सत्यमेव जयते

वार्षिक प्रतिवेदन

ANNUAL REPORT
(2021-22)

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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Government of India
Ministry of Agriculture & Farmers Welfare
Department of Agriculture, Cooperation
& Farmers Welfare

Message

I am happy that the Central lnstilute of Horticulture (ClH), Medziphema,Nagaland, has created a momentum in the field of horticulture, imparting trainings of transfer of modern technologies to the rural mass, production and supply of quality planting material, setting up demonstration farms in different areas of North East region so as to change the attitude of the farming community by seeing and believing. The lnstitute has also actively coordinated with different organization for promoting organic farming in the region. The nursery certafication and accreditation programme, certificate course and skill development course, agri-business promotions and marketing initiatives taken by the lnstitute in collaboration with various organizations is commendable. Such a venture has not only exposed and encouraged the growers to compete with the farmers of other States but also made realization about the quality of their produce.

It gives me immense pleasure that CIH is bringing out its Annual Report 2021-22 highlighting achievements made. The Director with his team has been appreciably putting all effort in achieving the objectives of the lnstitute. I commend the Director and CIH team for their sincere effort in providing technical support for improving the horticulture sector this region.

I wish the lnstitute all success in its future endeavour.

(DR. ABHILAKSH LIKHI)

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Dr. Prabhat Kumar
बागवानी आयुक्त
Horticulture Commissioner

सत्यमेव जयते

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Foreword

I am delighted to know that the Central Institute of Horticulture is bringing out its Annual Report for the year 2021-2022. The report reflects the achievements made by the Institute. I am pleased that CIH is not only focusing on developing technologies to increase production of various horticultural-commodities but also working intensely for skill development with the farming community.

North east region despite its enormous potential for horticulture development, the growers/ entrepreneurs are still not getting the right technology to achieve desire levels of production and productivity as well as handling of produce. In addition, provision for good quality planting material for quality produce needs attention as the region has a good scope of growing almost all horticultural crops. Lack of proper post harvest management practices and infrastructure, proper market linkage for produce has always been a constraint. The institute has taken various initiatives for effective technology transfer, imparting training to the growers and officials in the NE region. Awareness on organic farming and certification through setting up of demonstration farms, market linkage initiatives through exhibitions and meets, are some of the significant achievements worth mentioning.

I am sure the effort put in by the entire team of CIH will go a long way in improving horticulture scenario in the region. I take this opportunity to extend my best wishes to the employees of CIH and do hope that the Annual Report 2021-22 will be useful to all stakeholders and patrons.

(Dr. Prabath Kumar)
Horticulture Commissioner

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Preface

Central Institute of Horticulture is bringing out its 14th Annual Report highlighting its achievements made during the year 2021-2022. The institute focusing on its objectives has carried out various programmes during the year. Various farm activities such as cultivation of organic turmeric, demonstration of oyster mushroom production, cultivation of fruits and vegetables, cultivation of onion and cole crops, intercropping of Dragon fruit in papaya block, cultivation of strawberry, gladiolus, statice etc were carried out at CIH. In the field of human resource development, the institute has organized farmer's training and training for trainers in identified areas of horticulture in the region. Extension bulletins and folders with special reference to focus horticultural crops of NER were also published by the institute for technology dissemination.

CIH has been authorized as the nodal agency for providing accreditation and certification of nurseries in the region in order to facilitate production of quality, disease free planting material by nurseries for horticulture crops. The aim is to establish a network of quality nurseries across the country for the purpose of propagation and distribution of quality planting material in the region. In this regard, 3 nurseries have been accredited during the year 2021-22 in NE Region.

The three months certificate course on Post harvest Management and value addition has also been conducted to provide self employment and entrepreneurship in focused courses. The Institute has also taken several initiatives in creating market linkage and promoting the produce of the region by organizing workshops/seminars, buyers and sellers meet which provides a platform to the farmers to understand the issues related to production and marketing of horticulture crops.

These few achievements made by the Institute had been possible by the sincere hard work and tireless effort of the entire staff of CIH. The Institute also extends its profound gratitude and acknowledgement to the State Horticulture Departments of North East Region, various organizations and institutes for their constant support and cooperation.

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

कार्यकारी सारांश

केंद्रीय बागवानी संस्थान, नागालैंड कार्यक्रमों के तहत अपनी विभिन्न विकास गतिविधियों को अंजाम देता है जैसे प्रशिक्षकों और किसान लाभार्थियों के प्रशिक्षण द्वारा क्षमता निर्माण, उन्नत उत्पादन प्रौद्योगिकियों का प्रदर्शन, गुणवत्तापूर्ण रोपण सामग्री का उत्पादन और आपूर्ति, पूर्वोत्तर क्षेत्र में नर्सरी का प्रत्यायन और प्रमाणन, बागवानी में कौशल विकास और प्रमाणपत्र पाठ्यक्रम, बागवानी फसलों की जैविक खेती को बढ़ावा देना, बागवानी फसलों का कृषि-व्यवसाय संवर्धन और कटाई के बाद प्रबंधन, विधि और परिणाम प्रदर्शन के माध्यम से प्रौद्योगिकी का हस्तांतरण, फ़ोल्डरों, मैनुअल, पत्रक आदि का प्रकाशन और उत्तर पूर्व राज्यों के बागवानी विभागों और अन्य राष्ट्रीय संगठनों, गैर सरकारी संगठनों, किसानों के समूह और स्वयं के साथ समन्वय स्थापित करना इत्यादि शामिल है।

रिपोर्ट किए गए वर्ष के दौरान विभिन्न कार्यक्रमों के तहत संस्थान द्वारा की गई विकास गतिविधियों की कुछ महत्वपूर्ण उपलब्धियों को वार्षिक रिपोर्ट (2021 - 22) में नीचे संक्षेप में बताया गया है।

खेत विकास

- संस्थान ने विभिन्न फल फसलों, वृक्ष मसालों, सब्जियों और कंद फसलों के लिए 25 हेक्टेयर क्षेत्र पहले ही स्थापित कर लिया है। काजू, साइट्रस, आम, अनार, किन्नू मंदारिन, असम नींबू ,खासी मंदारिन, अमरूद, अनानास, लीची, आंवला, आड़ू, बेल, एवोकैडो, ड्रैगन फ्रूट, कैरम्बोला, सपोटा, बेर, कस्टर्ड सेब, ख़ुरमा फसलों के मदर ब्लॉक्स को बनाया गया है।
- संरक्षित खेती के तहत, रिपोर्ट किए गए वर्ष के दौरान सजावटी फसलों जैसे जरबेरा, एन्थ्यूरियम और उच्च मूल्य वाली सब्जियां शिमला मिर्च, खीरा, टमाटर आदि का प्रदर्शन किया गया है।
- 2000 वर्गमीटर क्षेत्र के पॉली हाउस के तहत वायरस मुक्त साइट्रस (खासी संतरा और नागपुर संतरा) मदर ब्लॉक का भी रखरखाव किया जा रहा है।

गुणवत्तापूर्ण रोपण सामग्री का उत्पादन

- 2021-22 के दौरान, संस्थान द्वारा उगाए गए रूट स्टॉक पौधो में 12050 अमरूद (स्थानीय), साइट्रस (रफ नींबू- 18450 और रंगपुर नींबू- 26550), काजू (स्थानीय) -4900 और आम (स्थानीय) -2500 नग शामिल हैं।

- रिपोर्ट किए गए वर्ष के दौरान संस्थान ने 17450 सिट्रस किस्म का प्रवर्धन किया। (खासी संतरा, मोसम्बी और नीबू), 1150 नग काजू, (वी-4, वीआरआई-3, एच-1608, एच-2/16 और बीबीएसआर-1), 2250 नग अमरूद । (एल-49, इलाहाबाद सफेदा, श्वेता और ललित), 3500 ड्रैगन फ्रूट कटिंग (cv. वियतनाम लाल और सफेद पौधे) और 850 नग लीची (सी.वी. चीन) इत्यादि ।

मानव संसाधन विकास

- वर्ष 2021-22 के दौरान, सीआईएच ने 28 प्रशिक्षण कार्यक्रम आयोजित किए, जिनमें से 7 प्रशिक्षण ऑनलाइन प्लेटफॉर्म के माध्यम से आयोजित किए गए, जिसमें सभी पूर्वोत्तर राज्यों के किसानों, उद्यमियों, वैज्ञानिकों, विस्तार कार्यकर्ताओं, विद्वानों और बागवानी अधिकारियों सहित कुल 1239 प्रतिभागी शामिल हुए। विभिन्न आई.सी.ए.आर. संस्थानों और इसके केंद्रों और भारत भर के एस.ए.यू. के विशेषज्ञों को संसाधन व्यक्तियों के रूप में आमंत्रित किया गया था।

प्रशिक्षण कार्यक्रमों का समर्थन करने के लिए खेतों में और बाहर प्रदर्शन और गतिविधियाँ।

- वर्ष 2021-22 के दौरान, विभिन्न सब्जियों, जड़ वाली फसलों और भिंडी , लोबिया, लौकी, भारतीय बीन डोलिचोस. जैसी विभिन्न सब्जियों, जड़ फसलों और मसालों की फसलों के प्रदर्शन का आकलन करने के उद्देश्य से विभिन्न प्रौद्योगिकी प्रदर्शन किए गए। पत्ता गोभी, ब्रोकली, गांठ गोभी, प्याज, अदरक और हल्दी सीप मशरूम की खेती और वर्मी कम्पोस्ट पर भी प्रदर्शन किया गया।

- कम लागत वाली वर्मी कम्पोस्ट इकाई का उत्पादन और रखरखाव ।
- खुले मैदान में स्ट्रॉबेरी की खेती।
- शिमला मिर्च, टमाटर और खीरा जैसी उच्च मूल्य वाली सब्जियों की संरक्षित खेती।
- संस्थान ने कृषि महाविद्यालय त्रिपुरा, लेम्बुचेरा के सहयोग से 3 X 3 मीटर की दूरी पर खेत में प्रदर्शन किया। प्रदर्शन में लगभग 0.5 हेक्टेयर क्षेत्र के कुल क्षेत्र को कवर किया। प्रदर्शन कार्यक्रम दो अलग-अलग स्थानों पर आयोजित किया गया था. जिनमें से प्रत्येक में 0.5 हेक्टेयर था, अर्थात बामुटिया, मोहनपुर, पश्चिम त्रिपुरा और कैट, लेम्बुचेरा।
- संस्थान ने नागालैंड के पेरेन जिले के अंतर्गत पुंगलवा बी गांव में 0.5 हेक्टेयर के लिए एकीकृत बागवानी मॉडल पर एक ऑफ-फार्म प्रदर्शन भी किया है। कार्यक्रम का उद्देश्य प्रति इकाई क्षेत्र में उत्पादकता बढ़ाना, लाभप्रदता, आजीविका में सुधार और टिकाऊ खेती करना है।

नर्सरी का प्रत्यायन और प्रमाणन

- 2021-2022 की अवधि के दौरान, उत्तर पूर्व क्षेत्र की कुल 3 नर्सरी का मूल्यांकन, किया जिसमें नए आवेदन और नवीनीकरण आवेदन दोनों शामिल हैं ।

प्रकाशन

- वार्षिक रिपोर्ट 2020-21 का प्रकाशन ।
- कद्दू वर्गीय सब्जियों की उन्नत उत्पादन तकनीक पर तकनीकी बुलेटिन
- बागवानी फसलों के विपणन और मूल्य श्रृंखला विकास पर प्रशिक्षण मैनुअल
- पूर्वोत्तर क्षेत्र के विशेष संदर्भ के साथ संतरा नारंगी और मीठे नारंगी में प्रचार तकनीक पर एक्सटेंशन फ़ोल्डर।

कृषि-व्यवसाय को बढ़ावा

- फॉरवर्ड मार्केट लिंकेज को सुविधाजनक बनाने के उद्देश्य से, संस्थान ने मोलसांग ऑर्गेनिक पाइनएप्पल प्रोड्यूसर्स कंपनी लिमिटेड, नागालैंड और सत्सुमी फार्म एलएलपी, नई दिल्ली के बीच 11 नवंबर 2021 को सीआईएच, मेडजिफेमा, नागालैंड में ताजे जैविक अनानास की आपूर्ति के लिए एक समझौता ज्ञापन पर हस्ताक्षर करने में मध्यस्थता की।

- वर्ष 2021-22 के दौरान,03 नग. एफपीसी,एफपीओ,उद्यमियों के लिए विपणन और व्यवसाय विकास पर जागरूकता कार्यक्रम आयोजित किए गए। कार्यक्रम का उद्देश्य बेहतर लाभप्रदता के लिए अपने बागवानी व्यवसाय के प्रबंधन पर एक समझ प्रदान करना है।

- नीटहब जोरहाट के सहयोग से 66 प्रतिभागियों के साथ 11 अगस्त 2021 को पूर्वोत्तर क्षेत्र में कृषि-स्टार्टअप के अवसरों पर एक ऑनलाइन प्रशिक्षण आयोजित किया गया।

- संस्थान ने किसानों को 28 सितंबर 2021 को अनानास और 9 नवंबर 2021 को कीवी के बाजार प्रचार में सुविधा प्रदान की। कार्यक्रम का उद्देश्य किसानों को फॉरवर्ड मार्केट लिंकेज पर प्रशिक्षित करना और उनकी मूल्य श्रृंखला का मानकीकरण करना है।

- केंद्रीय बागवानी संस्थान, नागालैंड ने 11 नवंबर 2021 को मेद्जीफेमा में अपने परिसर में हॉर्टि - एक्सपो का आयोजन किया।

- केंद्रीय बागवानी संस्थान, नागालैंड ने राष्ट्रीय प्रौद्योगिकी संस्थान, सिलचर, असम में 16 से 18 नवंबर, 2021 तक पूर्वोत्तर हरित शिखर सम्मेलन 2021 के छठे संस्करण के दौरान प्रदर्शनी में भाग लिया।

- संस्थान ने ऑनलाइन और ऑफलाइन दोनों माध्यमों से 11 नवंबर 2022 को मधुमक्खी पालक शिखर सम्मेलन का आयोजन किया। कार्यक्रम का औपचारिक उद्घाटन श्री नरेंद्र सिंह तोमर, माननीय केंद्रीय कृषि और किसान कल्याण मंत्री ने वस्तुतः किया।

