INSTITUTE OF HORTICULTURE TECHNOLOGY

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Institute of Horticulture Technology

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Foreword

Institute of Horticulture Technology established during the year, 2009 under the aegis of Akhil Bhartiya Gramin Vikas Sanstha completes a decade in 2019, it's decadal growth is signified by landmark achievements in capacity building, applied research and horticulture development activities. Recognition of IHT by Ministry of Agriculture and Farmers Welfare, Govt. of India for capacity building in Hi-tech horticulture, as well as by Ministry of Science and Technology, as a "Scientific and Industrial Research Organization" (SIRO) is a testimony to the excellence institute has achieved during the last decade. IHT's Collaboration with Wageningen University and Research, the Netherlands has put it on the list of international institutes engaged in horticultural human resource development. IHT has also established a Centre at Mandira, Assam during 2017. The pace at which this Centre spread over 150 acres has come up shows the hard work and dedication which IHT staff has put in.

In the year 2018, Institute of Horticulture Technology, moved to its new premises in Knowledge Park III of Greater Noida opposite Sharda University Campus. The present premise has excellent state of the art lecture halls, seminar halls, library, laboratories, faculty and staff rooms plus a residential facility for 72 trainees. The Institute is equipped with well qualified and dedicated faculty, including need based visiting experts and guest faculties from Israel, Netherlands and Thailand. IHT's Technology Park has a number of polyhouses ranging from simple walk-in-tunnels to fully automated green houses, integrated computerized fertigation system, energy efficient greenhouse, hi-tech nursery raising chamber with boomer irrigation facility, besides 4 acres' open cultivation area under various horticultural crops.

The Institute has undertaken several R&D projects, technology demonstrations in the Technology Park & farmers field and has designed a number of training courses of varying durations on various aspects of horticulture. The development of courses based on modules at IHT is a dynamic process and the experts revised courses were offered in 2018-19 after conducting SWOT analysis. Today, the Institute of Horticulture Technology has emerged as a premier horticulture institute in the country for applied research, capacity building, and development,

Dr. K L Chadha, Padma Shri Awardee
Chairman, Institute of Horticulture Technology

Executive Summary

Institute of Horticulture Technology- IHT founded in the year 2009 under the aegis of Akhil Bhartiya Gramin Vikas Sanstha – ABGVS shall be completing a decade in October, 2019. During this period, it has made contributions in the areas of R&D, technology demonstration, capacity building in Horticulture sector. The Institute moved to its new campus located in Knowledge Park-3 opposite Sharda University in Greater Noida during the year 2018.

During the year 2018-19 (April - March), a number of in-house R&D projects on Protected Vegetable Cultivation, Hydroponics, High Density Plantation, Micro-irrigation systems, Soil health management and Fertigation technology, cut flower, orchid production and production and buy back of dendrobium and aromatic plants like Citronella, Patchouli and Sugandmantri were carried. Standardization of technology for production of quality planting material through micro and macro propagation techniques remained the focal point of applied research at the Institute. Other than R&D projects during last year 110 capacity-building programmes of various durations were conducted for farmers, extension officers and self-sponsored candidates covering 7671 persons. Of this 77 programmes covering 4739 persons were conducted at the main campus in Greater Noida, whereas 33 onsite capacity building programmes were conducted at district level in different states covering 3274 persons.

The institute's North East Regional Centre at Mandira, Kamrup, Assam, spread over 150 acres carried on R&D projects, technology demonstration and capacity building trainings in Assam lemon, Banana, Mango, Pineapple coconut among the fruit plantation crops. Among vegetable: cucurbits, chilies, beans, turmeric, among aromatic plants: Citronella, Patchouli and Sugandmantri. The Institute successfully completed the project "Partnership Project on Technology Demonstration for Hybrid Dendrobium Cut Flower Production in Farmers Field in Manipur for Bio Entrepreneurship Development" in partnership with IBSD Manipur. The project achieved its goal of developing Bioresources Entrepreneurship in cut flower Dendrobium production and has become a replicable project for other farmers of the state.

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1. INTRODUCTION

Institute of Horticulture Technology established under the aegis Akhil Bharatiya Gramin Vikas Sanstha - ABGVS in 2009 at Greater Noida NCR achieved a landmark in 2015 when Ministry of Agriculture and Farmer Welfare, Government of India recognized IHT as a resource institute and empaneled it for providing trainings in Hi-tech horticulture. Later on in 2017, the organization was recognized as SIRO by DSIR, Ministry of Science and Technology, Govt. of India.

The ABGVS has objectives of development of farmer friendly crop production module, use of environment friendly technologies to enhance productivity, pest and pesticide free vegetable production under protected condition, efficient use of water in open field and protected cultivation, optimum use of fertilizer and micronutrient, organic farming, training & capacity building in the sector of horticulture. The organization also works on Nanotechnology & its application in: agriculture, health, environment & allied fields.

IHT is steered by an Advisory Board consisting of eminent experts in Horticulture and Forestry as its members. Dr. K L Chadha (Padma Shri awardee) former Deputy Director General – DDG (Horticulture), Indian Council of Agricultural Research – ICAR, New Delhi and National Professor of international repute chair the Advisory Board.

While the Institute deals with several important aspects of horticulture, it has attained excellence in the technology of protected cultivation of horticultural crops - a production system which over the years has gained futuristic importance due to challenges posed by biotic and abiotic stresses. It also facilitates precision farming and quality assurance of horticultural produce.

R&D and Technology demonstration of crop production modules in varied agro climatic conditions of the country has been another important part of IHT activities during the year. In one of the projects the crop production module standardized by IHT (in house) was demonstrated in farmers' fields resulting in development of incubation centers in Manipur. In another project undertaken with partnership of

Institute of Bioresources and Sustainable Development- IBSD, Imphal, Manipur, protected cultivation technology for vegetables was customized to suit an array of farming situations in Mizoram. IHT has also took initiative to identify varieties of Bird's Eye Chili grown in Mizoram and known for its Capsaicin content (0.589%) on the varietal resistance/ tolerance to local pests and diseases.

Similarly, other R&D projects with the support of Department of Biotechnology, Ministry of Science and Technology, Govt. of India on production and buy back of aromatic plants mainly Patchouli, Citronella & Sugandmantri and macro propagation of banana cultivar Malbhog – a highly popular and high value banana has also been taken up by IHT.

In addition to the R&D Projects and Technology demonstration in farmers' fields the capacity building trainings were structured and developed for different climatic regions of India. Farmers, extension officials, students, present and prospective entrepreneurs availed the training in world class facilities in IHT.

Precision farming is another area of capacity building undertaken by IHT. The impact of precision farming on resource conservation, both natural as well as other inputs in the form of fertilizers and pesticides has helped in making farming sustainable and environment friendly. The Institute's expertise in micro irrigation, fertigation and mulching in protected and open production systems has been appreciated and well received by the farmers, extension officials and entrepreneurs alike.

The most of the training courses are of short duration of 5 to 7 days, while certificate courses of one month, three months and six months' duration has also been offered in 2018-19. Crop specific and customized training courses are made available and offered to stake holders to keep our programme demand driven.

1.1 The Advisory Board

The institute is chaired by Dr. K L Chadha, Padma Shri awardee and an eminent horticulture scientist of national and international repute who is supported by a galaxy of reputed experts and scientists as members of Advisory Board.

