan. I sincerely hope that the efforts of the team and all staff of ICAR-NIASM will improve the management of research farm and make it a model farm to be replicated elsewhere.

जुलाई / July 31, 2021

हिमांशु पाठक / Himanshu Pathak

**Kharif sowing and management:** All the sowing activities were completed during first fortnight. Few fields are left un-sown for early or different date *rabi* sowing. Though canal water was not available during whole month, the sowing operations could be completed in scheduled time due to enhanced water storage facility. Further the intermittent rains reduced the water requirement to great extent. The other maintenance activities like weed management in research fields was facilitated by manual weeding. While in general fields use of selective herbicides was taken up to suppress the weed growth.

**Maintenance activities in orchards:** Dragon fruit, guava and acid lime orchards were in production phase while pomegranate, sweet orange and date palm were in fruit development stage. Due care was taken to protect fruits from adversities. In grape shoot growth was harnessed by tipping at 12-14 leaves and same was continued in case of regrowth. The damaged & infected fruits in pomegranate, Sweet orange, Acid lime and Guava were removed and destroyed by burying in soil.

**Plant Protection**: Spraying of agro-chemicals like copper oxychloride, carbendezim, mancozeb, etc was carried out to control downy mildew in grape and leaf spot in pomegranate. The spraying was also carried as a preventive measure in sweet orange, guava and dragon fruit by prophylactic applications against various diseases. In case of insect pest management, spraying of Azadirachtin, Emamectin benzoate and Deltamethrin was carried out to manage fruit borer in guava, pomegranate and to prevent fruit fly infestation in dragon fruit orchards.

**Malad farm activities**: Soybean was already sown in 6 fields at Malad farm during June month. Due to two good showers of monsoon, the crop was in very good state. Spraying of selective herbicide was carried out in two stages to manage weeds that resulted better growth of Soybean crop.

Sunflower Field

Soybean under Drip Irrigation

Fruiting in Guava Orchard

**Weed Management and Campus Cleaning**: After monsoon shores there was ample weed in and around the fields, roadsides and open areas. Manual weeding was preferred in experimental fields while selective herbicides were used in general crops. Application of Paraquat dichloride or Glyphosate was done along road sides and in open arras. All the pruned biomass from orchards, straws and weeds collected at ground was cut into small pieces by using mulcher as well as shredder for composting. Some of the wastes received at dumping site was cut into pieces with the help of shredder machine. This agro-waste is being used for composting with various enrichment treatments. Thorny & infested biomass was destroyed by incineration.

The long period average (LPA) rainfall and average temperature of July at Baramati is 67.9 mm and 26.5 °C, respectively. The details of weather during the July 2021 has been listed in Table 1 and depicted in following figure.

**Table 1.** Summary of weather variables recorded during July, 2021.

| Weather Parameters | Week | | | | Monthly | Max. | Min. |
|---|---|---|---|---|---|---|---|
| | 1st | 2nd | 3rd | 4th | | | |
| T Max (°C) | 33.6 | 30.2 | 29.7 | 29.7 | 30.5 | 34.5 | 26.9 |
| T Min (°C) | 22.1 | 22.4 | 22.0 | 21.4 | 22.0 | 23.6 | 20.2 |
| T Avg (°C) | 27.9 | 26.3 | 25.9 | 25.6 | 26.3 | 28.8 | 24.3 |
| RH Mean (%) | 67 | 86 | 82 | 79 | 79 | 95 | 62 |
| WS (km/h) | 10.3 | 8.2 | 11.1 | 13.7 | 11.0 | 15.4 | 6.7 |
| BSS (h) | 7.2 | 1.2 | 2.1 | 2.6 | 3.3 | 10.1 | 0.0 |
| Total PE (mm) | 46.1 | 24.0 | 25.7 | 31.7 | 138.7 | 8.0 | 2.1 |
| Total Rain (mm) | 4.2 | 57.0 | 4.8 | 6.4 | 72.4 | 27.0 | 0.0 |