- एफपीओ के लिए बिजनेस प्लानिंग पर उन्नत कार्यक्रम पर बर्ड लखनऊ द्वारा 05 दिनों के प्रशिक्षण कार्यक्रम में 27 सितंबर से 01 अक्टूबर 2021 तक भाग लिया।

- 28 और 29 अक्टूबर 2021 को ई प्रोक्योरमेंट और ई. टेंडरिंग पर एन.पी.सी., नई दिल्ली द्वारा 02 दिवसीय प्रशिक्षण कार्यक्रम में भाग लिया।

फसलोत्तर प्रबंधन और बागवानी फसलों का मूल्यवर्धन

- संस्थान में विभिन्न उत्पादों का विकास किया गया है और इच्छुक किसानों और ग्रामीण युवाओं क ऐसे उत्पादों के प्रसंस्करण के लिए प्रशिक्षण दिया गया है।

- पूर्वोत्तर क्षेत्र के स्थानीय रूप से उपलब्ध और कम उपयोग वाले फलों और सब्जियों के मूल्यवर्धन के लिए 15 प्रोटोकॉल विकसित किए गए हैं।

- सीआईएच के प्रशिक्षुओं द्वारा निर्मित स्थानीय रूप से उपलब्ध कम उपयोग किए गए फलों से तैयार 07 विभिन्न प्रकार के किण्वित फल पेय और कैंडी का शुभारंभ किया गया ।

- सीआईएच में पीएचएम पर प्रशिक्षण और प्रमाणपत्र पाठ्यक्रम लेने के बाद खाद्य प्रसंस्करण और मूल्यवर्धन में कुल 4 स्टार्टअप शुरू हो गए हैं।

सर्टिफिकेट कोर्स

- 13 प्रशिक्षुओं के साथ बागवानी फसलों की कटाई के बाद प्रबंधन पर आयोजित तीन महीने का सर्टिफिकेट कोर्स आयोजित किया।

संस्थान के कार्यक्रम, एन.ई.आर. के राज्य बागवानी विभाग और आईसीएआर, एस.ए.यू., सी.ए.यू. और के.वी.के. के विशेषज्ञों के सहयोग से चलाए जा रहे हैं। मैं प्रबंधन बोर्ड (बी.ओ.एम., समिति और तकनीकी सलाहकार समिति) के सदस्यों के सभी कार्यक्रमों में उनके बहुमूल्य मार्गदर्शन के लिए अपनी हार्दिक कृतज्ञता व्यक्त करता हूं।

संस्थान , बागवानी आयुक्त (डी ए और एफडब्ल्यू, कृषि) कृषि एंव किसान कल्याण मंत्रालय, भारत सरकार के अधिकारियों को उनके निरंतर समर्थन, मार्गदर्शन और सहयोग के लिए अपना गहरा आभार व्यक्त करता हूं। मैं सीआईएच के कर्मचारियों को कार्यक्रमों के लक्ष्यों को संबोधित करने और उन्हें लागू करने और प्राप्त करने के लिए अपने ईमानदार प्रयासों के लिए भी धन्यवाद देता हूं।

डॉ. नवीन कुमार पटले
अतिरिक्त आयुक्त (उद्यान) डी. ए. एवं एफडब्ल्यू
कृषि एवं किसान कल्याण मंत्रालय, निदेशक इन्चार्ज,
सी. आई. एच

Executive Summary

Central Institute of Horticulture, Nagaland carried out its various development activities under the programmes, viz. Capacity building by training of trainers and farmers/beneficiaries, Demonstration of improved production technologies, Production and supply of quality planting material, Accreditation and certification of nurseries in NE region, Skill development & certificate courses in horticulture, Promotion of organic cultivation of horticulture crops, Agri-business promotion & Post-harvest management of horticultural crops, Transfer of technology through method & result demonstration, Publication of folders, manuals, leaflets etc and Coordination with state horticulture departments of NER and other National organizations, NGOs, farmers' group and self-help groups.

Some significant achievements of the developmental activities undertaken by the Institute under various programmes have been highlighted in the Annual Report (2021-22) as summarized below.

➢ **Farm development**

- The Institute has already established 25 ha area for different fruit crops, tree spices, vegetables and tuber crops. 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 have been established in the farm.
- Under protected cultivation, ornamental crops such as gerbera, anthurium and high value vegetables (capsicum, cucumber, tomato etc) have been demonstrated during the reported year 2021-22.
- Virus free citrus (Khasi Mandarin & Nagpur Mandarin) mother block is also being maintained under poly house of 2000 sqm area.

➢ **Production of quality planting material**

- During 2021-22, Root stock seedlings raised by the Institute consists of 12050 Guava (Local), citrus (Rough lemon- 18450 & Rangpur lime- 26550, Cashew (Local)-4900 and Mango (local)-2500 nos,
- The Institute propagated 17450 nos of citrus var. Khasi Mandarin, Mosambi and Acid lime, 1150 nos of cashew nut in varieties V-4, VRI-3, H-1608, H-2/16 and BBSR-1, 2250 nos of in guava var. L-49, Allahabad Safeda, Shweta and Lalit, 3500 nos of Dragon fruit cuttings cv. Vietnam Red & White plants and 850 nos. of Litchi cv. China during the year 2021-22.

➢ **Human resource development**

- During the year 2021-22, CIH organized 28 training programmes out of which 7 trainings was conducted through online platform making a total of 1239 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 were invited as resource persons.

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

- During the year 2021-22, various technology demonstrations were carried out with an objective to assess the performance of the different vegetables, root crops and spices crops such as okra (Ladies finger), cowpea, bottle gourd, Indian bean (Dolichos), cabbage, broccoli, knol khol, onion, ginger and turmeric. Demonstration on oyster mushroom cultivation and vermicompost was also carried out.
- Production and maintenance of low cost vermicompost unit
- Cultivation of strawberry in open field.
- Protected cultivation of high value vegetables such as capsicum, tomato and cucumber.
- The Institute in collaboration with College of Agriculture Tripura, Lembucherra conducted off farm demonstration of guava at a spacing of 3x3m. The demonstration covered a total area of about 0.5 ha area. The demonstration programme was conducted at two different locations covering 0.5 ha each; viz Bamutia, Mohanpur, West Tripura and CAT, Lembucherra.
- The Institute has also undertaken an off-farm demonstration on Integrated Horticulture Model for 0.5ha in Punglwa B village under Peren district of Nagaland. The object of the programme aims at enhancing productivity per unit area, profitability, livelihood improvement and sustainable farming.

➢ **Accreditation and certification of nurseries**

- During the period of 2021-2022, a total of 3 nurseries were assessed/monitored which includes both fresh application and renewal applications,
- 3 nurseries were accredited and certification were done with a rating **2 Star** to 2 nurseries and with a **1 Star** rating to remaining 1 nursery.

➢ **Publication**

- Annual Report 2020-21
- Technical bulletin on "Improved production technology of cucurbitaceous vegetables"
- Training manual on "Marketing & Value Chain Development of Horticulture Crops"
- Extension folder on "Propagation techniques in Mandarin orange and Sweet orange with special reference to NE Region".

➢ **Agri-business promotion**

- With the objective to facilitate in forward market linkage, the Institute mediated in signing an MOU between Molsang Organic Pineapple Producers Company Ltd., Nagaland & Satsumi Farm LLP, New Delhi on 11th November 2021 at CIH, Medziphema, Nagaland for supply of fresh organic pineapples from Nagaland to New Delhi.
- During the year 2021-22, 03 nos. of awareness programme on marketing and business development were organized for FPCs/ FPOs/ Entrepreneurs. The objective of the programme was to provide an understanding on managing their horticulture business for better profitability.
- An online training on Opportunities for Agri-Startups in NE region was organized in collaboration with NEATEHUB, AAU, Jorhat on 11th August 2021 with 66 participants.

- The Institute facilitated the farmers in market promotion of Pineapple on 28th Sept 2021 and Kiwi on 9th Nov 2021. The objective of the programme is to train the farmers on forward market linkage and standardizing their value chain.
- Central Institute of Horticulture, Nagaland organized Horti Expo on 11th November 2021 at its campus in Medziphema.
- Central Institute of Horticulture, Nagaland participated in the Exhibition during the Sixth Edition of Northeast Green Summit 2021 from 16-18 November, 2021 at National Institute of Technology, Silchar, Assam.
- The Institute organized Beekeepers Summit on 11th November 2022 through both online and offline mode. The programme was formally inaugurated by Shri Narendra Singh Tomar, Hon'ble Union Minister of Agriculture & Farmers Welfare virtually.
- Participation in 05 days training programme by BIRD Lucknow on Advanced program on Business Planning for FPOs w.e.f. 27th Sept to 01st Oct 2021.
- Participated in 02 days training programme by NPC, New Delhi on E Procurement & E Tendering on 28th& 29th Oct 2021.

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

➢ 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.

➢ 15 nos of protocols have been developed for value addition of locally available and underutilized fruits and vegetables of NE Region.

➢ Launched 07 different types of fermented fruit beverages and candy prepared from locally available underutilized fruits manufactured by trainees of CIH.

➢ A total of 4 nos of start ups in food processing and value addition have started after taking training and certificate course on PHM at CIH.

➢ **Certificate course**

- Three months certificate course was organized on "Post-harvest Management of Horticultural Crops" with 13 trainees.

The programmes 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.

The Institute also extends its profound gratitude and acknowledgement to the Horticulture Commissioner and officials at DA & FW, Ministry of Agriculture & Farmers Welfare, Government of India, for their constant support, guidance and cooperation. I also acknowledge the staff of CIH for putting their sincere efforts to address and implementing and achieving the targets of the programmes.

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

1. About the Institute

Recognizing the great potential for horticulture 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 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 at Medziphema.

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.

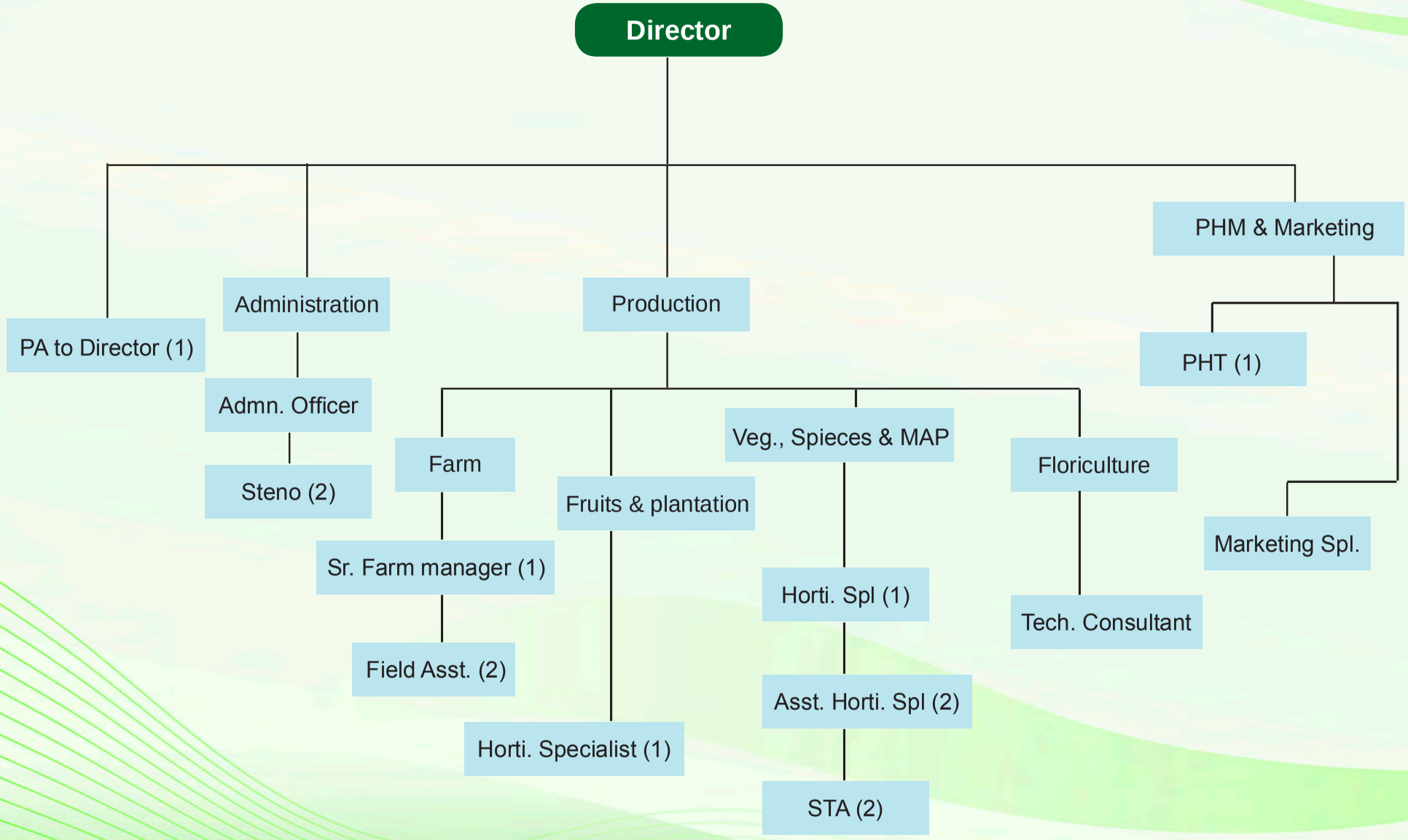
MANDATE OF THE CENTRAL INSTITUTE OF HORTICULTURE:

- 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

Horticulture in north east is known for its vast resources and its varied climate, altitude, edaphic condition offers immense scope to enrich biodiversity in the region and social diversification. Horticulture in North East is a significant and upcoming sector in India and has proved to be the best diversification option for agriculture land use, because of assured and remunerative returns to the farmers. Horticulture provides higher unit of productivity and offers great scope for value addition and this sector is taking inroads throughout the length and breadth of the region as this region has rich diversity of both indigenous and introduced horticultural crops.