Chairman

Dr. K. L. Chadha, Padma Shri
Former DDG (Horticulture) ICAR, New Delhi

Former Horticulture Commissioner, Ministry of Agriculture, Government of India
Former Executive Director, National Horticulture Board, Government of India
Former Director, Indian Institute of Horticulture Research, Bengal.

Advisory Board Members

Dr. H.C Bhattacharyya

Former Director
Extension Education
Assam Agriculture University, Assam

Dr. T. Janaki Ram

Assistant Director General
ICAR. New Delhi

Dr. M.L Chadha

Former Director, Africa & South Asia

AVRDC – The World Vegetable Centre, Taiwan

Dr. Narayanbhai Chawda

Chairman,, VNR

Raipur, Chhattisgarh

Dr. Pritam Kalia

Former Head

Division Vegetable Crops

Indian Agricultural Research Institute New Delhi

Dr. Ram Prasad I.F.S

Director

IIFM, Bhopal MP

1.2 In house Faculty

Land & Building: Four acres' land in Greater Noida with suitable building and other infrastructure and 150 acres of land in Guwahati Assam

- Dr. K.L Chadha Padma Shri Awardee
  Chairman, Institute of Horticulture Technology
- Dr. Umesh Kohli
  Director, Institute of Horticulture Technology
- Dr. Pritam Chandra
  Head, Greenhouse Technology
- Dr. Moniruddin Ahmed
  Chief Scientist, IHT, Mandira, Assam

Divisions:

Fruits

- Ms. Aruna Yadav

Vegetable

- Dr. Amrita Bhattacharya
- Sh. Karan Singh
- Sh. Lalit Pratap Singh
- Sh. D. C Sharma
- Dr. Dharam Singh

Floriculture and Landscape

- Dr. Amar Singh - Floriculture

Greenhouse Technology

- Dr. Pitam Chandra
  Ex-Director at Central Institute of Agricultural Engineering (ICAR)
- Ms. Pausuidaule

Nano Technology

- Dr. Srinivas Rao

- Sh. Kuldeep Sharma

International Guest Faculty (As per requirement)

- Sh. Shmuel Katz, Horticulture Expert, Israel
- Sh. Martin, Micro irrigation and Fertigation Expert PRIVA, Netherlands
- Sh. Kiyoschi, Horticulture Expert, Japan

Training Associates

- Sh. Bikram Berman
- Sh. Mero Dole
- Sh. M. Abdullah

Laboratory Assistants

- Sh. Indiver Mishra
- Ms. Gitanjali
- Sh Kapil Nagar

Field Supervisors

- Sh. Avesh Singh
- Sh. M.S.Negi

Administration staff

- Sh. Sanjeev Kulshrestha (Registrar)
- Sh. Aneesh Ranjan (Relationship Manager)
- Ms. Leenu (Coordinator- Trainings)
- Sh. Krishankant (Designer- Graphics)
- Sh. Ashutosh Dwivedi (Office Executive)
- Sh. Chandan Pandit (Office Assistant)
- Ms. Rakhi (Front Desk Executive)
- Sh. Devraj (Supervisor)

2. INFRASTRUCTURE

Institute of Horticulture Technology has a state of the art Technology. It consists of two blocks. Block A has series of greenhouse ranging from the simplest naturally ventilated polyhouse to fully automated greenhouse. Block B is devoted to open production systems for fruits, vegetables, ornamental plants and medicinal and aromatic plants.

Plate1: A View of Technology Park of IHT at Greater Noida

The fertigation unit most modern and fully computerized caters to both the greenhouses and open production systems. All the open and protected production systems have the facility of sprinkler, drip and boomer irrigation. Technology Park has field classrooms, lawns and is a unique place for providing trainings on landscape horticulture. The facilities at Technology Park are described is here under.

2.1. List of R & D Facilities Existing in Technology Park:

2.1.1. Research Greenhouses

2.1.2. Hi Tech Nursery Greenhouse

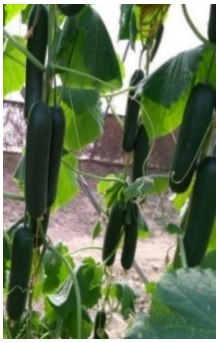
2.1.3. Research Glasshouse

2.1.4. Greenhouse with Retractable Roof

2.1.5. Intelligent Automated Greenhouse for Hydroponics

2.1.6 Polyhouses and Shade Net houses

2.1.6.1 Hybrid Polyhouse



2.1.6.2 State of the Art Energy Efficiency Polyhouse.

2.1.6.3 Zero Energy Naturally Ventilated Polyhouse

2.1.

Zero Energy Naturally Cooling Polyhouse

2.1.6.5 Shade Net House

2.1.7. Other facilities

2.1.7.1 Mushroom Cultivation Chamber

2.1.7.2 Multi-Channel Automatic Fertigation Chamber

2.1.7.3 Vermi-Compost Chamber

2.1.7.4 Open Field Cultivation –

Vegetables and Fruits

Good agricultural practices in Lettuce and other vegetables show cased in Tech Park

2.2.Other Technologies Demonstrations

Vegetables and fruit plants grown in open field with modern technology *like micro irrigation, soil moisture and weed management- Mulching, monitoring systems*.

2.2.1 Moisture conservation technology

In the center maximum cultivated area is under mulching. Plastic mulching is used inside polyhouses and open field for cultivation of vegetables. During summers in the month of May-

June when the temperature is at peak mulching conserve moisture, reduces weeds and also maintains the temperature of plant root zone. The productivity of crop is also increase with the use of mulching technology.

2.2.2 Complete drip system

While using latest technology conserving water is given top priority in the center For the purpose of irrigation in greenhouses and open field the drip system has been adopted. It attracts farmers looking for low cost, water saving irrigation techniques. Low pressure drip irrigation is also installed in the technology park for the farmers/growers looking for zero energy usage.

2.2.3 Sprinkler with Boomer Technology for Maintenance of Lawn and Hedges in the Center

2.2.4 Lawn and Classrooms

The classrooms are for providing practical trainings to the trainees and provide good shelter in hot sun especially in summers.

2.2.5 Power back up

Genset 63 kvA for back up in case of power failure, again there is second back up in the form of solar unit especially for the computerized system of the fertigation unit.

2.2.6 Vegetable Crops grown at Technological Park

Vegetables crops grown according to their season at open field by following Good Agriculture Practices at IHT technology Park hroughout the year viz. Beetroot (Crimson Globe, IARI), Eggplant (Michal Pusa, Purple Long and Pusa Purple Cluster), Broccoli (Parasio), Carrot (Pusa Nantis – 3 Crops), Cauliflower, Fenugreek (Pusa Early Branching, IARI), Green Cabbage (Neo), Hot Chili (Pusa Jwala), Knol Khol (White Viena), Lettuce (Iceberg), Lettuce (Red Lollo New Red Fire), Pea (Mahy 22), Potato (Kufri Khyati), Radish -4 crops (Shubhra 32 and Mahy 22), Red Cabbage (Ruby Wall), Regular Tomatoes (Sioux and NS-4266), Spinach, Sweet corn and Turnip (Purple Top White Globe -IARI).

2.3 Main Building

The main building in 2-acre land with modern landscape is divided into Instructional area, classrooms, laboratories, administrative block, faculty area, hostel and utility area.

The complete area is hygienic, well illuminated with green building concept, wide corridor, classrooms well equipped with comfortable sitting area and modern training aids. Museum show casing different inputs used in protected cultivation with respect to the greenhouse structure function and crop production modules.