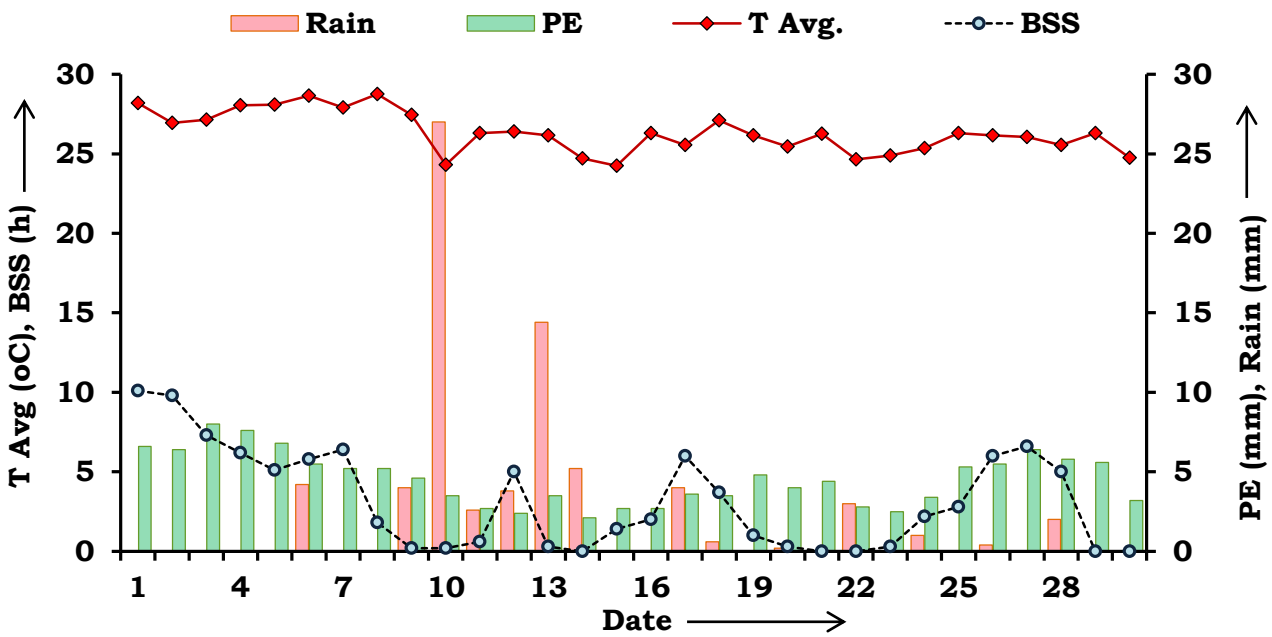



**Fig 1.** Variations of daily rainfall (Rain), pan evaporation (PE), mean temperature ($T_{Avg}$) and bright sunshine hours (BSS) during July, 2021 at ICAR-NIASM Baramati.

**Maintenance of *Kharif* crops**: All experimental as well as Kharif sowing was completed till the first fortnight of July 2021. The weed management and irrigation activities are to be continued as a part of maintenance of these crops. As the canal is supposed to start and storage water is also available so there will not be any issue of irrigation Plant protection and research treatments will be carried out as per the requirements of the project leaders. Rain showers are expected from second fortnight with high intensity therefore care is required to manage the runoff to be diverted away from crops and orchards. Therefore, cleaning of drainage water channels is pre-requisite during first fortnight.

Manual weeding operation in action

Irrigation after sowing of crops

Sapota orchard maintenance

**Orchard maintenance**: Canopy management activities in sweet orange, dragon fruit, grape, pomegranate, guava and fig need to be continued during next month. Abundant flowering in dragon fruit has been observed therefore fruit thinning and nutrition management is required for better fruit size. Management of fruit fly remains a challenge during August and September months and frequent spraying with neem-based formulations is to be continued. Number of research trials are going on in dragon fruit to address various issues so it is necessary facilitate requirements of the project leaders for treatment imposition, sampling and harvesting. In view of early and better production of mango after pruning, some treatments are to be given through soil drenching and foliar sprays.

