अप्रैल / April 2022

Issue
26

भाकृअनुप
ICAR

राअस्ट्रैप्रसं
NIASM

FARM COORDINATOR

... कृषि तकनीकी समन्वय पत्र

भाकृअनुप – राष्ट्रीय अजैविक स्ट्रैस प्रबंधन संस्थान
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निदेशक के लेखनी से...

अप्रैल 2022 का महीना चिलचिलाती गर्मी के साथ सामान्य से अपेक्षाकृत अधिक गर्म रहा। महीने के आखिरी तीन दिनों में पारा 40 डिग्री सेल्सियस के पार चला गया था। ये असामान्य परिस्थिति कृषि प्रबंधन कर्मियों के सामने विविध चुनौतियों के साथ सामने आए हैं। कर्मचारियों के लिए स्वास्थ्य एहतियाती उपाय के रूप में कार्य रणनीतियों को बदलना आवश्यक था। सिंचाई प्रबंधन एक और चुनौती थी क्योंकि पानी की बढ़ती आवश्यकता के साथ-साथ अतिरिक्त लोड-शेडिंग घंटों के कारण पंपिंग ऑपरेशन सीमित हो गया था। संवेदनशील झाड़ियों और पेड़ों के घाटियों में मल्चिंग के लिए कृषि-अपशिष्ट के उपयोग को पहले ही प्रयोग में लाया जा चुका है। सक्रिय जड़ क्षेत्र में वाष्पीकरण और मिट्टी के तापमान को ठंडा करके नमी के नुकसान को कम करना आवश्यक है। इस उद्देश्य के अनुसार सभी कृषि-अपशिष्ट और बायोमास को पुन: चक्रित करने की प्रक्रिया लगातार जारी रखने की आवश्यकता है।

आगामी खरीफ मौसम के लिए तैयार रहने के लिए अप्रैल का महीना अनुसंधान भूखंडों से मैनुअल थ्रेसिंग, गर्मियों की फसलों की बुवाई और रखरखाव, परती खेती और तैयारी जुताई कार्यों में व्यस्त था। करोंदा, निंबू, मोसमी और आम फल विकास अवस्था में थे। अंगूर में बैक प्रूनिंग का काम पूरा हो गया है और कैनोपी प्रबंधन अब लक्ष्य सूची में है। इस भीषण गर्मी के दौरान सिंचाई के पानी का अधिक कुशल उपयोग आवश्यक है। भूखंडों के भीतर पूरी तरह से शेड्यूलिंग और समान वितरण द्वारा इसकी देखभाल की जानी चाहिए। मलद प्रक्षेत्र कृषि गतिविधियों में अगले महीने से अच्छी गति आने की उम्मीद है क्योंकि सिंचाई जल भंडारण सुविधा और बोरवेल खुदाई जैसी विकास गतिविधियों के लिए प्रशासनिक प्रक्रियाएं पूरी होने जा रही हैं। सिंचाई के पानी की उपलब्धता का लाभ उठाने के लिए खरीफ सीजन की बुवाई को थोड़ा पहले लक्षित करने की जरूरत है और मानसून पूर्व बारिश से पहले जुताई की तैयारी पूरी कर ली जानी चाहिए। समग्र उपलब्धियों से यह स्पष्ट है कि हर महीने 'फार्म कोऑर्डिनेटर' के माध्यम से लक्ष्य निर्धारित करने से अच्छी प्रगति हो रही है।

डॉ. प्रवीण तावरे के नेतृत्व वाली टीम को इस महत्वपूर्ण प्रकाशन को नियमित रूप से प्रकाशित करने में उनके समर्पण और निरंतरता के लिए मैं धन्यवाद देता हूं।

From Director's Desk...

The month of April 2022 was relatively hotter than normal with the scorching heat. During last 3-days of month, the mercury crossed 40°C mark. These unusual evidences have come up with diverse challenges ahead of the farm management personnel. It was required to change the working strategies as a health precautionary measure for manpower. Irrigation management was another challenge due to increased water requirement accompanied with added load-shading hours limiting the pumping operation. Use of agro-waste for mulching at the basins of sensitive shrubs and trees has been already instigated. Mulching activity to be continued consistently to recycle all the agro-waste and biomass.