The classrooms are spacious and comfortably accommodate 50 persons at a time and different executive areas for smaller training groups.

2.3.1. Administrative Office

- Open area-lawn with horticulture inputs for interaction.
- Complete area Wi-Fi enabled.

- Wired and Wireless communication facility.

Located at prominent place-with parking on main wide road Opposite Sharda University, ATMs in close vicinity, Best Hospitals in the close proximity, Shopping Complex with Cineplex, Branded restaurants and Registration cum Reception Area.

2.3.2. Class Rooms

There are 8 classrooms in institute premises and two classrooms are at Technology Park for field practical classes. There are number of classrooms in institute premises where 230 students can have classes at a time and two having capacity of 150 are at Technology Park for field practical classes. The class rooms are equipped with the modern teaching aids like LEDs, projectors, whiteboards, Audio System etc.

2.3.4. Micro Irrigation Laboratory and Soil Analysis Laboratory

The laboratory is well equipped with various components of micro-irrigation. Different types of emitters, drippers, sprinklers with different specifications kept for demonstration. Fertilizer injectors like fertibridge, dozertron and ventury system with fertilizer tank are been showed in laboratory, where trainees can make fertilizer solutions of various strength and components as per crop requirement.

The lab is well equipped and use Pusa STFR (Soil Test and Fertilizer Recommendation) for analyzing the soil samples and training of the trainers. Pusa STFR Meter has been developed at IARI and is licensed. It has a programmable colorimeter for analysis of soil parameters quantitatively. This soil testing kit analyze 14 major and micro nutrients and also make crop-specific fertilizer recommendation with tentative dosage for 100 crops within a short time. The farmers

are made aware of the importance, precautions and methods for collecting soil sample for appropriate nutrient analysis. This helps them to achieve higher yields and keeps soil fertile.

2.3.5. Innovative laboratories

The lab is a strategic and goal-focused unit where trainees work and interact with the faculty focused on a specific area like greenhouse components, insect identification, microscopy for plant and other associated material as needed in the training programmes. The lab houses innovative technological inputs for the farmers and trainers to interact.

Other newly built laboratories are

i. Microbial Laboratory
ii. Nanotechnology Laboratory
iii. Hydroponic Laboratory
iv. Food Preservation Laboratory

2.3.6. Library

Library with books, latest and old journals, booklets, reference books, Magazines, Newspapers and own published books by eminent scientists. Sitting arrangement for study and research.

2.3.7. Other Facilities

- Computer Lab
- Rooms for Director, Dean, Registrar,
- Cabins for Faculty and modular working stations for other Staff'
- Spacious Seminar/ Conference Hall
- Museum
- Store
- Cafeteria
- Washrooms – Separate for Ladies & Gents
- Complete facility air conditioned
- 100% Power backup including air-conditioning

2.3.8. Hostel

We have in-house residential facility with separate blocks for male and female trainees. The hostel is located in Knowledge Park in the same campus with main building, near Pari Chowk, Greater Noida. Knowledge Park has more than 100 institutional facilities for education and research.

Facilities:

i. V.I.P rooms

ii. Officers rooms

iii. Twin/triple sharing room

iv. Bathroom with every room attached

v. Balcony attached with every room

vi. Wi-Fi enabled – wired and wireless

vii. Power and water supply- 24 hours

viii. Ladies and gents blocks - Separate wings

ix. Security-24hrs

x. CCTV surveillance in corridors 24 hours

xi. Hygienic and Well illuminated room with basic amenities

xii. Water RO dispenser with cooling and heating facility

xiii. Cafeteria with TV facility

xiv. Parking area-specious

xv. Games- indoor and outdoor facility

Medical Facilities

- Best Hospitals are located in the close proximity like Sharda Hospital (0.5kms), Yatharth Wellness Hospital (1.2kms), Kailash Hospital (2kms), Sahdeo Hospital (1.5kms), Prompex Hospital (1.2kms) etc.

3. INSTITUTE OF HORTICULTURE TECHNOLOGY CAMPUS MANDIRA, ASSAM

3.1. Brief overview:

The North Eastern Regional Centre IHT Mandira, Assam was started on 17th October, 2016. This campus has been started mainly for Research and Development and Capacity Building Programs for North Eastern Region. The station is located 80 km from Guwahati on Guwahati Jalpayiguri road. The prospective plan for North East Regional station Mandira has been developed and entire area of 150 acres has been divided into five plots. At present Fruit and Nut crops, Vegetable crops, Medicinal and Aromatic plants and spices crops are grower and production of

Production of "Quality Planting Material" of all important horticultural crops of the North Esat Region is the major mandate at this campus. Customization of Good

Agricultural Practices is the second important mandate. Capacity building programs are regularly run for all stake holders. A layout of production and experimental area of IHT Mandira, Kamrup Assam is given below:

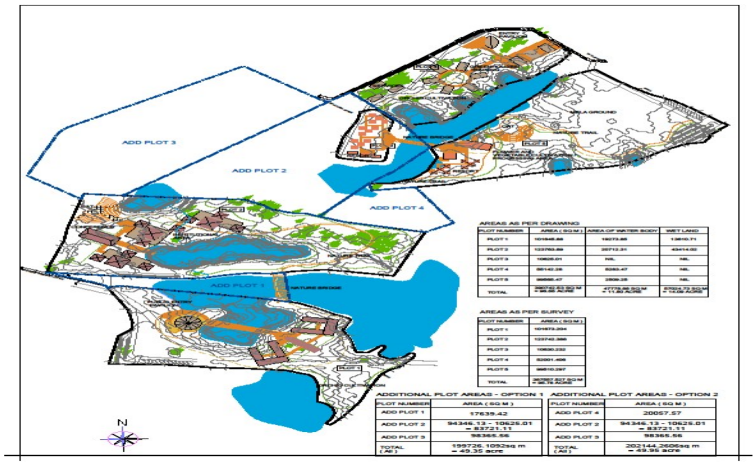


Plate 2: Layout Map of IHT Mandira, Kamrup, Assam 150 Acres arable land is divided into five blocks. All blocks are been brought under Horticultural Crops important to North East Region.

3.2.Fruits and Nut Crops

North East Region is known as a major hot spot for genetic diversity of important horticultural crops. The agro climate of the region is a complex matrix of humid tropical, subtropical and sub temperate regions. During the year under report plantation of fruit and nut crops important to the region were undertaken as shown in table 1 below

Table 1: Plantation of Fruit and Nut crops

S. No	Crops	Date of Planting	Variety	Total Number of Plants	Total Area
1	Lemon	06-06-18	Assam Lemon	490	1 Acre
2	Banana	03-07-18(G-9)	Grand Naine	1200(G-9) &	2 Acre

Plate 3: Coconut plantation at IHT Mandira Assam

3.3. Annual Horticultural Crops Raised

In annual crops the major objective was to evaluate and conserve the local land races of various vegetables crops, spices and ornamental plants. The crops raised during the year are shown in table 2.