**Plant protection**: Due to increase in humidity diseases like *Cercospora* spot and bacterial blight in pomegranate, downy mildew and anthracnose in grape, rotting in dragon fruit and other orchards create a havoc. Likewise, some pests like lemon butterfly in citrus, leaf eating caterpillars in drumstick, stem borer in mango and grape, fruit borer and fruit flies in various fruits. Prophylactic spraying for disease control and ETL based spraying for management of insect pests are required.

**Nutrition management**: Application of fertilizers in field crops and orchards will be done through soil application/ fertigation as per recommendations. Due to rains irrigation may not be required. Foliar application of soluble grade fertilizers and micronutrients will be effective.

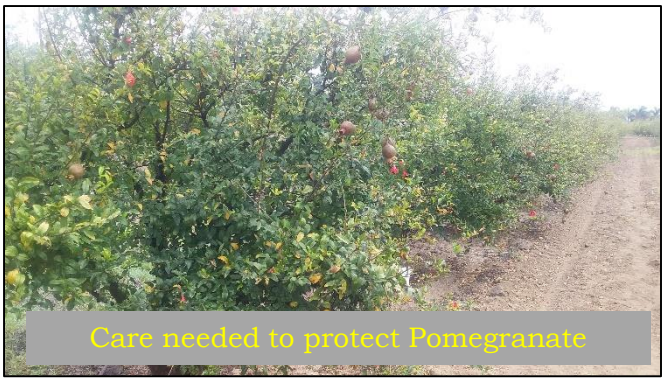
**Disposal of farm produce**: Harvesting and disposal of amla, coconuts, dragon fruit, pomegranate and lemon to be looked after through counter sale and balance produce to be sent to APMC market.

**Landscape garden maintenance**: Development of triangular portion has been started by establishing 'Naxatra Udyan'. The remaining portion is to be completed during August along with beautification at the entry point at main road.

## Integrated Disease and Pest Management

The area being in rain shadow, rains received are generally late mostly through return monsoon. The climatic conditions from August to October remain congenial for disease infections like collar rots in new plantations, bacterial and fungal blight in pomegranate, downy mildew and anthracnose in grape, citrus canker, fruit rot in dragon fruit, anthracnose in guava, etc. The pests like leaf eating caterpillars, fruit sucking moths and fruit flies become more prevalent during this period. Therefore, due care is needed through cultural practices as well as use of biopesticides, biological agents and agro-chemicals. Mealy bug pest being very notorious pests, it is required to initiate management practices for preventing its infestation in various fruit crops. Following are some of the important activities that need to be concentrated during these three months period.

1. Avoiding waterlogging: The frequency of rain is going down as against an increase in intensity during a given period. So care is needed to avoid entering the runoff into crop fields and orchards along with proper drainage to avoid waterlogging.
2. Weed management: Vigorous growth of weeds after rains is natural. The weeds harbor various pests by performing as secondary host and for diseases by providing source for primary infection and making micro-environment congenial for pathogens. Integrated weed management is needed through tillage, roughing, weeding and herbicide application.
3. Nutrition management: During rainy season fertigation cannot be done due no need of irrigation. In such case foliar application of nutrients is a better option to correct nutrition deficiencies.
4. Cultural practices: When the soil is wet heavy machinery should not be run through fields or orchards to avoid sub-surface compaction. Hand till equipment can be used for soil surface management. Similarly, training and pruning operations are required in orchards to maintain optimum canopy for disease free sustainable production.
5. Fruit cover options: Infestations like fruit borer, fruit fly and fruit sucking moths during later stage of fruit development can be managed well through fruit cover options. It helps to improve appearance and quality of the produce.
6. Harvesting and proper stage: Harvesting at proper maturity is important for better quality of produce. Especially delayed harvesting in fruits may lead to deterioration due to pest damage and fruit cracking and development of molds.
7. Spraying of agrochemicals: This should always be the last option in disease in pest management. Prophylactic spraying for diseases and ETL based use of chemicals for management of insect pests is must to face the challenge.