The month of April was busy in manual threshing from research plots, sowing and maintenance of summer crops, fallow cultivation and preparatory tillage operations to stay prepared for upcoming *kharif* season. Karonda, acid lime, sweet orange and mango were in fruit development stage. Back pruning in grape was completed and canopy management is on target list now. During this hot summer more efficient use of irrigation water is necessary. It should be looked after by thorough scheduling and uniform distribution within the plots. Malad farm activities are supposed to take good pace from next month as the administrative processes are at completion for developmental activities like irrigation water storage facility and bore-well digging. From the overall achievements, it is evident that chalking down the targets every month through 'Farm Coordinator', is resulting in to good progress.

I thank the team led by Dr. Pravin B Taware for their dedication and sincerity in bringing out this important publication very regularly.

अप्रैल / April 30, 2022

हिमांशु पाठक / Himanshu Pathak

Field crops' management:

- A1, A2, B1 and B3 fields are under Conservation Agriculture project. Treatment imposition was facilitated through allotment of workers. Machinery inputs were provided for extending the experiment to the farmer's field near main gate of the institute.
- B2 field is having trial on nitrogen use efficiency in sugarcane. The work of soil sampling and field cleaning as well as fertilizer application was facilitated.
- Harvesting of bhindi and brinjal in B4 field followed by recut in brinjal was completed.
- Harvesting of general chickpea crop from D5 and E7-8 fields was completed and threshing done with the help of multi-grain thresher. Also facilitated harvesting and manual threshing of *rabi* crops from experimental fields viz., wheat (B5, C8), chickpea (B7, B8) and quinoa (C6, D6).
- Maintenance of experimental field crops like mung bean (C3), cotton, maize, soybean, chickpea (C4) was facilitated for irrigation, weed management and plant protection and treatment imposition.
- C6 field is dedicated for experiments on vegetable research. Harvesting of brinjal and tomato, roughing of aged tomato plants and transplanting of chilli saplings in some portion was carried out along with plant protection activities.
- Ploughing/ secondary tillage operations carried out immediately after harvesting of crops and some of the fields were prepared for sowing of summer crops.
- Sowing of mung bean (C2, C6) and soybean (E7-8) was carried out as a general as well as experimental crop.

Orchard management:

- Harvesting of grape Thomson seedless (J5), sapota (K7) and acid lime (I2)
- Fertigation of 12:61:0, 0:52:34. 0:0:50 in sweet orange, mango. And soil application of DAP 100g L-1 in Mango.
- Plant protection included spraying of Megafol 2.5 ml L-1 in sapota, Chlorpyriphos 1.5 ml L-1 and Streptocyclin + Copper oxy chloride 2 g L-1 followed by Dimethoate 1.5 ml L-1in pomegranate, Flubendamide 0.25 ml L-1 on drumstick (H1, I5), Carbendezim 1.25 g + Azadirachtin 1% 1.25 ml L-1

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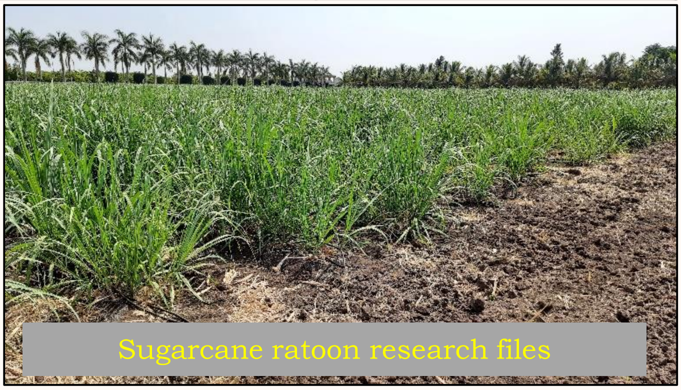
Sugarcane ratoon research files


Summer mungben


Cotton, maize research field


Sapota fruits ready to harvest


Malad Farm: Ajwain crop at maturity

The long period average (LPA) of April rainfall and average temperature at Baramati is 7.1 mm and 30.2 °C, respectively. The details of weather during the April 2021 has been listed in Table 1 and depicted in following figure.

Table 1. Summary of weather variables recorded during April, 2022.