Table 2: Annual Horticultural Crops raised

S.No	Crops	Date of Planting	Variety	Total Number of Plants	Total Area
1	Pumpkin	18-03-19	F1(Hazari)	500	1 Bigha
2	Bird Eye Chilly	20.03.19	Mizoram Local	1500	500 Sq. M.
3	Beans	25.03.19	Mizoram Local	1500	500 Sq. M.
4	Marigold	20-02-19	Pusa Narengi		0.5bigha
5	Turmeric	02-05-18	Megha	500kg	2 Bigha

Plate 4: Assam lemon plantation at IHT Mandira Assam

Plate 5: Pine-apple plantation Cv. Queen

3.4. Production of Quality Planting Material of Hybrid Dendrobium Orchids

Dendrobium Hybrids dominate amongst the cut flowers in the world trade. Quality plating material is the corner stone of for establishment of successful ventures IHT at Mandira Assam has taken up an elaborate programme on QPM of Dendrobium. A summary is presented in table 3 below.

Table 3: Standardization of QPM Production in Dendrobium Hybrid Orchids

S.No	Crops	Date of Planting	Variety	Total area/location
1	Orchid sticks	18-05-18	Sonia-17	Inside 4000m2 nethouse
2	Tissue culture orchids (9 months old)	27-05-18	-do-	Inside 4000m2 nethouse
3	T/c orchids (3month old)	05-02-18 & 7-12-18	-do-	Inside 4000m2 nethouse
4	T/c orchids (one month old)	16-02-19 & 06-03-19	-do-	Inside 4000m2 nethouse
5	Orchid sticks at block	24-08-18	-do-	Inside 4000m2 nethouse

Plate 6: A view of 4000m2 net house (Dendrobium Orchid House)

Plate

7: A view of orchid plants inside 4000sqm net house

Plate 8: A view of orchid blocks under 4000 sq. m. net house

3.5.Aromatic Planting Material

IHT is mainly working on three aromatic plants i.e. Citronella, Patchouli and Sugandh Manti. A collection of elite genotypes of all the three is being maintained. Quality planting material of all the three is being multiplied for distribution to the farmers. An account of aromatic plant collections and multiplication during 2018-19 is brought out here under in table 4.

Table 4: Aromatic Plant Collections and Multiplication

S.No	Crops	Date Of Receiving /Planting	Total Planting Materials	Variety	Total Area/Location
1	Citronella	07-06-18	5000 slips	Zorlab c-2	Inside 200m2

					nethouse
		08-06-18	30 slips	Kelkar var.	Open field at plot no.-1
		28-09-18	5000 slips	C-5	Open field at plot no.-1
		18-12-18	40000 slips	Kelkar (java var.)	Open field at plot no.-1
2	Patchouli	07-06-18	200 cuttings	Johri	Inside 4000m2 nethouse
		07-06-18	100 cuttings	R & d centre	Iht guest house
					4000m2 se
					ield at plot
					1000m2 se
					1000m2 se
	ri(rhizome)				200m2 nethouse
		11-06-18	100 plants	Jagiroad	Inside 200m2 nethouse
		11-09-18	30kg	Karbi-anglong	Inside 4000m2 nethouse
		28-09-18	30kg	-do-	-do-
		16-02-19	300kg	Bilasipara	Inside 1000m2 nethouse

Plate 9: A view of 1000sqm net house for aromatic plants

Plate 10: A view of patchouli plants in open field and inside net house

Plate 11: Production of QPM of Turmeric Cv. Megha at IHT Mandira Assam

4. RESEARCH AND DEVELOPMENT PROJECTS INCLUDING COLLABORATIVE AND IN-HOUSE PROJECTS

Table 5: Research and Development Projects

Project No.	Project Title	Sponsoring Agencies	Investigation	Duration
IHT-AM-1	Technology Demonstration for Hybrid Dendrobium Cut Flower Production at Farmers Field in Manipur for Bio-Entrepreneurship Development.	IBSD	Principal investigator Dr Umesh Kohli-IHT. Principal investigator Dr Sudripta Das-IBSD Co-investigator Ms. Aruna Yadav- IHT	9th Feb, 2017 to 9th Feb, 2019 **(24 Months)**
IHT-AM-2	Demonstration of Sustainable Technologies for Protected and Open Cultivation of Important Vegetable Crops in Farmers Field and IBSD Main Hub Mizoram.	IBSD	Principal investigator Ms Aruna Yadav-IHT. Co- investigator Dr Sudipta Das- IBSD	29th Dec, 2017 to 29th Dec, 2019 **(24 Months)**
IHT-AM-3	**Aroma Project-** Field Demonstration of Cultivation and	DBT	Principal Investigator Dr. Principal Investigator Ms. Aruna Yadav-	8th March, 2018 to 8th March, 2021

	Development of Process Technologies of Aromatic Crops- Patchouli, Citronella and Sugandh Mantri in Assam.		IHT	**(34 Months)**
IHT-AM-4	**Biotech-KISAN-** Empowering farmers of Assam and Nagaland as scientific grass root leaders through skill up-gradation, advance technology percolation and market information in the area of horticulture and fisheries.	DBT	Ms. Aruna Yadav	w.e.f Dec, 2018
IHT-AM-5	Standardization of growing media for plug type nursery production of vegetable crops.	R & D Project	Dr. Umesh Kohli & Ms Aruna Yadav	24 months *(w.e.f. 2018 Continued)*
IHT-AM-6	Studies on hydroponics and aeroponics alternate production systems for vegetables in urban and peri urban areas.	R & D Project	Dr. Umesh Kohli & Ms Aruna Yadav	24 months *(w.e.f. 2018)*
IHT-AM-7	Selection of Cost Effective Media for Production of Dendrobium	Collaboration with IBSD-Manipur	Dr. Umesh Kohli & Ms Aruna Yadav	24 months *(w.e.f. 2018)*

	Orchids.			
IHT-AM-8	Identification of Cultivars of tomato, cucumber and capsicum growing in growing in low cost naturally ventilated polyhouses.	R & D Project	Dr. Umesh Kohli & Sh. Dharam Singh	24 months *(w.e.f. 2018)*
IHT-AM-9	Enhancement of water use and fertilizer use efficiency through evaluation of different micro-Irrigation and fertigation systems in fruits and vegetable crops.	R & D Project	Dr. Pritam Chandra, Dr. Amrita and Mr. Lalit Pratap Singh	24 months *(w.e.f. 2018)*

4.1. Project No. IHT-AM-1

Technology Demonstration for Hybrid Dendrobium Cut Flower Production at Farmers Field in Manipur for Bio-Entrepreneurship Development

Aiming at development of bio entrepreneurships based on Dendrobium orchid cut flower production, Institute of Horticulture Technology, Mandira, Assam and Institute of Bio-resources and Sustainable Development, Manipur jointly executed partnership project titled "Technology Demonstration for Hybrid Dendrobium Cut Flower Production in Farmers Fields in Manipur for Bio-Entrepreneurship Development".

The project was thus successful on all accounts as it not only demonstrated and customized the technology right up to farmers' field, but established marketing channels as well. Sale of orchid cut flower spikes like hot cakes by the beneficiary farmers bolstered the farmers and youth with their newly acquired capacities to go in for scaling up their units and to establish new orchid cut flower production units. The desired goal of developing bio entrepreneurship is thus fully realized.

Plate 12: Field day on Dendrobium cut flower production at IHT Mandira Assam – 19th September, 2018

Plate 13: Standard Dendrobium spike being demonstrated at Haraorou Manipur on field day, 17th September, 2018

4.2.Project No. IHT-AM-2

Demonstration of Sustainable Technologies for Protected and Open Cultivation of Important Vegetable Crops in Farmers Field and IBSD Main Hub Mizoram.

