Annual Report

(2014-15)

CENTRAL INSTITUTE OF HORTICULTURE

DEPARTMENT OF AGRICULTURE AND COOPERATION

MINISTRY OF AGRICULTURE, GOVERNMENT OF INDIA

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CENTRAL INSTITUTE OF HORTICULTURE
MEDZIPHEMA: NAGALAND

ANNUAL REPORT
2014-15

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CIH Annual Report, 2014-15

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KRISHI BHAWAN, NEW DELHI-110 001

Dated : 24th June, 2015

FOREWORD

North East Region is endowed with diverse agro climatic conditions, varied soil types and abundance of rainfall has huge potential for cultivation of tropical, subtropical and temperate horticultural crops. The infrastructure facilities created under Horticulture Mission for North East and Himalayan State (HMNEH) such as nurseries, mother blocks, protected structure, water reservoirs, machines/tools and post harvest handling and storage etc. have helped in improving the production of horticultural crops.

Apart from HMNEH interventions, the Central Institute of Horticulture (CIH) has been imparting various training programmes both for officials, farmers entrepreneurs, SHG's, NGO's or allied as a part of capacity building promoting production of quality planting materials, protected cultivation, organic farming, nursery accreditation and certification, post harvest management activities and marketing aspects. Besides, introduction of four certificate courses for unemployed youth, the institute also has been organizing exposure tours for potential entrepreneurs, officials and progressive farmers. The institute has been actively co-ordinating with various reputed institute, different organization and stake holders of horticulture in the region and the state government departments of North east region in an effort to achieve its objectives.

The North East Region has become one of the leading producers of mandarins, pineapple, kiwi, banana, ginger, turmeric, potato, onion, orchids, anthurium, roses and chrysanthemum. Several success stories experienced by farmers about rejuvenation of citrus orchards, tissue culture banana, high density planting system, hi-tech nurseries, commercial spices and flower production are the indicators of significant development of horticulture in the NER and hills. The productivity of many of the horticultural crops is still below the national level. Development of human resource through trainings and transfer of technology for large scale adoption of hi-tech production system shall help in increasing the production and productivity of horticultural crops on the lands of small and marginal farmers. I am happy to learn that CIH has made good progress in he past one year and many new initiatives were taken for the development of horticulture in NER.

The Director and his team has been putting their sincere effort to carry forward the mandate of institute and to achieve its target for improving the Horticulture sector in this region. I am very happy that CIH is bringing out its annual report highlighting achievements made during the year 2014-15. I wish the institute all success in its future endeavour.

(S.K. Malhotra)

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EXECUTIVE SUMMARY

The Central Institute of Horticulture has been striving hard towards achieving its mandate with its available resources for addressing key issues relevant to horticulture development in the region and has made some significant achievements so far. This emphasized on the reports on a number of significant advances the institute has made in 2014-15. Inspite of manpower and other logistic constraints, the institute with regard to production of quality planting material, the Institute has established about 12 ha area under different fruit blocks as mother plants for scion collection to be used in different propagation activities and developed about 56,000 plants of quality planting material in different fruit crops. During the year under report, gap filling has been done for three crop in the existing scion blocks of guava, cashew nut and citrus as these orchards were aged and unproductive. Raising of rootstocks and propagation of citrus, cashew nut, guava and mango was also successfully carried out in the Institute.

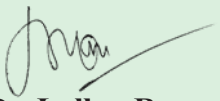
In terms of technology demonstrations, various activities like high density plantation of banana, plantation of pomegranate, litchi, Cultivation of pineapple under plastic mulch, plantation of tomato, capsicum and cucumber under polyhouse, establishment of organic model farm of turmeric, organic cultivation of french bean, broccoli, cultivation of off season onion, mulching with black polythene in exotic citrus, mango, old guava, pomegranate, aonla, peach and bael block etc were taken up at the Institute farm. In the farmers field, demonstration of improved technologies such as Demonstration of Banana var. Grand Naine, Mango var. Amrapalli and Mallika, Cashewnut var. VRI-3, V-4, BBSR 1, Sweet orange var. Early Gold and Olinda Valencia, Mandarin orange var. Khasi Mandarin and demonstration of vegetables (broccoli, cabbage, spinach and French bean) etc was implemented.

In the field of technology transfer, the institute has organized 26 trainings which were attended by farmers 1273 and two training for trainers (69 officials) were conducted in identified areas of horticulture in the region. The Institute has also organized two numbers of exposure trips to reputed Institutes in the country for the officials and farmers of North East Region besides participation in various exhibitions and trade fairs. Extension bulletins and folders with special reference to focus horticultural crops of NER was also published by the institute for technology dissemination.

The importance of using clean and healthy nursery stocks is no doubt crucial and hence establishment of more number of registered nurseries is required since there is shortage of quality planting material in the NER. Therefore, in order to facilitate accreditation of nurseries for horticulture crops, CIH has been authorized as the nodal agency for providing accreditation and certification of nurseries in the region. The certificate course for the less educated youth of NER has also been initiated to provide self employment and entrepreneurship in focused areas. Various issues for horticulture development in the region has also been discussed through National and International seminar to achieve milestone of CIH.

Central Institute of Horticulture with the objective to work towards holistic development of horticulture sector in NER took several initiatives in creating market linkage and promoting the produce of the region by organizing trainings, exposure trips, workshops/seminars, buyers and sellers meet to provide platform to the farmers to understand the issues related to production and marketing of horticulture crops.