In NEH region farming being the main stay of the people, development of horticulture will markedly improve the economy of the people. Establishment of orchards and planting of plantation crops on hill slopes will prevent soil erosion which may solve the problem of shifting cultivation and out migration of people to towns. The diverse agro-climatic condition has benefitted this region to grow horticulture crops ranging from tropical to temperate crops. The Region is also considered to be the richest reservoir of genetic variability of large number of horticultural and plantation crops. The enormous diversity makes the region a gene pool for the varietal improvement but in spite of potentiality no worth mentioning development in the field of horticulture has taken place. It may be mentioned that in hill area particularly horticultural crop cultivation as an alternative to jhuming may prove to be a boon in the regional economy.

During the last two decades, there has also been a significant sensitization of the global community towards organic cultivation during the year 2020-21 (Horticulture statistics report) for environmental preservation and assuring of food quality. In North East region, the production of fruits accounts to 4434.01 MT, Vegetables 5406.8 MT, Cut Flowers 4962.98 MT, Loose flowers 205.04 MT, Aromatic crops 109.89 MT, Spices 627.62MTand Plantation crops 227.45 MT. Therefore, the North East Region has a great scope for the enhancement of production and productivity under horticulture industry due to conducive climatic condition thus, improving the socio economy of the farmers of North East Region of India.

The area and production of major horticultural crops of the Region are depicted in Table 1.

Table 1: AREA AND PRODUCTION OF HORTICULTURE CROPS CATEGORY WISE 2021-22 (Second Advance estimate)

Area in '000 ha

Production in '000 MT

Sl. No.	Sates/ UTs	Fruits		Vegetables		Plantation		Aromatics & Medici-nal		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	17.42	2.67	11.76	0.24	0.16	0.00	0.00	0.00	12.39	37.69	0.15	66.06	193.03
2	Assam	159.98	2504.19	302.68	3669.47	89.24	159.72	4.62	0.18	5.31	35.58	57.80	100.49	310.51	1.40	662.31	6738.85
3	Manipur	41.62	463.86	32.90	339.81	0.90	0.32	0.04	0.12	0.07	0.01	0.17	9.05	58.90	0.40	84.58	863.58
4	Meghalaya	37.38	378.16	49.61	520.16	27.00	33.98	0.00	0.00	12.47	0.00	0.36	14.24	71.67	0.27	140.69	1004.60
5	Mizoram	66.22	345.36	40.67	224.61	14.15	14.20	0.77	0.78	0.08	0.00	0.80	27.75	101.38	0.30	149.63	687.43
6	Nagaland	33.90	313.39	41.11	454.26	3.35	8.60	0.22	1.71	0.05	0.00	0.22	10.65	43.26	0.72	89.27	822.16
7	Sikkim	20.16	50.77	21.05	124.20	0.00	0.00	0.00	0.00	0.24	16.50	0.09	42.44	102.94	0.53	83.89	295.02
8	Tripura	55.64	569.49	48.11	1054.62	15.28	36.82	0.00	0.00	0.00	0.00	0.00	6.74	28.56	0.22	125.77	1689.72

Source: DAC & FW, Ministry of Agriculture and Farmers welfare, Govt. of India, 2021-22 (Second Advance estimate)

3. Achievements

3.0.1. PRODUCTION AND DISTRIBUTION OF QUALITY PLANTING MATERIAL

3.1.1. Establishment of scion/mother block under field condition

The Institute has already established 25 nos. of mother blocks of Cashew, Citrus, Mango, Pomegranate, Kinnow Mandarin, Assam Lemon, Khasi Mandarin, Guava, Pineapple, Litchi, Aonla, Peach, Bael, Strawberry, Avocado, Dragon fruit, Carambola, Sapota, Ber, Custard apple, Persimmon, Acid lime, Plum, Pear blocks in the farm and Citrus scion mother blocks is also maintained under poly house 2000 sqm area. Availability of good planting material being very important for horticulture development and one of the key mandates of CIH is production of quality planting material.

Table 2. Details of establishment of fruit crops under field condition

Activity	Crops	Achievements (Nos.)
❖ Maintenance of scion mother blocks	Khasi Mandarin, Guava, Cashew nut, Mango, Dragon fruit, Assam Lemon, Kinnow Mandarin, Litchi, Fig, Custard Apple, Sapota, Avocado, Ber, Star fruit, Loquat, Beal, Peach, Aonla, Pear, Jamun, Plum, Acid lime, Citrus Rootstock etc.	❖ 25 crops

3.1.2. Raising of rootstocks

The supply of good planting material is very vital for the development of good nursery management practices which include methods of propagation. As such, the Institute has been raising rootstock for crops such as citrus, cashew nut, mango & guava for further multiplication. The rootstock that has been raised by the Institute during the period 2021-22 in the following crops is mentioned below:

Table 3. Rootstock of fruit crops

Sl. No.	Crop	Rootstock raised	Source
1.	Guava (Local)	12050	Local
2.	Citrus (Rangpur lime)	26550	Meghalaya
3.	Citrus- cv. Rough lemon	18450	Meghalaya
4.	Cashew nut (Local)	4900	Local
5.	Mango (Local)	2500	Local
	Total	**64450**	

3.1.3. Propagation

The availability of quality planting material is one of the major constraints in improving the production of horticulture crops and considering the huge demand for quality planting material of improved varieties, the Institute is putting its effort in carrying out propagation activities of crops like citrus, cashew, dragon fruit, litchi and guava. During the period under report, the Institute has propagated 1150 nos of cashew nut in varieties V-4, VRI-3, H-1608, H-2/16 and BBSR-1. The propagation method followed in cashew nut is soft wood grafting. In guava var. L-49, Allahabad Safeda, Shweta and Lalit, 2250 nos of plants were propagated by wedge grafting method, 17450 nos of citrus var. Khasi Mandarin, Mosambi and Acid lime following

T-Budding and nuceller method. 3500 nos of Dragon fruit cv. Vietnam Red & White plants were developed by cutting method and 850 nos. of Litchi cv. China seedlings were raised by Air layering method. The successful propagated plants are used for gap filling at farm and distributed to the farmers for demonstration programmes at farmer's field in NER. and sale to the farmers.

The scion /bud stick has been produced from existing scion mother block at the Institute. During the year under report, the Institute has produced 1500 nos of scion stick of Cashewnut (V-4, VRI-3, H-1608, H-2/16, and BBSR-1), 3000 nos of scion stick of Guava (L-49, Allahabad Safeda, Shweta and Lalit), 2500 nos of bud stick of citrus (Khasi Mandarin, and Mosambi).

Table 4: Details of plants propagated

Sl. No.	Crop	Propagation method	Propagated Plants
1.	Citrus (Khasi Mandarin, Mosambi & Acid lime)	T- Budding, nuceller seedling	17450
2.	Guava (Lucknow-49, Allahabad Safeda, Lalit &Shweta)	Wedge grafting	2250
3.	Cashewnut (VRI-3, V-4, BBSR-1, H-2/16, H-1608)	Soft wood grafting	1150
4.	Dragon fruit-cv. Vietnam Red & White	Cutting	3500
5.	Litchi-cv. China	Air layering	850
		Total	**25200**

The scientific method is followed in the production of quality planting materials. The rootstocks were selected as per the crop and raised in the plastic portray under protected condition at Institute nursery unit. The Institute has propagated cashew nut cvs V-4, VRI-3, H-1608, H-2/16 and BBSR-1 through soft wood grafting, guava cvs. L-49, Allahabad Safeda, Sweta and Lalit, were propagated by wedge grafting method, citrus cvs Khasi Mandarin, were propagated following T-Budding and Wedge grafting method. The citrus was propagated through 'T' budding method; Cashew nut was propagated through soft wood grafting method and Guava. Dragon fruit was propagated through cutting method and Litchi was propagated through Air layering method. The propagated plants were monitor regularly and scientific cultural practices were followed as and when required as per need for better growth and to check the infestation of insect & pest and diseases in nursery unit. The plants were hardened in shade net before distribution /sold to the farmers.

Table 5: 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	78%
2.	Citrus (Khasi Mandarin, Mosambi & Acid lime)	T- Budding, nuceller seedling	74%
3.	Cashew (VRI-3, V-4, BBSR-1, H-2/16, H-1608)	Soft wood grafting	70 %
4.	Dragon fruit (Vietnam Red & White)	Cutting	85%
5.	Litchi (China)	Air layering	75%

Table 6: Sale of planting materials during 2021-22

Sl. No.	Particulars (Crops)	Qty (Nos.)	Rate (Rs.	Amount (Rs.)
1.	Acid Lime plants	13771	25.00	344275.00
2.	Cashewnut plants	12	40.00	480.00
3.	Khasi Mandarin plants	882	50.00	44100.00
4.	Dragon fruit plants	31	50.00	1550.00
5.	Guava plants	375	40.00	15000.00
6.	Avocado plants	2	50.00	100.00
	Total			405505.00

Glimpses of Nursery unit at CIH, Nagaland

Raising of rootstocks in crates

Guava rootstock

Cashew nut rootstock

Mango rootstock

Fig 1. Rootstock raising of different fruit crops

Khasi Mandarin budded

Guava grafted

Fig 2. Propagation activities in different fruit crops

3.2. TECHNOLOGY DEMONSTRATIONS UNDER OPEN FIELD

3.2.1. Bottlegourd

In the year 2021-2022 demonstration on three varieties of bottle gourds were carried out namely Pusa Naveen and Pusa Santhusti in an area of 200 sqm respectively. The objective of the demonstration was to identify the better performing variety for this region. It was observed that Pusa Naveen gave a yield of 35 kg, while Pusa Santhusti produced a yield of 25 kg.

Fig 3. Assessment of bottle gourd var Pusa Naveen and Pusa Santhusti

3.2.2. Cowpea

A demonstration was carried out to assess the performance of FYM @ 250 kg, neem cake @ 2 kg & NPK @ 3g/ litre drenching on growth, yield attributes and yields of cowpea cv. Kashi Kanchan at CIH, Nagaland during the reported year. Seeds were sown at a spacing of 60 cm × 10 cm an area of 100 sq m. The data revealed that treatment FYM @ 250 kg, neem cake @ 2 kg & NPK @ 3g was found to be best in terms of plant height (68.15 cm), and pod yield (46 kg). Hence, it is found that combined application of FYM @ 250 kg, neem cake @ 2 kg & NPK @ 3g was found feasible and suitable on growth and yield of Cow pea cv. Kashi Kanchan under foot hill condition of Nagaland.

Fig 4. Assessment of cowpea var. Kashi Kanchan

3.2.3. Indian bean

A field demonstration was laid out in an area of 150 sq m to assess the performance of Indian bean var Kashi Kanchan grown with treatments combination of FYM @ 250 kg neem cake @ 2 kg & NPK @ 3g/ litre drenching and control during summer 2021-22 at CIH farm Nagaland. The data revealed that variety Kashi Haritima with treatment FYM @ 250 kg neem cake @ 2 kg & NPK @ 3g/ litre drenching was found best on growth and yield under foot hill condition of Nagaland.

Fig 5. Assessment of Indian bean var. Kashi Haritima

3.2.4. Colocasia

Colocasia is grown as staples or subsistence crop throughout the throughout the NE Region and several varieties of taro are cultivated. They are consumed after boiling or frying. Leaves and petioles are also used as vegetable in various forms. Farmers of North Eastern region used different parts of Colocasia as pig feed. It is also used in folklore system of medicine in an important article of diet.

Fig 6. Assessment of colocasia var. Local

During the reported year, a field demonstration was conducted to assess the performance of Colocasia var Local in an area of 300 sq m with treatment FYM @ 250 kg neem cake @ 2 kg & NPK @ 3g/ litre drenching. The result revealed that the treatment was found effective in terms of No. of corms/ plant (1.85), No. of cormels/plant (7.10), Weight of corms/ plant (176.34 g), weight of cormels/ plant (231.00 g) and yield (62 kg) per 300 sqm.

3.2.5. Ginger

In the year 2021-2022 a demonstration was conducted in CIH to study the response of organic manures on the growth yield and quality of ginger (cv. Nadia). The rhizomes were planted in the first fortnight of May with a spacing of 20cm x 25cm in an area of 100 sq m. The crop was harvested on the 8th month when the leaves turned yellow and started drying up. The results of the demonstration showed that the yield of ginger could be increased with proper management practices and conducting such demonstrations may lead to improvement and empowerment of farmers of the region.

Fig 7. Assessment of ginger var. Nadia

3.2.6. Turmeric

During the year 2021-22, demonstration of organic model farm for cultivation of turmeric variety Megha turmeric-1 and Lakadong was undertaken in an area of 400 sq m. It was planted at a spacing of 25 x 30 cm during the month of April 2021. The parameters recorded are given in the table below.

Fig 8. Assessment of turmeric var. Lakadong & Megha Turmeric-1

Table 7: Growth and yield parameters of turmeric

Cultivar	DAS	Plant ht. (cm)	No. of leaves/ plant	No. of clumps/ plant	Yield/ plant (kg)	Total Yield (Kg)	Curcumin content (%)
Megha Turmeric-1	60 days	23.41	6.00	2.00	0.50	60	4.60
	90 days	43.70	9.00				
	150 days	85.43	18.00				
Lakadong	90 days	43.10	9.00	2.00	0.55	47	4.70
	150 days	84.65	19.00				

3.2.7. Cabbage

A field demonstration was conducted at CIH, Nagaland during 2020-2021 in an area of 300 sqm to assess the response of FYM @ 250 kg neem cake @ 2 kg & NPK @ 3g/ litre drenching on growth and yield of cabbage (*Brassica olerceae* var. capitata) and also assess the performance of Smita and Presto variety. The plots were treated with FYM, Vermicompost and control. Low incidence of small cabbage white butterfly (*Pieris rapae*) was identified in the field. Handpicking of caterpillars and spraying of neem oil on intervals was done to control the pest population. It was observed that FYM @ 250 kg neem cake @ 2 kg & NPK @ 3g/ litre drenching treated plot gave Head diameter (15.4 cm) and fresh weight of head (978 g) in variety Smita followed by Presto.