Weather Parameters	Week				Monthly	Max.	Min.
	1st	2nd	3rd	4th			
T Max (°C)	39.3	39.0	38.6	38.6	39.0	41.4	35.9
T Min (°C)	19.6	23.3	21.9	22.6	22.0	25.3	14.5
T Avg (°C)	29.5	31.2	30.3	30.6	30.5	32.5	27.2
RH Mean (%)	43	44	45	44	44	56	27
WS (km/h)	6.1	6.7	7.1	6.9	6.7	9.3	4.2
BSS (h)	8.3	4.6	8.6	7.5	7.3	10.0	0.4
Total PE (mm)	64.7	63.7	64.5	60.6	271.5	12.0	6.2
Total Rain (mm)	0.0	0.0	0.0	1.0	1.0	1.0	0.0

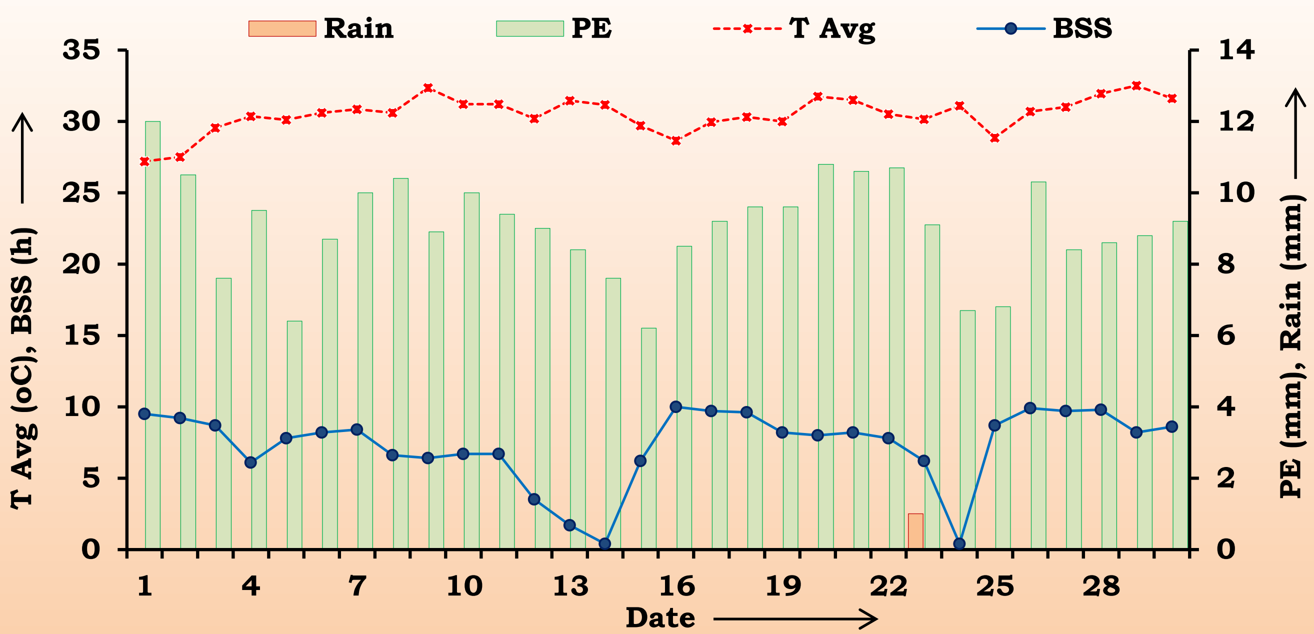

Fig 1. Variations of daily rainfall (Rain), pan evaporation (PE), mean temperature (T_{Avg}) and bright sunshine hours (BSS) during April, 2022 at ICAR-NIASM Baramati.

This April was unusual as far as the weather is concerned. With the scorching heat, April was relatively hotter than normal. This time both maximum and minimum temperature remained higher than normal. The all-time record of the highest maximum temperature in April was recorded in 2000 and 2010, (41.3). This year since the beginning of month, mercury levels have touched 39.0 °C. On three occasions (April 28-30) this year, Baramati reported day temperatures of more than 40.0 °C. This April also saw the coldest night in the last decade when mercury dropped to 14.5 °C on April 1. After that, night temperatures have seen a significant rise, adding to the heat.