These few achievements made by the Institute has been possible by the sincere, hard work and tireless effort of entire CIH staff and with the guidance and advice of Horticulture Commissioner and his officials at DAC, Ministry of Agriculture, Government of India. 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. Lallan Ram
Director

1. INTRODUCTION

Central Institute of horticulture was established in the year 2006 for the holistic development of horticulture sector in the North East Region. Located at Medziphema, Nagaland about 30 km from Dimapur city and 44 km from the capital city Kohima the Institute spreads over an area of 43.50 hectare. The main thrust areas of the Institute are refinement and demonstration of identified technologies pertaining to the region; production and supply of quality seed and planting material; training and capacity building of state government officials, field functionaries and farmers on different aspects of horticulture development including organic farming, monitoring of centrally sponsored programmes in the area of horticulture, post harvest management, processing, value addition, marketing and agribusiness promotion.

VISION

To emerge as the pioneering, innovative, farmer focused and self-supporting 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.

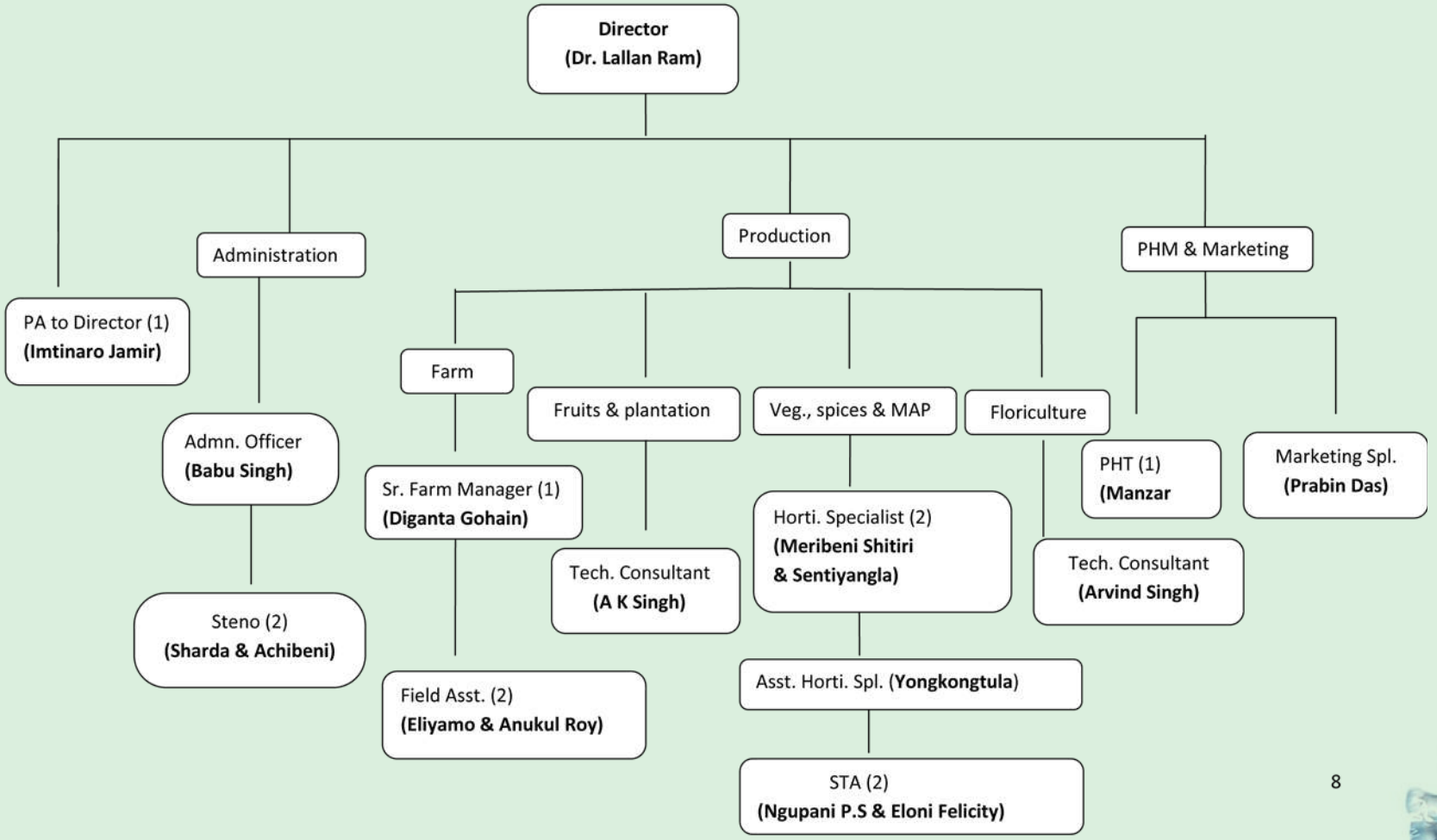
OBJECTIVES

- Capacity building by training of trainers and farmers/beneficiaries.
- Demonstration of improved production technologies.
- Accreditation and certification of nurseries in NER
- 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 Govt. officials and farmers/beneficiaries of North Eastern Region.
- Production and supply of quality planting material.
- Accreditation and certification of nurseries in NER
- Transfer of technology through method and result demonstration and publication of folders, manuals, leaflets etc
- Promotion of organic farming.
- Post harvest, marketing and agri-business promotion through exhibition, seminars, workshop, exposure trip, buyers' seller meet.
- Coordination with state horticulture departments of NER and other National organizations.
- Monitoring of centrally sponsored programmes in the area of horticulture

ORGANIZATIONAL SETUP



2 HORTICULTURE SCENARIO IN NORTH EAST REGION

The North-eastern region comprises of eight states viz., Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura and Sikkim falls under high rainfall zone and the climate ranges from temperate to sub-tropical and tropical. The region lies between 21.5°N-29.5°N latitudes and 85.5°E-97.3°E longitudes with a total geographical area of 262180 km^2 which is nearly 8% of the total geographical area of the country. The region is characterised by difficult terrain, wide variations in slopes and altitudes, land ownership system and indigenous cultivation practices.