Fig 9. Assessment of cabbage var Smita and Presto

3.2.8. Broccoli

A field demonstration was conducted at Central Institute of Horticulture, Nagaland to assess the performance of Broccoli var Saki F1, Basanti F1 & KTS 1 in an area of 300 sqm. Among the three varieties, Basanti F1 performed better with FYM @ 250 kg neem cake @ 2 kg & NPK @ 3g/ litre drenching treatment for Curd length (11.62 cm) and Curd weight (380 g). Hence, the result revealed that among the three varieties, broccoli variety Basanti F1 performed better followed by KTS1 and Saki F1.

Fig 10. Assessment of broccoli var Saki F1, Basanti F1 & KTS 1

3.2.9. Knol khol

Knol-Khol (Brassica oleracea var. gongylodes) demonstration was conducted in CIH, Nagaland during rabi season of 2021-22 to assess the performance of Knol khol var Pusa Virat in an area of 150 sq m. Four weeks old seedlings of knol-khol cv. Pusa Virat with treatment of full dose of FYM @ 250 kg neem cake @ 2 kg was applied 15 days before transplanting. Observations recorded indicated that the variety Pusa Virat exhibited maximum Plant height (22.60), Knob diameter (5.83) and yield (20.5 kg).

Fig 11. Assessment of knol-khol cv. Pusa Virat

3.2.10. Onion

To assess the performance of onion var NHRDF ADR TL, a demonstration was conducted at Central Institute of Horticulture in an area of 150 sq m. The nursery bed was prepared in open field condition as well as sown in protrays and kept under poly-house. Transplanting has been carried out in the second week of October. The seedlings were transplanted by giving treatments using FYM, neem cake @ 2 kg & NPK @ 3g/ litre drenching. From the observations recorded, it indicates that the variety NHRDF ADR TL exhibited maximum Plant height (4.10 cm), fresh weight of bulb with leaves (128 gm), height of bulb (6.3 cm), diameter of bulb (5.6 cm) and total yield (32.7 kg).

Fig 12. Assessment of Onion cv. NHRDF ADR TL

3.2.11. Demonstration on Oyster mushroom cultivation

Mushrooms are edible fungi which is suitable for wide range of age group. It produces high quantity of quality food which has high biological value grown on many substrates. Mushroom can supply a high protein diet and lower calorific value so it is suitable for heart patients as it also contains all kinds of amino acids needed by human body. There are many different species of mushroom and among those species, oyster mushroom is most commonly cultivated.

It has the potential to solve many growing global problems like food demand, unemployment, environmental pollution etc. Mushroom produces enough amount of quality and quantity food which is of high biological value and suites wide range of groups from child to elder people. Among the different types of mushroom, oyster mushroom is also one of the most cultivated species. Oyster mushroom (*Pleurotus ostreatus*) belongs to the family Agaricaceae and class Basidiomycetes and also commonly known as 'Dhingri' in India. Oyster mushroom is known for its rich content in vitamin C and vitamin B complex and its protein content varies from 1.6 to 2.5 percent along with mineral salt which is essential for human body. Oyster mushroom cultivation has increased throughout the world because of its medicinal properties and its

potential to grow at wide range of temperature and different agro based residues. And the substrates where the mushrooms are grown can also be used as biofertilizer for enriching the soil fertility, as animal feed and also as a feed for biogas production. Mushroom cultivation is known to be eco-friendly as it brings no effect to the environment compared to other crop cultivation. Mushroom cultivation depends on many factors such as temperature, humidity, sterility of the substrates etc.

Fig 13. Oyster mushroom cultivation

A demonstration was carried out in the institute during the year 2021-2022 to observe the effect of gram powder on growth and yield of Oyster mushroom using spawn on wheat grains and cultivation on paddy straw amended with 0.0, 1.0, 2.0 and 3.0% gram powder. The growth and yield recorded significantly earlier and better as the gram powder was increased. The earlier completion of spawn running, appearance of pinheads, period between flushes, maximum number of bunches of fruiting bodies, and higher yield was observed in case of amending 3.0%, 2.0% gram powder followed by1.0% gram powder, whereas, poor performance was recorded in case of control.

3.2.12. Demonstration on vermicompost

Vermicompost (vermi-compost) is the product of the decomposition process using various species of worms, usually red wigglers, white worms, and other earthworms, to create a mixture of decomposing vegetable or food waste, bedding materials, and vermicast. This process is called vermicomposting, while the rearing of worms for this purpose is called vermiculture.

Fig 14. Low cost structure of vermicompost unit

Vermicast (also called worm castings, worm humus, worm manure, or worm faeces) is the end-product of the breakdown of organic matter by earthworms. These excreta have been shown to contain reduced levels of contaminants and a higher saturation of nutrients than the organic materials before vermicomposting.

Vermicompost contains water-soluble nutrients and is an excellent, nutrient-rich organic fertilizer and soil conditioner. It is used in gardening and sustainable organic farming. Because the earthworms grind and uniformly mix minerals in simple forms, plants need only minimal effort to obtain them. The worms' digestive systems create environments that allow certain species of microbes to thrive to help create a "living" soil environment for plants.

A demonstration was carried out in the institute during the year 2021-2022 in nine vermi beds. Decomposable waste from the farm is collected which are pre - digested for twenty days up to a month by heaping the material along with cattle dung slurry. This process partially digests the material and fit for earthworm consumption. It is then incorporated into the pit for vermicomposting. Usually, 3-4 numbers of cycles are carried out in a year.

3.2.13. Banana fibre extraction and handicraft making:

Banana is one of the important fruit crops grown in most of the states of India. The economical part of Banana is its fruit. In most tribal areas, the inflorescence and the soft inner pseudo stem are also used for consumption. In India, approximately 5 lakhs tones of banana trunk are discarded as waste every year after harvesting. There is good scope to get additional income from banana crop through appropriate utilization of pseudo stem, leaves, suckers etc. In some of the states, attempts are being made to utilize the pseudo stem, leaves and suckers for making the products like papers, handicrafts, ropes, edible items etc., on very small scale which have good economical value. We can extract fibre from the pseudo stem which has extensive uses in industries like textile, paper, and composite materials. Banana fibre being eco-friendly is a very good replacement for synthetic fibre.

➢ **Extraction process**:

Fibre extraction machine or decorticator is used for extraction of fibre from banana pseudo stem. It can be used for extraction of pineapple fibre as well. The machine operates on a single phase current with 1 Hp capacity. It is easily operated by unskilled worker and even women can operate with ease. After harvesting of the fruit, banana pseudo stems are cut down which can be used as a raw material for fibre extraction. Wild banana pseudo stem can also be used for extraction. This machine can also be used for pineapple leaf fibre extraction.

Fig 15. Collection of banana stems & extraction of fibres

➢ **Sheath preparation**

The banana pseudo stems have to be cut in 6-7 feet length and 4-5 inch width. The length may vary depending upon the need of the fibre length. The harvested pseudo stem should be used within 48 hour and the cut open sheath should be used within the same day.

Fig 16. Preparation of sheath

➢ **Extraction**

The split sheath should be inserted into the fibre extraction machine carefully, after which the fibre needs to be washed thoroughly to remove the dirt and debris of the pseudo stem.

Fig 17. Extraction of fibres & washing

➢ **Drying**

The washed fibre should be properly dried in the shade or sun. From 10 Kg of raw pseudo stem, about 200-250 gram of dried fibre is obtained.

Fig 18. Drying of washed fibre

➢ **Product weaving**

The fibre can be used to make different handicraft products such as tea coaster, sling bags, door mats, trays, hats etc. depending upon an individual creativity. It can be blended with wool or jute fibres for preparation of various products. The dried fibre can also be sold to various textile industry and the prices vary depending upon the processing and quality of the fibre.

Fig 19. Various end products prepared from banana fibres

3.3. TECHNOLOGY DEMONSTRATIONS ON FRUIT CROPS

Table 8: Demonstration of fruit crops at CIH Farm during 2021-2022

Name of Demonstration	Area	Parameter	Outcome
Evaluation of Citrus rootstock block cv. Rangpur lime	0.30 ha	Growth & yield	To get rootstock seed for raising seedlings
Evaluation of Bael block cv. B-1, B-2	0.23 ha	-do-	To check suitable cultivar for NER
Evaluation of Peach block cv. Early Greenday, Sun crest & Snow green	0.09 ha	-do-	-do-
Evaluation of Pear block cv Red calman, Red bastlet &Pekhan	0.032 ha	-do-	-do-
Evaluation of Plum block cv. Black amber, Santa rosa, Pratier	0.044 ha	-do-	-do-
Evaluation of Khasi Mandarin	0.025 ha	-do-	-do-
Evaluation of Dragon fruit cv. Red & White flesh	0.035 ha	-do-	-do-
Evaluation of Jamun cv. J-37	0.13 ha	-do-	-do-
Evaluation of HDP Guava cv. Dhawal & Red Flesh	0.075 ha	-do-	-do-
Evaluation of Acid lime cv. AL-1 & Phule Sharbati	1.0 ha	-do-	-do-
Evaluation of Avocado cv. Local & Hass	0.045 ha	-do-	-do-
Evaluation of strawberry cv Winter dawn	500 sqm	-do-	-do-

Fig 20. Pit digging, pit filling of top soil, neem cake and bavistin

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

3.4.1. Cucumber

A demonstration was carried out to assess gynoecious cucumber hybrids in poly house under foot hill condition of Nagaland. The data revealed that there was a significant variation for yield and related parameters among the poly house cucumber hybrids (Table 9,10 & 11). It was also observed that there was significant difference in fruit yield, which varied among the studied hybrids and ranged from 2.26 kg to 2.43 kg per plant. Hence, it was found that cucumber cv. Aslan followed by Yildo were suitable under protected conditions.

Influence of different training systems in cucumber under naturally ventilated poly house: In order to develop a suitable training system in cucumber, four training systems viz., Drape (the apical meristem is not removed and the plant is draped over the top cable wire at 8 feet height; all other side branches are removed), Pinch (the apical meristem is removed at 8 feet height and a lateral shoot is trained over the cable wire at 8 feet height and back down to the floor), Umbrella (the apical meristem is removed at 8 feet height and allowing two stems to develop, which are then draped over the trellis to grow) and the Control (without any pruning) were evaluated. It was revealed that the Umbrella (2.45 kg) system followed by the Drape system (2.15 kg) and Pinch system (1.98 kg) recorded significantly higher values for yield per plant in cv. Aslan, while control registered the lowest value (2.18 kg/plant).

Table 9. Evaluation of parthenocarpic F1 cucumber hybrid

Variety	No. of fruits per vine	Fruit length (cm)	Fruit dia. (cm)	Fruit weight (g)	Yield (kg)
Yildo F1	11.26	185.14	4.22	84.87	2.26
Aslan	13.26	185.12	4.02	89.33	2.43

Fig 21. Assessment of cucumber cv. Yildo and Aslan under polyhouse

3.4.2. Tomato

Fig 22. Assessment of Tomato cv. Himsona and NS 4266

A field demonstration was undertaken to assess the performance of poly house tomato on different training system. Tomato plants grown in a vertical culture tied to strings were trained onto one-stem and two-stem systems for canopy management under naturally ventilated poly house, while an unpruned plant served as control. Among different training systems, plants trained to two-stem recorded highest numbers of clusters (19.78) and yield per plant (8.46) in variety NS4266 (Table 12). However, the maximum average number of fruits per cluster (5.31), fruit length (3.74 cm), fruit diameter (4.41), fruit weight (53.57 g) was noted in plants trained onto one-stem. Unpruned control registered lower value for all the attributes studied.

3.4.3. Capsicum

Fig 23. Assessment of Capsicum cv Natasha

To assess the performance Capsicum var. Natasha of, a demonstration was carried out during 2021-22 The seeds were sown on September 2021 in the nursery and it was transplanted on first week of October 2021 under the poly house in an area of 500 sqm. The result obtained showed that Capsicum var. Natasha was found better in plant growth and yield parameters such as Plant height (52.3 cm) Fruit wt (76.2 g), Fruit diameter (5.8 cm), fruit length (5.2 cm), Number of fruits per plant (12) and yield ha^{-1} (63.03 t).

3.4.4. Gerbera

Fig 24. Assessment of different cultivars of Gerbera

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.

3.3.5. Anthurium

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 25. Anthurium cultivation at CIH

3.3.6. Gladiolus

A demonstration was conducted to evaluate varietal performance gladiolus cultivars namely: Pink Friendship, and White Prosperity, in an area of 500 sq m at CIH Farm, Medziphema in open field condition during the year 2021-22**.** The demonstration was conducted with uniform cultural practices to ensure optimum good quality flowers as well as response of vegetative growth. Corms of 4.0 cm diameter was planted at 8-10 cm depth at a spacing of 50 x 55 cm. The performance of cv. Friendship indicated strong adaptability and good association under the foot hill climatic condition of Nagaland.

Fig 26. Assessment of gladiolus flower

3.3.7. Golden rod

Golden rod (Solidago) is a flowering plant in the aster family and most popular as filler flower crop to the bouquets. It is being commonly grown by side shoot, offshoot seedling and foliage at flower initiation stage is used as filler to bouquets. Golden rod was grown during the financial year 2021-22 at CIH Nagaland.

Fig 27. Assessment of golden rod flower

3.5. DEMONSTRATIONS AT FARMERS FIELD

3.5.1. Demonstration on High Density Plantation of Guava

The Institute in collaboration with College of Agriculture Tripura, Lembucherra conducted off farm demonstration at spacing of 3x3m. The demonstration covered a total area of about 0.5 ha area. The demonstration programme was conducted at two different locations covering 0.5 ha each; viz Bamutia, Mohanpur, West Tripura and CAT, Lembucherra.