South farm maintenance activities:

- Land preparation after harvesting of *rabi* crop will be continued through ploughing and secondary tillage operations.
- Sowing of summer crops of research under planting time and preparations for early *kharif* sowing.
- Weeding, irrigation and facilitating plant protection activities in summer crops.
- Manual threshing experimental produce from various treatments to be completed.
- Cleaning of roads and bunds to minimize weed seed load as a part of Integrated Weed Management practice. Repairing of pitching along the roads and removal of boulders from field after tillage operations.

Orchard management:

- As back pruning in grape is already completed, shoot thinning will be due in next month. Desired number of shoots will be retained on the cordons to avoid crowding and getting more number of fruiting units.
- The orchards in G4 and G6 need to be replanted. The fields will be prepared for planting of grape, passion fruit and pomegranate orchards.
- Removal of dried leaves in date palm and removal of sucker shoots will be taken up to clean the main stem.
- In all orchards cultivation tillage will be carried out in between rows to improve soil aeration. The agro-waste and other biomass collected from the campus will be utilized as mulch around the tree stems for moisture conservation, weed management and regulation of soil temperature.
- Plant protection activities will be needed in sweet orange for lemon butterfly and thrips pests, in mango for management of hoppers, fruit fly and leaf moulds, in grape the thrips infestation, in pomegranate for fruit borer and blight and in dragon fruit for leaf rot associated with sunburn.
- Soil application of fertilizers will be carried out in sweet orange, dragon fruit, mango and grape.

Malad farm activities:

- Field preparation through fallow cultivation and removal of unwanted shrubs.
- Preparations for early sowing of *kharif* crops is being targeted. The plan for sowing and plantation work will be chalked down implemented in next few months.
- The BOQ bidding process to carry out water storage tank development along with bore-well digging is being processed and will be finalized during the first fortnight of May. The work is to be completed on priority before the monsoon starts. Monitoring
- Preparations for peripheral plantation and fencing work will be carried out simultaneously.

Fallo cultivation : ploughing

Chilli research field

Grape shoot development after pruning

Garden maintenance & other activities:

- Maintenance of peripheral plantations through soil pulverizing, training-pruning and fertilizer application. The gap filling activity to be initiated by identifying the locations and saplings for planting.
- Shuffling of indoor plants to nursery for pest management, hardening and training activities.
- Trimming of garden and avenue shrubs, lawn maintenance activities by weeding, mowing, irrigation & fertilizer application.

Managing afternoon works during hot sunny period

As reported, this April was unusual as far as the weather is concerned. With the scorching heat, April was relatively hotter than normal. This year since the beginning of month, mercury levels have touched 39.0 $^{\circ}$C. On three occasions (April 28-30) this year, Baramati reported day temperatures of more than 40.0 $^{\circ}$C.

Similar trend of hot sunny afternoons is expected during the month of May. IMD and State Govt., have advised to not to work in open fields during 12pm to 4pm period. It creates a challenge to manage farm activities during hot sunny period. Precautionary measures are being taken up to complete open field works during first half of the day as prescribed. During the second half, looking into itching sunlight, the activities are concentrated indoors or in shade. These works include manual threshing of experimental produce, farm produce grading or processing and internal cleaning activities. Similarly, issue of heating up of tractor engines arises. Therefore, heavy tillage operations are carried out during morning and evening hours only, as far as possible. Only the light operations for research layout preparation are carried out during the first half of the day.

Regarding the irrigation activities, dependence on electricity supply is an issue and need to face increased load shading hours. As usual for four days a week the lifting operations from canal source are done in night shift. But crop irrigation activities need to be done during day time. The drip irrigation system is operated during the first half period of the day and mulching with shredded material is being executed in orchards to minimize evaporation losses.

Drip irrigation in fodder crops

Contd. from page 2

- Hygeine maintenance by collecting destroying infested fallen fruits, and pruned biomass from sapota (K7) and sweet orange (I3, J1) orchard.
- Collecting agro-wastes, shredding and using it for mulching in various orchards.
- Preparing dragon fruit cuttings as a planting material for disposal.
- Facilitated covering of shednet of different colours over dragon fruit (H5) as research.

Malad farm activities:

Harvesting of Ajawain crop and bringing it to main campus for manual threshing purpose. Irrigation facility development: As the proposal for Water storage pond along with bore-well during last year was not processed due to deficiencies in bids, fresh proposal for gem bidding have been submitted.