A large number of horticultural crops are grown in the north eastern region, many of them were originated in this region like banana, mango, a large number citrus species, flowers, etc. Among the states of the NER,in terms of fruit production and area, Assam occupies maximum followed by Arunachal Pradesh and Tripura. Similarly in vegetable production Assam has occupied maximum in production and covered area under the crop . The north eastern region is well known for diverse non-traditional and indigenous fruits and vegetable grown in different agro-climatic conditions may be grouped as temperate, subtropical and also tropical origin. Some of the non-traditional and indigenous fruits and vegetables *Baccaurea sapida, Flacourtia gangomos, /Dillenia indica, /Averrhoa carambola, Prunus persica, Prunus domestica, Gugenia jampolana, Rhus semialata, Phyllanthus emblica, Annonu squamosa* etc.

The economy of north eastern states depended mainly on agriculture and more particularly based on horticulture. Out of the total population, 84.34% of people are rural based against 72.18% of national average. Although the farmers are producing various traditional crops like orange, banana, pineapple, ginger, turmeric for their livelihood, low production and poor productivity could not make much impact on income generation, food and income security. Commercial production of the horticultural crops yet to gain popularity in the region, though the concept of cultivation of the horticultural crops is associated with the culture and system of living of the people of the region. However, with the initiation of HMNEH, there was a tremendous impact on all fruits, vegetables, flowers production including research, marketing and value addition and post-harvest management. Production of fruit and vegetable has made several fold increase in area, production and also productivity. Increasing production in fruit and vegetable not only improved the economy of the growers and traders has also improved the situation of fruit and vegetable availability in this region, could make an indirect impact on per capita availability of fruit and vegetable to meet the challenge of nutritional security. The state wise status of horticulture in North East is as follows and indicated in Table 1.

Arunachal Pradesh produces about 0.21 m MT of horticultural crops from an area of about 0.01 m ha. Major share of production is from fruits (51.88%), vegetables (18.51%) and spices (29.62%). It produces about 0.3% of the total production of Apples and is ranked fourth most apple producing state in the country. The production of apples is about 10,000 MT from an area of about 13,000 ha having productivity of 0.8 MT/ha, forming about 9.27% of the total production of fruits in the state. The production of Banana forms about 12.33% of the total fruit production in the state with a production of 13,000 MT from an area of 5400 ha having productivity of 2.46 MT/ha. Citrus production is 36,000 MT from an area of 34,000 ha having productivity of 1.04 MT/ha. Production of pineapples is 34,000 MT from an area of 11,000 ha having productivity of 3.2 MT/ha. The State also produces about 61,600 MT of spices from 10,000 ha having productivity of 6.1 MT/ha. In flowers, it contributes about 4.14% to the total production of cut flowers in the country.

Manipur produces about 0.55 m MT of horticulture crops from an area of 0.10 m ha. Major horticulture produce is from fruits (52.34%) and vegetables (43.24%). Banana and Citrus form 12.19% and 16.77% respectively of the total production of fruits in the state. It contributes about 7.4% of the total production of pineapples in the country with production of 0.10 m MT of pineapple from an area 0.01 m ha with productivity of 8.6 MT/ha.

Meghalaya produces about 0.69 m MT of horticultural crops from an area of 0.10 m ha Major horticulture produce comprises fruits (35.22%) and vegetables (51.90%). Banana and Citrus form 27.82% and 16.08% respectively of the total fruit production in the state. It produces about 0.09 m MT of pineapple from an area of 0.01 m ha with productivity of 8.9 MT/ha. Potato constitutes 45.55% of the total vegetable crops in the state with productivity of 10.92 MT/ha. Meghalaya is ranked fourth among the most Tapioca producing states and accounts for 0.33% of the total production of tapioca in the country with productivity of 5.4 MT/ha.

Mizoram produces about 0.46 m MT of horticulture produce from an area of 0.07 m ha Major horticulture production comprises fruits (46%) and vegetables (25.15%). Banana, Citrus, Grapes and Papaya forms 56.07%, 20.76%, 9.6% and 3.2% respectively of the total fruit production in the state. Cabbage and potato constitute 24.79% and 11.67% of the total production of vegetables in the state.

Nagaland is producing about 0.27 m MT of horticulture crops from an area of 0.04 m ha. The major horticulture produce comprises fruits (55.88%) and vegetables (29.32%). Banana and Citrus constitutes 38.84% and 11.24% of the total fruit production in the state. Nagaland constitutes about 4.1% of the total production of pineapples in the country with productivity of 15.5 MT/ha. Nagaland produces about 38500 MT of spices with productivity of 5.2 MT/ha.

Sikkim produces about 0.20 m MT of horticulture produce from an area of 0.07 m ha The major horticulture production constitutes vegetables (60.72%), spices (26.32%) and fruits (12.96%).Citrus constitutes about 55.81% of the total fruit production in the state. Potato, Peas and Cabbage form 37.80%, 7.11% and 5.71% respectively of the total vegetable crops in the state. It produces about 0.05 m. MT of spices with productivity of 2.1 MT/ha.

Tripura produces about 1.21 m MT of horticulture produce from an area of 0.09 m ha Major horticulture produce comprises fruits (53.18%) and vegetables (43.97%). Banana and Citrus form 19.41% and 6.07% of the total production of fruits in the state. Tripura is ranked fourth in production of pineapples in the country and accounts for 10.8% of the total production of pineapples in the country with productivity of 22.6 MT/ha.