Fig 28. Demonstration plot established at Bamutia, Mohanpur, West Tripura and CAT, Lembucherra

3.5.2. Off farm demonstration on Integrated Horticulture Model (0.5 ha)

The Institute has undertaken an off farm demonstration on Integrated Horticulture Model for 0.5ha in Punglwa B village under Peren district of Nagaland. The object of the programme aims at enhancing productivity per unit area, profitability, livelihood improvement and sustainable farming. The demonstration is being carried out in association with the women self-help groups of Punglwa B village, making it a total of 60 women beneficiaries. Some of the initiatives of the Institute which were carried out during the first phase of demonstration are as follows:

Fig 29. Integrated Horticulture Model at Punglwa B village

a. Completed Installation of GI barbed wire around the perimeter covering 0.5 ha
b. Completed digging ring well 35 ft depth x4ft diameter
c. Planted 30 no of Moringa var. PKM 1 around the boundary
d. Plantation of 30 nos of acid lime var AL1 planted at 3x3m spacing
e. Planted 30 nos of guava var Lucknow 49 planted at 3x3m spacing
f. Planted of varieties of low chilling varieties of pear, peach and plum at 5x6m spacing

3.6. HUMAN RESOURCE DEVELOPMENT

3.6.1. Farmers training

During 2021-22, the institute has organized 26 farmers training which were attended by **1088** participants. The trainings were conducted via virtual means as well as physically under different areas of horticulture in different states of the NE region. Some of the trainings were also conducted by the Institute in collaboration with State Departments and ICAR-KVKs.

Table 10. Details of Farmers Training conducted

Target	No. of Trainings Conducted	Total Participants
40 nos.	5 (online)	303
	21 (offline)	785
	Total	**1088**

Table 11. Details of online trainings conducted

Topic & Date	No. participants
Online review on PHM certificate trainees (4th June 2021)	18
Online training on cultivation of exotic vegetables (15th July 2021)	67
Virtual Training on Post harvest Processing of Hort crops (20th July 2021)	78
Virtual Training on Nursery Management and Nursery Accreditation (29th July 2021)	100
Production Technology of Seasonal Flowers and Floriculture Enterprise for Income Generation" (18th October 2021)	40

Table 12. Details of farmers training conducted

S/ No.	Topic	Date	Venue	No. of partici-pants	Organized/ sponsored
1	Awareness cum training on Horticulture Avenues for sustainable income	9/09/2021	Dhansiripar Village, Nagaland	17	Organized
2	Awareness cum training on Horticulture Avenues for sustainable income	10/09/2021	Amaluma Village, Nagaland	18	Organized
3	Post harvest management of Hortl Crops	21/9/2021	CIH, Nagaland	9	Organized
4	Post harvest management of Hortl Crops	22/9/2021	CIH, Nagaland	9	Organized
5	Post harvest management of Hortl Crops	23/9/2021	CIH, Nagaland	9	Organized
6	Post harvest management of Hortl Crops	24/9/2021	CIH, Nagaland	9	Organized
7	Workshop on Beekeeping in Nagaland	29/10/2021	Longleng, Nagaland	50	in collaboration with NBHM Govt. of Nagaland
8	Workshop on Beekeeping in Nagaland	29/10/2021	Phek, Nagaland	50	
9	Awareness cum training on Beekeeping in Nagaland	29/10/2021	Kiphire, Nagaland	50	
10	Workshop for Awareness on Beekeeping in Nagaland	2/11/2021	Noklak, Nagaland	50	
11	Awareness cum training on Beekeeping in Nagaland	5/11/2021	Wokha, Nagaland	50	

12	PHM & Processing of Hort crops	28/10/2021	Thenzawl, Mizoram	50	in collaboration with CAU-College of Horticulture
13	Nursery Raising of Hortl crops	3/11/2021	Thenzawl, Mizoram	50	
14	Vermiculture & Vermi composting	23/11/2021	Thenzawl, Mizoram	50	
15	Training & pruning of fruit crops for enhancing quality and quantity production	25/11/2021	Thenzawl, Mizoram	50	
16	Vegetable Cultivation in Abandoned Jhum lands	11/11/2021	CIH, Nagaland	54	Organized
17	Vegetable Cultivation in Abandoned Jhum lands	12/11/2021	Peren, Nagaland	50	Organized
18	Production Technology of vegetables and PHM of Hort crops	2/12/2021	Dhansiripar village, Nagaland	40	Organized
19	Production Technology of vegetables and PHM of Hort crops	3/12/2021	Doyapur village Nagaland	40	Organized
20	Vegetables cultivation & PHM	16/12/2021	Amaluma, Nagaland	40	Organized
21	Production Technology of vegetables & PHM	17/12/2021	IHM Punglwa village Nagaland	40	Organized

3.6.2. Trainers' training

Central Institute of Horticulture conducted 2 nos of virtual Trainers Training with total of 151 participants. The training covered all Northeast states with participants comprising of horticulture officers and field functionaries from state departments, ATMA and KVKs.

Table 13. Details of trainers training conducted

S./ No.	Topic	Date	No. of participants	Category
1	2 Days Virtual Trainers Training on Production Technology and Post-harvest Management of horticultural crops	23-24th June 2021	101	State Horti officers, KVK, ATMA, extension functionaries
2	Virtual Trainers training on Production Technology of Potential Horticulture Crops	16th July 2021	50	State horticulture officers, ATMA extension functionaries
		Total	**151**	

3.6.3. GLIMPSE OF TRAINING PROGRAMMES

Fig 30. CIH staffs interacting with participants virtually during online training programmes

Fig 31. Awareness cum farmers' trainings conducted within Dimapur district of Nagaland

Fig 32. Awareness cum farmers' trainings conducted within Chumoukedima district of Nagaland

Fig 33. 4 days farmers training held in collaboration with CAU College of Horticulture, Mizoram

Fig 34. 5 days Farmers training on Bee keeping held under various districts of Nagaland

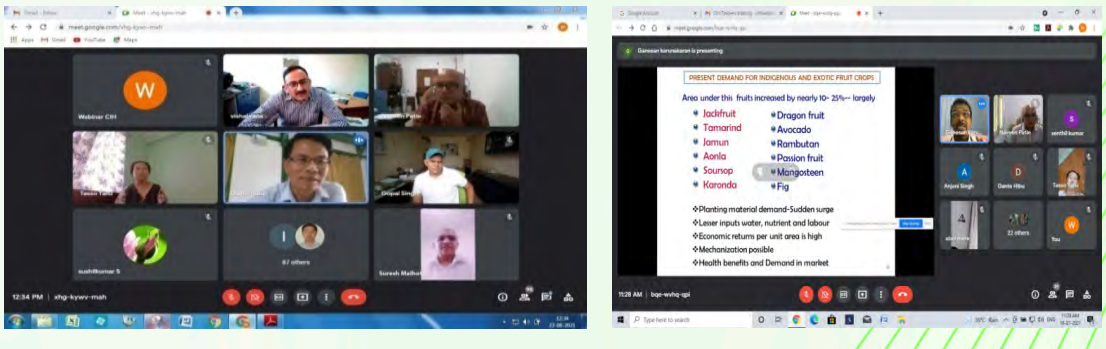


Fig 35. Glimpse of technical session during virtual Trainers' Training

3.7. MARKETING & AGRI-BUSINESS PROMOTION

Agri-business promotional activities help in promoting the farmers/ stakeholders and strengthening their market base. These programmes facilitate the farming community in creating avenues for market linkage.

The programmes designed by the Institute are focussed towards strengthening the horticulture marketing system in the long term. Proper understanding of the system would help the farmers in organizing their value chain and deriving suitable remuneration.

3.7.1. Facilitation in market linkage of pineapple

With the objective to facilitate in forward market linkage, the Institute under the guidance of Dr. N K Patle, Addl. Commissioner (Hort.), DA&FW & Director CIH, mediated in signing an MOU between Molsang Organic Pineapple Producers Company Ltd., Nagaland & Satsumi Farm LLP, New Delhi on 11th November 2021 at CIH, Medziphema, Nagaland for supply of fresh organic pineapples from Nagaland to New Delhi.

During December 2021, the FPC supplied around 5000 Kgs (5 consignments) of fresh pineapples to the firm in Delhi @Rs. 60/piece. The freight charges were borne by the firm in Delhi. As the response from the consumers in Delhi was very good, the firm has committed order in the next season.

Fig 36. Signing of MOU between Satsumi Farm LLP, New Delhi & Molsang Organic Pineapple FPC

Fig 37. Supervision by CIH staffs in harvesting, packaging at Bungsang Village, Nagaland

Fig 38. Pineapple boxes ready for dispatch at Dimapur Railway Station

Fig 39. Nagaland Pineapples at Delhi Rly Station

3.7.2. Farmers awareness on marketing/ business development

a) During the year 2021-22, 03 nos. of awareness programme on marketing and business development were organized for FPCs/ FPOs/ Entrepreneurs. The objective of the programme is to provide an understanding on managing their horticulture business for better profitability.

i. Training on Basics of DPR preparation and Entrepreneurship Development for ex-trainees and FPC members on 31st May 2021 with 24 participants.

ii. Practical supervision & training on packaging on 17th November 2021 at Bungsang village, Nagaland.

Fig 40. Training on DPR preparation

Fig 41. Packaging training in progress

3.7.3. Promotion & facilitation for Agri-Start ups

An online training on Opportunities for Agri-Start ups in NE region was organized in collaboration with NEATEHUB, AAU, Jorhat on 11th August 2021 with 66 participants. Shri. Abhilaskh Likhi IAS, Additional Secretary (Hort.), DA&FW presented the inaugural address and Dr. B C Deka, Hon'ble Vice Chancellor, Assam Agricultural University gave the keynote address.

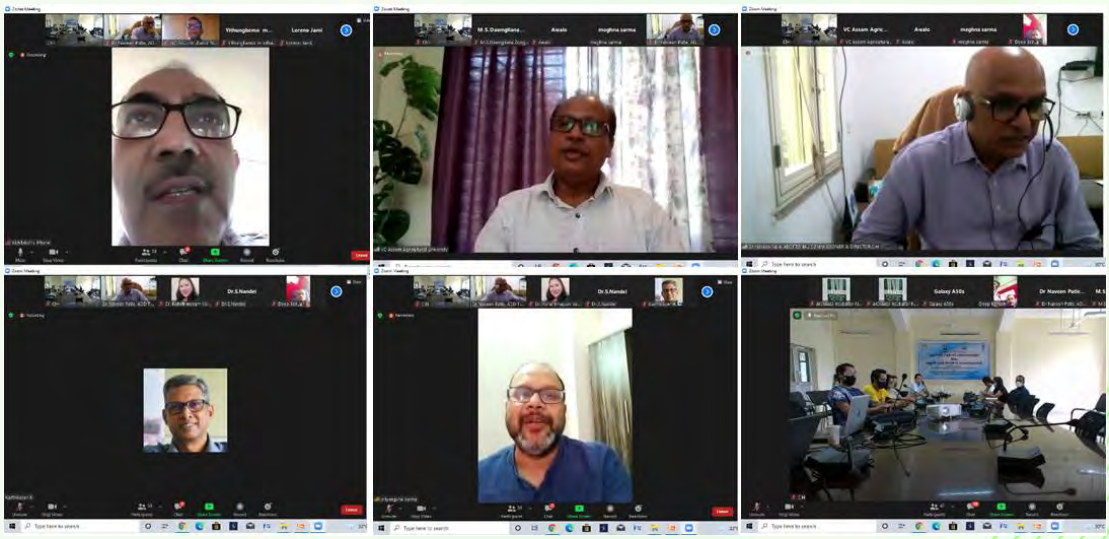


Fig 42. Online training for Agri Start ups

3.7.4. Market Linkage & Promotion of Horticulture Crops

The Institute facilitated the farmers in market promotion of Pineapple on 28th Sept 2021 and Kiwi on 9th Nov 2021. The Institute also supervised and facilitated the farmers in sending 04 consignments of organic pineapples to New Delhi on 18th November, 04th Dec, 10th Dec & 16th Dec 2021 through train. The objective of the programme is to train the farmers on forward market linkage and standardizing their value chain.

Fig 43. A part of pineapple consignment sent to Metro cities

Fig 44. Standardize Kiwi fruit packing

3.7.5. Exhibition/ Trade Fair

3.7.5.1. Horti Expo

Central Institute of Horticulture, Nagaland organized Horti Expo on 11th November 2021 at its campus in Medziphema. The exhibition was inaugurated by Smt Anenla Sato, Commissioner & Secretary (Horticulture), Govt. of Nagaland. The programme was also graced by Shri T Mhabemo Yanthan, Commissioner & Secretary & Team Leader, Nagaland Beekeeping & Honey Mission, Nagaland, Shri Diwakar Kachari, Board Member & Shri Shivanjan Dalmia, Board Member.

The exhibition was organized with the objective to promote the FPCs and entrepreneurs engaged in production and marketing of horticultural produce. Around 20 exhibition stalls highlighting various agri. and allied activities were a part of the exhibition programme.

Fig 45. Inauguration of exhibition

Fig 46. Glimpse of exhibition stalls

Fig 47. Dr. N K Patle, Addl. Commissioner, DA&FW delivering welcome address during the inauguration of Horti Expo

Fig 48. Smt Anenla Sato, Commissioner & Secretary (Horticulture), Govt. of Nagaland delivering the inaugural address

3.7.5.2. Sixth NE Green Summit at NIT, Silchar

Central Institute of Horticulture, Nagaland participated in the Exhibition during the Sixth Edition of Northeast Green Summit 2021 from 16-18 November, 2021 at National Institute of Technology, Silchar, Assam. The focus of this Summit was "Greening after Covid: Regional Cooperation, Innovation & Entrepreneurship.

The Institute showcased various process products along with local and exotic horticulture crops grown in Nagaland region. The technical staffs of the Institute also interacted with the participants and distributed folders and publications related to package and practices of horticulture crops to interested persons.

Fig 49. CIH stall during Sixth Edition of Northeast Green Summit 2021

3.7.5.3. India International Trade Fair - 2021

Central Institute of Horticulture, Nagaland participated as an exhibitor in the India International Trade Fair - 2021. 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. Four farmer participants from Senapati, Manipur, Kohima, Pfutsero and Noklak from Nagaland respectively participated and displayed their various fresh fruit & value added products. Folders and other publications on production technologies, package of practices PHM on fruits, flowers, vegetables and spices were displayed and distributed during the programme.

