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ANNUAL REPORT

(2020-21)

CENTRAL INSTITUTE OF HORTICULTURE

Department of Agriculture, & Farmers Welfare
Ministry of Agriculture & Farmers Welfare
Government of India, Medziphema, Dimapur, Nagaland

केंद्रीय बागवानी संस्थान
कृषि, एवं किसान कल्याण विभाग
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निदेशक
केंद्रीय बागवानी संस्थान
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Index

List of Tables

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भारत सरकार
कृशि एवं किसान कल्याण मंत्रालय
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Government of India
Ministry of Agriculture & Farmers Welfare
Department of Agriculture, Cooperation
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Message

Horticulture has become a priority area in the diversification in Indian Agriculture and is improving economic condition of farmers and entrepreneurs as also contributing significantly to the National economy. As a part of high value agriculture, horticulture provides a wide range of options to farmer for diversification and has potential to sustain large number of agro-industries, provides employment opportunities, nutritional security and health care.

Since inception for the last 15 years, the contribution of Central Institute of Horticulture, Nagaland is tremendous in imparting various training programmes, exposure trips, skill development & certificate course as a part of capacity building, promoting production of quality planting materials, technology demonstration of focus horticulture crops, protected cultivation, organic farming, nursery accreditation and certification, agri business promotion, post-harvest management and marketing activities. The Institute has been actively co-ordinating with various reputed Institutes, different organization and stake holders of horticulture in the region and the state government departments of North east region in an effort to achieve its objectives.

It gives me immense pleasure that CIH is bringing out its annual report highlighting achievements made during the year 2020-21. I compliment the Director, Central Institute of Horticulture, Medziphema and his team for putting their sincere efforts and offer my best wishes to the Institute in its future endeavour.

(Dr. Abhilaksh Likhi)

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Foreword

North East Region (NER) is the prominent source of varied horticulture crops and is abode with diverse agro-climatic conditions ranging from tropical to temperate. This region is major hotspot for cultivation of number of varieties of fruits, vegetables, flowers, spices, medicinal & aromatic plants, plantation crops but its potential still remains to be fully tapped. Availability of sufficient quality planting material, awareness of improved technologies, post-harvest management, adoption of plant protection measures and marketing linkages have been the major factors identified for the growth of horticulture sector in the region.

The Central Institute of Horticulture have mandate for imparting training programmes, certificate courses as a part of capacity building, production of quality planting material, protected cultivation, organic farming, nursery accreditation and certification, post harvest management and marketing aspects. The institute has been actively coordinating with different organizations, State Governments and other stakeholders to develop NER as horticulture hub.

In the present scenario of climate change, there are many challenges being faced to improve production and productivity. The productivity of many horticultural crops is still below the national level. Development of human resource through trainings and transfer of technology for large scale adoption of hi-tech production technologies may help in increasing the production and productivity of horticultural crops in the region.

I am happy to know that CIH is bringing out its Annual Report 2020-2021 highlighting achievements made during the year. I compliment the Director CIH and his team for their sincere effort in improving the horticulture sector in the region.

I wish the institute all success.

(S.K. Malhotra)

कार्यकारी सारांश

केंद्रीय बागवानी संस्थान, नागालैंड 2006 से अपनी स्थापना के बाद से पूर्वोत्तर क्षेत्र में बागवानी क्षेत्र में विकास को गति देने के लिए प्रमुख स्तम्भ है। यह बागवानी विकास गतिविधियों की योजना, समन्वय, पर्यवेक्षण और निगरानी के कार्य में लगा हुआ है। प्रशिक्षकों और किसानों/लाभार्थियों के प्रशिक्षण द्वारा क्षमता निर्माण के माध्यम से विभिन्न कार्यक्रम किये जा रहे है, जैसे उन्नत उत्पादन प्रौद्योगिकियों का ऑन और ऑफ फार्म प्रदर्शन, गुणवत्तापूर्ण रोपण सामग्री का उत्पादन और आपूर्ति, पूर्वोतर क्षेत्र में नर्सरी का प्रत्यायन और प्रमाणन, बागवानी फसलों की जैविक खेती को बढ़ावा देना, प्रदर्शनियों, संगोष्ठियों, कार्यशालाओं, एक्सपोजर ट्रिपों खरीदारों और विक्रेताओं की बैठक के माध्यम से कृषि–व्यवसाय को बढ़ावा देना; फसलोत्तर प्रबंधन और बागवानी फसलों का मूल्यवर्धन, बागवानी में कौशल विकास और प्रमाणपत्र पाठ्यक्रम; विधि और परिणाम प्रदर्शन के माध्यम से प्रौद्योगिकी का हस्तांतरण, एनईआर के राज्य बागवानी विभागों और अन्य राष्ट्रीय संगठनों, गैर सरकारी संगठनों, किसान समूह और स्वयं सहायता समूहों के साथ फ़ोल्डर, मैनुअल, पत्रक और समन्वय का प्रकाशन आदि। मुख्य उपलब्धियों का सारांश नीचे दिया गया है।

❖ मानव संसाधन विकास

- सीआईएच ने 54 प्रशिक्षण आयोजित किए, जिनमें से 24 प्रशिक्षण ऑनलाइन प्लेटफॉर्म के माध्यम से आयोजित किए गए थे, जिसमें सभी पूर्वोत्तर राज्यों के किसानों, उद्यमियों, वैज्ञानिकों, विस्तार कार्यकर्ताओं, विद्वानों और बागवानी अधिकारियों सहित कुल 1756 प्रतिभागी शामिल हुए। विभिन्न आईसीएआर संस्थानों और इसके केंद्रों और भारत के कृषि विश्वविद्यालय के विशेषजों को संसाधन व्यक्तियों के रूप में आमंत्रित किया गया था।
- वर्ष 2020–21 के दौरान संस्थान ने पूर्वोत्तर क्षेत्र के कुल 730 किसानों तक पहुंचने के लिए 30 किसानों का प्रशिक्षण आयोजित किया।

❖ कृषि विकास

- विभिन्न फल फसलों, वृक्ष मसालों, सब्जियों और और कंद फसलों के लिए लगभग 25 हेक्टेयर क्षेत्र स्थापित किया गया है।
- काजू, साइट्रस, आम, अनार, किन्नो मंदारिन, असम नींबू, खासी मंदारिन, अमरूद, अनानास, लीची, आंवला, आड़ू, बेल, एवोकैडो, ड्रैगन फ्रूट, कैरम्बोला, सपोटा, बेर, कस्टर्ड सेब, खुरमा ब्लॉकों की खेत में स्थापना हुई है।
- संरक्षित खेती के तहत सजावटी फसलों जैसे जरबेरा, एन्थ्यूरियम और उच्च मूल्य वाली सब्जियों (शिमला मिर्च, ककड़ी, टमाटर, कस्तूरी आदि) की खेती की जा रही है।
- 2000 वर्गमीटर क्षेत्र के पॉली हाउस के अंतर्गत वायरस मुक्त साइट्रस (खासी मंदारिन और नागपुर मंदारिन) मदर ब्लॉक का रखरखाव भी किया जाता है।

❖ गुणवत्तापूर्ण रोपण सामग्री का उत्पादन

- रूट स्टॉक (अमरूद स्थानीय 19735), साइट्रस (रफ नींबू और रंगपुर लाइम 51,440), काजू (स्थानीय 4615) और आम (स्थानीय 276) के नग से उगाए गए हैं।
- खासी मंदारिन और मौसंबी के बुडेड सीडलिंग 2500 नग, जबकि एसिड लाइम बीज के द्वारा 13500 नग उगाए गए हैं। अमरूद (लखनऊ–49, इलाहाबाद सफेदा, ललित और श्वेता के ग्राफटेड अंकुर 1945 नग), 1025 काजू के ग्राफटेड अंकुर (वीआरआई-3, वी-4, बीबीएसआर-1, एच-2/16, एच-1608), 1500 कटिंग ड्रैगन फ्रूट (वियतनाम रेड एंड व्हाइट), 250 एवोकैडो कल्टीवर. (स्थानीय और बीज द्वारा हस) और लीची–कल्टीवर चाइना के 280 स्तरित अंकुर को संरक्षित खेती के तहत पाला गया है।

❖ प्रशिक्षण कार्यक्रमों का आयोजन, खेतों में और बाहर प्रदर्शन और गतिविधियाँ।

- वर्ष 2020–21 के दौरान, विभिन्न सब्जियों, जड़ वाली फसलों और मसालों की फसलों जैसे भिंडी (लेडी फिंगार), लोबिया, यार्ड लॉन्ग बीन, बैगन, लौकी, भारतीय बीन (डोलिचोस) शकरकंद, प्याज और हल्दी के प्रदर्शन का आकलन करने लिए विभिन्न प्रौद्योगिकी प्रदर्शन किए गए। ऑयस्टर मशरूम की खेती की प्रदर्शन इकाई भी स्थापित की गई। 2020–21 के दौरान किए गए मुख्य प्रदर्शन निम्नलिखित हैं।
- शिटेक मशरूम का प्रारंभिक उत्पादन प्रदर्शन
- कम लागत वाली वर्मीकम्पोस्ट इकाई का उत्पादन और रखरखाव
- एपिस सेराना और एपिस मेलिफेरा मधुमक्खी काकोनियों का प्ररंभिक उत्पादन प्रदर्शन
- स्ट्रॉबेरी की खेती का प्रदर्शन
- कार्नेशन और उच्च मूल्य वाली सब्जियों जैसे शिमला मिर्च, टमाटर, कस्तूरी तरबूज और ककड़ी की संरक्षित खेती।
- पुंगलवा गांव , पेरेन जिला, नागालैंड में 0.25 हेक्टेयर के क्षेत्र में प्याज के प्रदर्शन रोपण पर ऑफ फार्म प्रदर्शन, पपीता का पौधारोपण। इंडिसेन गांव, दीमापुर जिले, नागालैंड में 500 वर्ग मीटर क्षेत्र में रेड लेडी और पेरेन जिले के जलुकी में 500 वर्ग मीटर, नकवारू, पेरेन जिला, नागालैंड में 0.1 हेक्टेयर क्षेत्र में एसिड लाइम के रोपण पर प्रदर्शन।

❖ नर्सरी का प्रत्यायन और प्रमाणन

- 2020–2021 की अवधि के दौरान, कुल 13 नर्सरी का मूल्यांकन/निगरानी की गई जिसमें नए आवेदन और नवीनीकरण आवेदन दोनों शामिल हैं।
- 13 नर्सरी को मान्यता दी गई थी और 2 नर्सरी को 2 स्टार रेटिंग के साथ प्रमाणन दिया गया था और शेष 11 नर्सरी को 1 स्टार रेटिंग दी गई थी।

❖ प्रकाशन

- दालचीनी की खेती के लिए अभ्यास, यार्डलॉन्ग बीन की खेती के लिए उत्पादन तकनीक, वर्मीकम्पोस्ट की उत्पादन तकनीक और जंगली सेब (डोसिनिया इंडिका) कैंडी, जूस और वाइन के प्रसंस्कृत उत्पादों पर चार विस्तार सामग्री अंग्रेजी में छपे हैं।
- काजू की खेती तकनीक, टमाटर प्रसंस्करण और स्ट्रॉबेरी की खेती पर हिंदी में तीन तकनीकी बुलेटिन छपे हैं।
- किसानों की आय दोगुनी करने के लिए "गुणवत्ता वाले काजू ग्राफट का उपयोग करें" पर तीन विस्तार सामग्री, खुरमा और एफपीओ फॉर्मेशन भी हिंदी में छपे हैं।

❖ कृषि-व्यवसाय के बढावा

- ई–बायर्स सेलर्स मीट का पहला संस्करण 19 जून 2020 को आयोजित किया गाया था। नागालैंड में बागवानी क्षेत्र में काम करने वाले एफपीओ/एफपीसी और एनजीओ ने भाग लिया और इंटरनेट के माध्यम से खरीदारों के साथ बातचीत की। इसी तरह, कोरोना वायरस फैलने के कारण लॉकडाउन अवधि के दौरान अनानास उत्पादकों को उनकी उपज के विपणन के लिए सुविधा प्रदान करने और रसद सहायता प्रदान करने के लिए श्री अनूप खिंची आईएएस, उपायुक्त, दीमापुर, नागालैंड की अध्यक्षता में 22 जुलाई 2020 को ऑनलाइन बागवानी हितधारकों की बैठक आयोजित की गई।

- केंद्रीय बागवानी संस्थान, नागालैंड के साथ कृषि मंत्रालय ने केंद्रीय कृषि और किसान कल्याण मंत्री, श्री नरेंद्र सिंह तोमर की अध्यक्षता में 11 नवंबर 2020 को कीवी फल के लिए मूल्य श्रृंखला निर्माण फार्म टू फोक पर एक ऑनलाइन बैठक का आयोजन किया था।
- अनानास उत्पादकों को बढ़ावा देने के लिए, नागालैंड के मोलवोम और बंगसांग गांवों के अनानास उत्पादकों को बढ़ावा देने के लिए, नागालैंड के मोलवोम और बंगसांग गांवों के अनानास उत्पादाकों के लिए संस्थान द्वारा कई पहल की गई। उनकी उपज के विपणन के लिए कुछ मानकों को विकसित करने पर ध्यान केंद्रित किया गया था। अनानास के लिए पैकेजिंग बॉक्स विकसित करने के लिए केंद्रीय बागवानी संस्थान, नागालैंड द्वारा एक पहल की गई थी।
- केंद्रीय बागवानी संस्थान, नागालैंड ने एग्रो रेवोलुशन सोसाइटी के तहत मधुमक्खी पालकों के लिए शहद उत्पादन के लिए तकनीकी सहायता को नोकलाक जिले, नागालैंड से बढ़ावा दिया। उत्पाद को औपचारिक रूप से डॉ. अभिलक्ष लिखी, आईएएस, अतिरिक्त सचिव, कृषि और किसान कल्याण मंत्रालय द्वारा लॉन्च किया गया था।
- संस्थान ने लॉकडाउन के दौरान पड़ोसी राज्यों में एफपीसी मोलसांग के लगभग 15 मीट्रिक टन अनानास के विपणन की सुविधा प्रदान की।
- केन्द्रीय बागवानी संस्थान, नागालैंड ने 8–10 फरवरी 2021 से सीएयू फार्म, इंफाल, मणिपुर में आयोजित क्षेत्रीय कृषि मेले में 01.04.2015 को भाग लिया।

❖ फसलोत्तर प्रबंधन और बागवानी फसलों का मूल्यवर्धन

- 2020–21 के दौरान कीवी, अनानास, अमरूद और प्लम स्क्वैश का उत्पाद विकास स्ट्रॉबेरी और अनानास के आरटीएस पेय कीवी की कैंडी, अदरक जंगली आंवला जंगली जैतून सट्रॉबेरी और ट्यूटी फ्रूटी स्थानीय रूप से उपलब्ध सब्जियों से बने अचार की गतिविधियां शुरू की गईं।
- फसलोत्तर प्रसंस्करण और बागवानी फसलों के मूल्यवर्धन पर उद्यमी विकास प्रशिक्षण ग्रामीण युवाओं के लिए आयोजित किया जाता है।

❖ कौशल विकास और प्रमाणपत्र पाठ्यक्रम

- गार्डनर के किसानों/बेरोजगार युवाओं के लिए 01 कौशल विकास पाठ्यक्रम आयोजित किया। कुल 21 प्रशिक्षुओं ने पाठ्यक्रम के लिए पंजीकरण और योग्यता प्राप्त की।
- 17 प्रशिक्षुओं के साथ बागवानी फसलों की कटाई के उपरांत प्रबंधन पर तीन माह का सर्टिफिकेट कोर्स आयोजित किया गया।

संस्थान के सभी कार्यक्रमों और गतिविधियों को एनईआर के राज्य बागवानी विभाग आईसीएआर, एसएयू, सीएयू और केवीके के विशेषज्ञों के सहयोग से चलाया जा रहा है। मैं प्रबंधन बोर्ड (समिति और तकनीकी सलाहकार समिति) टीएसी के सदस्यों के सभी कार्यक्रमों में उनके बहुमूल्य मार्गदर्शन के लिए अपनी हार्दिक कृतज्ञता व्यक्त करता हूं।

डॉ. एस.के. मल्होत्रा, कृषि और बागवानी आयुक्त और डीए एंड एफडब्ल्यू, कृषि और किसान कल्याण मंत्रालय, भारत सरकार के अधिकारीयों को संस्थान के विकास के लिए उनके निरंतर समर्थन और मार्गदर्शन के लिए मेरा हार्दिक आभार। मैं संस्थान की गतिविधियों को कियान्वित करने और प्राप्त करने उनके ईमानदार और और समर्पित प्रयासों के लिए सीआईएच के पूरे स्टाफ को भी धन्यबाद देता हूँ।

डॉ. एन. के. पटले
अपर आयुक्त (बागवानी) कृषि एवं किसान कल्याण विभाग एवं
निदेशक, केंद्रीय बागवानी संस्थान, नागालैंड

Executive Summary

Central Institute of Horticulture, Nagaland is the backbone for driving growth in horticulture sector in North East Region since its inception in 2006. It has been engaged in the task of planning, coordinating, supervising and monitoring of horticulture development activities. The programmes are executed through capacity building by training of trainers and farmers/beneficiaries, on & off farm demonstration of improved production technologies, production and supply of quality planting material, accreditation and certification of nurseries in NE region, promotion of organic cultivation of horticultural crops, agri-business promotion through exhibitions, seminars, workshops, exposure trips, buyers & sellers meet, post harvest management and value addition of horticultural crops, skill development & certificate courses in horticulture, transfer of technology through method & result demonstration, publication of folders, manuals, leaflets and coordination with state horticulture departments of NER and other National organizations, NGOs, farmers' group and self-help groups. The salient achievements are summarized below:

❖ **Human resource development**

- CIH organized 54 trainings out of which 24 trainings was conducted through online platform with a total of 1756 participants comprising of farmers, entrepreneurs, scientists, extension functionaries, scholars and horticulture officers from all North East States. The experts from various ICAR Institutes and its centers and SAUs around India were invited as resource persons.
- During the year 2020-21 the institute conducted 30 no's of farmers training reaching out a total of 730 farmers in NE region.