Mizoram is endowed with climate conducive for commercial production of Hybrid Tomato, Capsicum/Cucumber, French bean, Birds Eye Chili, Sticky pumpkin etc. The vegetables are in demand year around and local production is not sufficient to meet the demand. Technology demonstration in Field Level Demonstration Centers (FLDC's) for protected cultivation of hybrid tomato and capsicum/cucumber in IBSD, Main Hub, Mizoram and Farmers fields along with open field demonstration of innovative technologies for the production of French bean, Birds Eye Chili, Sticky pumpkin in the FLDC's in main hub will make farmers of the state aware about the potential of protected cultivation and open field cultivation of French bean, Birds Eye Chili, Sticky pumpkin crops with innovative technologies for harnessing higher profits from their produce. Capacity building training programmes for the technologies demonstrated will give confidence in the farmers to adopt the technologies in their fields.

The present project proposal dwells on capitalizing tomato and capsicum/cucumber commercial production in Mizoram along with open field demonstration of important vegetables like French bean, Birds Eye Chili, and Sticky pumpkin so that horti entrepreneurship is developed and a booming tourist and local demands of the vegetables are met across the state for gainful employment of youth of the region.

"Identification of botanical varieties of bird eye chili with resistance/ tolerance to local pests and diseases"

Birds Eye Chili, is known for its Capsaicin content (0.589%), which is grown in Mizoram and some part of Manipur. This is an indigenous variety of these areas. To make the cultivation of Birds Eye Chili a profitable venture, IHT has taken initiative to identify varieties of Birds eye

according to its resistance/ tolerance to local pests and diseases. Currently screening is under progress on the basis of visual symptoms of leaves, presence or absence of Whitefly and their mean count across the field.

Plate 14: Open and Protected Vegetable Production program was launched for Mizoram farmers on 22nd September, 2018 at Thingdawal, Mizoram. Women participation was noteworthy

4.3.Project No. IHT-AM-3

Aroma Project- Field Demonstration of Cultivation and Development of Process Technologies of Aromatic Crops- Patchouli, Citronella and Sugandh Mantri in Assam

North East India is one of the richest repositories of Aromatic plants in the World. This region is also famous for diverse culture of human races. The present project proposal has been conceptualized for a tenure of three years with a view to promote cultivation of aromatic plants Patchouli (Pogostemon cablin), Citronella (Cymbopogon winterianus) and Sugandh Mantri (Homalomena aromatica).

The present proposal has been conceptualized considering all these factors with a view to establish the relationship between Scientists - Farmers – Industries by integrating Field identification, Demonstration, Training, Generation of quality planting materials, processing, quality checking and 100 % by back assurance.

Plate 15: Visit of CSIR - CIMAP scientist Dr. Monuj Kumar, Dr. R K Srivastav and Dr. Israr Ali to IHT Mandira on 10.03.19

Plate 16: Visit of CSIR - CIMAP scientist Dr. Monuj Kumar, Dr. R K Srivastava and Dr. Israr Ali to IHT Mandira on March 10, 2019

Plate 17: A view of Sugandh Mantri inside 4000m2 net house

Total Coverage Target:

Patchouli (*Pogostemon cablin*) - 60 acres

Citronella (*Cymbopogon winterianus*) - 35 acres

Sugandhmantri (*Homalomena aromatica*) - 05 acres

The project started on 8th March, 2018 and the Quality Planting Material has reached on the specific sites according to the guided timelines of the project, its cutting has been done and beneficiary farmers selection is going by our IHT Mandira Faculty.

4.4. Project No. IHT-AM-4

Biotech-KISAN Project - Empowering farmers of Assam and Nagaland as scientific grass root leaders through skill up-gradation, advance technology percolation and market information in the area of horticulture and fisheries.

Assam, one of the front runner States of North Eastern India is endowed with abundant fertile land and water resources. The major horticultural crops of Assam are Banana, Pineapple, Mandarin Orange, Assam lemon, Jackfruit and Litchi under fruits; Turmeric, Ginger, Black pepper and Bhutjolokia.

Present project proposal under "Biotech-Krishi Innovation Science Application Network (Biotech-KISAN)" is proposed to promote growth of horticulture and fisheries sectors in Assam and Nagaland through area based regionally differentiated strategies, which includes technology promotion by organizing events and dissemination by capacity building, extension, post-harvest management in consonance with comparative advantage of each region and its diverse agro-climatic features.

Plate 18: Visit of DBT Scientist-G, Dr. Mohd. Islam and Dr. H. C. Gupta, former Director IARI to IHT, Mandira on 08.12.18(Site visit of Sub-Committee of PSMC to IHT campus, Mandira - Biotech KISAN; DBT project)

Plate 19: Banana plantation started with TC plants of Cv. G -9 at IHT Mandira Assam

The project has been revised by DBT experts after visiting the site with effect from December, 2018 and Institute of Horticulture Technology, Mandira, Assam has been assigned production of Cv. Malbhog of Banana and its demonstration in the farmers' fields.

IHT has customized the protocol and undertaken an experiment to standardize in regarding to the prevailing environment and cultural operations required. The present experiment was entitled as "**Identification of superior clones of Banana cultivars Malbhog and production of disease-free plantlets"**

4.5. Societal outcome of the R&D activities undertaken during last DSIR recognized period.

Capacity building and development the of bio-resources entrepreneurs in horticultural crops such as dendrobium, cut flower, micro-irrigation, use of machinery and fertigation showed tangible impact.

- Farmers are gaining interest in Orchid-Dendrobium Cut flower production. Local markets showing interest in Manipur for buying Dendrobium from farmers
- Local people has upgraded their livelihood through Dendrobium cultivation
- Endangered species of orchids shall be preserved.
- Indigenous varieties of fruits, vegetables and spices like Malbhog, birds eye chili, sticky pumpkins are growing commercially by local people with modern technological inputs showcased in Technology Demonstration activities in farmers fields.
- Identification of disease resistance in birds eye chili will help farmers from buying expensive pesticides.
- The crop modules standardized in protected cultivation with growing medium soil or hydroponics will provide farmers ready model to adopt resulting in harnessing better returns from the protected crop production.

Institute of Horticulture technology is devoting it's time to help and upgrade social livelihood of Farmers through collaborative projects, in-house R&D and capacity building.

5. CAPACITY BUILDING PROGRAMMES-2018-19

5.1. Training Courses Offered

Forty-one training courses listed in table- 1 below were offered during 2018-19, besides these a number of customized programmes were run as per the demands of farmers and other societal needs. Our training programmes meeting to the needs of urban and peri-urban populations remained very popular.

