दिसम्बर / December 2020

Issue 10







FARM COORDINATOR

... कृषि तकनीकी समन्वय पत्र





भाकृअनुप – राष्ट्रीय अजैविक स्ट्रैस प्रबंधन संस्थान ICAR-NATIONAL INSTITUTE OF ABIOTIC STRESS MANAGEMENT मालेगांव, बारामती, पुणे - 413 115, महाराष्ट्र, भारत Malegaon, Baramati, Pune – 413 115, Maharashtra, India



FARM COORDINATOR

... कृषि तकनीकी समन्वय पत्र



Page 1

December 2020

Issue-10

निदेशक के लेखनी से...

वर्ष २०२० की उपलब्धियों को देखते हुए, हम समझ सकते है कि कोविड़-१९ महामारी के कारण पैदा हुई अभूतपूर्व स्थितियों को संभालना वास्तव में एक चुनौती थी। 'फार्म समन्वयक' ने इस अवधि के दौरान प्रक्षेत्र में चल रहे और प्रस्तावित कृषि कार्यों पर प्रकाश डालकर एक महत्वपूर्ण भूमिका निभाई है।

'साउथ फार्म' में विभिन्न शोध परियोजनाओं की रबी सीजन की बुवाई दिसंबर 2020 के दौरान पूरी की गई है। गन्ने के साथ-साथ गेढूं, छोते, मक्का, सूरजमुखी, प्याज और क्विनोआ और विया जैसी वैकल्पिक फसतों की इस सीजन के दौरान परिक्षण हेतु बुवाई की गयी है। क्षेत्र के राउंड के दौरान अनुसंधान परिक्षेण हेतु बुवाई की गयी है। क्षेत्र के राउंड के दौरान अनुसंधान परियोजनाओं की पूरी समीक्षा की गई। पहले से ही क्षेत्र प्रयोग बहुत अच्छी तरह से योजनाबद्ध है। क्लाइमेट-रुमार्ट इंटीग्रेटेड फार्मिंग सिस्टम, लाइवस्टॉक प्रभाग, फिशरी प्रभाग और अन्य प्रयोगों की गतिविधियों को काफी सराहना मिली। विस्तृत चर्चा में आगे की सुधारों के लिए उपयोगी सुझावों पर प्रकाश डाला गया। प्रदर्शन बोर्डों को अधिक जानकारीपूर्ण और आत्म-व्याख्यात्मक बनाने का निर्णय लिया गया है।

'फार्म समन्वयक' इन गतिविधियों को प्रस्तुत करने में महत्वपूर्ण भूमिका निभा रहा है। यह प्रक्षेत्र की उपलब्धियों और भविष्य की योजना का आकलन करता है। मुझे पूरी उम्मीद है कि इस प्रयास से नियासम और अन्य जगहों पर अनुसंधान फार्म प्रबंधन में सुधार होगा। मैं डॉ. प्रवीण तावरे और टीम को इस प्रकाशन को ताने में उनके समर्पण और नियमितता के लिए धन्यवाद देता हं।

From Director's Desk...

Looking back to the achievements of the year 2020, it was really a challenge to handle unprecedented situations aroused due to COVID-19 pandemic. 'Farm Coordinator' played important role during this period by putting light on ongoing and proposed farm operations.



Rabi season sowing of various research projects in 'South farm' have been completed during December 2020. Along with perennial sugarcane, crops like wheat, chickpea, maize, sunflower, onion and alternate crops like quinoa and chia are under trial during this season. Thorough review of the research projects was undertaken during the field visit. Already the field experiments were very well planned. The activities in Climate-smart Integrated Farming System, Livestock and Fishery units and other experiments were highly appreciative. highlighted Elaborate discussions fruitful suggestions for further improvements. It has been decided to make display boards more informative and self-explanatory.

'Farm Coordinator' is playing a crucial role in presenting the activities, assesses the achievements and plan for future targets. I sincerely hope that this effort will improve research farm management in NIASM and elsewhere. I thank Dr. Taware and the team for their dedication and sincerity in bringing out this publication.