❖ **Farm development**

- About 25 ha area has been established for different fruit crops, tree spices, vegetables and tuber crops.
- Established mother blocks of Cashew, Citrus, Mango, Pomegranate, Kinnow Mandarin, Assam Lemon, Khasi Mandarin, Guava, Pineapple, Litchi, Aonla, Peach, Bael, Avocado, Dragon fruit, Carambola, Sapota, Ber, Custard apple, Persimmon blocks in the farm.
- Under protected cultivation, ornamental crops such as gerbera, anthurium and high value vegetables (capsicum, cucumber, tomato, muskmelon etc) are being cultivated.
- Virus free citrus (Khasi Mandarin & Nagpur Mandarin) mother block is also maintained under poly house of 2000 sqm area.

❖ **Production of quality planting material**

- Root stock seedlings are raised of Guava (Local) 19735, citrus (Rough lemon & Rangpur lime) 51,440, Cashew (Local) 4615 and Mango (local) 276 nos.
- Budded Seedlings of Khasi Mandarin and Mosambi are raised 2500 nos, whereas Acid lime by seeds raised about13500 nos. Grafted seedlings of guava (Lucknow-49, Allahabad Safeda, Lalit & Shweta) 1945 nos , 1025 grafted seedling of cashewnuts (VRI-3, V-4, BBSR-1, H-2/16, H-1608), 1500 cuttings of Dragon fruit Var. Vietnam Red & White, 250 Avocado cv. Local & Hass by seeds and 280 layered seedlings of Litchi-cv. China are raised under protected cultivation.

❖ **On & off farm demonstrations and activities to support training programmes.**

- During the year 2020-21, various technology demonstrations was carried out to screen and assess the performance of the different vegetables, root crops and spices crops such as okra(Ladies finger), cowpea, yard long bean, brinjal, bottle gourd, Indian bean (Dolichos), sweet potato, onion and turmeric. Demonstration unit was also established of Oyster mushroom cultivation.
- Introduction of shitake mushroom
- Production and maintenance of low cost vermicompost unit
- Introduction of *Apis cerana* and *Apis mellifera* bee colonies
- Cultivation of strawberry in open field.
- Protected cultivation of carnation and high value vegetables such as capsicum, tomato, musk melon and cucumber.
- Off farm demonstrations on Demonstration Planting of Onion in an area of 0.25 ha in Punglwa village, Peren district, Nagaland; Plantation of Papaya var. Red Lady in 500 sq.m area covered in Indisen village, Dimapur district, Nagaland & 500 sqm in Jaluki, Peren District; Demonstration on Plantation of acid lime in 0.1 ha area at Nkwareu, Peren district, Nagaland

❖ **Accreditation and certification of nurseries**

- During the period of 2020-2021, a total of 13 nurseries were assessed/monitored which includes both fresh application and renewal applications
- 13 nurseries were accredited and certification are given with a rating **2 Star** to 2 nurseries and with a **1 Star** rating to remaining 11nurseries.

❖ **Publication**

- Four extension folders are printed in English on Package of practices for cultivation of Cinnamon, Package of practices for cultivation of Yardlong bean, Production technology of Vermicompost and Processed products of wild apple (*Docynia indica)*: candy, juice and wine.
- Three Technical bulletins printed in Hindi on cashew cultivation techniques, Tomato processing and strawberry cultivation.
- Three extension folder on "Use quality cashew grafts to double farmers income", Persimmon and FPO formation are also printed in Hindi.

❖ **Agri-business promotion**

- The 1st edition of E-Buyers Sellers Meet was organized on 19th June 2020. FPOs/ FPCs and NGOs working in horticulture sector in Nagaland attended and interacted with the buyers through internet. Similarly, online horticulture stakeholders meet was organized on 22nd July 2020 under the Chairmanship of Shri. Anoop Khinchi, IAS, Deputy Commissioner, Dimapur, Nagaland to facilitate and to provide logistic assistance to the pineapple growers for marketing their produce during the lockdown period due to Corona virus spread.
- The Ministry of Agriculture along with Central Institute of Horticulture, Nagaland organized a virtual meeting on 'Value Chain Creation for Kiwi fruit – Farm to Fork' on 11th November 2020 under the Chairmanship of Union Minister of Agriculture and Farmers' Welfare, Shri Narendra Singh Tomar.
- To promote the pineapple growers, a number of initiatives were taken by the Institute for pineapple

growers belonging from Molvom & Bungsang villages, Nagaland. The focus was to develop certain standards to market their produce. An initiative was taken by Central Institute of Horticulture, Nagaland to develop packaging boxes for pineapples.

- Central Institute of Horticulture, Nagaland promoted technical support for honey production for beekeepers under Agro Revolution Society from Noklak district, Nagaland. The product was formally launched by Dr. Abhilaksh Likhi, IAS, Additional Secretary, Ministry of Agriculture & Farmers Welfare.
- The Institute facilitated in marketing of around 15MT of pineapples of FPC Molsang to the neighboring states during lockdown.
- Central Institute of Horticulture, Nagaland participated in the Regional Agri Fair held at CAU farm, Imphal, Manipur w.e.f. 8-10 February 2021.

❖ **Post harvest management and value addition of horticultural crops**

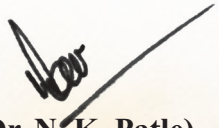
- The activities are product development of kiwi, pineapple, guava and plum squashes, RTS beverages of strawberry and pineapple, candies of kiwi, ginger, wild aonla, wild olive, strawberry and tuitty fruity, pickles from locally available vegetables.
- Entrepreneur's development trainings on post-harvest processing and value addition of horticultural crops are conducted for rural youths.

❖ **Skill development & certificate course**

- Organized one (01) skill development courses for the farmers/ unemployed youth of on Gardener. A total of 21 trainees registered and qualified for the course.
- Three months certificate course on organized on "Post Harvest Management of Horticultural Crops" with 17 trainees.

All programmes and activities of the Institute are being carried out in close collaboration with state horticulture department of NER and experts from ICARs, SAUs, CAU and KVKs. I express my sincere gratitude to the members of the Board of Management (BOM) committee and Technical Advisory Committee (TAC) for their valuable guidance in all the programmes.

My heartfelt gratitude to Dr. S.K. Malhotra, Agriculture & Horticulture Commissioner and officials at DAC& FW, Ministry of Agriculture & Farmers' Welfare, Government of India for their unceasing support and guidance for the development of the Institute. I also thank the entire staff of CIH for their sincere and dedicated efforts in executing and achieving the activities of the Institute.



(Dr. N. K. Patle)
Addl. Comm (Hort.) DAC & FW &
Director (I/c), CIH

1. About the Institute

Recognizing the huge potential for development in the North-Eastern region and to provide institutional support to tap this potential, Government of India has set up the "Central Institute of Horticulture" at Medziphema, Nagaland in the year 2005-06 under the Central Sector Scheme. This Institute has been set up to support for holistic development of horticulture at Medziphema for NE Region in an area of 43.50 ha, which is situated at 35 km from Dimapur and 45 km from Kohima city on National Highway 39.

VISION: To emerge as the pioneering, innovative, farmer focused and self-supporting horticultural Institute in the country.

MISSION: To provide excellent, innovative and relevant training to all the stakeholders so as to empower individuals and enable horticulture industry to bring about socio-economic development and sustainability in North East Region.

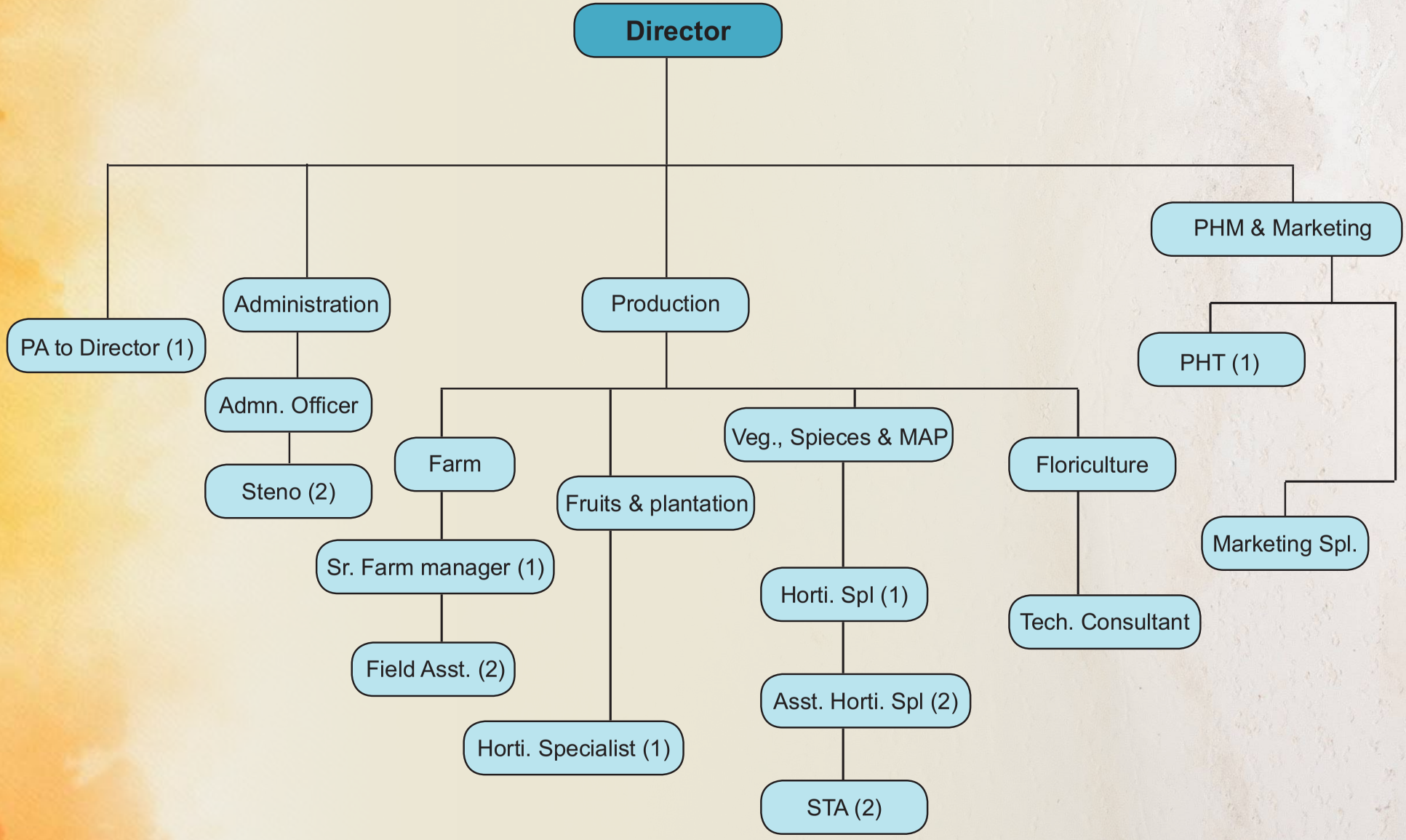
MANDATE OF THE CENTRAL INSTITUTE OF HORTICULTURE:

- Capacity building by training of trainers and farmers/beneficiaries.
- Demonstration of improved production technologies.
- Certificate courses in horticulture.
- Provide quality planting material and seeds of recommended elite varieties of horticultural crops in NE Region.
- Accreditation and Certification of Nurseries in NE region.
- Follow-on extension support in the field of horticulture.
- Promotion of organic cultivation of horticulture crops.
- Establishing convergence and synergy among programmes in the field of horticulture.
- Monitoring of Centrally Sponsored Programmes in the area of horticulture.

FOCUS AREAS

- Training of state government officials and farmers/beneficiaries of North Eastern Region.
- Production and supply of quality planting material.
- Accreditation and certification of horticulture nurseries in NER.
- Certificate courses in horticulture.
- Skill development courses in horticulture.
- Transfer of technology through method & result demonstration & publication of folders, manuals, leaflets etc.
- Promotion of Organic Farming.
- Marketing and agri-business promotion through exhibitions, seminars, workshops, exposure trips, buyers & sellers meet.
- Coordination with state horticulture departments of NER and other National Organizations, NGOs, farmers' group and self help groups.

Organizational Setup



2. Current scenario of Horticulture in NE Region of India

The North-eastern region comprises of eight states viz., Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura and Sikkim falls under high rainfall zone and the climate ranges from temperate to sub-tropical and tropical. The region lies between 21.5°N-29.5°N latitudes and 85.5°E-97.3°E longitudes with a total geographical area of 262180 km^2 which is nearly 8% of the total geographical area of the country. The region is characterized by difficult terrain, wide variations in slopes and altitudes, land ownership system and indigenous cultivation practices. The north eastern region is well known for diverse non-traditional and indigenous fruits and vegetable grown in different agro-climatic conditions may be grouped as temperate, subtropical and also tropical origin. Land is a critical resource in many of the NE states, and availability and management of land for agricultural activities are essential for raising the region's overall agricultural production and productivity. The overall geographical land to man ratio for the NE region (0.67 ha/person) is much higher than the national average (0.32 hectare/person).

Farmers are producing various traditional crops like orange, banana, pineapple, ginger, turmeric for their livelihood, but low production and poor productivity could not make much impact on income generation, food and income security. Concept of cultivation of the horticultural crops is associated with the culture and system of living of the people of the region. State wise scope of growing horticultural crops is identified for NE Region (Table 1).

There is immense potential for vertical and horizontal growth in horticulture sector in the region. At present horticultural crops account for only 18.60% of cultivated area. This share is highest in Sikkim followed by Manipur, Arunachal Pradesh, Meghalaya, Tripura, Mizoram, Assam and Nagaland. There is need to expand area under horticultural crops particularly in Assam, Mizoram and Nagaland where at present it is less than 20% of the cultivated area. In terms of its contribution to the national production, the Region accounts for about 5.1% (fruits) and 4.5% for vegetables. The major horticultural crops of the Region are depicted in Table 2.