Table 1. Area (A)and production (P) of horticulture crops in NER (2013-14)

Area in ha ('000); Production in MT ('000)

State	Fruits		Vegetables		Flowers			Aromatic		Spices		Plantation	
	A	P	A	P	A	P		A	P	A	P	A	P
						loose	cut						
Arunachal Pradesh	89.09	321.26	1.40	35.00	0.02	0.01	1.86	5.15	109.18	10.17	64.27	1.00	0.56
Assam	144.68	2007.80	281.40	3031.90	3.00	20.00	32.69	4.35	0.16	93.80	279.14	97.80	174.56
Manipur	54.05	515.69	25.19	271.04	0.76	0.28	0.01	0.00	0.00	10.47	24.14	0.90	1.50
Meghalaya	35.30	348.00	43.60	515.35	0.05	0.00	2.37	0.00	0.00	17.50	83.88	25.61	29.40
Mizoram	57.55	343.90	41.10	254.14	0.20	171.57	1.23	1.11	0.90	22.47	59.62	7.60	4.40
Nagaland	40.56	411.00	38.55	492.37	0.01	0.00	0.36	0.00	0.00	9.77	39.16	1.67	11.35
Sikkim	16.02	24.05	26.11	134.53	0.24	16.00	1.88	0.00	0.00	32.06	55.80	0.00	0.00
Tripura	68.38	786.35	46.69	780.52	0.00	0.00	0.00	0.00	0.00	5.69	18.04	15.81	32.20
Total	**505.63**	**4758.05**	**504.04**	**5514.85**	**4.28**	**207.86**	**40.4**	**10.61**	**109.34**	**201.93**	**624.05**	**150.39**	**253.97**

Sources: *National Horticulture Board database 2015*

3. ACHIEVEMENTS

3.1. PRODUCTION AND DISTRIBUTION OF QUALITY PLANTING MATERIAL

3.1.1. Establishment of scion/mother block under field condition

Low productivity of different horticultural produce in the region is largely due to non-availability of quality planting material, including seeds. Availability of genuine planting material being very important for horticulture development, one of the key mandates of CIH is production of quality planting material and the Institute have established about 12 ha area under different fruit blocks as mother plants for scion collection to be used in different propagation activities. The following fruit crops were established.

Sl. No	Crops	Varieties
1	Sweet orange	Early Gold, Rhod-e-Red, Trovita, Cara-cara Navel, Ruby Nucellar, Moro Blood, Olinda Valencia, Itaborai,
2	Tangerine/ Mandarin	Clemenule, Daisy Tangerine, W. Murcott, Sikkim Mandarin, Khasi Mandarin, STG, Nagpur Mandarin
3	Lime	Bears lime, Mexican lime, Acid lime
4	Lemon	Eureka Lemon, Lisbon lemon, Kachai lemon
5	Cashew	VRI-3, Vengurla-4, BBSR -1,H-2/16,H-1608, Bhaskara, Dhana, V-7, Ullal-3, Ullal-4, Priyanka, VRI-3,Sel.-2
6	Guava	Sweta, Lalit, Allahabad safeda, Lucknow-49,
7	Mango	Langra, Bombay green, Pant Sinduri, Dashehari, Mallika
8	Litchi	Shahi, Seedless, Kalkatia, Red Rose Scented, China and Tezpur
9	Bael	B-2,NB-5,NB-6
10	Aonla	Kanchan ,NA-6, NA-10, NA-7, Krishna, Laxmi -52
11	Peach	Shane-E-Punjab
12	Passion fruit	Purple local, Yellow

Litchi

Litchi is one of the popular and focused subtropical fruits of the North-east region where it is consumed as fresh fruits. During the period under report, establishment of new mother block for Litchi var. Shahi, China and Tezpur was carried out in an area of 1 ha following the right technical specification. The planting material was procured from National Research Centre on Litchi, Bihar. The main objective of establishment of the mother block is to evaluate the performance and suitability of the cultivar under Nagaland condition.

Pomegranate

Pomegranate is capable of growing in different agro-climatic conditions however, its major cultivation is confined in tropical and subtropical regions. Since one of the key areas of CIH is production of quality planting material, the Institute has planted pomegranate var. Bhagwa in an area of 0.50 ha with an objective to evaluate the performance of pomegranate in NEH region. The planting material was procured from National Research Centre on Pomegranate, Solapur, Maharashtra. The plantation was

Pomegranate plantation in field

Litchi plantation in field

carried out following the recommended package of practices and after consultation and coordinating with the scientists of NRCP.

During 2014-15, gap filling of existing mother blocks was done in fruit crops such as Guava var Lucknow-49 (350 nos), Allahabad Safeda (120 nos), Shweta (50 nos), Lalit (40 nos). The total number of gap filling done for Cashew nut var. BBSR-1, V-4,VRI-3,H-2/16 and H-1608 is 150 , whereas for citrus var Early Gold, Rhode- e- Red,Olinda Valencia and W.Murcott, 60 nos of plants were gap filled.

3.1.2. Raising of Rootstocks

Rootstock plays a crucial role for survival and establishment of tree in the field as well as productivity. 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, cashewnut, guava, mango and rose for further multiplication. The number of rootstocks raised at the Institute during the year 2014-15 are Rangpur lime (30,000), rough lemon (10,000), cashewnut (6000), mango (5000), guava (6000).

Buddable stage of citrus rootstock

Guava rootstock seedlings ready for grafting

Cashew rootstock ready for grafting

Mango rootstock ready for grafting

3.1.3. Propagation

The development of horticulture greatly depends upon the use of quality planting material in the production system. 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 in crops like citrus, cashew, rose, mango and guava. During the period under report, the Institute has propagated 3250 nos of cashew nut in varieties V-4, VRI-3, BBSR-1, H-1/16 and H1806. The propagation method followed in cashew nut is soft wood grafting. In guava var. Sweta, L-49, Lalit and Allahabad Safeda, 6300 nos of plants were propagated by wedge grafting method, 4200 nos of citrus var. Khasi Mandarin following T-Budding and Wedge grafting method and in mango var. Dashehari, Langra, Amrapali 2400 nos were propagated by wedge grafting method. The successful propagated plants are used for gap filling and distribution to the farmers for demonstration programmes.