हिमांशु पाठक / Himanshu Pathak

दिसम्बर / December 31, 2020

Contents					
Page 1	निदेशक की लेखनी से/ From Director's Desk				
Page 2	Achievements December 2020				
Page 3	Weather Summary December 2020				
Page 4	Targets January 2021				
Page 5	Challenges Ahead				
Page 6	Technical Basics for a Month				
Page 7	परिसर की जैव विविधता / Biodiversity at Campus				
Page 8	प्रगति के पथपर / Plan for Progress				



- Sowing of rabi experimental crops viz., wheat (C7, E5), chickpea (B7, C6), maize (C1, C4), quinoa (C3, D3), sunflower (D5), onion transplanting (B4) and mixture of various crops (C2, E3, E4, E6) have been completed during this month. All these sowing operations were carried out by preparing ridges-furrows or flat beds as per the experimental design requirements. Experimental sowing was carried out preferably by dibbling. Application of basal dose of fertilizers was done as per the recommendations.
- Maintenance of field crops: Timely nutrition-irrigation, pesticide spraying, weed management were important maintenance operations carried out during this month. Fertilizer broadcasting was followed by irrigation as per schudes Spraying for management of pod borer in chickpea was required therefore spraying of "Fame' was carried out. For weed management 2,4-D spraying in wheat crop was done followed by single hand weeding. Thinning at early stage followed in wheat, chickpea and chia crops was required to retain optimum number of plants.
- **Maintenance of orchards**: Canopy management, plant protection and irrigation were important operations completed during this period as per the targets fixed.
- Acid lime training: Training of acid lime plants was carried by 'skirting' i.e., removing of lower branches and removing crisscross branches. Watering was withheld as a part of 'bahar treatment'. Spraying of Copper oxy chloride @ 2g/L was done as a general practice.
- Karonda pruning was completed during this period which was meant for giving bushy canopy structure.
- Dipping and berry thinning in grape: Gibberellic acid (GA3) 40 ppm and 50 ppm dipping was done Sharad seedless grape to enhance berry growth. In between two dips, berry thinning was carried out to make the bunches loose. Spraying of Hexaconazole 1ml/L along with 0-52-34 @ 5g/L was carried out to control powdery mildew and Fipronil 0.8ml/L for management of Spodoptera infestation.
- Drumstick pruning for ratoon crop & Spraying of Azadirachtin 1% @ 1ml/L



Mr. Sunil V. Potekar & Mr. R.N. Singh

The long period average (LPA) of December rainfall and average temperature at Baramati is 5.7 mm and $21.9 \text{ }^{\circ}\text{C}$, respectively. The details of weather during the December 2020 has been listed in Table 1 and depicted in following figure.

Table 1. Summary of weather variables recorded during December, 2020.

Weather	Week				Monthly	Mor	Min
Parameters	1 st	2^{nd}	3 rd	4 th	Montiny	max.	WIIII.
T Max (°C)	30.0	30.5	29.3	29.0	29.8	31.6	27.3
T Min (°C)	13.7	16.8	14.0	11.8	14.1	18.7	8.3
T Avg (°C)	21.8	23.7	21.6	20.4	22.0	24.6	18.0
RH Mean (%)	61	60	65	62	62	74	52
WS (km/h)	4.3	5.1	5.1	4.3	4.7	6.9	3.3
BSS (h)	8.2	4.6	6.3	7.6	6.6	9.5	0.0
Total PE (mm)	29.8	32.5	27.6	26.9	128.6	5.7	3.0
Total Rain (mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0



Fig . Variations of daily rainfall (Rain), pan evaporation (PE), mean temperature (T_{Avg}) and bright sunshine hours (BSS) during December, 2020 at ICAR-NIASM Baramati.



Rabi crops maintenance in research farm through irrigation and nutrition management, plant protection and weed management will be looked after for better experimental outcomes. Plan is to be made for replacing flood irrigation by microirrigation systems on commissioning of new irrigation project is to be initiated.

Canopy management in orchards: It includes following operations in various orchards at north farm.

- Dragon fruit: Alternate plants in row are to be headed back to initiate canopy management trials for the next season. This includes cutting of shoots 10cm below the height of pole and placing canopy support window on top of the pole. There after the shoot number will be maintained at different levels as a part of canopy management.
- Date palm: Side suckers and dried leaves to be removed to promote erect growth.
- Sweet orange: New bahar season is to be initiated this month by training for skirting, spacing and hygiene. Lower branches as well as crisscross and dried and diseased branches will be removed as a part of canopy management.
- Guava: Tree pruning to manage size of trees for high density plantation.