Table1: Major Horticultural Crops of NE Region

State	Fruit	Vegetables	Spices	Others
Arunachal Pradesh	Apple, Orange, Kiwi, Walnut	Potato, Tomato, Cabbage	Ginger, Turmeric Cardamom (large)	Medicinal plants and Herbs, Flowers/Orchid
Assam	Banana, Orange, Pineapple, Arecanut, Lemon	Potato, cauliflower, cabbage and other summer vegetables	Ginger, turmeric	Medicinal plants and herbs, flowers
Manipur	Pineapple, papaya, banana, lemon, orange, passion fruit	Potato, cauliflower, pea, tomato	Chili, turmeric	Medicinal plants and herbs, flowers
Meghalaya	Pineapple, banana, orange, passion fruit, strawberry	Cabbage, chow-chow	Ginger, chili	Medicinal plants and herbs, flowers
Mizoram	Orange, banana, papaya, grapes, passion fruit	Potato, squash, cabbage, broccoli	Ginger, chili	Flowers/ orchid, medicinal plants and herbs
Nagaland	Pineapple, banana, orange, passion fruit	Tapioca, cucumber	Chili, ginger, large cardamom	Medicinal plants and herbs
Sikkim	Orange, passion fruit	Cabbage, potato, off-season vegetables	Large cardamom, ginger	Medicinal plants and herbs, flowers/ orchids
Tripura	Pineapple, banana, litchi, jackfruit, mango	Potato, off-season vegetables	Ginger	Medicinal plants and herbs, flowers

Table 2: AREA AND PRODUCTION OF HORTICULTURE CROPS CATEGORY WISE 2020-21 (Third Advance estimate)																	
																Area in '000 ha	
																Production in '000 MT	
Sl.No.	Sates/ UTs	Fruits		Vegetables		Plantation		Aromatics & Medicinal		Flowers			Spices		Honey	Total	
		A	P	A	P	A	P	A	P	A	P		A	P	P	A	P
											Loose	Cut					
1	Arunachal Pradesh	48.14	125.84	2.62	17.41	2.67	11.76	0.24	0.16	0.00	0.00	0.00	14.04	29.49	0.13	**67.71**	**176.79**
2	Assam	161.99	2512.62	334.50	4196.92	88.60	181.83	4.58	0.18	5.25	35.24	58.91	133.51	337.86	1.35	**729.42**	**7324.92**
3	Manipur	41.62	463.86	32.90	339.87	0.90	0.32	0.04	0.12	0.07	0.01	0.17	6.45	53.50	0.40	**81.98**	**858.24**
4	Meghalaya	37.23	382.21	49.28	517.76	26.74	34.53	0.00	0.00	12.53	0.00	0.35	14.25	77.66	0.25	**140.03**	**1006.76**
5	Mizoram	65.95	345.18	40.47	191.45	21.45	33.64	0.77	0.78	0.08	0.00	0.80	27.82	100.93	0.25	**156.53**	**673.03**
6	Nagaland	33.69	314.33	40.66	456.24	2.78	7.90	0.11	0.86	4.32	0.00	0.22	10.95	42.14	0.65	**92.51**	**822.34**
7	Sikkim	20.13	50.78	24.20	138.20	0.00	0.00	0.00	0.00	0.24	16.50	0.09	42.35	102.57	0.45	**86.93**	**308.58**
8	Tripura	55.45	571.43	48.57	847.72	16.06	40.80	0.00	0.00	0.00	0.00	0.00	6.73	29.47	0.20	**126.81**	**1489.62**

Source : DA & FW, Ministry of Agriculture & Farmers Welfare, Govt. of India, 2020-21 (Third Advance estimate)

3. Achievements

3.1. PRODUCTION AND DISTRIBUTION OF QUALITY PLANTING MATERIAL

3.1.1 Establishment of scion/mother block under field condition

The Institute has already established mother block of 22 nos. crops like Cashew, Citrus, Mango, Pomegranate, Kinnow Mandarin, Assam Lemon, Khasi Mandarin, Guava, Pineapple, Litchi, Aonla, Peach, Bael, Avocado, Dragonfruit, Carambola, Sapota, Ber, Custard apple, Persimmon crop cafeteria at the farm and virus free mother plants of mandarin orange are also maintained under poly house (2000 sqm area). Availability of quality and disease free planting material being very important for horticulture development and is one of the key mandates of CIH.

Table 3. Details of establishment of fruit crops under field condition

Activity	Crops	Achievements (Nos.)
❖ Maintenance of scion mother blocks	Khasi Mandarin, Sweet orange, Guava, Cashew nut, Mango, Dragon fruit, Assam Lemon, Kinnow Mandarin, Litchi, Fig, Custard Apple, Sapota, Avocado, Ber, Star fruit, Loquat, Beal, Peach, Aonla, and pomegranate.	❖ 20 crops

3.1.2. Raising of rootstocks

The supply of quality and disease free planting material plays vital role and establishment of nursery with scientific management practices. As such, the Institute has established rootstock and mother block of fruit crops. The rootstock that has been raised by the Institute during the period 2020-21 in the following crops is mentioned below:

Table 4. Rootstock of fruit crops

Sl. No.	Crop	Rootstock raised	Source
1.	Guava (Local)	19735	Local
2.	Citrus (Rangpur lime)	25160	Meghalaya
3.	Citrus- cv. Rough lemon	26280	Meghalaya
4.	Cashew nut (Local)	4615	Local
5.	Mango (Local)	2760	Local
	Total	**78550**	

3.1.3. Propagation

The availability of disease free quality planting material is one of the major constraints in improving the production of horticulture crops. There has been large demand for planting material of improved varieties. Therefore, the Institute is putting its effort to produce and provide grafted/budded/layered true to the type seedlings of major fruit crops like citrus, cashew and guava to NE Region. During the period under report, the Institute has propagated 1025 nos of cashew nut var. V-4, VRI-3, H-1608, H-2/16 and BBSR-1 by soft wood grafting, Guava var. L-49, Allahabad Safeda, Shweta and Lalit, 1945 nos by wedge grafting, Seedlings of Khasi Mandarin(2000), Mosambi (500) following T-Budding and13500 nuceller seedling of Acid lime. During the year 2020-21 about 1500 nos of cuttings of Dragon fruit cv. Vietnam Red & White plants were prepared, whereas 250 nos. of Avocado seedlings cv. Local & Hass were raised by seed and 280

nos. of Litchi cv. China were raised by Air layering. The scion /bud stick has been produced from existing scion mother block at the Institute (Table 5.).

Table 5: Details of plants propagated

Sl. No.	Crop	Propagation method	Propagated Plants
1.	Citrus (Khasi Mandarin, Mosambi& Acid lime)	T- Budding, nuceller seedling	16000
2.	Guava (Lucknow-49, Allahabad Safeda, Lalit & Shweta)	Wedge grafting	1945
3.	Cashewnut (VRI-3, V-4, BBSR-1, H-2/16, H-1608)	Soft wood grafting	1025
4.	Dragon fruit-cv. Vietnam Red & White	Cutting	1500
5.	Avocado cv. Local & Hass	Seedling	250
6.	Litchi-cv. China	Air layering	280
		Total	**30000**

The rootstocks selected fruit crops raised in portrays or polybags under protected condition nursery unit. The propagated plants were monitored regularly to produce disease free seedling and also control of insect & pest infestation. The plants were hardened in shade net before distribution /sold to the farmers.

Table 6: Success rate of propagated planting material

Sl.No.	Crops	Methods of propagation	Success % of propagated plants
1.	Guava (Lucknow-49, Allahabad Safeda, Lalit & Shweta)	Wedge grafting	81%
2.	Citrus (Khasi Mandarin, Mosambi & Acid lime)	T- Budding, nuceller seedling	76%
3.	Cashew (VRI-3, V-4, BBSR-1, H-2/16, H-1608)	Soft wood grafting	74 %
4.	Dragon fruit (Vietnam Red & White)	Cutting	85%
5.	Litchi (China)	Air layering	75%

Fig 1. Nursery units of horticultural fruit crops at CIH

Table 7: Sale of planting materials during 2020-21

Sl. No.	Particulars (Crops)	Qty (Nos.)	Rate (Rs.)	Amount (Rs.)
1.	Acid Lime plants	22500	25.00	562500.00
2.	Cashewnut plants	350	40.00	14000.00
3.	Khasi Mandarin plants	2175	50.00	108750.00
4.	Mosambi plants	75	50.00	3750.00
5.	Guava plants	455	40.00	18200.00
6.	Mango plants	45	50.00	2250.00
	Total			709450.00

3.1.4. Production of quality planting material during lockdown period: A CIH Initiative

The Institute has already established 20 nos. of mother blocks of crops like Cashew, Citrus, Mango, Guava, Kinnow Mandarin, Assam Lemon, Khasi Mandarin, Pineapple, Litchi, Aonla, Peach, Bael, Sapota, Ber, Custard apple. During the national lockdown, the Institute has been able to supply more than 30000 planting materials of various horticulture crops like Acid Lime, Cashewnut, Khasi Mandarin, Mosambi, Guava and Mango in Kohima, Dimapur, Peren, Mokokchung & Phek districts of Nagaland. It is estimated that an area of 70 ha orchards has been established in farmers' field from the planting materials supplied by CIH, Nagaland.

Fig 2. Planting material at CIH Nursery

Fig 3.Visit of Shri.Temjen Imna Along, Hon'ble Minister, Higher Technical Education & Tribal Affairs, Govt. of Nagaland to CIH Nursery Units & distribution of planting materials

3.2. TECHNOLOGY DEMONSTRATIONS UNDER OPEN FIELD

3.2.1. Okra

A demonstration was laid out at CIH farm, Nagaland during the year 2020 to assess the performance of organic manure on growth and yield of okra var. Arka Anamika & Kashi Pragati in an area of 210 sqm. A total of three treatments viz., FYM @ 250 kg +Fusicont @ 3g/ litre drenching, Vermicompost @ 25 kg +Fusicont @ 3g/ litre drenching and control were used in the demonstration. Manures were incorporated at the time of planting and seeds were sown during the month of August. Field operations were adopted as per technical recommendations.

Observations indicates that var. Arka Anamika obtained maximum plant height (91.06cm) with treatment of vermicompost + Fusicont and also no. of fruits per plant (10.9), fresh weight of fruit (21 g) and yield per plot (20 kg) was found maximum in treatment FYM + Fusicont followed by vermicompost+ Fusicont followed by var. Kashi Pragati recorded maximum plant height (91.02cm),Number of fruits per plant (10.7) and fresh weight of fruit (20 g) and yield per plot (15 kg) in treatment FYM + Fusicont followed by vermicompost+ Fusicont. Thus, it may be concluded that application of organic manures was found better on growth and yield of okra cv. Arka Anamika & Kashi Pragati under foot hill condition of Nagaland.

Fig 4. Assessment of okra var. Kashi Pragati

3.2.2. Cowpea

Cowpea (*Vigna unguiculata* L. Walp) is a traditional leguminous crop grown in NE Region. The pods, seeds and leaves are consumed locally. Experiment was also laid out to assess the performance of FYM @ 250 kg +Fusicont @ 3g/ litre and Vermicompost @ 25 kg +Fusicont @ 3g/ litre on growth, yield attributes and yields of cowpea cv. Kashi Kanchan at CIH, Nagaland during 2020 -21.Seeds were shown at a spacing of 60 cm × 10 cm an area of 100 sq m. The data revealed that treatment FYM @ 250 kg +Fusicont @ 3g/ litre drenching was found to be best in terms of plant height (55.13 cm), number of leaves (56.09), number

of branches (27.46), length of pods (35.64 cm), width of pods (0.87 cm), days of germination (3.3), number of pods per plant (35.60), number of seeds per pod (12.20), pod weight (17.63) and pod yield (72 kg).

Fig 5. Assessment of cowpea var. Kashi Kanchan

3.2.3. Yardlong bean

Fig 6. Assessment of yardlong bean var. Arka Mangala

Field demonstration was conducted at CIH during 2020-21of Yardlong bean cv. Arka Mangala, at a spacing of 60 cm × 10 cm in an area of 150 sqm. A total of three treatments viz., FYM @ @320 kg +Fusicont @ 3g/ litre drenching, Vermicompost @ 40 kg +Fusicont @ 3g/ litre drenching and control were used. The data revealed that treatment FYM @ @320 kg +Fusicont @ 3g/ litre drenching was found to be best in terms of plant height (71.13 cm), number of leaves (56.06), number of branches (27.41), length of pods (32.23 cm), width of pods (0.67 cm), days of germination (3.3), number of pods per plant (32.00), number of seeds per pod (12.00), pod weight (14.52 g) and pod yield (48 kg). Hence, it is found that combined application of FYM @ @320 kg +Fusicont @ 3g/ litre drenching was found feasible and suitable on growth and yield of Yardlong bean cv. Arka Mangala under foot hill condition of Nagaland.

3.2.4. Indian bean

Fig 7. Assessment of Indian bean var. Kashi Haritima

A field demonstration was laid out to assess the performance of Indian beans grown with treatments combinations of FYM @ @320 kg +Fusicont @ 3g/ litre drenching, Vermicompost @ 40 kg +Fusicont @ 3g/ litre drenching and control each replicated thrice in open field of variety Kashi Haritima during summer 2020-21 at CIH farm Nagaland. The data revealed that variety Kashi Haritima with treatment FYM @ @320 kg +Fusicont @ 3g/ litre drenching was found best when combined application of FYM @ @320 kg +Fusicont @ 3g/ litre on growth and yield under foot hill condition of Nagaland.

3.2.5. Bottlegourd

In the year 2020-2021 demonstration on three varieties of bottle gourds were carried out namely Pusa Hybrid, Kashi Ganga, and Arka Bahar in an area of 80 sqm, 70 sqm and 60 sqm respectively. The objective of the program was to identify the better performing variety in our region. It was observed that Pusa Hybrid gave a yield of 30 kg from an area of 80 sqm, while Kashi Ganga produced a yield of 22 kg from an area of 70 sqm and Arka Bahar produced 30 kg from an area of 60 sqm.

Fig 8. Assessment of bottlegourd var. Pusa Hybrid, Kashi Ganga

3.2.6. Brinjal

Brinjal is one of the most popular vegetable of NE Region and grown many *Solanum* spp. and consumed locally by the people of the region. Field demonstration was conducted at CIH, Nagaland during 2020-2021 in an area of 210 sq.m to study the response of different organic manures on growth and yield of brinjal variety *Pusa purple cluster*. Two treatment combinations were provided namely FYM and FYM + Neemcake. Sowing of seeds was done in last week of March and transplanting was done in last week of April. Five plants from each plot was chosen randomly and kept in observation. It was observed that the average plant height at 60 days after transplanting was 31.4cm and 34.09cm for FYM and FYM + Neemcake respectively. The fruit length was also observed to be longer in case of FYM + Neem cake i.e 19.4cm as against 18cm for FYM. The fruit weight was also found to be 76g average for FYM + Neemcake treated plot as compared to 43g for FYM treated plot.

Fig 9. Assessment of brinjal var. Pusa Purple Cluster

3.2.7. Onion

Demonstration on Onion was conducted at Central Institute of Horticulture in the year 2020-2021. Two winter varieties of onion namely Red and Red-3 were planted. Demonstration was laid out to identify the variety which performs better. The nursery bed was prepared in open field condition for both the varieties using FYM and Neem-cake. Sowing of seeds was done during the third week of November and seedlings

were transplanted in first and second week of January. From the table given it can be clearly seen that the variety Red performed better in all aspects and recommended.

Growth characteristics of Onion var Red and Red-3

Sl.no	Variety	Average height (cm)	Average weight of bulb with leaves (gm)	Average weight of bulb without leaves (gm)	Average Diameter of bulb (cm)	Average Height of bulb (cm)
1	Red	48.5	89.7	71.1	4.7	4.5
2	Red-3	38.7	76.2	65.4	4.1	3.8

Fig 10. Assessment of Onion var. Red & Red-3

3.2.8 Sweet Potato

Demonstration on sweet potato was carried out in an area of 200 sqm to study the performance of different cultivars viz. Sree kanaka, Sree Vadra, ST-14, Kamala Sundari and S-1156. Cuttings were planted and raised in nursery and replanted in well prepared field during July, 2019. FYM and neem cake was incorporated at the time of planting. The harvesting of the crop was done on Dec 2020. The data were recorded on three randomly selected plants from each varieties and data indicates that the maximum growth and yield characters i.e, vine length (156.18), number of leaves per vine (119.02), number of tuberous roots per vine (4.40), fresh weight of tubers per vine (0.452 kg), tuber girth (14.07 cm), tuber length (21.07 cm) and tuber yield (37) was obtained in cv. Sree Vadra followed by cv ST-14

Fig 11. Assessment of Sweet potato varieties

3.2.9 Turmeric

Demonstration was conducted to assess the growth, yield and quality of two recommended turmeric cultivars Megha Turmeric-1 and Lakadong. The study was undertaken in an area of 0.4 ha during the month of June 2020.Recommended cultural practices were followed.