Table 6: List of Training Courses Offered at IHT Main Campus Greater Noida during 2018-19

S. NO.	COURSE CODE	COURSE TITLE	DURATION
VEGETABLE CROPS			
1	IHT-101	Plug Nursery Production – Vegetables	
2	IHT-102	Production Technology of Greenhouse	

		Vegetable Crops	1 week
3	IHT-103	Training ,Pruning and Trellising	
4	IHT-104	Quality Vegetable Production	
5	IHT-105	Nursery Production for Kitchen Gardens	
6	IHT-106	Year Round Vegetable Production	
7	IHT-107	Polyhouse Vegetable Production	
8	IHT-108	Vegetable – Open Cultivation	
9	IHT-109	Production Technology of Greenhouse Vegetable Crops-Supervisor Level I	
10	IHT-110	Production Technology of Greenhouse Vegetable Crops-Supervisor Level II	3 months
11	IHT-111	Vegetable Seed Production and Technology	
12	IHT-112	Year Round Vegetable Production Under Open and Protected Structure	1 year
FRUIT CROPS			
11	IHT-201	Root Trainer Nursery Production –Fruits	1 week
12	IHT-202	Canopy Management of Fruit Plants	
13	IHT-203	High Density Planting	
14	IHT-204	Rejuvenation of Unproductive Fruit Plants	
15	IHT-205	Planning, Layout and after care of Fruit Plantation	2 weeks
16	IHT-206	Commercial Fruit Production	3 months
17	IHT-207	Fruit Production Technology- Supervisor Level-4	1 year
FLORICULTURE AND LANDSCAPING			
18	IHT-301	Plug Nursery Production - Flowers and Ornamentals	1 week
19	IHT-302	Production Technology of Cut Flowers in Greenhouse	
20	IHT-303	Polyhouse Cut Flower Production	2 weeks
21	IHT-304	Urban Landscaping	1 week
22	IHT-305	Production Technology of Cut Flowers in Greenhouse	1 month
23	IHT-306	Protected Cultivation of Flower Crops	3 months
24	IHT-307	Cut Flower Production in Open and Greenhouse- Supervisor Level-4	1 year
25	IHT-308	Landscape and Gardening- Supervisor Level-4	1 year
MODERN TECHNOLOGIES AND MANAGEMENT			
26	IHT-401	Modern Nursery Production Technology	1 week
27	IHT-402	Micro Irrigation and Fertigation	
28	IHT-403	Soil Health Management	
29	IHT-404	Soil Moisture Conservation	
30	IHT-405	Drip and Fertigation Technology	
31	IHT-406	Integrated Pest Management	
32	IHT-407	Hardening of Ex. Vitro Horticultural Plants	2 weeks
33	IHT-408	Innovative Nursery Production	3 weeks
SPECIAL COURSES			
34	IHT-501	Polyhouse Construction and Maintenance	1 week
35	IHT-502	Climate Control in Polyhouse	

36	IHT-503	Hydroponics and Aeroponics	
37	IHT-504	Commercial Hydroponics	3 days
38	IHT-505	Home Scale Mushroom Production	1 week
39	IHT-506	Home Scale Fruit and Vegetable Preservation	
40	IHT-507	Home Scale Waste Management	
41	IHT-508	Mushroom Production Technology	
42	IHT-509	Post-Harvest Management of Fruits and Vegetables	2 weeks
43	IHT-510	Gardener	3 month
44	IHT-511	Greenhouse Operator and Maintenance	
45	IHT-512	Horticulture Supervisors Training Course	6 months

5.2. Training at Main Campus Greater Noida

Institute of Horticulture Technology at its main campus conducted 66 capacity-building programmes on various horticultural production technologies for farmers and other stake holders during 2018-19, in addition, 7 trainings were held for extension officers and trainers coming from different states. The training organized for MANAGE, Hyderabad remained noteworthy during the year. A summary of capacity building programmes conducted during the year 2018-19 is given in Table below.

A. Table 7: Trainings Conducted at IHT Main Campus, 2018-19

S.No	State/U.T	Date	Training Title
1	Andaman & Nicobar	04.02.2019-08.02.2019	Urban Landscaping
2	Assam	29.08.2018 - 31.08.2018	Modern Horticultural Production Technologies
3	Assam	19.02.2019-25.02.2019	Training Cum Exposure Visit on Protected Cultivation with special reference to Organic Cultivation
4	Gujarat	28.01.2019 – 01.02.2019	Hi-Tech Horticulture Production Technologies with Special reference to

			Organic Farming
5	Jharkhand	6.03.2019 to 10.03.2019	Hi-Tech Horticultural Crop Production Technologies
6	Mizoram (Dist.- Kolasib)	08.10.2018 - 17.10.2018	Skill Development Training of progressive Farmers Solanaceous crops
7	Ministry of Home Affairs, Govt. of India BSF Trainees	13.12.2018 - 21.12.2018	Latest Technologies of Modern Horticulture and Gardening
8	New Delhi Municipal Corporation	27.08.2018 - 29.08.2018	Landscaping & Floriculture
9	New Delhi Municipal Corporation	10.09.2018 - 12.09.2018	Landscaping & Floriculture
10	New Delhi Municipal Corporation	13.09.2018 - 15.09.2018	Landscaping & Floriculture
11	New Delhi Municipal Corporation	17.09.2018 - 19.09.2018	Latest Technologies of Modern Gardening
12	Sikkim (South & West)	01.10.2018 - 07.10.2018	Modern Horticultural Production Technologies
13	Tamil Nadu (Dist.-Perambalur)	02.04.2018 -06.04.2018	Hi-tech Horticulture Production Technology on high value Vegetable Crops with Special Reference to Micro-irrigation and Mulching
14	Tamil Nadu (Dist.-Ariyalur)	09.04. 2018 -13.04.2018	Hi-Tech Horticulture Production Technology with Special Reference with Micro-irrigation, Fertigation & Mulching
15	Tamil Nadu (Dist.-Thiruchirappalli)	13.04.2018 -17.04.2018	Hi-Tech Horticulture Production Technology with Special Reference with Micro-irrigation, Fertigation & Mulching
16	Tamil Nadu (Dist: Dindigul)	18.04.2018 -22.04.2018	Protected Cultivation in Vegetable Crops
17	Tamil Nadu	27.04.2018 -01.05.2018	Hi-Tech Horticulture Production Technology

	(Dist.-Erode)		
18	Tamil Nadu (Dist.- Vellore)	03.05.2018 -07.05.2018	Micro-irrigation and Fertigation Techniques
19	Tamil Nadu (Dist.-Thiruppur)	07.05. 2018 -11.5.2018	Modern Nursery Production Technology
20	Tamil Nadu (Dist.-Villuppuram)	11. 05.2018 -15.05.2018	Modern Horticultural Production Technologies
21	Tamil Nadu (Dist.-Puddukkottai)	16.05.2018 -20.05.2018	Modern Horticultural Production Technologies
22	Tamil Nadu (Dist.-Ramnathapuram)	23.05.2018 -27.05.2018	Modern Horticultural Production Technologies
23	Tamil Nadu (Dist.-Thanjavur)	28.05.2018 -01.06.2018	Protected Cultivation with Special reference to Organic Farming and Pest Management
24	Tamil Nadu (Dist.-Kanyakumari)	01.06. 2018 -05.06.2018	Modern Horticultural Production Technologies
25	Tamil Nadu (Dist.-Dindigul)	06.06. 2018 -11.06.2018	Modern Horticultural Production Technologies with reference to Organic Farming
26	Tamil Nadu (Dist.-Sivagangai)	11.06.2018 -15.06.2018	Modern Horticultural Production Technologies
27	Tamil Nadu (Dist.-Kodaikanal)	18.06.2018 -22.06.2018	Hi-Tech Horticultural Production Technologies with Special reference to Organic Farming
28	Tamil Nadu (Dist.-Tirunelveli	25.06.2018 -29.06.2018	Hi-Tech Horticultural Production Technologies with Special reference to Organic Farming
29	Tamil Nadu (Dist.-Dharmapuri)	01.08.2018 - 05.08.2018	Hi-Tech Horticultural Production Technologies with Special reference to organic farming
30	Uttar Pradesh (Dist.- Gorakhpur / Mathura)	23.08.2018 - 25.08.2018	Production of vegetable crops
31	Private Candidates	03.04.2018-07.04.2018	Protected Cultivation with Special Reference to Hydroponics