Weed management: Hand weeding for weed management in field crops, orchards, along road sides and peripheral plantations.

Irrigation management: Commissioning and testing of new irrigation project is an important target for coming month. It includes lifting of water from canal to 'Malhar' pond at southern end and to 'Manas' from there. Operation of internal irrigation network at south farm & orchards.

Nutrition management: Scheduling fertilizer application and fertigation for integrated nutrition management.

Plant protection: Important pests and diseases to be managed during January 2021 are as follows;

Chickpea: fruit borer

Pomegranate: thrips, fruit borer and Cercospora blight

Grape: mealy bug and powdery mildew

Mango: hoppers, aphids and powdery mildew

Sweet orange and acid lime: prophylactic spray of copper fungicide

Dragon fruit: copper fungicide spray after pruning Drumstick: leaf eating caterpillar Landscape garden maintenance & campus beautification: Includes training pruning of

beautification: Includes training pruning of ornamental plants to give desired shape. Lawn maintenance by mowing, fertilizer application and weed management. New plantations around football ground and at hostel building.





Challenges Ahead

Preparing Orchards for Optimum Performance in Shallow Soil Depth

The orchards at NIASM farm are standing on very shallow soil. Originally the planting was done by breaking the hard basaltic rock by blasting and/ or using poklain breaker. The pits of size 1Mx1Mx1M or the trenches of 0.75M width and 0.60M were prepared and filled with imported soil and/ or native soil. That means there is least space available for tree growth. Under such circumstances as the trees grow, it is experienced that the production declines year after here. These edaphic stresses required to be managed through canopy management i.e., by reducing the tree size to balance the root volume. Already planting of orchards at campus have been carried out in high density pattern, where there is much scope to limit the canopy size by regular training and pruning operations. Canopy management involves limiting the limiting production too. This will help to keep balance in source sink relationship managing quality produce simultaneously. Secondly, of addition of soil from outside and improving organic carbon content there by improving soil water holding capacity can help to mitigate the stress. Therefore, it is required go for frequent application of farm yard manure or compost and use of green manure crops in between tree lines.

Field Visit Dec 21-24, 2020



Role of Tillage Operations in Farm Management

ascertain soil type before commencing tillage good soil-seed contact and adequate moisture operations. Soil characteristics include basic for vigorus plant growth. Over longer periods, soil data about composition, pH, organic matter content, its reduces surface soil granulation. Light and structure, fertility status and the depth of the medium textured soils form good tilth more plough layer. Therefore, it is good practice to easily. Major difficulties arise with clayey dig a pit for major soil types to carefully soils. So cultivation should aim at obtaining study the soil profile prior to developing aggregates in the range of 2 to 20 mm process and routine tillage. Soil is a dynamic without entity whose structure, nutrients, organic Eliminating matter content and microbial flora can compete with crops and managing crop change over season. On the contrary a residues to maintain organic matter content mineral composition of its three major can together improve soil structure and its components- sand, silt and clay- does not tilth. Excessive cultivation intensifies the change. Soil type determines when and which oxidation of organic matter and evaporation implement to use for operations