The result of demonstration showed that the Plant height (102.52 cm), Number of leaves (7.0), Number of clump (2.0)and Yield (300 kg/ha) was recorded maximum in Lakadong, whereas, the maximum wt. of rhizome/plant (0.35 kg), and Cucurmin content (4.70%) was recorded in Megha Turmeric -1. Hence, it can be suggested that the cultivars Megha Turmeric-1 and Lakadong are suitable for cultivation in the region coupled with suitable technology for enhancing the productivity of turmeric crop.

Fig 12. Assessment of Turmeric var. Megha Turmeric & Lakadong

3.2.10 Tree spices

To study the performance of tree spices under lower hill conditions of Nagaland at CIH 20 plants of cinnamon were planted in the existing tree spices block. The recommended package of practices and intercultural operations is being carried out at regular intervals. Bay leaf has emerged as a semi-domesticated tree that provides supplementary income to marginal farmers. The leaves are used as a condiment and spice but find major application in the pharmaceutical and ayurvedic medicine industry. Hence, during the reported year, first harvesting of bay leaf was done. The present growth characteristics of the existing tree spices are mentioned below.

Table 9: Growth characteristics of Tree spices

Sl. no	Crops	Height (ft)	No. of branches	Stem girth (cm)	Year of planting
1	Bay leaf (Local)	6.0	15	4.3	2018
2	Cinnamon (Navasree)	3.1	6.6	2.6	2018
3	Curryleaf (DWD-1)	4.5	4.6	2.3	2018

Fig 13. Assessment of Tree spices (Cinnamon, Bay leaf & Curry leaf)

3.2.11 Vermicompost unit

Vermicomposting is a chemical and biological process for recycling nutrients with the aid of earthworms and microorganisms. Thus, vermicompost is considered as a high nutrient biofertilizer with diverse microbial communities. It is a sustainable, cost effective, and ecological technology for efficient treatment of biodegradable wastes, and is thus widely adopted to recycle hazardous and worthless organic wastes into safe and valuable products. Earthworms consume various organic wastes and reduce the volume by 40–60%. Each earthworm weighs about 0.5 to 0.6 g, eats waste equivalent to its body weight and produces cast equivalent to about 50% of the waste it consumes in a day. The moisture content of castings ranges between 32 and 66% and the pH is around 7.0. The worm castings contain higher percentage (nearly two fold) of both macro and micronutrients than the garden compost.

During the year 2020-2021, a total of 9 vermibeds (5 nos. HDPE beds and 4nos.of concrete beds) were maintained in the institute for the purpose of demonstration. Decomposable waste such as farm residues and litter are commonly used as composting materials. Animal dung mostly cow dung and dried chopped crop residues are the key materials used generally. About 800-1000 earthworms are introduced per bed where red earthworm spp. is used because of its high multiplication rate.

Fig 14. Low cost structure of vermicompost unit

3.2.12 Oyster mushroom cultivation

Scientific name : *Pleurotus ostreatus*

The oyster mushroom is popularly known as 'dhingri' in India is a common edible mushroom. It is one of the most suitable fungal organisms for producing protein rich food from various agro-wastes or forest wastes without composting. The flesh is white, firm, and varies in thickness due to stipe arrangement. The bags after fruiting is completed can be used for making of vermicompost. A demonstration was carried out in the institute during the year 2020-2021 and the following observations were recorded.

Fig 15. Oyster mushroom cultivation

- The optimal substrate pH level for the growth of mycelium was observed to be between 5- 6.5.
- When the temperature exceeded above 30 degrees centigrade more infection in bags were seen.
- It was also observed that when temperature and pH level were optimum a bag of 1kg substrate and 100g spawn produced 500g- 1000g Oyster mushroom.

3.2.13 Bee-keeping

Bee-keeping (or apiculture) demonstration was taken up in the year 2020-2021 with 2 species of bees namely *Apis cerana* and *Apis mellifera*

Fig 16.Apis cerana honey bee

i. ***Apis cerana* (Indian bee):** Indian honeybee or Eastern honeybee is a well-known bee species in India. Prior to the introduction of Italian bee, this was the only rearable *Apis* bee spp. in India. These are comparatively non-aggressive and rarely shift locations. These bees construct multiple parallel combs in dark places such as clay pots, logs, wall, tree openings, etc. and produce 7–9 kg of honey per colony per year.

Fig 17.Apismellifera honey bee

ii. ***Apis mellifera* (European bee):** Italian bee (*Apis mellifera ligustica*) is one of the sub species of *A. mellifera* and is not native to India and was introduced from Europe during the second half of 20th century. The introduction was primarily because the native Indian bee colonies were vanishing because of the Thai sac brood virus. They are bigger than all other honeybees except *Apis dorsata*. They produce 25–40 kg of honey per colony per year. Probably these bees are the one of the most studied animals.

3.3. TECHNOLOGY DEMONSTRATIONS ON FRUIT CROPS

3.3.1. Strawberry:

The Institute has established a demonstration plot for strawberry varieties Winter Dawn in an area of 600 sqm with an objective to study the performance under Nagaland condition. Observations are recorded on Growth, yield and quality parameters. The yield was obtained 135 kg and it may be commercially feasible subject to production of suckers at reasonable cost locally for this region.

Fig 18. Cultivation of Strawberry

3.3.2. Khasi Mandarin:

Institute has planted Khasi mandarin in an area of o.16 ha to establish demonstration block with spacing of 5m x 5m and in recommended pit size (60 x 60 x60 cm). The FYM and fungicides was incorporated during filling of pits. All the recommended intercultural operations were followed.

Fig 19.Khasi Mandarin Plantation

The cultural practices were followed as per recommendation. Observations are under process and it may not be suitable for commercial cultivation at lower hills of the region

3.3.3. Acid lime :

Institute has planted a mother block 0f Acid Lime cv. AL-1 in an area of 0.06 ha. Farmyard manure was incorporated at the time of planting and the saplings were transplanted in the field at a distance 5 m x 5 m in a pit size of 60 x 60 x 60 cm. All the intercultural operation was followed. The main objective to develop the Acid Lime block is to provide quality planting material and popularize the improved production technology in the NER States. The growth and performance observation are being monitored and is satisfactory.

Fig 20.Acid Lime Plantation

3.4. SOIL SAMPLING AND SOIL TESTING

Soil samples are collected from farm and protected area to assess the physical and chemical properties that provide basic information on soil condition so to support economical application of nutrients and build a strategic nutrient management plan for maintaining the health of the soil at farm.

Zigzag method of soil sampling was followed in which two different samples were collected based on the crop root depth and character. Surface samples (15-25 cm) for shallow rooted crops and sub surface (25-50 cm) for perennial deep rooted crops. 15-25 composite samples depending upon the size of the area were

Fig 21. Digging of V shape pits and collect the soil slice

Fig 22. Collect in a plastic bag (15-20 samples)

Fig 23. Quartering of sample

Fig 24. Shade dried, packaging, labelling and storage for analysis obtained

collected from polyhouse and farms. Two representative samples from each blocks were collected based on the area undulation or slope of the area. These samples were processed and sent for analysis at AAU, Jorhat, Assam.

Table 10: Analysis of soil sample from polyhouse and farms of CIH at AAU, Jorhat

Sample identification	Parameter with values					
	pH (1:2.5) At 20°C ATC	**Electrical Conductivity**	**Organic Carbon**	**Available Nitrogen Kg/ha**	**Available Phosphorus (P_2O_5)Kg/ha**	**Available Potassium (K_2O)Kg/ha**
Polyhouse (P2)	5.64 (Acidic)	0.09 (Low)	0.49 (Medium)	225.61 (Low)	17.10 (Low)	431.42 (High)
Polyhouse (P3)	5.63 (Acidic)	0.10 (Low)	1.16 (High)	346.71 (Medium)	16.30 (Low)	392.45 (High)
Polyhouse (P4)	4.55 (Extremely Acidic)	0.11 (Low)	1.29 (High)	420.10 (Medium)	23.00 (Medium)	431.42 (High)
Polyhouse (P5)	4.95 (Extremely Acidic)	0.12 (Low)	1.52 (High)	346.40 (Medium)	17.10 (Low)	314.50 (Medium)
Polyhouse (P10)	5.55 (Acidic)	0.11 (Low)	1.15 (High)	305.11 (Medium)	20.71 (Low)	576.17 (High)
First block (FL1)	5.63 (Acidic)	0.11 (Low)	0.52 (Medium)	210.31 (Low)	22.84 (Medium)	268.80 (Medium)
First block (FL2)	5.33 (Acidic)	0.10 (Low)	0.86 (High)	311.41 (Medium)	18.33 (Low)	258.05 (Medium)
First block (FR1)	5.78 (Acidic)	0.11 (Low)	1.10 (High)	360.25 (Medium)	24.11 (Medium)	345.41 (High)
First block (FR2)	5.51 (Acidic)	0.11 (Low)	0.65 (High)	231.46 (Low)	20.21 (Low)	259.39 (Medium)
Middle block (ML1)	5.94 (Acidic)	0.11 (Low)	0.85 (High)	310.54 (Medium)	19.64 (Low)	279.55 (Medium)
Middle block (ML2)	5.65 (Acidic)	0.10 (Low)	1.10 (High)	298.44 (Medium)	20.88 (Low)	149.18 (Medium)
Middle block (MR1)	5.38 (Acidic)	0.12 (Low)	0.88 (High)	310.22 (Medium)	17.24 (Low)	252.67 (Medium)
Middle block (MR2)	5.57 (Acidic)	0.15 (Low)	0.62 (High)	245.64 (Low)	24.37 (Medium)	221.76 (Medium)
Last block (LL1)	5.42 (Acidic)	0.11 (Low)	1.22 (High)	378.64 (Medium)	20.21 (Low)	165.31 (Medium)
Last block (LL2)	5.71 (Acidic)	0.11 (Low)	0.65 (High)	231.46 (Medium)	20.21 (Low)	349.44 (High)
Last block (LR1)	5.64 (Acidic)	0.11 (Low)	1.92 (High)	410.51 (Medium)	23.11 (Low)	567.17 (High)
Last block (LR2)	5.72 (Acidic)	0.10 (Low)	1.26 (High)	385.45 (Medium)	23.08 (Low)	237.89 (Medium)

12 Soil analysis (Punglwa Village)farmers field demonstration plot

Soil sample were collected from the farmers field demonstration plot at Punglwa village, Peren district, Nagaland following the zigzag method of soil sampling. 20 surface composite samples were collected which were processed and tested using PUSA STFR rapid soil testing Kit.

Fig 25.PUSA STFR rapid soil testing Kit

Table 11: Values of soil sample analysis from Punglwa demonstration farm

Sl.no	Particulars	Value	Result
1.	pH	5.04	Moderately acidic
2.	Lime requirement	3.7t/acre	-
3.	E.C (mS/cm)	0.234	Non-Saline
4.	OC (%)	0.5666	Medium
5.	Av. Nitrogen (Kg/ha)	354	Medium
6.	Phosphorus (Kg/ha)	6.7	Low
7.	Potassium (Kg/ha)	154.5	Medium

3.6. TECHNOLOGY DEMONSTRATION UNDER PROTECTED CULTIVATION FOR VEGETABLES AND FLOWER CROPS

3.6.1. Tomato

A demonstration was carried out on tomato var. Himsona and Avtar under naturally ventilated poly house in foot hill condition of Nagaland conditions at CIH with an objective to assess the varieties under double and single training support system applying NPK (19 all) and micronutrient. The observation revealed that two-stem training support system in tomato was found most suitable with a yield of 4.3 kg per plant cv. Himsona as compared to single stem trained.

Fig 26. Assessment of tomato var. Himsona & Avtar

3.6.2. Cucumber

Parthenocarpic cucumber hybrid var. Kian was evaluated under naturally ventilated poly house during October, 2020 -Jan, 2021. Findings revealed that the cultivar Kian recorded Vine length (3.5m), Days to first flower (22.10), Days to picking (38.59), No. of fruits per vine (18.82), Fruit diameter (4.03cm), Fruit weight (57g) and yield (3.35 kg).

Fig 27. Assessment of gynoecious cucumber F1 under poly house

3.6.3. Muskmelon

Muskmelon variety Bobby F1 hybrids was planted in the natural ventilated poly houses in Jan.2020-21 in an area of 300 sq m for demonstrating latest technologies and to obtain high quality fruit production systems for domestic market of and to achieve potential productivity per unit area.

The seedlings were transplanted at a spacing of 0.8 x 0.8m. Farmyard manure and Neem cake were incorporated at the time of transplanting. The result revealed that Muskmelon variety, Bobby F1 hybrids recorded Plants length (1.85 m), No. of fruits per vine (10.82), Fruit length (13.66 cm), Fruit diameter (45.37 cm), Fruit weight (347 g) and Yield (2.46 kg/plant)..

Fig 28. Assessment of Muskmelon var. Bobby under poly house

3.6.4. Capsicum

Capsicum (*Capsicum annuum* L.) commonly known as sweet pepper or bell pepper planted under poly house at the Central Institute of Horticulture, Medziphema, Nagaland to assess the performance of capsicum varieties Swarna and Natatsha. The seeds were sown on September 2020 in the nursery and it was transplanted on first week of Oct., 2020 under the poly house area is 300 sqm. Capsicum var. Natasha was found better in plant growth and yield parameters such as Plant height (42.2 cm) Fruit wt (70.1 g), Fruit diameter (5.6 cm), fruit length (4.9 cm), Number of fruits per plant (10) and yield ha^{-1} (63.03 t). It may be suitable for commercial cultivation under protected conditions.

Fig 29. Assessment of Capsicum var. Swarna & Natasha

3.6.5. Gerbera

Gerbera (*Gerbera jamesonii* Bolus ex Hooker F.) is one of the most popular commercial cut flower under protected conditions in NE Region. Therefore, a demonstration was laid out under naturally ventilated poly house of Central Institute of Horticulture, Medziphema, Nagaland during 2020-21 to evaluate the different gerbera varieties .Five gerbera varieties viz., Dana Ellen, Intense, Pre-intense, Balance, Stanza and White house were planted on raised beds in two rows at spacing of 25 × 40 cm using five different

media such as soil + 10% Neem cake; FYM 20% + Sand 20%+Soil 20%+compost 20%+ perlite 10% +Neemcake 10%; FYM 30% + Soil 30%+compost 20% + perlite 20%; Soil 60%, Sand 20%, compost 10% + FYM 10%), and FYM 10% + Soil 60%, + Neemcake 10% + sand 20%. The parameters on Plants heights in cm, Nos. of leaves, Leaf length in cm., Leaf width in cm, No. of days taken for bud emergence after planting, Flower petals colour, No. of flower clamp, No. of flower per plants, Length of flower stalk (cm), diameter of flower bud (cm), Disc diameter of flower (cm), No. of petals per flowers, No. of Suckers per plants, Vase life of Flowers @ 2% sucrose solution are being recorded.

Fig 30. Assessment of different cultivars of Gerbera

3.6.6. Anthurium

Anthurium (*Anthurium andreanum* Lind.) belongs to Araceae family and is the most popular high value cut flower because of post-harvest life. NE region is considered as one of the best region in India for growing Anthurium because of the congenial climatic conditions. Mizoram and Meghalaya States are already cultivating on commercial scale by the private entrepreneurs. Considering suitable climate at lower hill of Nagaland a field demonstration was laid out to evaluate suitable varieties for commercial production by the entrepreneurs of Nagaland. Anthurium varieties Tropical, Xavia, Momento and Pistachi are planted under protected condition at CIH Farm, to evaluate suitable cultural practices to ensure optimum good quality cut flowers. The Anthurium crops cultivated is continuing to produce good quality flowers since 2016-17 to till date.

Fig 31.Anthurium cultivation

3.6.7. Gladiolus

A demonstration was conducted to evaluate varietal performance gladiolus cultivars namely: Pink Friendship, White Prosperity, Euro Vision and Nova Lux in an area of 1500 sq m at CIH Farm, Medziphema in open field condition during the year 2020-21. The demonstration was conducted with uniform cultural practices to ensure optimum good quality flowers as well as response of vegetative growth. Corms of 4.5 cm diameter was planted at

Fig 32. Assessment of different gladiolus varieties

5-7 cm depth at a spacing of 20 x 30 cm. The performance of cv. Nova Lux indicated strong adaptability and good association under the foot hill climatic condition of Nagaland.