Soft wood grafted cashew plants

Wedge grafted guava plants

T- budding in citrus

Wedge grafting in mango

3.2 TECHNOLOGY DEMONSTRATIONS

3.2.1 AT INSTITUTE LEVEL

For transfer of technology, establishing of demonstration plots of focused and important horticultural crops were conducted time to time at campus for introducing the latest technology to increase horticulture production and dessiminate to the farmers in particular and uplift of the rural masses in general.

3.2.1.1. PROTECTED CULTIVATION

1. Cherry tomato

Cherry tomato (*Solanum lycopersicum* var. cerasiforme)is a relatively warm season crop. Plants grow well at the temperature range of 19°C to 30°C. It also requires plenty of sunshine but low humidity, continuous rain in the hot weather will increase disease problems such as bacterial wilt, blight, rot and fruit cracking. During the period under report, cultivation of cherry tomato was planted during November 2014 to study the performance of variety Omaxe under polyhouse in an area of 100 sqm. Observations were also recorded on plant growth and physico-chemical parameters at different interval after planting. The main characteristics of which are given in Table 2 and 3.

Table 2. Growth characters of cherry tomato

Variety	DAS	Plant height (cm)	No. of branches	No. of leaves/ branch	No. of flowers / plant	No. of fruits/ plant
Omaxe	15 days	28.50	4.00	73.00		
	30 days	87.66	13.00	325.00	6.00	
	60 days	302.40	10.00	1181.00	60.00	51.00
	90 days	409.80	17.00	1340.00	74.00	89.00

DAS : Days after sowing

Table 3. physico-chemical parameters of cherry tomato

Fruit length (cm)	Fruit breadth (cm)	Fruit wt. (g)	Acidity (%)	Vit. C (mg/1g of pulp/juice	T.S.S (^{0}Brix)	Reducing sugar (%)	Non-reducing sugar	Total sugar
2.12	2.11	6.42	1.03	276	7.4	3.80	5.06	9.13

2. Tomato

Tomato (*Lycopersicon esculentum L*)is one of the most popular and widely grown vegetables ranking second in importance to potato in many countries. The fruits are eaten raw or cooked. Tomato in large quantities is used to produce soup, juice, ketchup, puree, paste and powder. It supplies vitamin C and adds variety of colours and flavours to the food. Green tomatoes are also used for pickles and preserves. It is adapted to wide range of soils and climates extending from the tropics to almost the Artic circle. During 2014-15, cultivation of tomato was undertaken to study the performance of variety Ramganga under polyhouse in an area of 200 sq m and observations on plant growth and physico-chemical parameters were also recorded as given in Table 4-5.

Table 4. Growth characters of tomato

Variety	Date of planting	DAS	Plant height (cm)	No. of branches/ plant	No. of leaves/ branch	No. of flowers/ plant	No. of fruits/ plant
Ramanga	Nov. 2014	15 days	30.58	5.00	44		
		30 days	69.04	9.00	202		
		60 days	276.80	12.00	900	53	9
		90 days	409.80	18.00	1340	74	89

DAS : Days after sowing

Table 5. Physico-chemical parameters of tomato

Fruit length (cm)	Fruit breadth (cm)	Fruit wt. (g)	Acid-ity (%)	Vit. C (mg/1g pulp/juice	T.S.S (^{0}Brix)	Reduc-ing sugar	Non-reducing sugar	Total sugar
2.12	2.11	6.42	1.03	276	7.4	3.80	5.06	9.13

3. Capsicum

Sweet pepper [*Capsicum annum* L. var. Grossum (L) Sendt] is one of the important vegetable crops which require mild climate for its growth and development. The fruits are harvested either at green mature stage or at colouring stage and is a very good source of vitamin A and C and other nutrients having great demand in big cities and other urban areas of the country and fetch very high price. Capsicums are grown under shade net houses and green houses to get good quality and better yield round the year. During the period, cultivation of capsicum variety Indam Bharath and Lucinde was carried out to study the performance of the variety under Nagaland condition. The growth parameters recorded is given in Table 6.

Table 6. Growth characters of capsicum

Variety	Date of planting	DAS	Plant height (cm)	No. of branches/ plant	No. of leaves/ branch	No. of flowers/ plant	No. of fruits/ plant
Indam Bharath	Nov. 2014	15 days	11.78	2.00	15.00		
		30 days	23.38	4.00	31.00		
		60 days	55.90	6.00	56.00	3.00	2.00
		90 days	70.10	6.00	80.00	4.00	6.00
Lucinde	Nov. 2014	15 days	11.72	2.00	15.00		
		30 days	23.44	3.00	31.00		
		60 days	56.80	4.00	38.00	4.00	1.00
		90 days	76.60	6.00	70.00	5.00	6.00

4. Cucumber

The cucumber (*Cucumis sativus L.*), Known as Khira in Hindi is a very popular and important vegetable grown in hills and plains of India. It is used as salad, pickle and also as cooked vegetable. It has a cooling effect, prevents constipation, useful in jaundice and seeds have number of ayurvedic uses. During the period, cultivation of cucumber variety Kian was sown during November 2014 to study the performance under polyhouse condition of Medziphema, Nagaland. Observations recorded for growth parameters is given below.