Care needed to protect Pomegranate

Bagging of fruits

## Establishment of Naxatra Udyan (The Constellation Park)

On the eve of ICAR Foundation Day on July 16, 2021 a Naxatra Udyan (Constellation Park) was established as a 'Tree Plantation' programme at ICAR-NIASM campus. 42 different species of plants representing 27 Naxatras were planted in the central triangle of the Institute. All the staff members including Scientists, Technical, Administration and Associate staff participated in the programme. Dr Himanshu Pathak, Director, inaugurated the establishment of 'Naxatra Udyan' by planting Vat-vriksha i.e., '*Ficus religosa*' plant.


The concept of Naxatra Udyan is basically for biodiversity conservation. There are lot many trees/ plants that are not much familiar as not been grown commonly and may become instinct in future. Therefore, arrangement has been made through vedic culture for conservation of such species by assigning them to specific zodiac positions. As the earth orbits around sun, virtually various changes in appearance of star positions can be seen from earth. The arrangement of some of these stars is presumed to have appearance resembling common living or material things; named accordingly. The 360° sky positions are divided into 27 equal parts and are named by the star arrangement in specific location. Therefore, there are 27 Naxatras (constellation) through which the sun and the moon seem to be passing through during their virtual movements around earth. Each constellation is then supposed to have an effect on certain plant species, out of which two for each have been selected for planting is this park. The plantation is arranged in three circles of 42 m, 33 m and 24 m diameter. Outer circle is having 27 main deity plants assigned to specific Naxatra, the middle and inner one has 18 and 9 secondary plants, respectively, totaling 54 plants. These plants represent 42 different species. It is supposed that one must try to conserve plant representing their Naxatra decided on the basis of birth time and place. Instead of taking this as a superstition, one must consider this an arrangement for biodiversity conservation.

**List of plant species in Naxtra Udyan:**

Golden shower (Cassia fistula), Kuchala (*Strychnos nux-vomica*), Vasaka (*Justicia adhatoda*), Amla (*Emblica officinalis*), Cutch tree (*Acacia catechu*), Cluster fig (*Ficus racemosa*), Baheda (*Terminelia bellirica*), Jamun (*Syzigium cumini*), Stone-apple (*Aegle marmelos*), Sacred fig (*Ficus religiosa*), Agar wood (*Aquilaria agallocha*), Sandalwood (*Santalum album*), Bamboo (*Dendrocalamus strictus*), Banyan tree (*Ficus bengalensis*), Flame of forest (*Butea monospema*), Juhi (*Jasminum auriculatum*), Beaty leaf (*Calophyllum inophyllum*), Washnut (*Sapindus mukorossi*), Payar peepal (*Ficus rumphii*), Arjuna (*Terminelia arjuna*), Jasmine (*Jasminum grandiflorum*), Bullet wood (*Mimusops elengi*), Red cotton tree (*Bombax ceiba*), Nagkesar (*Messua ferrea*), Night Jasmine (Nyctanthes arbourstritis), Lodhra (*Symplocos racemosa*), White damar (*Vateria indica*), Rattan cane (*Calamus rotang*), Ashoka (*Saraca indica*), Jack fruit (*Artocarpus heterophyllus*), Camel's foot (*Bahunia variegata*), Mango (*Mangifera indica*), Neem (*Azadiracta indica*), Burflower tree (*Mitragyana parvifolia*), Sonpatta (*Bahunia racemosa*), Hirda (*Terminelia chebula*). Moha (*Madhuka indica*), Tamarind (*Tamarindus indica*), etc.