3.6.8. Golden rod (Solidago)

Golden rod (Solidago) is a flowering plant in the aster family and most popular as filler crop to the bouquets. It is being commonly grown by seeds and foliage at flower initiation stage is used as filler to bouquets. Golden rod was grown during the financial year 2020-21 at CIH.

Fig 33. Assessment of golden rod flower

3.6.9. Landscape and beautification

One of the most important elements in successful landscape garden is plants. A successful landscape garden requires energy, determination and knowledge of plants. Therefore, over the last 12 years in CIH, we have found exciting reasons to use plants in new ways to improve the landscape of the Institute because making the office more beautiful will bring environmental, social and economic benefits. Above all, one must have a belief in the powerful connection between people and nature in order to create successful public spaces.

Out of the 9 important vegetation types of India, 6 are found in the North Eastern region. These forests harbour 80,000 out of 15,000 species of flowering plants out of which 1145 species of orchids, 80 species of rhododendrons, 60 species of bamboo and 25 species of canes. In terms of floral species richness the highest diversity is reported from the states of Arunachal Pradesh and Sikkim amongst the North Eastern States

Fig 34.Gazania Flower

Fig 35. Petunia Flower

Fig 36. Dianthus Flower

Fig 37. CIH guest house lawn

Fig 38. Lawn outside office building

3.6. DEMONSTRATIONS AT FARMERS FIELD

Table 13. List of off farm demonstrations established in farmer's field

Sl. no	Components	Area	Place
1	Planting of Onion Variety: Red TL & Red 3 Source: NHRDF	0.25 ha	Punglwa village, Peren district, Nagaland
2	Plantation of Papaya var. Red Lady (3x3m spacing)	500 sqm	Indisen village , Dimapur district, Nagaland
3	Plantation of Papaya var. Red Lady (3x3m spacing)	500 sqm	Jaluki, Peren District
4	Demonstration on Plantation of acid lime (3x3m spacing) Variety: AL-1 Source: CCRI, Nagpur	0.1 ha	Nkwareu, Peren district

3.6.1. Off farm demonstration of onion varieties Red TL and Red 3 in Nagaland condition

An off farm demonstration on cultivation of onion varieties viz. Red TL and Red 3 was conducted at Punglwa B' village under Peren district to assess the performance of the varieties and to promote commercial cultivation of onion in the state for sustainable income and improve livelihood of the farming communities. The demonstration was conducted in 0.25 ha area under the technical guidance and supervision of the CIH experts. The institute distributed two varieties onion seeds to the famer's viz. Red TL and Red 3. Organic inputs like neem cake, FYM and locally available pig manure were incorporated during land preparation for sowing and transplanting. Harvesting was done at about 16 weeks from the time of transplanting of seedlings. The demonstration of onion in 0.25 ha area produced a total harvest of about **7.54 quintals** after cleaning, sorting and grading.

Fig 39. Demonstration on cultivation of onion in farmers field

The demonstration was identified as successful as the yield was satisfactory. The var. Red TL performed very well, in terms of size, average weight and total yield. The farmers have shown keen interest for its cultivation in large areas. The technology is recommended to the NE region state horticulture department for adoption.

3.6.2. Demonstration on planting of papaya variety Red Lady in 0.1 Ha Area (Jaluki Town, Peren District, Nagaland)

The institute conducted off farm demonstration on plantation of papaya at Jaluki Town, under Peren district of Nagaland. The demonstration covered an area of 0.1ha. The institute provided papaya seedlings to the beneficiary farmer . The papaya plants were planted at 3x3m spacing during the first week of December 2020. Organic inputs like FYM and compost have been incorporated @ 1kg per pit prior to transplanting the seedlings. The plants are at foliage growth stage and attained an average height of 35-40 cm after 4 months of planting.

Fig 40.Off farm demonstration of papaya var. Red Lady in Peren district

3.7. HUMAN RESOURCE DEVELOPMENT

3.7.1. FARMERS TRAINING 2020-21

A total of 54 trainings are being conducted out of which 24 online trainings have been conducted for total 1756 participants comprising of farmers, entrepreneurs, scientists, extension functionaries, scholars and horticulture officers from all Northeast states. The experts from ICAR institutes and centres and SAUs were invited as resource persons.

The institute also conducted offline trainings for farmers in the State of NE region. The institute conducted on campus training as well as off campus training by CIH or in collaboration with various KVKs. During the year 2020-21 the institute conducted 30 nos of farmers training reaching out a total of 730 farmers in NE region.

Table 14. Training Summary 2020-21

No. of Farmers Trainings	No. of participants
24 (Online)	1756
30 (Offline)	730
54	**2436**

Table 15. Details of online trainings and webinar conducted

Topic & Date	No. partt.
Online training on Preparation of Plum Squash (22/5/2020)	7
Online training on Preparation of Plum Candy (29/5/2020)	21
PHM and Preparation of jackfruit chips and Plum Candy (5/6/2020)	20

Mushroom Production Technology (12/6/2020)	19
Online training on flower arrangement (23/6/2020)	20
Online training on Bio-enhancers and Bio-pesticides for Organic Vegetable Production System in North Eastern Region (30/6/2020)	35
Webinar on Protected Cultivation in North East India: Prospects, Issues and Solutions (11/7/2020)	215
Online Training on Production Technology of flowers in North East India (25/7/2020)	60
Webinar on Atma nirbhar Krishi through Holistic Growth of the Horticulture Sector In North- Eastern India (8/8/2020)	67
Online training on Nursery Management and Production Technology of Selected Horticulture Crops (10/8/2020)	90
Nursery Management and Production Technology of Selected Horticulture Crops (11-14/8/2020)	90
Online training on Production Technology of vegetables for North East Region (17/8/2020)	67
Webinar on Prospects of Processing and Entrepreneurship (19-22/8/2020)	100
Online Training on Production Technology and Post Harvest Management of Horticulture crops (3-4/9/2020)	70
Online Learning on "Secondary Activities of Agriculture for Income Generation and Self Reliance (7-9/9/2020)	75

Table 16. Details of offline trainings

Topic & Date	Location	No.Part.
2 Days Training on Horticulture Avenues for Sustainable Income (21-22/10/2020)	Noklak District, Nagaland	55
1 Day Awareness cum Farmers Training (23/10/2020)	Mokokchung District, Nagaland	21
1 Days Awareness cum training on Production Technology and Post harvest value addition of Horticulture crops (2/12/2020)	ARTC Dimapur, Nagaland	30
1 Day Training on Production technology and IPM of vegetables (15/12/2020)	Heningkunglwa village Peren, Nagaland	25
1 Day Production Technology and Value addition of Hort. crops (17/12/2020)	Amaluma village Dimapur, Nagaland	15
1 Day Training cum Demonstration on Production Technology of Onion (6/01/2021)	Punglwa village, Peren Nagaland	25
2 Days Training on Organic Farming (14-15/01/2021)	CIH, Nagaland	20
2 days Training on Nursery Management of Hort. Crops (19-20/01/2021)	CIH, Nagaland	27
3 Training Programme on Establishment of Vegetable Seed Nursery (13-14/01/2021)	Umsning, Meghalaya	50

2 days farmers training on scientific production technology of kiwi (27-28/01/2021)	KVK, Ukhrul, Mizoram	40
2 days Production and Post Harvest Management of king chilli (01-02/02/2021)	KVK Imphal West, Manipur	40
2 days farmers training on orchard management of fruit crops (02-03/02/2021)	KVK, Tamenglong, Manipur	40
2 days farmers training on Production, Post Harvest management and value addition of citrus (5-6/2/2021)	KVK, Chandel, Manipur	40
Production and Processing of Ginger and Pineapple (03-04/02/2021)	KVK, Churachanpur, Manipur	40
Farmers training on horticulture crops (23/02/2021)	KVK, Serchhip, Mizoram	30
Farmers training on horticulture crops (26/02/2021)	KVK, Serchhip, Mizoram	30
Farmers training on horticulture crops (02/03/2021)	KVK, Serchhip, Mizoram	30
Farmers training on horticulture crops (05/03/2021)	KVK, Serchhip, Mizoram	30
Training on Nursery Management of Hort. Crops (16-17/3/2021)	KVK Peren	30
Training on Organic farming (18-19/3/2021)	CIH, Medziphema	20

GLIMPSE OF TRAINING PROGRAMMES

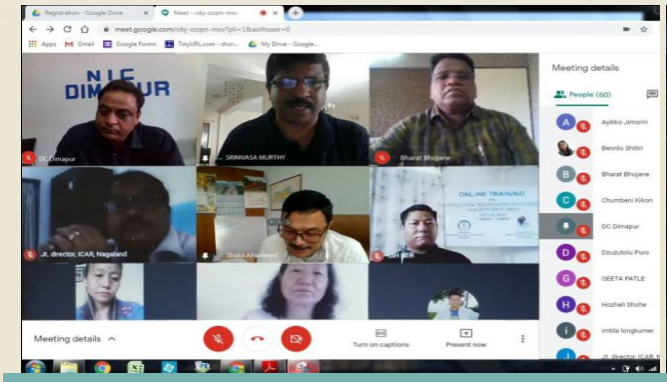


Fig 40.Webinar on Protected Cultivation: Challenges, Issues & Prospects

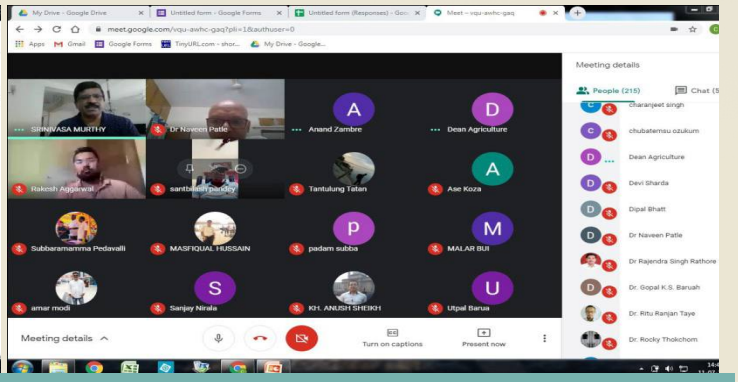


Fig 41.Online Training on Production Technology and Nursery Management of Hort. crops

Fig 42. Two days training in collaboration with SP Noklak district, Nagaland

Fig 43.Farmers training in collaboration with various KVKs under ICAR Manipur Centre

Fig 44.Farmers Training on Banana Fibre Extraction at CIH

Fig 45. Two days Farmers Training on Nursery Management at CIH

3.7.3. Trainers Training 2019-2020

Fig 46.Trainers training on Gardener held at CIH Medziphema

Five days trainers' training on Gardener was conducted at CIH, Medziphema from 7th to 11th December 2020. The training was organized for field staffs of Sainik School, Punglwa, Peren district, Nagaland.

The objective of the programme was to provide basic technical guidance on various technologies related to gardening. Institute provided training through slide presentations as well as practical demonstrations and field visits. Altogether 9 participants attended the training programme.

3.8. AGRI-BUSINESS PROMOTION

Agri-Business promotional programmes are organized with the objective to promote the produce of the farmers. A number of initiatives have been undertaken to highlight and facilitate in marketing of horticultural produce.

3.8.1. E-Buyers Sellers Meet

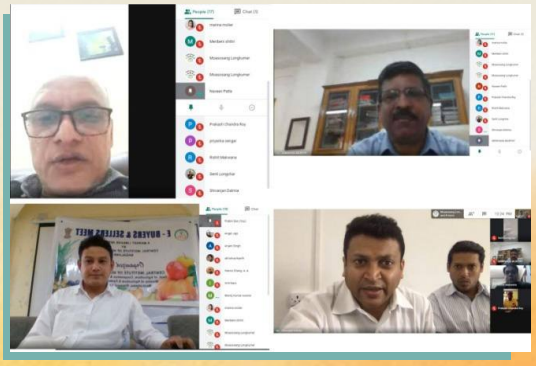


Fig 47.E-Buyers Sellers Meet

The 1st edition of E-Buyers Sellers Meet was organized on 19th June 2020 through online mode. The objective of the programme was to facilitate linkage of horticultural produce to market. Dr. B N S Murthy, Horticulture Commissioner, DAC&FW was the special guest of the meet. Prominent buyers from North East and other parts of India participated in the meet. FPOs/ FPCs

and NGOs working in horticulture sector in Nagaland attended and interacted with the buyers. Dr. N K Patle, Dy. Commissioner (Hort.), DAC&FW and Director i/c. CIH welcomed all the participants and also facilitated the interactions between buyers and sellers. Mr. Prabin, Marketing Specialist was the moderator of the meet.

3.8.2. Horticulture Stakeholders' Meet

An online horticulture stakeholders meet was organized on 22nd July 2020 under the Chairmanship of Shri Anoop Khinchi, IAS, Deputy Commissioner, Dimapur, Nagaland. Dr. B N S Murthy, Horticulture Commissioner, DAC&FW attended the programme as Special Guest. The meet was organized to facilitate and provide logistic assistance to the pineapple growers in marketing their produce during the lockdown period. The Chairman assured his full support in helping the pineapple growers under Dimapur district. The meeting was attended by FPC members, Village Chairman, Pineapple Growers, Entrepreneurs and officials of CIH, Nagaland.

Fig 48.Online horticulture stakeholders meet

3.8.3. Market promotion of Kiwi fruit

The Ministry of Agriculture along with Central Institute of Horticulture, Nagaland organized a virtual meeting on 'Value Chain Creation for Kiwi fruit – Farm to Fork' on 11th November 2020. To popularize the marketing and consumption of kiwi fruit, since it is produced on large scale without proper marketing channel. The meeting was chaired by the Union Minister of Agriculture and Farmers' Welfare, Shri Narendra Singh Tomar in presence of Minister of State for Agriculture, Shri Parshottam Rupala, Secretary, Department of Agriculture and Farmers Welfare and other officials of the Ministry and State of Nagaland.

Addressing the gathering, the Union Minister of Agriculture and Farmers' Welfare, Shri Narendra Singh Tomar said that the entire North East due to difficult terrain is lagging behind and all Ministries including Agriculture Ministry are working towards ensuring a progressive North East. He said that this lag needs to be removed and can only be one through a comprehensive vision along with stable policy planning and balanced growth across the region as envisioned by Prime Minister Shri Narendra Modi.

Shri Tomar stated that the Himalayan Sub - Temperature climate is suitable for Kiwi production and there is a need to introduce high yielding cultivars. With extensive research and development support, the commercial cultivation of Kiwi fruit has been extended from the Sub - Himalayan Regions of India to the mid hills of Himachal Pradesh, Sikkim, Meghalaya, Arunachal Pradesh, Nagaland and Nilgiri Hills. Presently, India is producing 13,000 MT of Kiwi in an area of about 4,000 Ha in Arunachal Pradesh, Nagaland, Mizoram and Himachal Pradesh.

India currently imports 4,000 tonnes of Kiwis from New Zealand, Italy and Chile. Shri Tomar said that to strengthen Prime Minister Shri Narendra Modi's vision and mission of creating an Atmanirbhar Bharat, the Ministry of Agriculture is trying to provide handholding support to Kiwi farmers across the country. This is also in line with the call of 'Vocal for Local' which will help in reducing dependence on imports and building a sustainable market for locally produced Kiwi fruit variants.

The Union Agriculture Minister further said that the entire nation is witness that Prime Minister Shri Narendra Modi has focused on Agriculture and allied sector rights for the beginning and his leadership has guided all to look threadbare and in-depth into all aspects of Agriculture especially the gaps which need to be filled in order to ensure that farmers can reap the benefits of their toil. He said that a new chapter is being introduced in the Agricultural history of Nagaland which will be highly beneficial to the Kiwi farmers of the State. He said that this programme of Kiwi Production enhancement will prove to be a milestone in the years to come.

Shri.Tomar said also elaborated on the problems faced by the farmers in the North East region namely lack of good planting material, productivity issues, lack of packaging facilities and marketing networks for farmers. Considering the problems faced, he said that Centre is working hand in hand with State Governments and especially the Central Institute of Horticulture, Nagaland and the Department of Agriculture and Farmers's Welfare has taken key steps to ensure proper training and capacity building of farmers in production as well as packaging of kiwi products is done. The Government is also ensuring that farmers are connected to the market so that they can reap a fair price for their produce. The institute in Nagaland has also conducted training and exposure visit of farmers from Phek District of Nagaland for helping them understand how to reap good returns through Kiwi production. Shri Tomar added that persistent efforts should be made by all to ensure Nagaland can emerge as the 'Kiwi State' of India.