Table 7. Growth characters of cucumber cv Kian

DAS	Plant height (cm)	Branches/ plant	Leaves/ branch	Flow-ers/ plant	Fruits/ plant	Fruit length (cm)	Fruit diameter (cm)	Fruit wt. (kg)
15 days	12.45	3.00	5.00					
30 days	28.26	3.00	11.00	4.00	3.00	17.06	5.38	93.00
60 days	46.37	6.00	26.00					

Cherry tomato cv Omaxe in polyhouse

Tomato var. Ramganga in polyhouse

Capsicum var. Indam Bharat in polyhouse

Cucumber var. kian in polyhouse

3.2.1.2 Open field

1. Turmeric

Turmeric *(Curcuma longa)* the sacred spice is used as condiment, dye, drug and cosmetic in addition to its use in religious ceremonies. It is an erect, perennial herb grown as an annual crop. Turmeric prefers a warm, humid climate with a rainfall of 1500 mm and temperature of 20^0-30^0C. Turmeric being a value added crop may be cultivated by the farmers on commercial basis. During 2014-15, demonstration of organic model farm for cultivation of turmeric variety Megha Turmeric-1 was undertaken in an area of 0.5 ha. It was planted at a spacing 25 x 30 cm during the month of April 2014. The parameters recorded is given in Table 8.

Table 8. Physico-chemical Characteristics of turmeric

Cultivar	DAS	Plant ht. (cm)	No. of leaves / plant	No. of clumps / plant	Yield/ plant (kg)	Total yield (tonnes)	Curcumin content (%)
Megha Turmeric-1	30 days	15.40	4.00	2.00	0.50	2.8	4.60
	60 days	24.61	6.00				
	90 days	42.82	9.00				
	120 days	65.90	12.00				
	150 days	84.65	18.00				

2. French bean

French bean (*Phaseolus vulgaris L.*) is an important cold season vegetable grown for its tender pods, shelled green beans and dry beans (rajmah). A demonstration plot was established on organic cultivation of French bean var Arka Anoop which was sown during October 2014 at CIH farm in an area of 0.25 ha to study the effect of different organic manures. The data recorded is given below in Table 9 which revealed that all the treatment was found to have significant effect in different characteristic of french bean over control except in number of seeds available in pod. The treatments were FYM+ Bio fertilizers, Pig manure + Bio fertilizers, 50% FYM+50% Pig manure and control. Manures were incorporated at the time of planting and seeds were sown at a spacing of 40 x 20 cm in a plot size of 14 x 14 m.

Table 9. Effect of different organic manure on vegetative growth and yield of French bean var. Arka Anoop

Treatments	Plant height (cm)	No. of leaves/ plant	No. of branch-es /plant	No. of pods /plant	Pod dia. (cm)	Pod length (cm)	Pod wt. (g)	No. of seeds/ pod	Wt. of seeds/ pod (g)
FYM+ Bio fer-tilizers	22.60	18.00	5.00	6.00	1.32	2.97	3.88	3.00	0.42
Pig manure + Bio fertilizers	21.55	18.00	5.00	10.00	0.58	2.87	4.54	3.00	0.49
50% FYM+50% Pig manure	21.79	18.00	5.00	9.00	0.58	3.45	4.79	3.00	0.48
Control	15.24	14.00	4.00	6.00	0.59	3.53	3.91	3.00	0.40

3. Onion

Onion *(Allium cepa)* is a cool season vegetable crop but its demand remain constant year round in the market due to its usefulness as an essential ingredient in various culinary recipes and as raw in salad. Besides onion is the largest contributor of foreign exchange earning from export among fresh horticultural produce. During the reported period, demonstration on off season production of Kharif onion variety Prema-178 was conducted in an area of 0.10 ha. The main objective of the demonstration is to evaluate the performance of the variety and its effect on organic manures. A total of four treatments were replicated three times in a randomized block design. The treatments were farmyard manure @ 6 tonnes/ha, pig manure@5 tonnes/ha, vermicompost @4 tonnes/ha and control. Manures were incorporated at the time of planting. Onion was planted at a spacing of 15 x 10 cm in a plot size of 1 x 1 m during the month of November 2014. Observations were recorded at regular intervals and the parameters recorded are detailed in Table 10 where the result indicated that application of Pig manure was found to be better than that of other treatments in respect of bulb weight and bulb diameter. However plant height was better in the plants treated with FYM.

Table 10. Effect of different organic manure on vegetative growth, yield and quality of Onion var. Prema-178

Treatments	Plant height (cm)	No. of leaves/ plant	Neck thickness (cm)	Bulb dia. (cm)	Wt. of bulb (g)	T.S.S (^{0}Brix)
Vermicompost	17.40	4.33	4.90	18.02	12.23	8.92
Pig manure	25.33	5.33	5.16	32.35	23.99	8.80
FYM	27.30	5.33	4.16	29.98	22.77	12.08
Control	8.46	3.00	2.50	15.12	9.00	8.60

4. Broccoli

Broccoli (*Brassica oleracea* var. *italica*) is an important cole crop. Broccoli is usually boiled or steamed. It contains high amount of vitamins A, C and minerals like K, P, Ca, Fe and also thiamine, riboflavin, niacin. It is the richest source of protein among cole crops. A high intake of broccoli has been found to reduce the risk of cancer and also prevents heart disease. During the period under report, cultivation of broccoli variety Sakura was planted as part of demonstration in an area of 0.10 ha. A total of four treatments farmyard manure @ 6 tonnes/ha, pig manure@5 tonnes/ha, vermicompost @4 tonnes/ha and control were replicated three times and was incorporated at the time of planting. It was planted at a spacing of 60 x 45 cm in a plot size of 1 x 1 m during the month of October 2014. Regular observations were recorded for different manures and is given in Table 11 which indicates that application of Pig manure showed significant impact on growth and other attributes of broccoli followed by vermicompost.