Landscape garden maintenance:

Spraying on indoor plants, garden shrubs, hedges and edges was carried out twice to control mealy bug pest infestation. Initially, the infestaed portion was washed using soapy water followed by spraying of Emamectin benzoate 0.5 g L-1. Infested coconut trees were also treat similarly.

The general campus cleaning was continued to remove road side parthenium and unwanted shrubs. Thorough weeding and cleaning operations were done ahead of visit of various dignitaries to the institute.

Arrangement of indoor plants by regular reshuffling was done to avoid defoliation of plants in shade.

Acid lime in fruit growth

Integrated Pest Management- I

It is not possible and also not desirable to get rid of plants from all pests. Monitoring and managing pest levels instead of eliminating pests can preserve the environment, reduce costs, protect the health of humans and animals, and maintain beneficial organisms such as birds, bees, butterflies, predaceous bugs, and other pollinators. Therefore, integrated pest management (IPM), an approach that uses knowledge about pests and their life cycles, cultural practices, nonchemical methods, and pesticides to manage pest problems.

Why to manage pests:

Pests in agriculture may include insects and mites, weeds, plant diseases, mammals, and birds. It can be tempting to look for a quick solution to an insect feeding on a plant. Many people hurry to pull, hoe, or spray every weed they see. Insects and weeds, however, play a role in the ecosystem. After planting a garden or establishing a lawn, the natural process of plant succession begins to re-establish native and non-native plants. A weed growing in a lawn represents the first stage in a sequence of events that, if allowed to continue, could eventually result in a forest. Many cultivated plants are not as competitive as many of our natives, weeds, or pests; cultivated plants survive only with the constant help and intervention of the agriculturists.

What we call "pests" are part of a natural system at work. An ecosystem has no pests. Only humans consider certain species pests when they occur where they are not wanted. We will be more successful in managing unwanted species on realizing that these organisms follow predictable patterns that can be used to our advantage.

What is IPM approach?

When modern pesticides were first developed, they were used extensively. Pests susceptible to a pesticide were quickly killed, leaving resistant ones to breed and multiply. It became clear that pesticides alone would not solve all pest problems. Instead, overuse of pesticides caused the development of resistant pests. Scientists began to develop a new approach to pest control. This new approach was described as 'integrated pest management (IPM)'. 'Integrated' refers to the fact that all control measures (mechanical, cultural, biological, and chemical) are considered and used as appropriate. An IPM plan allows some level of pests in the environment. Pests are much less likely to survive a program that uses many different methods of reducing their populations.

Steps in IPM approach:

Integrated pest management was first suggested by entomologists because insects were the first group of pests to prove difficult to manage with chemicals alone. Early proponents of IPM suggested using five basic strategies to improve insect management:

- **Monitor** and scout insects to determine insect types and population levels.
- **Identify** pest and host accurately.
- **Assess** and consider economic or aesthetic injury thresholds. A 'threshold' is the point at which action should be taken.
- **Implement** a treatment strategy using mechanical, cultural, biological, or chemical controls, or a combination of these strategies.
- **Evaluate** success of treatments.

IPM of all pest populations (weeds, disease organisms, and mammals):

Integrated pest management regulates pests by using a variety of control measures, including mechanical, cultural, biological, and chemical. Management rather than eradication of pests is the goal.

An IPM plan begins with a careful evaluation of each pest infestation. Only then can one decide about the appropriate tactics necessary to suppress pest activities. The life cycle of the pest, possible damage, natural enemies, and effects of weather, among other factors, are considered before a control plan is implemented. Pesticides may be an attractive option for homeowners because the formulations can be inexpensive, easy to use, and can provide quick results. However, they often also impact beneficial insects and other non-targeted organisms. An IPM plan may be slower to show results and could require more effort than spraying a chemical, but the reduced impact on the environment can be worth the investment. The more gardeners learn about biological and ecological processes, the more imaginative they will be in formulating and implementing Integrated Pest Management plans.