The packaging concept developed by the Institute was also launched by the Hon'ble Union Minister of Agriculture and Farmers' Welfare, Shri Narendra Singh Tomar during the virtual meet.

Three (03) consignments of Kiwi fruit were sent to buyers in Mumbai, Delhi & Surat through flight in the packaging boxes developed by the Institute.

Market Promotion of Kiwi

– **Problems**

- Road connectivity
- Grading, packaging
- Production & productivity issues
- Freight charges

– **Intervention**

- Development of packaging concepts, training & promotion, mobilization of farmers and facilitation in market linkage.
- Virtual meeting on 'Value Chain Creation for Kiwi fruit – Farm to Fork'& Launch of Packaging Concepts by Hon'ble Agriculture Minister & Sr. Officials in agriculture ministry.
- Facilitation in logistics for fulfilling orders (outside state) in organized format
- Facilitated in sending consignments to Delhi, Mumbai &Surat

– **Outcome**

- Model for packaging developed
- Promotion of kiwi fruit of Nagaland

3.8.4. Market promotion of pineapple fruit

To promote the pineapple cultivation on large scale and its proper marketing, a large number of initiatives were taken by the Institute for pineapple growers belonging from Molvom & Bungsang villages, Nagaland. The focus was to develop certain standards to market their produce. A key component that has been found missing while marketing farmers' produce is "Packaging". Many of the farmers are either not aware or not able to invest or do not have the technology to develop packaging for their produce. The knowledge on importance of packaging have always been disseminated to the farming community, however, there are very few who actually practice and are able to reap the benefits associated with it.

Fig 49. A Glimpse of Pineapple field in Bungsang Village, Nagaland

With the objective to promote Nagaland pineapple in distant market, an initiative was taken by Central Institute of Horticulture, Nagaland to develop packaging boxes for pineapples. While developing packaging boxes alone will not make much of a difference if the other important variables like stage of harvesting, size and weight of pineapple, quality and damage/injury free pineapples are not considered.

Two (02) consignments of pineapples were sent to buyers in Delhi/ Guwahati through train in the packaging boxes developed by the Institute and minimal damage has been reported in both the consignments.

- **Market Promotion of Pineapple**

– **Problems**

- Market accessibility
- Grading, packaging

– **Intervention**

- Development of packaging concepts, training & promotion, mobilization of farmers and facilitation in market linkage.
- Facilitation in logistics for fulfilling orders (outside state) in organized format
- Facilitated in sending consignments to Delhi, Guwahati

– **Outcome**

- Model for packaging developed
- Promotion of pineapple fruit of Nagaland
- Farmers to start using packaging boxes for orders outside state
- Farmers able to manage and arrange logistics for outside orders

3.8.5. Market promotion for Honey

Central Institute of Horticulture, Nagaland took an initiative to promote honey of beekeepers under Agro Revolution Society from Noklak district, Nagaland. The Institute trained the farmers on packaging & bottling of honey and also facilitated them in marketing of honey. The product was formally launched by Dr. Abhilaksh Likhi, IAS, Additional Secretary, Ministry of Agriculture & Farmers Welfare during review meeting on Central Sector Scheme for FPOs on 17th March 2021 at CIH, Nagaland.

Fig 50.Noklak honey formally launched by Dr. Abhilaksh Likhi, IAS, Additional Secretary

3.8.6. Agri-marketing training programmes.

The Institute organized a number of training programmes to facilitate the farmers for marketing their produce. The trainings organized for the farmers group are as follows;

– On-Farm training cum demonstration on packaging of Pineapple at Bunsgang village on 8th Sept 2020.

– Hands on packaging training of Kiwi fruit on 8th November 2020 at CIH, Nagaland.

– Packaging development programme for Pineapple for FPC Molsang on 19th November 2020.

– Training to FPC on Business Development & Accountancy on 19th March 2021 at CIH, Nagaland.

3.8.7. Facilitation in Market linkage for pineapples during lockdown in neighboring states

The Institute facilitated in marketing of around 15MT of pineapples of FPC Molsang to neighbouring states during lockdown.

Fig 51.A view of pineapples loaded and ready for transport

3.8.8. EXHIBITION/ TRADE FAIR

3.8.8.1. Participation in Regional Agri Fair, Imphal, Manipur

Central Institute of Horticulture, Nagaland participated as an exhibitor in the Regional Agri Fair held at CAU farm, Imphal, Manipur w.e.f. 8-10 February 2021. The fair was organized by Central Agricultural University, Imphal, Manipur. The Institute highlighted the various activities being carried out as per the mandates of the Institute. The focus horticulture crops available in the NEH region were displayed. Folders and other publications on production technologies, package of practices PHM on fruits, flowers, vegetables and spices were displayed and distributed during the programme. Disease free quality planting material of major fruit crops was also displayed.

Fig 52. A glimpse of CIH stall at Regional Agri Fair, Imphal, Manipur

3.9. POST HARVEST MANAGEMENT

3.9.1. Upgradation of minimal processing unit

The minimal processing unit has been set up at the institute for practical training to the Farmers and entrepreneurs who would like to enhance their income through processing their Horticultural surplus produce or unsold produce. The objective of this unit is to provide hands on training & impart technical knowledge about food processing and to guide the individuals/communities, who are willing to set up small agro processing unit, to tap the natural resources existing in their environments.

The Minimal processing unit is up graded as per the need and on regular intervals. The main activities carried out for strengthening of the processing unit during FY 2020-21 are:

- All the formalities completed and work order for supply and commissioning of solar dryer system cum heat spacing as per the NISE specification for 180 kg capacity of fruits and vegetables has been issued.
- All the formalities completed and work order for design, supply and commissioning of solar hybrid plant for minimal processing unit with 3 KVA, single phase, 50 Hz capacity has been issued.
- Plastic packaging pouches have been procured for juice, vacuum packing and other processed products.

3.9.2. Product Development

Different products have been developed in the Institute and interested farmers and rural youths have been given hands on trainings for the processing of such products. The products developed in the Institute are listed as under:

Fig 53.Aloe vera gel with Vit. C & Aloe vera based hand sanitizers

Fig 54.Preparation of Megha Turmeric powder

Fig 55.Carambola candy

Fig 56.Naga king chilli pickle

Pineapple Ready-To-Serve
500 bottles
BCR=1:1.3

Chayote Tuitty Fruity
20 units (100 grm)
BCR=1:1.2

Ginger Candy
230 units (100 grm)
BCR=1:1.7

Wild Apple Candy
200 units (50 grm)
BCR=1:1.1

Mango Chunda (Chutney) 11 units (250 grm) BCR=1:1.1

Mango Pickle 10 units (250 grm) BCR=1:1.1

3 protocol trials were done for kiwi candy. Refinement still required for kiwi candy

Kiwi Jam 4 units (500 grm) BCR = 1:1.1

3.9.3. Initiatives for marketing and promotion of processed products

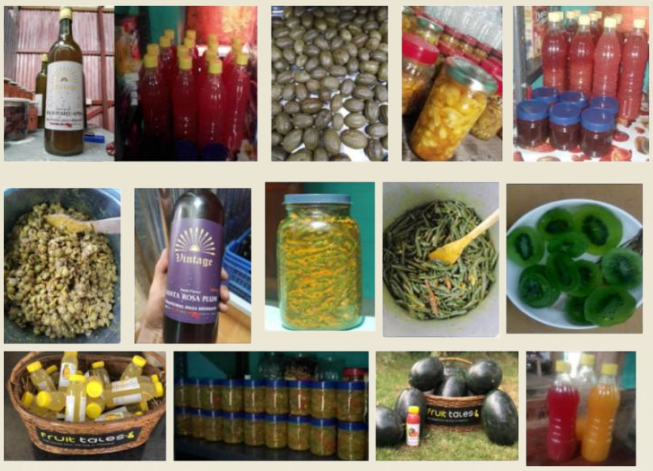
The major fruits cultivated in the region are mandarin, lime and lemons, banana, mango, guava, pineapple, plum, peach and kiwi along with wild fruits of the region. The NE region has untapped potential to enhance the income of the farming population by promotion of value addition and processing of surplus or unsold produce of specific horticultural crops.

To mitigate the problems of post-harvest losses CIH has successfully initiated and conducted training of rural youths and entrepreneurs in the field of post-harvest processing, preservation and value addition of horticultural crops. The value added products of the trainees are also promoted by CIH.

Brochure of Value added products developed by CIH

3.9.4. Food processing ventures of the ex trainees of CIH

The Institute has also taken the initiative to provide hand holding support to the Ex-trainees of PHM course. After undertaking the course, the trainees were encouraged to start small scale processing units with the technical support from the Institute. Entrepreneur trainees have started preparing value added products like pickles, jams, candy, RTS, cold pressed juices through local markets via home delivery system Fruit Tales (a food processing enterprise launched through the initiative of CIH, Nagaland) have sold more than 500 bottles of cold pressed juice during the lockdown period. Another beneficiary, Dwellington Home, has sold about 150 units of pickles, 200 bottles of fruit juices and 100 jars of Plum Jam.



3.9.5. Trainings on Post Harvest Management (2020-2021)

Table 17. List of Post Harvest Management & Value addition trainings conducted

Sl No	Particulars	Date	Duration	Place	No of participants	Type of participants
	Online training on Processing of Jackfruit chips	5th June 2020	1	online	20	Students and entrepreneurs
	Online training on Post Harvest management and arrangement of Flowers	23rd June 2020	1	online	20	Students and entrepreneurs
	Online training on Prospects of processing and entrepreneurship	19th to 22nd August 2020	4	online	100	Students and entrepreneurs
	online training programme on "production technology and Post harvest management of Horticultural crops	3rd to 4th September 2020	2	online	70	Rural youths
	Training on "Horticultural Avenues for sustainable Income"	21st to 22nd October 2020	2	Noklak District	55	Rural youths and Farmers
	Training on "Horticultural Avenues for sustainable Income	23rd October 2020	1	Mokokchung District	21	Rural youths and Farmers
	Training on Value addition & processing of horticultural crops	17th December 2020	1	Amaluma Village	15	Farmers and house wives
	3 days Refreshers course on Post harvest Management & Processing	12th,13th& 15th January 2021	3	CIH	12	
	Training on Pineapple and banana fiber extraction for Meghalaya and Assam trainees	2nd& 3rd Feb 2021	2	CIH	8	
	Total		**17**		**321**	

3.10. ACCREDITATION AND CERTIFICATION OF NURSERIES IN NER

Nursery Accreditation and Certification of horticulture nurseries has been one of the major activities of the institute. During the period of 2020-2021,a total of 13 nurseries were assessed/monitored which includes both fresh application and renewal of nursery applications, out of which 13 nurseries were accredited and certification were issued with a rating **2 Star** to 2 nurseries and with a **1 Star** rating to remaining 11nurseries. The details of the nurseries are provided in the table below:

Table 18.Nurseries Accredited summary during the year 2020-21

State	No. of Nurseries Accredited
Arunachal Pradesh	-
Assam	10
Manipur	1
Mizoram	-
Nagaland	2
Tripura	-
Total	**13**

Table 19. Detailed list of Nurseries Accredited during the year 2020-21

Sl. no.	Name of Nurseries	Location/ State	Crop	Production capacity per annum	Star rating	Remarks
1	Rhakho Kiwi Nurs-ery	Pfutsero Nagaland	Kiwi	40000	**"1Star"**	Renewal
2	Ato Nursery	Khuzama Nagaland	Plum Peach	20000 5000	**"1Star"**	Renewal
3	Highway Nursery Plantation	Langathel Manipur	Mango Citrus Guava Litchi Lemon	10000 15000 10000 5000 10000	**"2 Star"**	New
4	Daffodil Nursery	Bherakuchi, Khetri, Jogiroad Assam	Mango Litchi Lemon Lime Khasi Mandarin Guava Sweet Orange	10000 20000 30000 15000 12000 15000 5000	**"2 Star"**	New
5	Anowara Nursery	Dhupdhara, Assam	Litchi Lemon Plum	6000 5000 7000	**"1Star"**	New
6	Roshmi Nursery	Barosimoli Dhupdhara Assam	Litchi Lemon Guava Mango	35000 35000 10000 6000	**"1Star"**	New
7.	Yeansunara Nursery	Uttar Chelabari Dhupdhara Assam	Litchi	10000	**"1Star"**	Renewal
8.	Naltali Nursery	Kathpara Assam	Litchi Lemon Lime	20000 30000 30000	**"1Star"**	Renewal
9.	Palash Nursery	Chamarkuchi Nalbari, Assam	Lemon	25000	**"1Star"**	Renewal
10.	Medicinal & Fruit Crops Nursery	Dhupdhara Assam	Litchi Lemon	20000 25000	**"1Star"**	Renewal

11.	Sania Nursery	Dhupdhara Assam	Litchi Lemon Guava	20000 20000 4000	**"1Star"**	Renewal
12.	M. Hussain Nursery	Moterjhar Dhubri, Assam	Litchi Lemon Mango Cashewnut Ber	4000 1200 5000 1800 400	**"1Star"**	Renewal
13.	J. N. Nursery	Uttar Chelabari Dhupdhara Assam	Litchi	20000	**"1Star"**	Renewal

Table 20.List of Nursery Accreditation committee of NER

State	Address	Contact/email
Nagaland		
Dr. V.J. Shivankar, Chairman	Former Director, NRCC, Nagpur	**M-**07972322680/9422988418, shivankarvj@yahoo.com
Dr. AabonYanthan	Scientist (Hort.), ICAR, Nagaland Centre	M-09718852675
Dr. Moa Walling	Deputy Director, Dept of Hort, Nagaland	M-7005287704
Assam		
Dr. V.J. Shivankar, Chairman	Former Director, NRCC, Nagpur	M-07972322680/9422988418, shivankarvj@yahoo.com
Dr. Nishant. A. Deshmuk,	Scientist (Hort.), ICAR Umiam	M-8974036747, nadeshmukh@gmail.com
State representative	-	
Arunachal Pradesh		
Dr. K.K. Jindal	Ex. ADG (Horticulture)	M-9418029482, kkjindal45@gmail.com
Dr. HammylliendeTalang	Scientist, ICAR, Umiam	M- 9436311164/8132887733 hammylliende@gmail.com
Shri. Tage Tatung	Joint Director (Horticulture), Govt. of Arunachal Pradesh	
Meghalaya		
Dr. Anjani Kumar Jha	Principle Scientist (Hort), ICAR Umiam	M-9402507059, akjhaicar@yahoo.com
Dr. HeiplanmiRymbai	Scientist (Hort.), ICAR, Umiam	M- 8131076434, rymbaihort@gmail.com
State representative		
Sikkim		
Dr. Yog Raj Chanana	Former HOD, Hort., PAU, Ludhiana	M-9876153322 yrchanana@yahoo.com
Dr. Sudip Kumar Dutta	Scientist, ICAR, Sikkim Centre	
State representative	-	
Manipur		

Dr. R.C.Upadhyaya	Ex. Director, NRC-Orchid, Sikkim	M-9868645393 urc@hub.nic.in
Dr. SubhraSaikat Roy	Scientist (Hort.), Manipur Centre	M- 8730933835, subhra-saikat@gmail.com/ ssroy.icar@nic.in
State representative	-	
Tripura		
Dr. R. P. Gupta	Ex. Director, NHRDF, New Delhi	M-9850880668
Dr. H. Lembisana Devi,	Scientist (Hort.), Tripura Centre	M-8415917083
State representative	-	
Mizoram		
Dr. P.K.Singh	Ex. Deputy Managing Director, NHB	M-9868893701 Singhpraveen2017@gmail.com
Dr. VishambharDayal/ Dr. AmitGoswami	Scientist, Mizoram centre, Scientist (Hort), IARI, New Delhi	M-7005453095 Vishamber5009@gmail.com
Shri. Lalremruata	HEO, Govt of Mizoram	M- 8119865660 remruatahamp@gmail.com
Spices		
Dr. R.K. Bhattacharya	Ex. Professor & Head, AAU, Jorhat	M-9435050790, ran-jitkb2010@gmail.com
Dr. AzezeSeyie,/ Dr. Chongtham Tania,	Scientist, Nagaland Centre Scientist, Manipur centre	M-7085962272
State representative		

Fig 57.Glimpses of Horticulture Nurseries Assessment of NER States during 2020-21

3.11.SKILL DEVELOPMENT & CERTIFICATE COURSE

3.11.1. Skill development

Central Institute of Horticulture, Nagaland organized one (01) skill development courses for the farmers/ unemployed youth of North-eastern States. The institute has been accredited by ASCI to impart skill trainings in North East Region. The objective of the course is to equip the less educated unemployed youth of the region with the skills to work in the field of horticulture and provide self-employment.