Fig 50. CIH stall during IITF- 2021

3.8.6. Seminar/ Workshop/ Conference/ participation

3.8.6.1. Beekeepers Summit

The Institute organized Beekeepers Summit on 11th November 2022 through both online and offline mode. The programme was formally inaugurated by Shri Narendra Singh Tomar, Hon'ble Union Minister of Agriculture & Farmers Welfare virtually. The dignitaries present were Shri Kailash Choudary, Hon'ble Minister of State for Agriculture & Farmers Welfare, Smt Shobha Karandlaje, Hon'ble Minister of State for Agriculture & Farmers Welfare, Shri Sanjay Agarwal, Secretary, DA& FW, Ministry of Agriculture & Farmers Welfare, New Delhi, Dr. Abhilaksh Likhi, Addl. Secretary, DA& FW, Dr. S.K. Malhotra, Agriculture & Horticulture Commissioner, DA& FW who attended the programme virtually from New Delhi.

Dr. N K Patle, Addl. Commissioner (Hort.) & Executive Director, National Bee Board, DA& FW, Shri T Mhabemo Yanthan IAS, Comm. & Secy. To Governor & Team Leader, Beekeeping & Honey Mission, Smt Anenla T Sato (IAS), Comm. & Secy. (Horti), Govt. of Nagaland, Dr. R E Lotha, Director of Horticulture, GoN, Shri Shiv Anjan Dalmia, Member, Board of Management (BOM), CIH & MD, Fosse Holdings, Kolkata and Shri Diwakar Kachari, Member BOM, CIH attended the programme at CIH, Nagaland.

The summit was organized to promote the beekeepers in the state of Nagaland and in the country. A technical session on the topics "Pollination-Production & Productivity of Agriculture & Horticulture Crops by Bee-Pollinating Services" and "Quality Control of Honey & Marketing Strategy" was also organized with resource persons from Nagaland Beekeeping & Honey Mission.

Fig 51. Hon'ble Union Minister of Agriculture & Farmers Welfare with MoS, Agriculture & dignitaries attending the program virtually

Fig 52. Dignitaries & participants attending the Beekeepers Summit at CIH, Nagaland

3.8.6.2. Participated in 05 days training programme by BIRD Lucknow on Advanced program on Business Planning for FPOs w.e.f. 27th Sept to 01st Oct 2021.

3.8.6.3. Participated in 02 days training programme by NPC, New Delhi on E Procurement & E Tendering on 28th& 29th Oct 2021.

3.9. POST HARVEST MANAGEMENT

3.9.1. Protocol development and preparation of value added products by unemployed youths

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. 15 nos of protocols have been developed for value addition of locally available and underutilized fruits and vegetables of NE Region.

Fig 53. Tree bean pickle

Fig 54. Oiless pickle

Fig 55. Litchi RTS

Fig 56. Peach RTS

Fig 57. Dehydrated Lemon rings

Fig 58. Guava leather

Fig 59. Mango squash

Fig 60. Raw Mango Chutney

3.9.2. Creating Market access for the processed products

Shri. Narendra Singh Tomar, Hon'ble Minister of Agriculture & Farmers Welfare launched 07 different types of fermented fruit beverages and candy prepared from locally available underutilized fruits manufactured by Mr. N.G.Baio, founder & owner of Hills Foods from Senapati, Manipur and Naga King Chilli Pickle prepared by Ms. Viseno Yakhro, founder & owner of Dwellington Home, Kohima, Nagaland.

Fig 61. Different types of fermented fruit beverages and candy

3.9.3. Strengthening & up gradation of minimal processing unit

Fig 62. Solar dryer system cum heat spacing as per NISE specification for 180 kg capacity of fruits & vegetables

Fig 63. Solar hybrid plant for minimal processing unit 3KVA, single phase, 50 Hz capacity

Fig 64. Installation of false ceiling at the MPU

3.9.4. Trainings on Post harvest Management

Table 14. List of Post harvest Management & Value addition trainings conducted

Sl No	Particulars	Date	No of Days	Place	No of participants
1	3 days Refreshers course on Post harvest Management & Processing	12th,13th & 15th January	3	CIH	12
2	Training on Pineapple and banana fiber extraction for Meghalaya and Assam trainees	2nd & 3rd Feb 2	2	CIH	8
3	3 months certificate course on PHM	19th Feb to 28th April 2021	3 months	CIH	17
4	online review meeting for the ex-trainees of PHM on	4th June 2021	1	Online	17
5	Post harvest Management and value addition of plum & Kiwi"	24th June 2021	1	Online	89
6	Post harvest management of horticultural crops	20th July 2021	1	Online	78
7	Prospects of food processing & entrepreneurship	22nd to 24th Sept 2021	3	On campus	9
8	Prospects of Naga king chilli preparation & mushroom cultivation	17th Nov 2021	1	On campus	25
9	Production technology of vegetables and post harvest management	2nd Dec 2021	1	Dhansiripar village	40
		Total	**13**		**295**

Fig 65. Trainings conducted on post harvest & value addition of horticultural crops

3.9.5. Outcome of trainings under PHM

A total of 4 nos of start ups in food processing and value addition have started after taking training and certificate course on PHM at CIH.

Table 15: Details of the start ups

Sl No	Name of start up with details	Products	State
1	Taste of Noklak, Noklak District, Nagaland, Contact: 9366362186	Ginger candy, fruit beverages, Honey, Fruit candies and pickles	Nagaland
2	Dwellington Home Kigwema village, Kohima Contact: 8131898708	King chilli pickles and fruit jams	Nagaland
3	Hills foods Enterprise Senapati District, Manipur Contact: 7085632932.	Fermented fruit beverages, fruit candy and juices	Manipur
4	Foodies Delight, Tuli Town, Mokokchung District Contact: 8787673976	Gooseberry candy, fermented fruit beverages, fruit candy etc	Nagaland

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 2021-2022, a total of 3 nurseries were assessed/ monitored which includes both fresh application and renewal applications, out of which 3 nurseries were accredited and certification were done with a rating **2 Star** to 2 nurseries and with a **1 Star** rating to remaining 1 nursery. The details of the nurseries are provided in the table below:

Table 16. Nurseries Accredited during the year 2021-22

State	No. of Nurseries Accredited
Arunachal Pradesh	1
Assam	1
Manipur	-
Mizoram	-
Nagaland	1
Tripura	-
Total	3

Table 17. Detailed list of Nurseries Accredited during the year 2021-22

Sl. no.	Name of Nurseries	Location/ State	Crop	Production capacity per annum	Star rating	Remarks
1	Daffodil Nursery Old	Bherakuchi, Khetri, Assam	Litchi Mango Guava Orange Lemon Sweet Orange Dragon fruit	50000 25000 30000 40000 80000 15000 25000	**“2”Star**	Renewal
2	Namthung Agri.- Horti. Multipurpose Nursery	Namthung, Dirang, West Kameng, Arunachal Pradesh	Apple Kiwi Persimon	30000 100000 5000	**“2”Star**	Renewal
3	Jungyam Nursery	Noklok, Noklok Dist. Nagaland	Kiwi Citrus	20000 5000	**“1” Star**	Fresh

Table 18. List of Nursery Accreditation committee of North East Region

State	Address	Contact/email
Nagaland		
Dr. V.J. Shivankar, Chairman	Former Director, NRCC, Nagpur	M-07972322680/9422988418, shivankarvj@yahoo.com
Dr. Aabon Yanthan	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. Hammylliende Talang	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. Heiplanmi Rymbai	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. Subhra Saikat Roy	Scientist (Hort.), Manipur Centre	M- 8730933835, subhrasaikat@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. Vishambhar Dayal/ Dr. Amit Goswami	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, ranjitkb2010@gmail.com
Dr. Azeze Seyie / Dr. Chongtham Tania,	Scientist, Nagaland Centre Scientist, Manipur centre	M-7085962272
State representative		

Fig 66. Glimpses of Horticulture Nurseries Assessment of NER States during 2021-22

3.11. CERTIFICATE COURSE

3.10.1. Three (3) months certificate course on Post harvest Management

The three months certificate course on "Post-harvest Management of Horticultural Crops" commenced on 17th January 2022 at Central Institute of Horticulture (CIH), DA&FW, Ministry of Agriculture and Farmers Welfare, Government of India, Medziphema and concluded on the 25th March 2022. Altogether 13 trainees from all over NE Region undertook the 3 months PHM course.

Fig 67. Trainees of certificate course attending online & practical classes

3.12. 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. Renovation of old kitchen area floor

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

3.12.7.Renovation of Main gate entrance

4. PUBLICATION

4.1. Annual Report

☞ N.K. Patle and Meribeni Shitiri. 2021. ***Annual report (2020-21)***. Central Institute of Horticulture, DA & FW, Ministry of Agriculture and Farmers' Welfare, Govt. of India, Medziphema, Nagaland.

4.2. Technical bulletin

☞ N K Patle and Meribeni Shitiri.2021. ***Improved production technology of cucurbitaceous vegetables.*** CIH/ Tech. bulletin 9/ pp 1-31.

4.3. Extension folder

☞ N K Patle, Jungshienla Jamir, Moasosang Longkumer & Meribeni Shitiri.2021. ***Propagation techniques in Mandarin orange and Sweet orange with special reference to NE Region***. CIH/ DBT/ Tech. Folder 1/ pp 1-6.

4.4. Training manual

☞ N K Patle and Meribeni Shitiri.2021**.** ***Marketing & Value Chain Development of Horticulture Crops.*** CIH/ Training manual/ pp 1-91.

Fig 68. CIH Publication

5. MEETINGS

5.1. 13th Technical Advisory Committee (TAC)

The 13th Technical Advisory Committee (TAC) meeting of CIH was held on 18th and 19th Feb., 2021 at conference hall, CIH, Medziphema, Nagaland. The meeting was chaired by Dr.S.D.Upadhyaya, Chairman, TAC. Dr.N.K.Patle, Director Incharge CIH welcomed all the Technical Advisory Committee (TAC) members and thereafter, deliberated on the proposed agenda such as Confirmation of the recommendation of the 12th TAC members, Achievements of CIH 2020-2021 & draft Action Plan 2021-2022.

Fig 69. Technical Advisory Committee meeting at CIH, Nagaland on 19th February 2021

5.2. 15th Board of Management meeting (BOM)

Fig 70. Board of Management meeting

The 15th Board of Management meeting of CIH, Nagaland was held virtually on 29th June,2021. The chairman welcomed all the members and started the meeting as per the agenda note. Dr.N.K.Patle, Addl.Comm (Hort.), DA&FW & Director Incharge CIH presented the Achievements of the Institute as well as Annual Action plan 2021-22 . The Director I/c, CIH requested Horticulture Departments of North East to give proposals for organizing need based trainings for their farmers as well as officials and also to encourage Nurserymen to submit application for Accreditation. All the members expressed appreciation on the progress and commendable works carried out by the Institute.

6. IMPORTANT EVENTS CELEBRATED

6.1. Independence Day Celebration

Central Institute of Horticulture, Nagaland celebrated the 75th India Independence Day on 15th August 2021 at its campus. The programme began with hoisting of National Flag and speech delivered by Dr. N.K. Patle, Addl. Commissioner (Hort.), DA & FW & Director i/c, CIH. All the staff and field workers participated in the programme.

Fig 71. Dr. N.K. Patle, Director i/c, CIH hoisting the National Flag & delivering Independence Day Speech

Fig 72. Dr. N.K. Patle Director i/c, CIH with the staff

Fig 73. Dr. N.K. Patle Director i/c, CIH with the farm workers

6.2. Republic Day Celebration

Central Institute of Horticulture, Nagaland celebrated the 73rd Republic Day on 26th January 2022 at its campus. Shri. A.K Singh unfurled the National Flag and delivered the Independence Day speech. All the staff and field workers participated in the programme.

Fig 74. Staff and workers of CIH during Independence Day celebration

6.3. Field Day on vegetable cultivation for self sufficiency and income generation

Central Institute of Horticulture, Nagaland conducted Field Day on "Vegetable Cultivation for Self Sufficiency and Income Generation" in Ngwalwa village under Peren district of Nagaland on 29/04/2021. The objective of the programme was to promote vegetable cultivation for self sustainability and income generation.

Fig 75. Field Day on vegetable cultivation

The on-field programme was conducted maintaining strict SOP, it was well attended by representatives from 4 SHGs under Ngwalwa village, making a total of 24 participants. The field day was led by Dr. Moasosang, Asst. Horticulture Specialist, accompanied by two Senior Technical Assistant of the institute Mr. Mhasi and Ms. Marina. The Institute distributed 24 nos. of Vegetable Seeds Kit (6 nos per group) and were given preliminary training and technical guidance on the cultivation of these vegetable crops. The vegetables will be grown in their respective field/garden as a part of demonstration and promotion of the programme.

CIH observes World Environment Day

To commemorate the event, Central Institute of Horticulture, Nagaland also took part by planting few plant saplings around the office campus.

Fig 76. Planting of saplings during World environment Day

6.4. Field Day on Pineapple festival

Central Institute of Horticulture, Nagaland conducted Field Day on "Pineapple festival" in Medziphema village on 5th August 2021 as a part of Azadi ka Amrit Mahotsav. The objective of the programme was to create awareness on post harvest and handling of pineapple after harvesting so that post harvest losses can be minimized. The field day was participated by Mrs Meribeni Shitiri, Horticulture Specialist, Dr. Moasosang, Asst. Horticulture Specialist, accompanied by Senior Technical Assistant of the institute Ms. Marina.

Fig 77. Field Day on celebration of Pineapple festival

6.5. CIH observes World Coconut Day

Central Institute of Horticulture, Nagaland on 2nd September 2021, celebrated World Coconut Day on the theme "Building a Safe Inclusive Resilient and Sustainable Coconut Community Amid COVID-19 Pandemic & Beyond". To mark the event CIH organized Field day on coconut to emphasize and raise awareness on importance and benefits of coconuts.

Fig 78. World Coconut Day observed

World Coconut Day is observed on September 2 annually to commemorate the formation of Asian Pacific Coconut Community (APCC) by raising awareness campaigns and technical sessions. As a part of celebration the technical staffs of the institute visited coconut growing areas under Dimapur district to interact with the growers and provide technical guidance on issues related to production technology and post harvest processing.