Objectives of tillage

•Loosen, granulate and condition soils to promote plant growth

•Kill weeds and manage crop residues

Incorporate fertilizer

•Conserve moisture and prevent soil erosion

soil or influence on structure arrangement of primary soil particles, in turn Since excessive tillage of the surface soil can influence in the movement and availability of destroy the natural soil aggregates, minimum water and air and resulting root growth. As tillage is recommended, where only the top 5 the soil profile develops soil structures are to 10 cm may be cultivated for moisture formed by a natural aggregation of soil infiltration and conservation, planting and particles. The ideal soil structure is a stable, weed control. allows root penetration, returns adequate water for plant growth but a drain excess dry soil breaks into clods which may be water. The major soil structures are crumb, difficult to reduce to enable close soil-seed granular blocky, prismatic, columnar and contact for rapid germination. The range of massive. Granular and crumb structures are moisture needed for medium-textured soils generally characteristic of surface soils that such as loams or silt loams is quite wide, contain large amounts of organic matter. A about 60% of their field capacity. Sandy soils modification in soil structure constructive tillage may be required for throughout the normal soil moisture range. improved plant growth. These structures are Soil moisture content can be considered best maintained when soil moisture ensures optimum for cultivation when it increases good structure matter can be incorporated and surface greatest. Cultivation above the soil's moisture drainage is ensured by minimum tillage. limit creates a platy or laminar structure. Massive, prismatic and blocky are poor soil Surface and subsurface compaction or a hard structures that drain poorly, usually have a pan can occur with machinery operations on low organic matter and high amounts of clay wet soil above their plastic limit. Tractor and may contain less calcium. Improper wheel tracks cover as much as 90% of the poor cultivation practices produce structures and tilth. The short-term favourable effects of tillage are the breaking

It is important for farm personal to up clods for a more beneficial seedbed with type, texture, mineral when the soil is wet or very dry, tilling compacting the lower layers. weeds, so that thev don't routine tillage of moisture leading to tilth deterioration.

Tillage and tilth

A good tilth allows seed to come in close contact with soil. This happens when the soil has a granular structure and is compacted around the seed to facilitate the capillary movement of water from soil to seed. Primary tillage can have a profound Ploughing and subsequent tillage operations the can impair tilth if the soil is wet or very dry.

> Wet soil is compacted by tillage whereas through do not become plastic; they tend to stay loose formation, when organic granulation and structure formation is soil soil surface during cultivation.

Amla / The Indian Gooseberry



Indian gooseberry is known by two scientific names *Phyllanthus emblica* and *Emblica officinalis*. It's also commonly called amla.

This small tree has yellow-green flowers that blossom into round, edible fruits of the same color. The fruits are about the size of a golf ball with a pit and thin peel. Their taste has been described as sour, bitter, and astringent. The fruit is used in cooking in India, and most supplements on the market today are made only from the powdered, dried fruit or fruit extracts. However, the whole plant including the fruit, leaves, and seeds is utilized in traditional Indian medicine.

Potential benefits

Heartburn: Researchers observed that the amla fruit group experienced greater reductions in the frequency and severity of heartburn and vomiting than those in the placebo group.

Anti-aging: Due to its high vitamin C content, Indian gooseberry may have some promising anti-aging benefits. Vitamin C is an antioxidant that can help prevent cellular damage, which may help slow your body's natural aging process.

Cancer: Additionally, Indian gooseberry extracts may play a role in cancer prevention due to their antioxidant activity. It appears that Indian gooseberry may also help prevent cell mutations that lead to tumor growth and cancer development.

It's thought that the many phytochemicals, such as tannins and flavonoids, in Indian gooseberries play a role in cancer prevention, along with its vitamin C and antioxidant content. **Heart health**: One of the most common uses of Indian gooseberry is to promote heart health. There are many ways in which Indian gooseberry may decrease your risk of heart disease, including:

Antioxidant effects. Indian gooseberry extracts may protect against oxidative damage that's associated with heart injury. This has been noted in several animal studies.

Regulates endothelial function. A study in people with type 2 diabetes found taking 1,000 mg of Indian gooseberry daily improved endothelial function to the same extent as the drug atorvastatin.

Anti-inflammatory effects. Human studies have noted that Indian gooseberry can significantly reduce inflammation, which is considered a key factor in the development of heart disease.

Normalizes blood fat levels. Human studies have observed improved blood fat profiles after supplementing with Indian gooseberry, including lower triglyceride and total and LDL (bad) cholesterol, as well as increased HDL (good) cholesterol.

Reduces blood pressure. Indian gooseberry may help reduce high blood pressure levels by acting as a vasodilator, or by widening the blood vessels. High blood pressure is a risk factor for heart disease.

Anti-platelet effects. Finally, supplementing with Indian gooseberry may help prevent the formation of blood clots, which may cause a heart attack or stroke if they block an artery.

Blood sugar levels: These effects have also been noted in a small study in 32 people, in which taking 1–3 grams of Indian gooseberry powder daily for 21 days significantly decreased fasting and post-meal blood sugar levels, compared with a control group.

Immune health: Indian gooseberry have immune-strengthening effects due to its vitamin C content. A single Indian gooseberry contains approximately 600–800% of the Daily Value (DV) for this vitamin.