For the year 2020-21

Sl.	Course	Batch ID	Duration	No. of registered trainees	No. of qualified trainees
1	Gardener	225265	260 hours (18.01.21 to 03.03.21)	21	21
	Total			***21***	***21***

Fig 58. Practical classes of skill development course on Gardener

3.11.2. Certificate course on post-harvest management.

The three months certificate course was organized on "Post-Harvest Management of Horticultural Crops" and commenced on 19th February 2021 at Central Institute of Horticulture (CIH), DAC & FW, Ministry of Agriculture and Farmers Welfare, Government of India, Medziphema. Certificate course was concluded on the 28th of April 2021. The objective of the certificate course is to provide skill on post-harvest management, food processing and value addition of horticulture crops and local crop with minimum resources to the rural unemployed youths which will enable them to be fully equipped to run and manage pack houses, cold storage and food processing unit. The trainees from Tuensang, Mokokchung, Dimapur, Mon, Wokha, Noklak and Zunheboto Districts were given theory as well as hands-on practical demonstrations on value addition of different horticultural crops grown in the region. A total of 17 trainees were selected to undergo the 3 months certificate course.

i 2 lane

CIH hosts course on post harvest management of horticultural crops

Participants and CIH officials at the certificate course.

DIMAPUR: Three months certificate course on "post harvest management of horticultural crops" commenced on February 19, at Central Institute of Horticulture (CIH), Medziphema.

A press release by CIH stated that the course was inaugurated at the institute with a brief introductory session by course coordinator & post harvest technologist, Vinika K Aomi.

Delivering welcome note, additional commissioner -Hort, DAC&FW and director in-charge CIH, Dr. N K Patle encouraged the students to make the best use of their stay at CIH.

He also assured the trainees of all technical help and support in the future if they worked hard.

It may be noted that the objective of the course is to skill rural unemployed youth on post harvest management, food processing and value addition of horticulture crops which will enable them to be fully equipped to run and manage pack houses, cold storage and food processing unit.

The trainees from Tuensang, Dimapur, Mokokchung, Wokha, Kohima, Mon, Noklak and Dimapur will be given hands-on practical demonstrations on value addition of different horticultural crops grown in the region.

Technical advisory committee of CIH led by chairman of TAC, Dr. SD Upadhyaya also graced the inaugural as special guests. Vote of thanks was proposed by STA, Mhasizo Iuo. A total of 21 trainees enrolled for the certificate course.

Fig 59. Practical classes of certificate course on PHM

3.8. INFRASTRUCTURE DEVELOPMENT

3.12.1. Farmers Hostel ground floor building

3.12.2. Staff quarter building

3.12.3. Renovation of old farm building to convert in Farmers hostel

3.12.4. Construction Terracing work at Farm

3.12.6. Installation of New pipe line & water connection to last Block

4. Publication

4.1. Annual Report

- N.K. Patle and Meribeni Shitiri. 2020. ***Annual report (2019-20)***. Central Institute of Horticulture, DAC & FW, Ministry of Agriculture and Farmers' Welfare, Govt. of India, Medziphema, Nagaland.

4.2. Extension folders (English)

- N K Patle, Meribeni Shitiri& Marina.2020. ***Package of practices for cultivation of Cinnamon***. CIH/ Tech. Folder58/ pp 1-6.
- N K Patle, Meribeni Shitiri& Marina.2020. ***Package of practices for cultivation of Yardlong bean***. CIH/ Tech. Folder 59/ pp 1-6.
- N K Patle & Marina.2020. ***Production technology of Vermicompost***. CIH/ Tech. Folder60/ pp1-6.
- N K Patle, Vinika K Aomi, Mhasizotuo&MeribeniShitiri.2020. ***Processed products of wild apple (Docynia indica): candy, juice and wine***. CIH/ Tech. Folder 61/ pp 1-6.

4.3. Extension folders (Hindi)

- N K Patle, Director, Central Institute of Horticulture, Nagaland. 2020***. Use quality cashew grafts to double farmer's income.***CIH/ Hindi Tech. Folder 1/ pp 1-6.
- N K Patle, Meribeni Shitiri. 2020. ***Persimmon***. CIH/Hindi Tech. Folder 2/ pp 1-6.
- N K Patle, Prabin Das, Moasosang Longkumer. 2020. ***FPO formation***. CIH/Hindi Tech. Folder 3/ pp 1-6.

4.4. Technical bulletin (Hindi)

- N K Patle, Meribeni Shitiri, A.K Singh, Prabin Das, Moasosang, Mhasizotuo. 2020. ***Cashew cultivation techniques.***CIH/Hindi Tech. Bulletin1/ pp 1-11.
- N K Patle, A.K Singh, Meribeni Shitiri. 2020. ***Strawberry cultivation.***CIH/Hindi Tech. Bulletin 2/ pp 1-14.
- N K Patle, Meribeni Shitiri, Vinika. 2020. ***Tomato processing.***CIH/Hindi Tech. Bulletin 3/ pp 1-28.

Fig 60. Publications of CIH

5. MEETINGS/WORKSHOPS

5.1. Review meeting on Central Sector Schemes for FPOS

A review meeting was organized on 17th February 2021 at CIH, Nagaland to discuss on Central Sector Schemes for FPOs and was chaired by Dr. Abhilaksh Likhi, IAS, Additional Secretary, Ministry of Agriculture & Farmers Welfare. The meeting was organized to disseminate information and discuss issues and challenges faced in formation of FPOs. The interactive meeting was attended by FPOs, FPCs and officials from Nagaland while the other northeastern states attended virtually. The chairman appraised all to continue working in close coordination despite the geographical and topographical differences in order to achieve the target of forming 10000 new FPOs under the central sector scheme.

Fig 61. Review meeting chaired by Dr. Abhilaksh Likhi, IAS, Additional Secretary, Ministry of Agriculture & Farmers Welfare.

As a part of the meeting, the additional secretary along with other officials visited farmers producers company Molsang and interacted with the members in the field. He also visited onion demonstration farm of CIH at Punglwa village under Peren district and interacted with the women SHG groups.

Fig 62.A glimpse of field visit and interaction of farmers with Additional Secretary

5.2. Webinar on Atmanirbhar Krishi

The Institute conducted a Webinar on "Atmanirbhar Krishi Through Holistic Growth of the Horticulture Sector In North- Eastern India" which was held on 8th August 2020 in collaboration with Department of Horticulture, Govt. of Nagaland. The objective of the Webinar was aimed to develop the overall understanding on self-reliance and sustainability through various horticultural interventions.

Dr. B.N.S. Murthy, Horticulture Commissioner, GOI, was invited as the Chief Guest for the Webinar and Smt. Anenla T. Sato, IAS, Commissioner & Secy. Horticulture, Govt. of Nagaland , was the Special Guest. Dr. N.K. Patle Dy. Commissioner DAC & FW cum Director in charge CIH was moderator of the programme. The eminent speakers were Dr. R.E. Lotha, Director Horticulture Govt. of Nagaland, Dr. S.S. Roy, Senior Scientist, ICAR Manipur Centre, Dr. Sunila Kumari, Founder & Chairperson, Dragon Flora Farms LLP, Pune and Dr. B.J. Brahma, Director, SFAC. The participants included horticulture officers, faculty staffs and scientists from various institutes and departments, FPOs, entrepreneurs, farmers from all over North East States. Altogether about 67 participants joined and interacted in the programme.

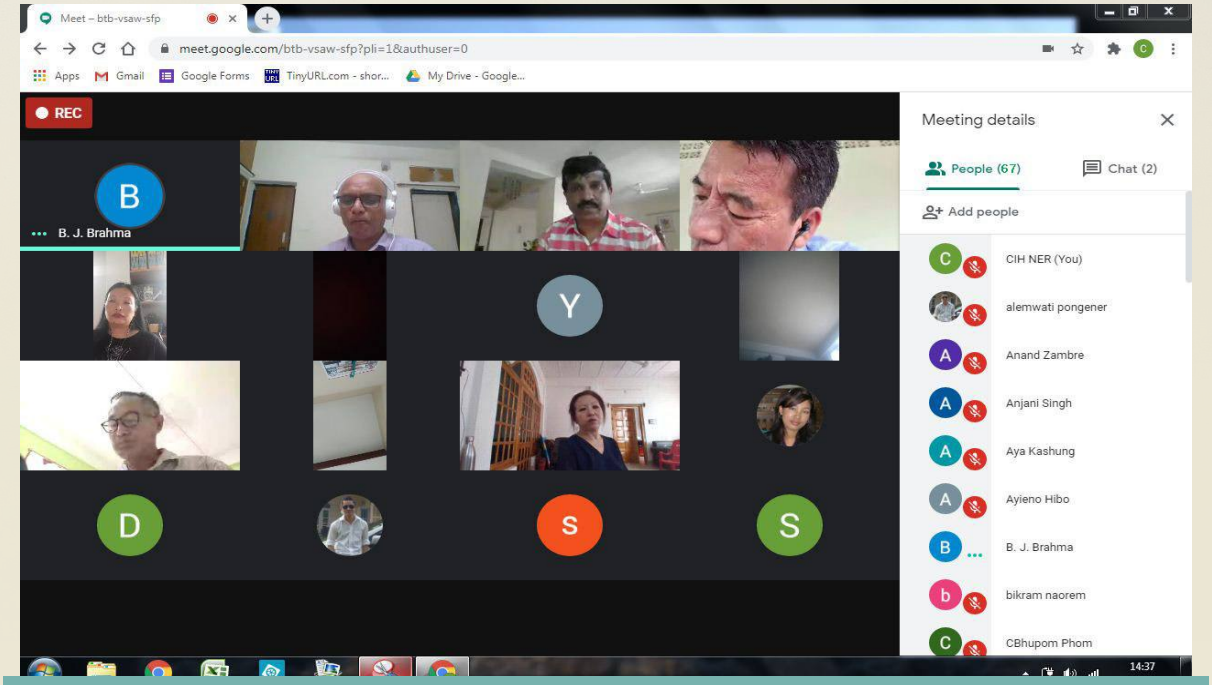


Fig 63. Webinar on "Atmanirbhar Krishi

6. IMPORTANT EVENTS CELEBRATED

6.1. Independence Day Celebration

Central Institute of Horticulture, Nagaland celebrated the 74th India Independence Day on 15th August 2020 following strictly social distancing norms and avoiding the gathering of crowds. Shri. A.K Singh hoisted the National Flag and also delivered the Independence Day speech. All the staff and field workers participated in the programme.

Fig 64. Independence Day celebration at CIH

6.2. Republic Day Celebration

Central Institute of Horticulture, Nagaland celebrated the 72nd Republic Day on 26th January 2021 at its campus. The Republic Day celebration programme began with hoisting of National Flag and Republic Day speech delivered by Dr. N.K. Patle, Addl. Commissioner (Hort.), DAC & FW & Director i/c, CIH. To commemorate the event, a number of activities like singing & dance competition, running race and other recreational activities for staffs, workers and trainees of skill development course was organized simultaneously. Certificates/ prizes were distributed to the winners/ trainees during the closing ceremony.

Fig 65. Flag hoisting by Dr. N.K. Patle, Director i/c, CIH

Fig 66. CIH staff with Dr. N.K.Patle, Director i/c, CIH

Fig 67. Cultural folk dance performed by Noklak trainees

6.3. International Women's Day

International Women's Day is a global day celebrating for the social, economic, cultural and political achievements of women. The day also marks a call to action for accelerating gender disparity. Significant activity are witnessed as groups come together to celebrate women's achievements or rally for women's equality. Central Institute of Horticulture, Nagaland also celebrated International Women's Day on March 8th 2020 with the trainees of certificate course. The participants were addressed on various challenges encountered by women in personal and professional life and discussed some of the effective strategies to handle difficult situations through case studies and personal experiences.

Fig 68. International Women's Day celebrated at CIH

Fig 69. Planting of saplings at CIH campus

6.4. World Environment Day

World Environment Day is celebrated on June 5 annually to encourage awareness and environmental protection. According to the United Nations, "the celebration of this day provides us with an opportunity to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises, and communities in preserving and enhancing the environment. However, World Environment Day 2020 celebrations were different as people took part in online activities and programmes due to COVID-19 lockdown. To commemorate the event, Central Institute of Horticulture, Nagaland also took part by planting few plant saplings around the office campus.

7. PERSONNEL

The Government of India has sanctioned 17 posts which include: Director (1), Horticulture Specialist (2), Marketing specialist (1), Post harvest technologist (1), Asst. Horticulture specialist (3), Farm Manager (1), Senior technical assistant (2), Administrative Officer (1), PA to Director (1), Stenographer (2), Field Assistant (2). All development, trainings and transfer of technology activities are being carried out at the institute under the administrative control of the Director, Central Institute of Horticulture supported by total staff strength of 16 comprising of technical, administrative staffs and 57 outsourced labours.

PRESENT STAFF POSITION AT CIH

1.	Director	: Dr. N.K. Patle (i/c)
2.	Technical consultant	: Mr. Arvind Singh
3.	Horticulture Specialist	: Mr. Anjani Kumar Singh
		: Mrs. Meribeni Shitiri
4.	Post Harvest Technologist	: Ms. Vinika K. Aomi
5.	Marketing Specialist	: Mr. Prabin Das
6.	Assistant Horticulturist	: Dr. Moasosang Longkumer
7.	Senior Farm Manager	: Ms. Petekhrienuo
8.	Senior Technical Assistant	: Ms. Marina
		: Mr. Mhasizotuo
9.	Administrative officer	: Mr. Babu Singh
10.	P A to Director	: Ms. Imtinaro Jamir
11.	Stenographer	: Mrs. Sharda Devi
		: Ms. Kevisetuono Krose
12.	Field Assistant	: Mr. Eliyamo Humtsoe
		: Mr. Anukul Roy

8. Budget

Table 21.FINANCIAL PROGRESS REPORT OF CIH, NAGALAND FOR THE YEAR 2019-20

(Rs. in Lakhs)

HEAD OF ACCOUNT	Budget	LOC	Expenditure
Major Head-2401	Estimate	Received	(1st April2020 to 31st March,2021)
119-Hort & Veg Crop	2020-21	2020-21	2020-21
55-Green Rev.-Kris. Yojn.			
05-Hort. Directorates & Instt.			
1	2	4	5
550501- Salary	450,000.00	450,000.00	390,925.00
550502- Wages	11,500,000.00	10,290,000.00	9,258,415.00
550506- Medical Treatment	50,000.00	-	-
550511- D T Expenses	100,000.00	-	-
550513- Office Expenses	2,260,000.00	2,258,000.00	2,192,016.00
550514- Rent rate & taxes	50,000.00	50,000.00	21,500.00
550516- Publication	500,000.00	500,000.00	253,680.00
550520- Other Admni. Expn.	5,740,000.00	2,500,000.00	2,379,191.00
550526- Advt. & Publicity	200,000.00	100,000.00	5,686.00
550527- Minor works	9,630,000.00	4,000,000.00	2,688,410.00
550528- Prof. services	200,000.00	50,000.00	-
550550- Other charges	12,370,000.00	9,520,000.00	9,517,712.00
5596-Swachhta Action Plan	200,000.00	200,000.00	111,570.00
Total (2401)	**43,250,000.00**	**29,918,000.00**	**26,819,105.00**
Major Head-4401			
119-Hort & Veg Crop			
16-Green Rev.-Kris. Yojn.			
01-MIDH-CIH			
160152- Mach. & Equipment	3,050,000.00	1,500,000.00	218,513.00
160153- Major Works	4,050,000.00	34,050,000.00	11,807,466.00
Total (4401)	**47,100,000.00**	**35,550,000.00**	**12,025,979.00**
Grand Total	**90,350,000.00**	**65,468,000.00**	**38,845,084.00**