6.6. Field Day cum training on vegetable cultivation

Central Institute of Horticulture, Nagaland conducted field visit cum training to Punglwa B village in Peren district of Nagaland on 30th November 2021 with the objective to provide training on Production technology of seasonal vegetables to the farmers. The Institute distributed Kitchen Garden vegetable seed kits to the beneficiaries and delivered training on management of vegetable garden. The technical staffs interacted with the farmers and provided technical guidance to them. Altogether 50 farmers participated in the programme.

Fig 79. Field Day cum training on vegetable cultivation

6.7. Field Day on onion harvest at Punglaw village

A field day to the onion demonstration site at Punglwa B' village was organised on Onion harvesting with the objective to provide hands on training about harvesting and post harvest handling process.

Fig 80. Field Day on onion harvest at Punglaw village

7. DBT PROJECT

- **Project Title:** Network Project for Establishment of disease-free elite Khasi mandarin and Sweet Orange genetic stocks through shoot tip grafting (STG) and mass production of quality planting material for Northeastern states of India.
- **DBT Sanction Order No. & Date:** BT/PR40114/NER/95/1657/2020 Dated 10/02/2021
- **Name of Principal Investigator:** Dr. N.K.Patle (Addl. Comm, DA & FW & Director I/c, CIH)
- **Name of Co-PI/Co-Investigator:** Dr. Moasosang Longkumer (Asst. Hort. Specialist, CIH)
- **Institute:** Central Institute of Horticulture, Nagaland (CIH)
- **Total Cost:** Rs.5012320.00
- **Duration:** 3 years

Approved Objectives of the Project:

- Selection of elite candidate plants with superior horticultural traits from farmer's field.
- Indexing of candidate plants for detection of CTV and citrus greening bacterium through PCR/RT-PCR or ELISA.
- Submission of twigs collected from indexed candidate plants to HUB for generation of STG derived plants.
- Raising of root stocks viz., rough lemon and other citrus following rootstock nursery practices as per National Protocol & Standards.
- Establishment of protected Hi Tech scion bank of khasi mandarin and sweet orange using STG derived plants received from HUB and periodic indexing will be carried out. Large scale generation of disease-free planting materials of khasi mandarin and sweet orange through conventional budding/leaf bud cottage institutionally as well as participatory approach involving certified/ accredited public & private sector horticultural nurseries.

- **Summary of the project:**

Based on the project objectives, firstly mandarin growing belts within the states were identified by coordinating with the state horticultural department. After proper research and exploration from all districts, we have selected most potential growing districts and surveyed certain villages under it. Certain criteria's like plants older than 15 years and above, trees with good yield, regular bearing and free from pest and diseases were kept for selecting the candidate mandarin and sweet orange mother plants.

From the survey, it was found that all the orchards were seedling origin and mostly of the orchards were not well maintained and were greatly affected by citrus decline while some orchards were young and still in developmental stage.

☞ **Details of survey for selection of candidate mother plants of khasi mandarin and sweet orange:**

Two potential districts were surveyed for selection of candidate mother plants of Khasi mandarin and sweet orange.

1) **Wokha district:** Under Wokha district, 3 villages- Pongitong, Humstoe and Wokha were surveyed during the month of August, 2021 for selection of elite candidate mother plants of Khasi mandarin and sweet orange. The trees were not deemed to be called as elite candidate plants as they did not meet the required horticultural traits. Sweet orange plants were not found.

2) **Mokokchung district:** Under Mokokchung district, 3 villages- Aliba, Chungtia and Salulamang were surveyed during the month of November, 2021 for selection of elite candidate mother plants of Khasi mandarin and sweet orange. The trees from Aliba and Chungtia villages were not deemed to be called as elite candidate plants as most of the orchards were affected by citrus decline. Sweet orange plants were not found.

From Salulamang village, 5 candidate plants were promising as they met the required horticultural traits. On the selected candidate plants, fruits were taken and further biochemical analysis was performed and based on the results, out of 5 plants 3 were selected as the final candidate plants. The GPS coordinates of the orchard from where the candidate plants were selected: candidate plant 1- 26.462763^0 N 94.683070^0 E, candidate plant 2-26.462726^0 N, 94.682982^0 E and candidate plant 3-26.462808^0 N, 94.683042^0 E.

Table 19: Details about selected mother plants of Khasi mandarin

Parameters	Candidate plant 1	Candidate plant 2	Candidate plant 3
Morphological (Tree/plant)			
1. Age of the plant (years)	23	22	22
2. Height of the plant (m)	5.19 m	5.85 m	4.8 m
3. Girth of the plant (cm)	30.56	16.45	15.00
Parameters	**Candidate plant 1**	**Candidate plant 2**	**Candidate plant 3**
4. E-W Canopy length (cm)	401	456	488
5. N-S Canopy length (cm)	375	388	402
6. Canopy volume (m^3)	573.3	599.56	447.10
7. Leaf lamina shape	Lanceolate	Lanceolate	Lanceolate
8. Leaf lamina length (cm)	4.1	3.6	3.4
9. Leaf lamina width (cm)	3.5	3.4	3.0
10. Leaf lamina shape	Lanceolate	Lanceolate	Lanceolate
11. Leaf lamina length (cm)	4.1	3.6	3.4
12. Leaf lamina width (cm)	3.5	3.4	3.0
13. Tree growth habit	Erect	Erect	Erect
14. Presence/ absence of spine	Present	Present	Present
15. Spine length (if present)	3cm	2.2cm	2.8 cm
16. No. of fruits per tree per season	1150	1050	990
17. Fruit yield (kg/plant)	178.25	110.25	145.8

18. Fruit bearing habit of tree (regular/ alternate)	Regular	Regular	Regular
19. Presence/Absence of any pest or disease symptoms	No	No	No
Morphological (Fruit)			
1. Fruit weight (g)	155.00	105.00	162.00
2. Fruit length (cm)	7.2	6.4	6.77
3. Fruit diameter (cm)	8.3	7.32	7.45
4. Fruit shape	Elliptical	Elliptical	Elliptical
5. Rind thickness (cm)	0.15	0.16	0.15
6. No. of segments	11	10	9
7. Pulp colour	Light orange	Light orange	Light orange
8. Fruit colour (epicarp)	Orange	Orange	Orange
9. Shape of apex (Stylar end)	Truncate	Truncate	Truncate
10. Shape of base (Stem / button end)	Truncate	Truncate	Truncate
11. Adhesion of albedo to pulp (Loose/ tight)	Loose	Loose	Loose
12. No. of seeds	19	17	17
13. Shape of seed	Pointed	Pointed	Pointed
Qualitative analysis of fruit			
1.TSS (Brix)	11	10	9
1. Titratable acidity	1.41	1.32	1.37
2. Juice content (ml)	64	58	60
Location with coordinates	26.462763^{O}N 94.683070^{O}E	26.462726^{O}N 94.682982^{O}E	26.462808^{O}N 94.683042^{O}E
Farmer's name and address	Bendangchuba, Salulamang village, Mokokchung district	Purtemsu, Salulamang village, Mokokchung district	Sakutemsu, Salulamang village, Mokokchung district

Sample collection of leaves for virus indexing was carried out during 1st week of February, 2022 from Salulamang village of Mokokchung district. 12 samples were collected from the 3 candidate mother plants (1 plant=4 samples) and submitted to the department of Biotechnology, AAU, Jorhat on the 1st week of February for testing of CTV and citrus greening. The results showed that all the samples were +ve for Greening disease and –ve for CTV.

While for rootstock raising, rough lemon seeds were sowed during the month of December, 2021 in the primary nursery bed. Till date, the germination percentage is approximately about 74.51% and some more germination is expected till last week of February. Watering, weeding disease- pest management and nutrient management was carried out as rootstock nursery practices as per National Protocol & Standards.

Media preparation (1part top soil: 1 part sand: 1/2part coco peat) for polybags filling was started from January month and around 6000 polybags have been filled till date. The plants that have attained 4-6 cm height with 2-3 true leaves were transplanted in polybags since 2nd

week of February. Approximately 4000 ready plants have been transplanted in the poly bags. Great efforts have been made to raise the target number of rootstock plants (40,000 plants). So far 4000 ready saplings have been transplanted in the polybags and the process is in progress. It is also targeted to complete the construction of the two screen house by last week of May, 2022.

✓ **Achievements till date (Objective-wise):**

Table 20: Achievements of the Project till date

SN.	Objectives	Achievements	Remarks
1	Selection of elite candidate mother plants	3 candidate mother plants were selected (All details are tabulated in Table 1)	
2	Indexing of elite candidate plants	12 samples were collected from the 3 candidate mother plants (1 plant=4 samples) and submitted to the department of Biotechnology, AAU, Jorhat on the 1st week of February for testing of CTV and citrus greening.	Results showed that all the samples were +ve for Greening disease and –ve for CTV.
3	Submission of twigs collected from indexed candidate plants	Have discussed with PI, IBSD, Manipur for collection and submission on last week of April 2022.	
4	Raising of root stock	*Rough lemon seeds sowed *Till date, germination percentage is approximately about 74.51%	*Transplanted 4000 ready plants in secondary nursery ie, (Polybags) * Target number of rootstock plants (40,000 plants).

Details of Publications & Patents, if any:

- An extension folder entitled "Propagation Techniques in Mandarin orange and sweet orange with special reference to NE Region" have been published on 08/11/2021.
- A research paper entitled "Effect of rootstock age, Integrated Nutrient Management and seasonal variations on conventional propagation method of khasi mandarin plants under polyhouse with respect to Nagaland" have been submitted to The Pharma Innovation Journal on 1/02/2022.

✓ **Details of Recurring Expenditure:**

Table 21: Details of Recurring Expenditure

Under head Consumables, Allotted Budget: Rs.2.5lakh				
Sl no.	**Particulars**	**Quantity**	**Rate**	**Amount (Rs.)**
1	Clippers	2 nos.	490.00	980.00
2	Budding/grafting knife	2 nos.	400.00	800.00
3	Aluminium tags & wire	2 pkt	400.00	800.00
4	Secateurs	2 nos.	550.00	1100.00
5	Ziplock pouch	2 pkt	250.00	500.00
6	Ice box container	1 no.	3100.00	3100.00
7	Ice freezer pack 6pc	1 pkt	1200.00	1200.00
8	Internet dongle+SIM card	1 unit	3500.00	3500.00
9	Pendrive (16 GB)	1 No.	550.00	550.00

10	Marker pen	10 nos.	20.00	200.00
11	Stapler and pin set	1 pkt	150.00	150.00
12	Stamp paper	1 no.	120.00	120.00
13	Rough lemon seeds	6 kg	1500.00+900 .00 transportation	90900.00
14	Coco peat blocks	30 kg	320.00	9600.00
15	Sand	900 CFT	20.00	18000.00
16	Large spade	2 nos.	800.00	1600.00
17	Small spade	2 nos.	750.00	1500.00
18	Khurpi	2 nos.	350.00	700.00
19	Shovel	2 nos.	1300.00	2600.00
20	Rose can	2 nos.	1116.00	2500.00(Including 12% IGST)
21	Knapsack sprayer	2 nos.	3572.00	8000.00 (Including 12% IGST)
22	Garden gloves	4 nos.	450.00	900.00 (Including 5% IGST)
23	Garden pipe	2 rolls	2288.00	5400.00 (Including 18% IGST)
24	Plastic film (Mulching sheets)	2 rolls	2543.00	6001.48 (Including 18% IGST)
25	Agro poly bags	280 kgs	237.29	78400.00 (Including 18% IGST)
26	Cocopeat blocks	25 kg	320.00	8000.00
			Total amount	**246800.00**
			Available balance	**3200.00**

Under head Contingency, Allotted budget: Rs.50000.00				
Sl no.	**Particulars**	**Quantity**	**Rate**	**Amount (Rs.)**
1	Urea	3 bags	650.00	1950.00
2	SSP	2 bags	850.00	1700.00
3	MOP	2 bags	1650.00	3300.00
4	Ridomil	5 kg	2250.00	11250.00
5	Imidaclopride (100ml)	2 ltrs	2450.00	4900.00
6	Printing and Publication of extension folder entitled “Propagation Techniques in Mandarin orange and sweet orange with special reference to NE Region”	500 nos.	19.00	10640.00 (Including SGST)
7	Research paper entitled “Effect of rootstock age, Integrated Nutrient Management and seasonal variations on conventional propagation method of khasi mandarin plants under polyhouse with respect to Nagaland” have been submitted to The Pharma innovation journal	1	5300.00 (Publication fees)	5300.00
8	GI wires	8 rolls	-	675.00
9	Revenue stamps	50 nos.	2.00	100.00
10	Welding spade	2 nos.	100.00	200.00
11	Pesticides			7462.00
			Total amount	**47477.00**
			Available balance	**2523.00**

Under head Travel, Allotted budget:1lakh		
Sl no.	**Particulars**	**Amount (Rs.)**
1	Visit to Wokha district for survey for selection of candidate mother plants of khasi mandarin and sweet orange	5250.00
2	Visit to Mokokchung district for survey for selection of candidate mother plants of khasi mandarin and sweet orange	28384.00
3	Visit to Mokokchung district for sample collection from selected candidate mother plants of khasi mandarin for indexing of CTV and citrus greening bacterium and submission of sample to Dept. of Biotechnology of AAU, Jorhat.	24420.00
	Total amount	**58054.00**
	Available balance	**41946.00**

Fig 81. Raising and maintenance of rootstock plants under DBT project

8. List of Farmers Footfall

During 2021-22, around 300 number of persons have visited the Institute from different parts of North East Region. The visitors comprise of farmers, SHGs groups, State Horti/ Agri, extension functionaries, ATMA, trainees, students etc.

During field visit from other organization, the Institute addresses various gaps and constraints for the farmers and horticulture professionals in various areas of horticulture, outside their districts and states. Such programmes help in converging and synergising multiple on-going and planned programmes for horticulture development. It also helps to introduce growers and agricultural professionals to new technologies and techniques which could be practically used and applied in different places in respective states. This forms the integral part of acquiring knowledge as 'Seeing is Believing'. It provides opportunity to the participants of different regions to interact and learn from each other. These visits help to promote modern horticultural technology, organic horticulture and income generating activities such as protected cultivation of vegetables and cut flowers, fruits, vegetables & spices, mushroom production, post harvest & value addition in conventional horticulture.