DDG (NRM) discussing before field visit

Round to hostel facility at campus


Walking through Sanjeevani Udyan


Discussions with scientists


PI describing the project happenings


Explaining the function of QR_NIASM


Performance of sugarcane under trial


Getting information of 'Field Phenomics'


At Climate Resilient IFS project

Curious about irrigation facility

प्रगति के पथ पर

सामान्य से अधिक गर्म इस महीने में सिंचाई की पानी की आवश्यकताओं और आईएमडी की सलाह की पृष्ठभूमि पर प्रक्षेत्र कर्मचारियों के विवेकशील उपयोग की ओर अधिक ध्यान देने की आवश्यकता रही। हालांकि, रबी की फसल की कटाई की गई थी, आधे से ज्यादा खेत बारहमासी या गर्मियों की फसलों के अधीन थे, जहां उच्च पैन रीडिंग के कारण सिंचाई के पानी की आवश्यकता लगभग दोगुनी हो गई थी। बागों के लिए पानी की आवश्यकता उच्च चरम पर थी क्योंकि उनमें से अधिकांश बागान टहनियों के विकास, फलने या फल वृद्धि की अवस्था में थे। बागवानी प्रथाओं, अनुसंधान गतिविधियों और सिंचाई जल बजट के लिए मानक संचालन प्रक्रियाओं के विवरण के माध्यम से बाग संचालन को नए आयाम दिए जा रहे हैं। बागों को जैविक खेती और प्राकृतिक खेती पर शोध के दायरे में लाया जा रहा है। अधिकांश बागों ने 7-9 वर्ष की आयु पूरी कर ली है और कुछ सिफारिशों को नोडल अधिकारियों के मार्गदर्शन में सूचीबद्ध किया जा रहा है। चल रहे अनुसंधान परियोजनाओं को प्रभावित किए बिना, कुछ बागों के कायाकल्प की भी योजना बनाई जा रही है।

उप-महानिदेशक, एनआरएम के हाथों फरवरी 2020 में 'फार्म कोऑर्डिनेटर' का पहला अंक प्रकाशित हुआ था। तब से, प्रत्येक माह के लिए लक्ष्य निर्धारित करके और प्रगतिशील परिवर्तनों के लिए सभी प्रयास करके, निदेशक के मार्गदर्शन में बहुत कुछ हासिल किया गया है। इस वजह खेत को हमेशा प्रदर्शनीय स्थिति में रखने में मदद हुयी। अन्य गणमान्य व्यक्तियों के साथ क्षेत्रीय दौरे के दौरान उप-महानिदेशक महोदय को उपलब्धियों का प्रदर्शन करते हुए अत्यधिक संतोष रहा। खेतों में आने वालों की संख्या दिन-ब-दिन बढ़ती जा रही है। प्रक्षेत्र का दौरा कर रहे किसान, छात्र, वैज्ञानिक और आम जनता प्रक्षेत्र की उपलब्धियों पर प्रकाश डाल रहे हैं। नियासम अनुसंधान फार्म के विकास और रखरखाव के बारे में आगंतुकों की सराहना कार्य सम्पन्न रहने के लिए एक महत्वपूर्ण ऊर्जा प्रदान करती है। प्रगति की योजना है कि सुधार हेतु सभी सुझावों के प्रति खुला रहना है और दृढ़ता के साथ उन्हें निरंतरता से लागू करना है।

Plan For Progress

The hotter than normal month required much attention towards irrigation water requirements and wise use of manpower on the background of advisories from IMD and the Government. Though the *rabi* field crops were harvested, half of the fields were under perennial or summer crops, where irrigation water requirements were almost doubled due to high PAN readings. Water requirement of orchards was at peak because most of them were at shoot development, flowering of fruiting stages with higher crop factors. The orchard operations are being given new dimensions through narration of standard operating procedures for horticultural practices, research activities and irrigation water budgeting. The orchards are being brought under research on organic farming and natural farming. Most of the orchards have completed age of 7-9 years and few recommendations are being listed under the guidance of nodal officers. Rejuvenation of orchards is also being planned without affecting the ongoing research projects.

The first issue of 'Farm Coordinator' was published in February 2020 with the hands of DDG, NRM. Since then, much could be achieved under the guidance of the Director by fixing the targets for each month and putting all efforts for the progressive changes. It helped in keeping farm always in presentable mode. Showcasing the achievements to the DDG during field visit along with other dignitaries, gave overwhelming contentment. Number of visitors to the farm is increasing day by day. The farmers, students, scientists and general public visiting the farm, are highlighting the accomplishments at the farm. Appreciation from the visitors about the development and maintenance of NIASM Research Farm provides a vital energy to be in action mode. The plan for progress is to stay open towards all the suggestions for improvement and implement them sincerely with persistence.