		03.04.2018-07.04.2018	Gardener
		04.04.2018-04.07.2018	Protected Cultivation of Cucumber, Capsicum and Tomato Supervisor Level-3
		17.04.2018-21.04.2018	Protected Cultivation with Special Reference to Hydroponics
		09.07.2018 - 16.07.2018-	Protected Cultivation of Flower Crops
		02.08.2018 - 04.08.2018	Hydroponics Crop Growing system
		07.08.2018 - 11.08.2018	Protected cultivation of vegetable crops
		23.08.2018 - 25.08.2018	Hydroponics
		28.08.2018 - 01.09.2018	Vegetable Production
		04.09.2018 - 08.09.2018	Production Technology of Greenhouse Vegetable Crops
		13.09.2018 - 15.09.2018	Production Technology of Greenhouse Vegetable Crops
		25.09.2018 - 27.09.2018	Commercial Hydroponics
		25.09.2018 - 29.09.2018	Production Technology of Greenhouse Vegetable Crops
		23.10.2018 - 25.10.2018	Commercial Hydroponics
		23.10.2018 - 27.10.2018	Production Technology of Greenhouse Vegetable Crops
		27.11.2018 - 01.12.2018	Production technology of Greenhouse Crops
		12.12.2018 - 14.12.2018	Mushroom Production
		25.12.2018 - 27.12.2018	Commercial Hydroponics
		25.12.2018 - 27.12.2018	Production Technology of Greenhouse Vegetable Crops
		25.12.2018 - 27.12.2018	Production Technology of Greenhouse Vegetable Crops
		25.12.2018 - 29.12.2018	Mushroom Production
		29.12.2018 - 30.12.2018	Mushroom Production
		07.01.2019 - 07.04.2019	Protected Cultivation of Cucumber, Capsicum and Tomato Supervisor Level-3

		10.01.2019 - 12.01.2019	Commercial Hydroponics
		19.01.2019 - 21.01.2019	Commercial Hydroponics
		21.01.2019 - 23.01.2019	Production Technology of Greenhouse Vegetable crops
		21.01.2019 - 23.01.2019	Commercial Hydroponics
		21.01.2019 - 25.01.2019	Production Technology of Greenhouse Vegetable crops
		22.01.2019 – 24.01.2019	Commercial Hydroponics
		25.01.2019	Commercial Hydroponics Workshop
		04.02.2019 - 03.05.2019	Protected Cultivation of Cucumber, Capsicum and Tomato Supervisor Level-3
		05.02.2019-09.02.2019	Production Technology of Greenhouse Vegetable Crops
		12.02.2019-16.02.2019	Production Technology of Greenhouse Vegetable Crops
		12.02.2019-17.02.2019	Protected cultivation of vegetable with special emphasis on basic Hydroponics
		22.02.2019-23.02.2019	Commercial Hydroponics Workshop
		12.03.2019-16.03.2019	Production Technology of Greenhouse Vegetable Crops
		28.03.2019-30.03.2019	Commercial Hydroponics

B. Table 8: Trainers Training/Extension Officials Trainings

S. No.	State	Date	Training Title
1	Himachal Pradesh	15.01.2019 - 19.01.2019	Plant Health Clinic with Special reference to Soil Health Management
2	Karnataka	19.11.2018 - 23.11.2018	Modern Horticulture Production Technologies with Special reference to Hi-tech Precision Horticulture
3	Maharashtra	02.01.2019 – 05.01.2019	Advance training of Officers in Micro Irrigation
4	Odisha	24.12.2018 - 25.12.2018	Vegetables flowers in controlled environment
5	Various States Through MANAGE, Hyderabad	23.09.2018 - 29.09.2018	Innovative Production Technologies of Vegetable Crops under Protected Cultivation
	Aboard	**Date**	**Training Title**
6	Bhutan Officers	30.05.2018 -08.06.2018	Modern Technology of Vegetable Production

C. Table 9: Exposure visits of farmers and Trainers- outside State

S. No	State	Place Visit	Date	Training Title
1.	Assam	Nasik, Maharashtra	23.09.18 to 30.09.18	Training cum Exposure visit
2.	Assam	Chennai, Tamil Naidu	15.11.18 to 19.11.18	Training cum Exposure visit
3.	Gujarat	IHT Greater Noida	20.02.2019	Exposure Visit to Technology Park
4.	Haryana	Nasik, Maharashtra	11.03.19 to 18.03.19	Protected & Hi- Tech Horticulture
5.	Haryana	Gujrat	28.03.19 to 01.04.19	Protected & Hi- Tech Horticulture
6.	Jharkhand	Raipur, Chhattisgarh	30.10.18 to 01.11.18	Protected & Hi- Tech Horticulture
7.	Jharkhand	Raipur, Chhattisgarh	02.11.18 to 04.11.18	Protected & Hi- Tech Horticulture
8.	Jharkhand	Raipur, Chhattisgarh	20.11.18 to 24.11.18	Protected & Hi- Tech Horticulture
9.	Jharkhand	Raipur, Chhattisgarh	17.12.18 to 19.12 .18	Protected & Hi- Tech Horticulture
10.	Jharkhand	Raipur, Chhattisgarh	03.01.19 to 05.01.19	Protected & Hi- Tech Horticulture
11. 1	Jharkhand	Raipur, Chhattisgarh	09.02.19 to 11.02.19	Protected & Hi- Tech Horticulture
12.	Jharkhand	Raipur, Chhattisgarh	11.02.19 to 13.02.19	Protected & Hi- Tech Horticulture
13.	Jharkhand	Raipur, Chhattisgarh	27 .02.19 to 01.03.19	Protected & Hi- Tech Horticulture
14.	Jharkhand	Raipur, Chhattisgarh	05.03.19 to 07.03.19	Protected & Hi- Tech Horticulture
15.	Jharkhand	Raipur, Chhattisgarh	07.03.19 to 09.03.19	Protected & Hi- Tech Horticulture
16.	Jharkhand	Raipur, Chhattisgarh	12.03.19 to 14.03.19	Protected & Hi- Tech Horticulture
17.	Jharkhand	Raipur, Chhattisgarh	16.03.19 to 18.03.19	Protected & Hi- Tech Horticulture
18.	Jharkhand	Raipur, Chhattisgarh	23.03.19 to 25.03.19	Protected & Hi- Tech Horticulture
19.	Jharkhand	Gujrat	23.03.19 to 28.03.19	Protected & Hi- Tech

5.3. Capacity Building Snapshots at IHT Main Campus Greater Noida

Plate 20: Farmers and officers from Andaman and Nicobar attended a special training on Urban landscape on 2nd Feb, 2019

Plate 21: Dr. K. L Chadha, Chairman, IHT interacts with farmers of district Erode, Tamil Nadu, 27th April, 2018

Plate 22: Sr. Horticulture Extension Officers from Himachal Pradesh attending Trainers Training programme on "Plant Health Clinic" at IHT Main campus Greater Noida. 15th -19th January, 2019

Plate 23: Trainings on "Hydroponic Production System" exposed trainees to an experience that is ultimate in learning

Plate 24: Plug nursery production being demonstrated to Sr. Extension

officers sponsored by MANAGE at IHT Technology Park, 23rd to 29th December, 2018

Plate 25: Hands on training- BSF Yodhas learn pruning of landscape plants at IHT Technology Park Greater Noida 13th -21st December, 2018