Table 11. Effect of different organic manure on vegetative growth of Broccoli var Sakura

Treatments	Plant height (cm)	Days taken for bud initiation	Diameter of curd/ head (cm)	Wt. of curd (kg)
Vermicompost	45.93	60	11.38	0.50
Pig manure	42.65	60	13.46	0.75
FYM	44.90	60	10.18	0.31
Control	23.53	60	8.00	0.20

Turmeric in field

French bean in field

Onion in field

Broccoli in field

5. Pineapple

Pineapple under plastic mulch

Pineapple (*Ananas comosus*) is one of the commercially important fruit crops of India. It is one of the choicest fruit all over the world because of its pleasant taste and flavor. Pineapple is a good source of vitamin A and B and fairly rich in vitamin C and minerals like calcium, magnesium, potassium and iron. It is also a source of Bromelain, a digestive enzyme. In addition to being eaten fresh, the fruit can also be canned and processed in different forms. It is being cultivated in high rainfall and humid coastal regions of peninsular India and hilly areas of North-Eastern region. Of late, it has been shown that pineapple can also be grown commercially in the interior plains with medium rainfall and supplementary protective irrigation. During the reported period, the Institute has under taken cultivation of pineapple under plastic mulch in an area of 625 m^2 as part of demonstration programme.

6. Mulching with black polythene in fruit crops

Mulching is the process or practice of covering the soil/ground to make more favourable conditions for plant growth, development and efficient crop production. When compared to other mulches, plastic mulches are completely impermeable to water; it therefore prevents direct evaporation of moisture from the soil and thus limits the water losses and soil erosion over the surface. In this manner it plays a positive role in water conservation. As such, during 2014-15, the institute has mulched fruit block especially in exotic citrus, mango, old guava, pomegranate, aonla, peach and bael bock with black polythene mulch.

Exotic citrus plants under plastic mulch

Mango plants under plastic mulch

Guava plants under plastic mulch

Litchi plants under plastic mulch

Strips mulching in peach

Strips mulching in aonla

7. Intercropping of Cassava

Due to increased emphasis on long-term management of weed populations in cropping systems with a reduced reliance on herbicides, the production of seeds by weeds that emerge after the critical period for weed control is increasingly important. Therefore, in order to control weeds especially thatch grass and generate additional income, the institute has done intercropping of Cassava in pineapple and rootstock block in an area of 1 ha

Intercropping of Cassava

8. Intercropping of Tuberose

Tuberose (*Polianthes tuberosa*) commonly known as Rajni gandha. It produces waxy, white and fragrant flowers on long spikes, which are mostly used as cut flowers; for making garlands and extracting essential oil. The Institute during the reported year has also intercopped tuberose in fruit crops and along roadside in an area of 1 ha.

Intercropping of tuberose in roadside and citrus orchard

9. Production of organic inputs

Vermicomposting is a simple biotechnological process of composting, in which certain species of earthworms are used to enhance the process of waste conversion and produce a better end product. Vermicompost has been shown to be richer in many nutrients than compost produced by other composting methods. Unlike other compost, worm castings also contain worm mucus which helps prevent nutrients from washing away with the first watering and holds moisture better than plain soil.

During the period under report, the Institute has undertaken heap method of vermicomposting for production of organic inputs. The organic inputs produced by CIH through vermicompost and NADEP is about 6 tonnes annualy.

3.2.1.4 Maintenance of existing plantation of various horticulture crops

1. Ultra high density plantation of guava

Guava (*Psidium guajava*) is an important fruit crop in tropical and subtropical regions of the country due to the hardy nature of its tree and prolific bearing even in marginal lands. Its cultivation requires little care and inputs. The traditional system of cultivation has often posed problems in attaining desired levels of productivity due to large tree canopy. Hence, a need arose to improve the existing production system, besides increasing its productivity through higher density or meadow orcharding to control tree size and maintain desired architecture for better light interception and ease in operations such as pruning, pest control and harvesting. The high density or meadow orcharding facilitates enhance production and quality of fruits. Ultra high density plantation of guava variety Lucknow 49, Shweta, Lalit and Allahabad safeda was established in an area of 1 ha at CIH farm during May 2010 at a spacing of 2x1m. The observations recorded for different parameters in different varieties is given in Table 12. The result indicated that different varieties exhibited significant varieties in terms of growth and other qualitative parameters. Variety Lalit was found to be superior over other varieties with regard to height (104 cm), trunk diameter (12.58 cm) and pectin content (0.48%). Shweta variety recorded the highest leaf area (70.60 cm^2) and no. of fruits/plant (33) compared to other varieties. The highest canopy spread (240 cm), weight of fruit (126.40 g), TSS (9.24 ^{0}Brix) and Vit. C (91.60 mg/100g of pulp/juice) was recorded in variety Lucknow-49. The height of fruit (6.05 cm) and size of fruit (35.87 cm^2) was found to be superior in Allahabad safeda.