Fig 82. Farmers/ students visit at CIH farm

9. 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 61 outsourced workers.

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

10. BUDGET

Table 22. FINANCIAL PROGRESS REPORT OF CIH, NAGALAND FOR THE YEAR 2021-22

(*Rs. in Lakhs*)

HEAD OF ACCOUNT	Budget	Revised	LOC	Expenditure
Major Head-2401	**Estimate**	**Estimate**	**Received**	**2021-22**
119-Hort & Veg Crop 55-Green Rev.-Kris. Yojn.	**2021-22**	**2021-22**	**2021-22**	**(1st April,2021 to 31st March,2022)**
57-Hort. Directorates & Instt.				
1	2	3	4	5
570101- Salary	-	-	-	-
570102- Wages	1,08,75,000.00	1,04,84,000.00	1,04,00,000.00	95,84,431.00
570106- Medical Treatment	1,00,000.00	1,00,000.00	-	-
570113- Office Expenses	22,60,000.00	25,00,000.00	25,00,000.00	23,80,800.00
570114- Rent rate & taxes	1,00,000.00	40,000.00	50,000.00	21,500.00
570116- Publication	5,50,000.00	5,50,000.00	5,37,000.00	3,42,216.00
570120- Other Admni. Expn.	58,00,000.00	50,00,000.00	44,72,000.00	17,33,523.00
570126- Advt. & Publicity	1,75,000.00	100,000.00	43,000.00	8,924.00
570127- Minor works	49,60,000.00	30,00,000.00	30,00,000.00	21,46,777.00
570128- Prof. services	4,00,000.00	2,00,000.00	-	-
570150- Other charges	1,25,00,000.00	1,25,00,000.00	1,25,00,000.00	84,49,632.00
5596-Swachhta Action Plan	2,00,000.00	2,50,000.00	2,00,000.00	77,909.00
Total (2401)	**3,79,20,000.00**	**3,47,24,000.00**	**3,37,02,000.00**	**2,47,45,712.00**
Major Head-4401				
119-Hort & Veg Crop				
16-Green Rev.-Kris. Yojn.				
01-MIDH-CIH				
160152- Machinery & Equipment	30,00,000.00	30,00,000.00	30,00,000.00	29,96,261.00
170153- Major Works	4,20,00,000.00	4,20,00,000.00	3,74,00,000.00	2,36,81,223.00
Total (4401)	**4,50,00,000.00**	**4,50,00,000.00**	**4,04,00,000.00**	**2,66,77,484.00**
G. Total	**8,29,20,000.00**	**7,97,24,000.00**	**7,41,02,000.00**	**5,14,23,196.00**

11. List of Board of Management & Technical Advisory committee

Table 23: Members of Board of Management (BOM)

Sl. no	BOM Members	Details
1	Horticulture Commissioner, Department of Agriculture & 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 Com-plex, 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

Table 24: 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

12. ANNUAL ACTION PLAN 2021-22

Table 25. ANNUAL ACTION PLAN 2021-22					
Sl.No	Components	Physical Targets	Approx. cost per unit (Rs. in lakh)	**Approx.** Financial **Allocation** (Rs. in lakh)	Name of Incharge
1	SALARIES			0.00	
2	WAGES (Labour, Security persons & Contingent staffs)			108.75	
3	**MEDICAL**			1.00	
4	DOMESTIC TRAVEL EXPENSES			0.00	
5	OFFICE EXPENSES				
a)	Office furniture (New Farmers Hostel)			5.00	
b)	Telephone bill & internet charges			1.00	
c)	Electricity bill/ Gas/ Water			1.50	
d)	Repair of motor vehicle and farm implements			1.00	
e)	Purchase of rubber stamp			0.10	
f)	Stationary			1.00	
g)	Office equipment			1.00	
h)	Computer & accessories			1.50	
i)	Printing & binding jobs			1.00	
j)	POL			5.00	
k)	AMC			1.50	
I)	Postage & Telegraph			1.00	
m)	Misc./others			2.00	
	Sub total			22.60	
6	RATE, RENT & TAXES			1.00	
7	PUBLICATION				
a)	Annual Report 2020— 2021	1 No.			Meribeni & all technical staff
b)	Technical bulletin/ training manual	2 Nos			
c)	Folders	S Nos.			
d)	Reprinting of exhausted Technical folders	10 Nos.			
e)	Procurements of books and journals				
f)	Translation of training manuals into local dialect	1 no			
	Sub total			5.50	

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	40 nos (50 trainees/batch	0.50 **Annexure -I**	20.00	Dr. Moa & all staff
ii)	Training of extension functionaries/ officers	02 nos. (40 trainees/batch	2.0 Annexure-II	4 00	
iii)	Exposure visit cum training of farmers	01,, S	3 Annexure -III	3.00	
iv)	Capacity building of staffs (As per actuals)			2.00	
v)	**Skill** development **trainings**				
a)	Floriculturist-Protected Cultivation/ Gardener as per MIDH norms	01 no		Subject to availability of fund	Sh. A.K. Singh & Sh. Arvind Singh
b)	Floriculturist-Protected Cultivation/ Gardener	02 nos.		Subject to availability of fund	
				29.00	
8.B.	SEMINAR/ WORKSHOP/ CONFERENCE/ MEETING				
i)	Workshop (Regional level for 2 days)	1 no.	2.00	2.00	Sh. Prabin Date
ii)	Technical Advisory Committee Meeting	1 no	1.00	1.00	Meribeni & Ms. Imtinaro
iii)	Board of Management Meeting	1 no	1.00	1.00	Sh. Prabin Das & Imtinaro
	Sub total			**4.00**	
8.C.	POST HARVEST MANAGEMENT				
i)	Protocol development and preparation of value added products by unemployed youths	08 trainings with 20 members per group	0.10	0.80	Ms. Vinika
ii)	Creating marketing access for the processed products	1 training with 20 members per group	0.20	0.20	
iii)	03 days programme on post harvest management processing of horticulture crops	3 nos	0.50	1. 0	
iv)	01 day awareness programme on post harvest handling and process-ing of horticulture crops	3Nos	0.50	1.50	

v	Upgradation of Minimal processing unit (Integrated packhouse)		Subject to availability of fund		
VI)	Setting up of incubation centre for promotion of start up	1 nit	5.00	5.00	
	Sub total			9.00	
8.O.	MARKETING & AGRI-BUSINESS PROMOTION				
8.D.i	Market linkage				
a)	Development of marketing linkage for horticulture crops	02 crops	1.00	2.00	Sh. Prabin Das
b)	Buyers & Sellers Meet cum Exhibition	1 no.	3.00	3.00	
8.D.ii	Market promotion				
a)	Brand development & promotion of horticultural produce from NE states	2 crops	0.50	1.00	
b)	Facilitation in standardization of horticulture produce (packaging, forward linkage) promotional activity	2 crops	1.00	1.00	
8.D.iii	Entrepreneurship development/ Agri-Start ups				
a)	Entrepreneurship development programme (3 days)	1 n €+	1.00	1.00	
b)	Training on agricultural marketing in NE states to extension officers (3 days)	2 nos.	1.50	3.00	
c)	Training to FPOs/ FPCs on marketing and value	02 nos.	0.50	1.00	
d)	Capacity building programme for agripreneurs in NIAM Jaipur (25 persons)	01 no.	3.50	3.50	
e)	Promotion & facilitation for agri-start ups (training business development)	01 no.	0.50	0.50	
	Sub total			**16.00**	
	Sub total of OAE			**58.00**	
	ADVERTISEMENT & PUBLICITY			1.75	
	MINOR WORKS				
a)	Repairing of poly house no.9 (Citrus Scion mother block)	1000 sq.m.	5.00	5 00	Sh. A K. Singh
b)	Construction of double door in poly house no. 12	1 no.	1.00	1.00	
c)	Construction of low cost polyhouse (bamboo based)	500sqm		2.00	Farm Manager
d)	Construction of RCC platform for citrus primary nursery PH Nos 1&6	10 Nos. (31mx1mx-2ft)	3.00	3.00	Sh. Arvind Singh
e)	Repair of floor in existing kitchen of Guest house	100 sqm		2.00	

f)	Construction of Shade net for Nursery unit as per MIDH norms	1 no. (500 sq m)	4.80	4.8	Sh. A.K. Singh
g)	Repairing and renovation of Fan & Pad system in poly house 6&7	2 unit	2.50	5.00	

8.B.	**SEMINAR/ WORKSHOP CONFERENCE/ MEETING**				
i)	Workshop (Regional level for 2 days)	1 no.	2.00	2.00	Sh. Prabin Date
ii)	Technical Advisory Committee Meeting	1 no	1.00	1.00	Meribeni & Ms. lmtinaro
iii)	Board of Management Meeting	1 no	1.00	1.00	Sh. Prabin Das & Imtinaro
	Sub total			**4.00**	
8.C.	**POST HARVEST MANAGEMENT**				
i)	Protocol development and preparation of value added products by unemployed youths	08 trainings with 20 members per group	0.10	0.80	Ms. Vinika
ii)	Creating marketing access for the processed products	1 training with 20 members per group	0.20	0.20	
iii)	03 days programme on post harvest *management* & processing of horticulture crops	3 nos	0.50	1. 0	
iv)	01 day awareness programme on post harvest handling and processing of horticulture crops	3Nos	0.50	1.50	
v	Upgradation of Minimal processing unit (Integrated packhouse)		Subject to availability of fund		
VI)	Setting up of incubation centre for promotion of start ups	1 unit	5.00	5.00	
	Sub total			9.00	

8.O.	**MARKETING & AGRI-BUSINESS PROMOTION**				
8.D.i	**Market linkage**				
a)	Development of marketing linkage for horticulture crops	02 crops	1.00	2.00	
b)	Buyers & Sellers Meet cum Exhibition	1 no.	3.00	3.00	
8.D.ii	Market promotion				
a)	Brand development & promotion of horticultural produce from NE states	2 crops	0.50	1.00	
b)	Facilitation in standardization of horticulture produce (packaging, forward linkage) promotional activity	2 crops	1.00	1.00	
8.D.iii	Entrepreneurship **development/ Agri-Start ups**				
a)	Entrepreneurship development programme (3 days)	1 n €+	1.00	1.00	
b)	Training on agricultural marketing in NE states to extension officers (3 days)	2 nos.	1.50	3.00	Sh. Prabin Das
c)	Training to FPOs/ FPCs on marketing and value	02 nos.	0.50	1.00	
d)	Capacity building programme for agripreneurs in NIAM Jaipur (25 persons)	01 no.	3.50	3.50	
e)	Promotion & facilitation for agri-start ups (training business development)	01 no.	0.50	0.50	
	Sub total			16.00	
	Sub total of OAE			5g.00	
	ADVERTISEMENT & PUBLICITY			1.75	
	MINOR WORKS				
a)	Repairing of poly house no.9 (Citrus Scion mother block)	1000 sq.m.	5.00	5 00	Sh. A K. Singh
b)	Construction of double door in poly house no. 12	1 no.	1.00	1.00	
c)	Construction of low cost polyhouse (bamboo based)	500sqm		2.00	Farm Manager
d)	Construction of RCC platform for citrus primary nursery PH Nos 1&6	10 Nos. (31mx1mx-2ft)	3.00	3.00	Sh. Arvind Singh
e)	Repair of floor in existing kitchen of Guest house	100 sqm		2.00	
f)	Construction of Shade net for Nursery unit as per MIDH norms	1 no. (500 sqm)		4.8	Sh. A.K. Singh
g)	Repairing and renovation of Fan & Pad system in poly house 6&7			5.00	

h) Construction of retaining wall along road in middle block I'			4.00	4.00	
i	Construction of ceiling and toilet in existing Min Processing Unit		300	3.00	Sh. Arvind Singh
j)	Installation of Solar Power back up for Administration building		5.00	5.0C	Admin Staff
k)	Rennovation of existing machang		1.00	1.00	Farm Manager
l)	Construction of water stand at Guest house		1.00	1.00	Sh. Prabin Das
m)	Installation of main pipe line & drip irrigation system for last block		6.80	6.8C	
n)	Construction of platform for existing Electrical Sub- station		1.00	1.0C	
0)	Construction of toilets for workers near to pot house	4 f1CIs.	1.25	5.0C	Sh. Arvind Singh
p)	Bance work of Terracing			**Subject to** availability of fund	Sh. Arvind Singh
	Sub total			49.60	
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			4.00	
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				
1	Management of existing demonstrations in the institute				
a)	Production & maintenance of vermicompost	9 units	0.4	0.40	
b)	Maintenance of existing bee colonies	3 colonies	0.10	0.10	Ms. Marina
c)	Maintenance of mushroom unit (Oyster & Shiitake)	2 units	0.25	0.50	
d)	Green manuring crop in fruit blocks (green gram, rajma, sunhemp & Dhanchia)	10ha	0.50	0.50	Mrs. Meribeni

e)	Procurement of FYM for farm	20 truck loads	1.00	1.00	Sh. A.K.Singh/ Sh.Mhasi
f)	Procurement of fertilizer & chemical for farm & nursery units		1.50	1.50	Sh. A.K.Singh
g)	Procurement of manures, fertilizers 8 chemicals for protected cultivation		Annexure	2.00	Sh. Arvind Singh
h)	Demarcation of orchard blocks with sign board	All Blocks	1.00	1.00	Sh. Mhasi
i)	Establishment of Low poly tunnels, Rain shelter houses		5.00	5.00	Mrs. Meribeni & Sh Arvind Singh
j	Maintenance of herbal garden		0.10	0.10	Mrs. Meribeni
k)	Procurement of Cow feeds, immunization etc		0.25	0.25	Ms. Pete
	Sub total			**12.35**	
ii	Demonstration of improved technologies in the institute				
a)	Establishment of Guava var. CISH Improved 6 radish guava cultivar, Bael var. CISH Improved, Jamun and Peach.	D block 0.25ha	0.25	0'2	Sh. A.K Singh & Sh.Mhasi