Plate 26: Fixing components of Micro-Irrigation Systems- Sr. Officers from Maharashtra try their hand at IHT Micro- Irrigation Lab Greater Noida- 2nd -5th January, 2019

Plate 27: Sowing seeds in pro trays for plug nursery production of vegetable crops, an operation that can be done both manually as well as by machines. - Trainees practicing at IHT Greater Noida in an end to end training programme on Greenhouse Vegetable Production, Jan-March, 2019

Plate 28: Farmers from Sikkim learning the use of strings to train tomato plants in green house crop. A training programme under North East Rural Livelihood Project- 1st to 7thOctober, 2018

Plate 29: Officers from Bhutan underwent training on Hi Tech Horticulture at IHT greater Noida 30th May to 8th June, 2018

5.4. Onsite Trainings at State and District Level

Institute of Horticultural Technology conducted onsite trainings and exposure visits in various districts of different states of the country. An account of onsite trainings and exposure visits conducted during the year 2018-19 is presented hereunder in table below:

Table10: Onsite Trainings across the States Conducted by IHT during 2018-19

S. No.	State	Place/Venue	Date	Title
1	Assam	IHT Mandira, Assam	03.03.2018	Nursery Generation, Cultivation and Processing
2	Assam	Rangjuli, Assam	18.04.18 to 23.04.18	7 day's skill development training programme on high tech horticulture and organic farming under HMNEH
3	Assam	Bamunigaon, Assam	24.04.18 to 30.04.18	7 day's skill development training programme on high tech horticulture and organic farming under HMNEH
4	Assam	Guwahati, Assam	03.05.18 to 09.05.18	7 day's skill development training program on Mushroom Cultivation under HMNEH
5	Assam	Baksa, Assam	28.06.18 to 04.07.18	7 day's skill development training programme on high tech horticulture and

				organic farming under HMNEH
6	Assam	IHT Mandira, Assam	16.09.18 to 22.09.18	Skill Development Training Programme on Generation of Quality Planting Material in Banana, Pineapple and Turmeric under Biotech-Kisan
7	Chhattisgarh	Chhattisgarh (Baloda Bazaar, Mahasamund, Surajpur, Balrampur)	09.06.18 to 24.06.18	Protected Cultivation of Horticultural Crops
8	Delhi	Delhi (Khadkhadi nehar, Nafajgarh)	2.4.2018 to 4.4.2018	Modern Horticulture Production and Post-Harvest Technologies
9	Delhi	Delhi (Akbarpur, Palla, Jaunthi, Nizampur)	9.4.2018 to 13.4.2018	Modern Horticulture Production and Post-Harvest Technologies
10	Madhya Pradesh	Madhya Pradesh (Kanashaiya, Bhopal)	14.5.2018 to 01.06.18	Good Agricultural practices with special reference to Protected cultivation
11	Madhya Pradesh	Madhya Pradesh (Kanasaiya)	10.09.18 to 14.09.18	Good Agriculture Practices with Special reference to Modern Horticulture
12	Mizoram (Kolasib)	Main Hub. Thindawl, Mizoram	22.09.18	Protected and Open Cultivation of Vegetable crops
13	Mizoram (Kolasib)	COE Horticulture, Thingdawl, Mizoram	30.01.19 to 31.01.19	Capsicum Cultivation
14	Mizoram	Farmers Site	2018-2019	Protected cultivation of tomato, cucumber, capsicum and open field

				cultivation of birds eye chili, sticky pumpkin and French beans.

5.5. Snapshots of Onsite Capacity Building Programmes

Plate 30: IHT conducted trainers training programme at Training and Demonstration Centre at Bhopal MP – 28th September, 2018

Plate 31: At Thingdawl in Mizoram farmers were trained on Greenhouse cucumber production, under a collaborative project between IHT, Assam and IBSD Mizoram. February, 2019

Plate 32: IHT, Mandira Assam, Interactive Lecture to farmers and youth

6. LIBRARY AND PUBLICATIONS:

Table 11: Books and Journals

S. No.	Name of Book	Author / Writer
	FRUIT SCIENCE	
1	Naagpuri Santare ki Unnat Baghwaani	ICAR
2	Aam Utpaadan	Kendriya Uttar ,Maidaani Udhyaan Sansthan
3	Canopy Management in Fruit Crops	Dr. Gorakh Singh
4	Aam Ki Baghbaani	A.K Mishra
5	Amrud ki Sadhan Aiwam Meadow Baghwaani	H. Ravishanker , Dr. Gorakh Singh
6	Papite Ki Safal Bhagwaani	Dr. Masha Raam
7	Propagation Techniques fir Mango , Guava and Aonla	Dr. Gorakh Singh , S. Raajan
8	Ver	Dr. Om Prakash Paarik
9	Naagpuri Santare Aiwam Nimboo ke liye Utkrusht Moolvrant	Dr. M Ladania
10	Bharat me Angoor	Dr. Karn Singh Chauhan , Dr. Hari Krishan Singh
11	Seb Baghwaani or Virvidh Karan Kisaano Baghwano ke liye Taqneeki Aiwam Prasaar - Vistaar Pustika	Dr. Vijay Singh Thakur
12	Phal Vraksho me Canopy Prabandhan	Gorakh Singh
13		
14	Good Agriculture Practices In Cashew	Gorakh Singh
15	The Litchi	FAO , New Delhi
16	Guava - 8 copies	Dr. Gorakh Singh
17	Amrud ki Sadhan Aiwam Meadow Baghwaani	Dr. Gorakh Singh
18	Proceeding of the 1st International Guava Symposium	R.K Pathak
19	Checklist of Commercial Varieties of Fruits	Dr. Gorakh Singh
20	Phal Aiwam Sabzi Parikshan	Indrapen Singh
21	Post-Harvest Handling of fruits , Vegetables , and Flower (II Edition)	Gorakh Singh , Swati Brche , Komal Singh Kiran
22	Tropical Fruit - Production and Marketing in Rialand	Dr. Songpol Som Sh. Mr. Suchat Vichitranand
23	Bharat me Angoor	Dr. Karn Singh

		Chauhan , Dr. Hari Krishan Singh
24	Banana	V. N Madhawa Rao
25	Seabuckthorn (Mordern Cultivation Technology)	Virendra Singh
26	Sheetostha Phalon ki Vaigyaanik Kheti	Kanchan Kumar Srivastava
27	Banana Cultivation in India	Dr. H. P Singh
28	Litchi Ki Uttam Prabandh Prakriya	Gorakh Singh , Vishaal Nath
29	Rejuvenation Nagpur Mandarin Decline	V.J Shivanker , Samh Nagvi
30	Papaya Cultivation In India	Dr. Mansha Ram
31	Bharatme Kiwi Phal Ka Utpaadan	Dr. Dhansyaam Pandey , Dr. Dharmendra Singh Rathore
32	Aam Ke Utpaadan Hetu Uttam Bhagwani Kriyaaye	H. Ravishanker
33	Kaaju Prabandhan Takneek	Gorakh Singh , V. N Huwali
34	Rejuvenation in Litchi	Dr. Gorakh Singh
35	Cashew Development in India Challenges & Opportunities	Gorakh Singh , V. N Huwali
36	Phal Vraksho me Canopy Prabandhan	Gorakh Singh
37	Canopy Management in Fruit Crops	Dr. Gorakh Singh
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