Pigeon pea Germplasm Collection

Rajmah Crop Trial

Tamarind Germplasm Collection

Dhaincha Ready for Green Manure

Mango Plants' Growth

Sweet Orange Fruit Growth

Dragon Fruit Developing Orchard


Landscape Garden Maintenance

Marking for Naxatra Udyan

Auguar Pit Digging for Naxatra Plantation

## प्रगति के पथ पर

जुलाई 2021 के दौरान 'नक्षत्र उद्यान' की स्थापना के रूप में एक पहल ने नए विचारों के साथ आगे बढ़ने के लिए सकारात्मक ऊर्जा को बढ़ाया है। 'नियासम प्रक्षेत्र का अवलोकन' पर एनएसी कोर्स में व्याख्यान देने का अवसर, और उसके बाद 'फार्म मशीनरी और उपकरणों का प्रदर्शन' इस माध्यम से प्रक्षेत्र में सुविधाओं की समीक्षा और ऑडिट करने का अवसर पाया गया। क्षेत्र अनुसंधान आवश्यकताओं को सुविधाजनक बनाने के लिए इन सभी का रखरखाव प्रक्षेत्र प्रबंधन का एक अभिन्न अंग है। किसी भी समय सभी मशीनरी को कार्य उपायुक्त रखने के लिए हमेशा प्रयास किए जा रहे हैं। सुझावों के अनुसार शोध उत्पादों की थ्रेसिंग के लिए आवश्यक समय और जनशक्ति बचाने के लिए प्लॉट थ्रेशर या सिंगल ईयर-हेड थ्रेशर खरीदकर थ्रेसिंग सुविधा को अपग्रेड करने का निर्णय लिया गया है।

दैनिक कृषि पद्धतियों के दौरान काटे गए बायोमास, कचरा, खरपतवार आदि के रूप में बहुत सारा कृषि-अपशिष्ट उत्पन्न होता है। इन कृषि-अपशिष्टों को परिसर से अन्य अपशिष्टों के साथ डंपिंग यार्ड में एकत्र और अलग किया जाता है। कांटेदार और रोगग्रस्त भाग को भस्म करके नष्ट कर दिया जाएगा। इसके निपटान में एक उदाहरण स्थापित करने के लिए कृषि-अपशिष्ट प्रबंधन गतिविधियों को एकीकृत करने का निर्णय लिया गया है। इन सभी कृषि अपशिष्टों को अच्छी गुणवत्ता वाली खाद बनाने के लिए जैविक और पोषक रूप से समृद्ध किया जाएगा।

## Plan For Progress

During July 2021, an initiative in the form of establishment of 'Naxatra Udyan' has increased positive energy to step forward with new ideas. The opportunity to deliver lecture in a NAC lecture on 'Overview of NIASM Farm' followed by "Display & Demonstration of Farm Machinery & Equipment's' in field, allowed to review and audit the facilities at farm. Upkeeping of all these to facilitate the field research requirements is an integral part of Research Farm Management. The efforts are always being made to maintain all the machineries at work at any given time. As per the suggestions it has been decided to upgrade the threshing facility by procuring Plot Threshers or Single Ear-head Threshers or other small gadgets to save time and manpower required for threshing of research produces.

Lot of agro-waste in the form of pruned biomass, trash, weeds, etc. gets generated everyday during agricultural practices. These agro-wastes along with other wastes from campus are collected and segregated at dumping yard. Thorny and diseased part is generally disposed of by incineration. It has been decided to integrate the agro-waste management activities to set an example in its disposal. For this purpose some structures already have been constructed. All these agro-wastes collected at the site will be enriched biologically and nutritionally to form good quality compost.

Display & Demonstration of Farm Machineries during NAC Lecture Series

**Farm Coordinator (Issue 17) July 2021**
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