Vitamin C can optimize immune health in several ways. It's an antioxidant, so it works to decrease cellular damage and inflammation.

प्रगति के पथ पर

प्रगति के पथ पर

प्रक्षेत्र समन्वयक के माध्यम से, दिन-प्रतिदिन खेत प्रबंधन अधिक पारदर्शी हो रहा हैं। यह कहा जाता है कि कोई भी कार्य की उपलब्धि दो बार होती हैं, पहली बार योजना के दौरान विचारों में और बाद में वास्तविक कार्यान्वयन के माध्यम से। इसलिए, कुछ हासिल करने के लिए उसकी योजना सबसे महत्वपूर्ण कदम हैं। नियोजन की प्रक्रिया में हमें भूमि की तैयारी, फसल की बुवाई, सिंचाई, पोषण, पौधों की सुरक्षा, स्वरपतवार प्रबंधन और समग्र कार्य प्रबंधन की मूल बातों पर ध्यान देने की आवश्यकता हैं। इसमें इन सभी फसल प्रबंधन प्रथाओं के माध्यमों की सूक्ष्म जांच आवश्यक होती है।

'मॉडल फ़ार्म' नियासम के प्रत्येक सहयोगी के लिए एक ड्रीम प्रोजेक्ट हैं। नई लिफ्ट सिंचाई परियोजना के चालू होते ही पानी के तनाव की वर्तमान स्थिति में सुधार होगा। परंतु आगे महत्वपूर्ण चुनौती होगी बेसाल्टिक पथरीली भूमि जिस पर फल पौंधे खड़े हैं। बढ़ते पौंधों के साथ, जड़ के विकास की समस्या महसूस हो रही हैं। इस महीने (21-24 दिसंबर, 2020) में प्रक्षेत्र के राउंड के दौरान, परियोजनाओं में सुधार के लिए सूक्ष्म-स्तरीय योजना पर चर्चा की गई। प्रदर्शन बोर्डों को अधिक जानकारीपूर्ण और आत्म-व्याख्यात्मक बनाने का निर्णय लिया गया। क्यूआर-कोड आधारित सूचना प्रणाली को शामिल करने के लिए एक छोटा डेमो आयोजित किया गया और सभी ने इसकी सराहना की। सभी अनुसंधान परियोजनाओं और प्रतिष्ठानों के लिए इस सूचना प्रणाली को विकसित करने का निर्णय लिया गया है।

Plan For Progress

Through the Farm Coordinator, day by day farm management is becoming more transparent. It is said that any work achievement happens twice, for the first time in thoughts during planning and afterwards through actual implementation. Therefore, planning is the most important step to achieve something. In the process of planning, one needs to look into the basics of land preparation, cultivation, irrigation, nutrition, crop plant protection, interculture operations, weed management and overall work management. This further demands micro investigation of these crop management practices.

'Model Farm' is a dream project for each and every colleague of NIASM. Present situation of water stress will improve as soon as the new lift irrigation project gets commissioned. The important challenge ahead is the edaphic stress incurred by the hard basaltic platform on which orchards stand. There are limitations in root development as the plants are growing. During field visit in this month (December 21-24, 2020), micro-level planning for improvements in projects was discussed. It was decided to make the display boards more informative and selfexplanatory. A small demo for inclusion of QR-code based information system was conducted and appreciated by everyone. Further, it has been decided to develop this information system for all research projects and establishments.



Contributors:

Dr Pravin Bhimdeo Taware, Senior Technical Officer (Farm) & Farm Manager Mr Rushikesh Shivaji Gophane, Senior Technical Assistant (Hort) Mr Patwaru Ranbhid Chahande, Senior Technical Assistant (Agril) Mr Sunil Vishnu Potekar, Senior Technical Assistant (Agro.Met.) Mr Aniket Tukaram More, Senior Technician (Farm) Mr Pravin Hari More, Senior Technical Assistant (Computer) **Compiled and edited by:** Dr Pravin Bhimdeo Taware, Senior Technical Officer (Farm) & Farm Manager **Published by:** Dr Himanshu Pathak, Director ICAR-National Institute of Abiotic Stress Management, Baramati, Pune, Maharashtra- 413115