9. List of Board of Management & Technical Advisory committee

9.1. Table 22: Members of Board of Management (BOM)

Sl. no	BOM Members	Details
1	Horticulture Commissioner, Department of Agriculture Cooperation & Farmers Welfare, Govt. of India, Krishi Bhawan, New Delhi	Chairman
2	Secretary/Director (Horticulture), Govt. of Arunachal Pradesh, Itanagar, Arunachal Pradesh	Member
3	Secretary/Director (Horticulture), Govt. of Assam, Guwahati, Assam	Member
4	Secretary/Director (Horti. & Soil Cons.), Govt. of Manipur, Imphal, Manipur	Member
5	Secretary/Director (Horticulture), Govt. of Meghalaya, Shillong, Meghalaya	Member
6	Secretary/Director (Horticulture), Govt. of Mizoram, Aizwal, Mizoram	Member
7	Secretary/Director (Horticulture), Govt. of Nagaland, Kohima, Nagaland	Member
8	Secretary/Director (Horticulture), Govt. of Sikkim, Gangtok, Sikkim	Member
9	Secretary/Director (Horticulture), Govt. of Tripura, Agartala	Member
10	Vice Chancellor/Director(Research), Assam Agriculture University, Jorhat, Assam	Member
11	Vice Chancellor/Director (Research), Central Agriculture University, Imphal, Manipur	Member
12	Prof. D.P. Ray, Ex-Vice Chancellor of OUAT, Bhubaneshwar, Orissa -Expert	Member
13	Sh. Diwakar Kachari, resident of Dimapur, Nagaland as a Farmer member	Member
14	Sh. Khiubangdibo, resident of Dimapur, Nagaland as a Farmer member	Member
15	Representative of North East Council, Nongrim Hills, Shillong, Meghalaya	Member
16	Director ICAR, Umroi Road, Umiam-793103, Meghalaya	Member
17	Managing Director, NABARD, Plot No-C24, G Block, Bandra Kurlar Complex, P.O.Box-8121, Bandra East, Mumbai	Member
18	Sh. Shiv Anjan Dalmia, Dalmia Greens, Meghalaya - Successful entrepreneur of NER	Member
19	Representative of M/s. Zopar Exports Pvt. Ltd. (North East Circle)	Member
20	Director, CIH, Medziphema, Dimapur, Nagaland	Member Secretary

9.2. Table23: Technical Advisory Committee (TAC)

Sl.No	Name	Details
1	Dr. S.D. Upadhyaya, Ex-Director Instruction, J.N. Agriculture University, Jabalpur, M.P	Chairman
2	Dr. R.C. Upadhyaya, Ex-Director, ICAR-NRC Orchids, Sikkim for guidance on fruit/vegetable crops	Member
3	Dr. Ramesh Mittal, Director, NIAM, Jaipur for guidance on market linkages in NE Region	Member
4	Dr. M. Tamil Selvan, Ex-Addl. Commissioner (Hort), DAC&FW for guidance on spice crops	Member
5	Dr. D.J. Rajkhowa, Joint Director, ICAR- Jharnapani, Nagaland for guidance on Integrated Farming systems	Member
6	Dr. A.K. Srivastav, Principal Scientist(Soil Science), NRC-Citrus, Nagpur for guidance on Soil Health	Member
7	Dr. Sunil Pareek, Head Department of Agriculture & Environment Sciences & Director (IQAC), National Institute of Food Technology Entrepreneurship & Management for guidance on Post Harvest Technology	Member
8	Dr. Anand Zambre, Executive Director, NCPAH for guidance on protected cultivation	Member
9	Director, Central Institute of Horticulture, Nagaland	Member Secretary

10. ANNUAL ACTION PLAN 2020-21

Table 24. ANNUAL ACTION PLAN 2020-21				
Sl.	**Components**	**Physical Targets**	**Approx. cost per unit (Rs. in lakh)**	**Final revised amount (Rs. In lakh)**
1	**SALARIES**			**1.00**
2	**WAGES** (Labour, Security persons & Contingent staffs)			**115.00**
3	**MEDICAL**			**0.50**
4	**DOMESTIC TRAVEL EXPENSES**			**1.00**
5	**OFFICE EXPENSES**			
	1) Office furniture			2.00
	2) Telephone bill & internet charges			0.50
	3) Electricity bill/ Gas/ Water			3.50
	4) Repair of motor vehicle and farm implements			1.00
	5) Purchase of rubber stamp			0.10
	6) Stationary			0.50
	7) Office equipment			0.50
	8) Computer & accessories			1.00
	9) Printing & binding jobs			0.50
	10) POL			3.00
	11) AMC			1.00
	12) Postage & Telegraph			0.20
	13) Purchase of staff car			4.00
	14) Misc./others (lightning arrester)			4.80
	Sub total			**22.60**
6	**RATE, RENT & TAXES**			**0.50**
7	**PUBLICATION**			
A	Annual Report	1 no. (300 copies)	**Annexure-I**	1.50
B	Folders	5 nos.	1.00	
C	Bulletin	1 no.	0.50	
D	Training manual/practical book	1 no.	1.00	
E	Procurement of books & journals		0.50	
F	Reprinting of folders		0.50	
	Sub total			**5.00**
8	**OTHER ADMINISTRATIVE EXPENSES**			
	A. Human Resource Development B. Seminar/Workshop/Conference/Meeting C. Post Harvest Management D. Marketing & Agri-Business Promotion			

8.A.	**HUMAN RESOURCE DEVELOPMENT**			
i	Farmers training (Online & offline mode)	40 nos.(50 trainees/ batch	0.50 **Annexure II**	20.00
ii	Training of extension functionaries/ officers (Online & offline mode)	02 nos. (40 trainees/batch	3.0 **Annexure II**	3.00
iii	Exposure visit cum training of farmers	02 nos.	2.50 **Annexure II**	5.00
iv	Capacity building of staffs (As per actual)			2.00
5	**Skill development trainings**			
A	Floriculturist-Protected Cultivation/ Gardener as per MIDH norms	02 nos.	2.00	4.00
B	Floriculturist-Protected Cultivation/ Gardener	02 nos.	Subject to availability of fund from RKVY	
	Sub total			**34.00**
8.B.	**SEMINAR/ WORKSHOP/ CONFERENCE/ MEETING**			
i	Technical Advisory Committee Meeting	1 no	1.50	1.50
ii	Board of Management Meeting	1 no	1.50	1.50
	Sub total			**3.00**
8.C.	**POST HARVEST MANAGEMENT**			
i	Protocol development and preparation of value added products by unemployed youths	10 trainings with 20 members per group	0.20	1.00
ii	Creating marketing linkage for the processed products	2 trainings with 20 members per group	0.20	0.40
iii	Strengthening of Minimal processing unit (Solar equipments, solar back up and other processing equipment)		6.50	6.50
iv	Creation of short promotional videos on success stories of PHM	2 nos.	0.50	1.00
v	Model training course on Post Harvest management of Horticultural Crops / other programmes of extension department	Subject to availability of fund for Extn. Dept.		
	Sub total			**8.90**
8.D.	**MARKETING & AGRI-BUSINESS PROMOTION**			
8.D.i	**Market linkage**			

a	Developing marketing channel for horti-culture crops (02 consignments to metro cities on promotional basis)	02 crops	1.00	2.00
b	Buyers & Sellers Meet cum Exhibition	1 no.	4.00	4.00
8.D.ii	**Market promotion**			
a	Infrastructure support for setting up of sales outlets of kiosks for horticultural crops in NE region and brand building support	As per CDB guidelines		3.00
b	Development of short video on success stories in market linkage	01 group	0.50	0.50
8.D.iii	**Entrepreneurship development**			
a	Entrepreneurship development pro-gramme (3 days)	1 no.	3.00	2.00
b	Training on agricultural marketing in NE states (3 days)	1 no.	Subject of avail-ability of fund from NIAM Jaipur	
	Sub total			**11.50**
	Sub total of OAE			**57.40**
9	**ADVERTISEMENT & PUBLICITY**			**2.00**
10	**MINOR WORKS**			
A	Repair and Renovation of Pump house building			4.00
B	Construction of low cost Visitor cum security hut (Near to pump house)	1	As per CPWD estimate	1.00
C	Maintenance of poly houses (replacement of plastic sheet/shade net& insect net)	5000 sq m		7.00
D	Installation of Pipeline for water distribution in Last block	1500 mt		3.00
E	RCC platform for citrus primary nursery (poly house no. 1 & 6)	10Nos (31m x1m x 2ft)	As per CPWD estimate	3.00
F	Replacement of shade net no. 11	1 No (500 sq m)	1.00	1.00
G	Furnishing materials for newly construct-ed Farmers Hostel (Bed, table, chair, Sofa for lobby, almirah etc) & Mess Hall			4.50
H	Construction of Shade net for Nursery unit as per MIDH norms	1 no (500 sqm)	As per CPWD estimate	4.80
I	AMC for electrical maintenance			2.00
J	Terracing work near to pump house			8.00
K	Setting up of Integrated Pack house with facilities of conveyor belt, sorting, grading units, washing, drying & weighing (As per MIDH guidelines)	1 unit (size =9M x 18M)		46.00

L	Up gradation of existing water harvesting structure (soil filling & Geo membrane sheet lining)			2.00
M	Installation of 5KVA solar power backup in bamboo guest house			5.00
N	Repairing and renovation of Fan & Pad system in poly house 6 and 7	2 unit	2.5	5.00
	Sub total			**96.30**
11	**PROFESSIONAL SERVICES**			
	A. Consultancy fees as per actual B. Professional fees as per actual C. Invigilator fees as per actual D. Legal fees as per actual			**2.00**
12	**OTHER CHARGES**			
	A. Demonstration of production technologies i. Management of existing demonstrations in the institute ii. Demonstration of improved technologies in the institute iii. Demonstration of improved technologies in NE states B. Production of quality planting material C. Accreditation of horticultural nurseries in NE Region D. Certificate course E. Exhibition/ trade fairs/ meets/ mela F. Farm development & beautification G. Contractual staff remuneration			
12.A	**DEMONSTRATION OF PRODUCTION TECHNOLOGIES**			
i	**Management of existing demonstrations in the institute**			
a	Production & maintenance of organic vermicompost	9 units		0.40
b	Production & maintenance of existing bee colonies	3 colonies	0.10	0.10
c	Production & maintenance of mushroom unit	2 unit	0.50	0.50
d	Green manuring in fruit blocks	05ha.		0.25
e	FYM for farm &polyhouses	20 truck load		1.00
f	Purchase of Fertilizer & chemicals (for farm)	GEM	1.50	1.50
g	Purchase of Fertilizers, manures, chemicals (for poly houses) - 10 nos. (1000sm) & 04nos.(100sqm)	GEM	**Annexure III**	1.00
h	Construction of hybrid net house (Bamboo based)	500sqm		2.00
i	Maintenance of sweet potato plot	500sqm		
j	Introduction of bee colonies	30 colonies	0.5	0.50
	Sub total			**7.25**
ii	**Demonstration of improved technologies in the institute**			

a	Establishment of Khasi Mandarin Mother block	0.5 ha E_6 block	0.30	0.30
b	Establishment of Acid Lime block	0.5 ha E_5 block	0.30	0.30
c	Establishment of Banana (TC) block	0.25 ha E_5 block	0.50	0.50
d	Plantation of Pineapple on sloppy land and along the road side of last block var Kew including poly mulch	0.5 ha D block	0.40	0.40
e	Establishment of Papaya (var. Red Lady),Guava (var. CISH Improved), Bael (var CISH Improved)	E 6 block 0.5 ha	0.50	0.50
f	Gap filling of Custard apple var. Arka Sahan, Balanagar, Sapota var. Cricket ball, Avocado var. Pinkerton , etc	E_3 block	0.50	0.50
g	Establishment of strawberry block including mulching var. Camarosa etc.		0.80	0.80
h	Performance of high value vegetables under protected cultivation (tomato & sweet pepper, Cucumber & Musk melon) -Seed F1hybrid	1500 sqm	**Annexure-IV**	0.30
i	Gap filling Flowers-Anthurium (Tissue culture plants)	800 nos.		1.00
j	Gap filling of existing crops-Gerbera (area-100sqm) - Tissues culture plants	2000nos.		1.00
k	Bitter gourd (Seed F1hybrid)	200gms seed		0.05
l	Musk melon (Seed F1hybrid)	100gms		0.05
m	Geo Mapping of CIH farm	40 ha		
n	Low cost hydroponics	2 units	1.00	1.00
o	Demonstration on Improved production technology with special emphasis on INM in brinjal, , cauliflower, Chinese cabbage (bokchoy), knol-khol & carrot (ICAR, Barapani& AAU, Jorhat)	0.3ha	**Annexure V**	0.50
p	Demonstration of improved production technology of okra, yard long bean, French bean, bottle gourd, cabbage, broccoli	0.2 ha	**Annexure V**	0.25
q	Demonstration on plantation of Papaya (Spacing 1.8x1.8m)- Tissue culture Plant	1 ha	**Annexure-VI**	0.25
r	Establishment of Durian fruit block	0.5 ha		0.50
s	Establishment of medicinal crops cafeteria			0.50
t	Demonstration on cultivation of Bird of Paradise and Red Ginger flower			0.50
	Sub total			**9.20**
iii	**Demonstration of improved technologies in NE states**			
a	Demonstration on plantation of Passion fruit (Spacing 4x4m)	1ha	**Annexure-VI**	0.50

b	Demonstration on high density plantation of guava (3x3m)	1 ha	**Annex-ure-VI**	0.50
c	Demonstration on plantation of lemon/ lime (3x3m)	1 ha	**Annex-ure-VI**	0.50
d	Demonstration on vegetable production technology in 15 locations by distribution of vegetable kits	60 farmers	0.25	0.25
	Sub total			**1.75**
12.B	**PRODUCTION OF QUALITY PLANTING MATERIAL**			
	a) Mass multiplication of quality planting material			
	i) Asexually propagated plants (Cashew 20000, citrus 10000, Assam Lemon 20000, Acid Lime 30000, Mango 10000, Guava 10000)	150000.nos	**Annex-ure-VII**	2.50
	ii) Production of potted plants/ vegetable seedlings	10000 nos	0.20	0.20
	iii) Production of ornamental potted plants	5000	0.20	0.20
	Sub total			**2.90**
12.C	**ACCREDITATION OF HORTICULTURAL NURSERIES IN NER**			
i	Accreditation & certification of horticultural nurseries in North East Region	15 nos.	0.64	**9.60**
12.D	**CERTIFICATE COURSE**			
i	Certificate course on post harvest Management and Value addition of Horticultural crops (3 months Duration)	1 no.	5.00	**5.00**
12.E	**EXHIBITION/ TRADE FAIRS/ MEETS/ MELA**			
i	National/ State level exhibitions (To organize/participate)	2 nos.	2.00	4.00
ii	District level promotional event	1 nos.	2.00	2.00
	Sub total			**6.00**
12.F	**FARM DEVELOPMENT & BEAUTIFICATION**			
	Landscaping i). Annual, seasonal, ornamental plants ii). Turf grass iii). Popup irrigation system in old. iv). Maintenance of land scape area	3500sqm. 18000sqft (Old lawn area and along with road)	2.00	2.00
	Sub total			**2.00**
12.G	**CONTRACTUAL STAFF REMUNERATION**			**80.00**
	Sub total of OC			**123.70**
13	**SWACHHTA ACTION PLAN**			**2.00**
	Sub total of Revenue			**429.00**

14	**MAJOR HEAD**			
1	**Machinery & Equipment**			
a	Farm tools & implements		**Annex-ure-VIII**	15.00
b	Mono block 15 hp motor for reservoir	1 no	0.50	0.50
c	Motor Vehicle			15.00
	Sub total			**30.50**
2	**Major works**			
a	Residential quarter building i. Type V - 1 no. ii. Type II - 4 nos.			150.00
b	Boundary wall	2.6KM		100.00
c	Farmers hostel			190.50
	Sub total			**440.50**
	Sub total of Major Head			**471.00**
	GRAND TOTAL			**900.00**

CENTRAL INSTITUTE OF HORTICULTURE

Department of Agriculture, & Farmers Welfare
Ministry of Agriculture & Farmers Welfare
Government of India, Medziphema, Dimapur, Nagaland

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