Table 12. Effect of different guava varieties on growth, yield and quality performance

Varieties	Plant height (cm)	Trunk diameter (cm)	Canopy spreads (cm)	Leaf area (cm^2)	No.of fruits /plant	Width of fruits (cm)	Height of fruits (cm)	Size of fruits (cm^2)	weight of fruit (g)	Acidity (%)	TSS (^{0}Brix)	Vitamin C (mg/100g of pulp/ juice)	Pectin (%)
L - 49	84.80	12.40	240	70.33	27	5.74	5.62	32.35	126.40	2.76	9.24	91.60	0.45
Shweta	87.80	11.76	216	70.60	33	5.08	4.23	21.68	89.20	3.04	7.20	91.32	0.44
Lalit	104	12.58	228	63.83	27	5.62	5.41	30.57	90.00	2.09	8.48	86.68	0.48
Allahabad safeda	88.80	11.42	228	53.79	27	5.62	6.05	35.87	98.80	0.30	7.92	87.96	0.36

2. Double row system of tissue culture banana plantation

Banana (*Musa* sp.) is one of the major and economically important fruit crop of India. Banana occupies 20% area among the total area under crop in India. This crop is being cultivated in climate ranging from humid tropical to dry mild subtropics. The Institute has established plantation of Double row system of tissue cultured banana of appropriate varieties like Grand Naine at a spacing of 1.8 x 1.8 m during September 2013 in an area of 0.6 ha. The vegetative and qualitative parameters recorded is detailed in Table 13, 14, 15 & 16.

Table 13. Growth characteristics of tissue cultured banana var. Grand Naine

DAP	Plant height (cm)	No. of leaf/ plant	Leaf size (cm^2)	size of pseud-ostem (cm)	Individual weight of bunch (kg)	weight of hands/ bunch (kg)	No. of hands/ bunch	Nos of fingers/ bunch
60	71.60	6	L=55.90 B=24.40	13.88	bunch1=17.35	2.26	8	104
120	243.20	13	L=140 B=28.40	21.99	bunch2=10.12	1.51	7	98
180	396.80	14	L=162.30 B=32.80	50.66	bunch3=8.38	1.28	6	83

Table 14. Fruit characteristics of tissue cultured banana var. Grand Naine

DAP	weight of fingers/hands (kg)				Length and Breadth of fingers (cm)			
		base portion	middle portion	upper portion		base portion	middle portion	upper portion
60	hands1	0.13	0.14	0.13	Bunch 1	B=3.07 L=15.33	B=3.91 L=14.52	B=3.96 L=13.62
120	hands2	0.13	0.12	0.11	Bunch 2	B=3.89 L=14.56	B=3.88 L=15.12	B=3.60 L= 13.04
180	hands3	0.13	0.12	0.11	Bunch 3	B=3.77 L=14.12	B=3.77 L=13.65	B=3.61 L=12.90

Table 15. Vitamin C and acidity of tissue cultured banana var. Grand Naine

Vitamin C (mg/100g of pulp/juice)				Acidity (%)			
Bunch	base portion	middle portion	upper portion	base portion	middle portion	upper portion	base portion
1	30	24	18	0.49	0.99	0.35	6.63
2	24	24	24	0.61	0.32	0.22	5.45
3	24	24	24	0.48	0.35	0.19	5.83

Table 16. Reducing, non-reducing and total sugar content of tissue cultured banana var. Grand Naine

Reducing sugar (%)		Non-Reducing sugar (%)				Total sugar (%)		
middle portion	upper portion	Bunch	base portion	middle portion	upper portion	base portion	middle portion	upper portion
5.83	3.38	1	0.36	1.43	3.65	6.70	7.33	7.07
5.96	3.82	2	3.27	2.46	3.28	8.89	8.55	3.82
5.20	5.41	3	1.94	4.96	7.61	7.88	10.43	5.41

3. Plantation of mango

Mango (*Mangifera indica*) is the leading fruit crop of India and considered to be the king of fruits. The fruit is very popular with the masses due to its wide range of adaptability, high nutritive value, richness in variety, delicious taste and excellent flavour. The Institute has established mango block of varieties like Langra, Bombay green, Pant Sinduri, Dashehari, Mallika in the farm to evaluate the performance of different varieties. The plantation was done during the year 2010, 2011 and 2012 in an area of 0.5 ha. The planting materials were procured from CISH, Lucknow and BAU, Sabour. The parameters given in Table 17 were that of the variety Mallika.

Table 17. Growth and quality characteristics of mango var. Mallika

Variety	Plant height (cm)	Trunk diam-eter (cm)	Can-opy spreads (cm)	Leaf area (cm^2)	No.of fruits/ plants	weight of fruits (g)	Width of fruits (cm)	Height of fruits (cm)	Size of fruits (cm^2)	Acid-ity (%)	TSS (^{0}Brix)
Mallika	174.60	22.04	265.20	77.25	33.00	0.414	11.35	14.17	160.95	0.58	12.98

Ultra high density plantation of guava at CIH field

Double row plantation of tissue culture banana

Fruiting in mango var. Dashehari at CIH field

Fruiting in mango var. Amrapalli at CIH field

4. Gerbera cultivation under polyhouse

Among the cut flowers, Gerbera is one of the most important commercial flowers grown world over and highly valued for their brilliant colours, appearance, and potentialities in the local as well as domestic and international market. Since, local cultivars do not perform as per consumer demand and have low production potential, it is essential to introduce exotic varieties adapted to local condition. A field experiment was conducted to study the performance of selected exotic gerbera cultivars under protected condition at CIH Farm, Medziphema in a randomized block design with four replications with uniform cultural practices to ensure optimum good quality flowers as well as response of vegetative growth. The performance indicated strong adoptability and good association with foot hill agro climatic condition

of Nagaland. Among the characters studied days to flowering, plant height, number of leaves/clump, number of flowers/clump, flower colour, stalk length, number of petals/flower, flower bud size, flower diameter and vase life under room condition showed significant differences among the varieties .The selective five cultivars *viz.,* Daphne, Kozak, Fanna, Milky White and Wall Street were found suitable under foot hill subtropical condition. The Kozak cv was found to be better in respect to flowering traits and vaselife of flower in 2% sugar solution.

Table 18. Effect of different cultivars on plant growth and flowering traits of gerbera

Cultivars	Plant height (cm)	Number of leaves	Number of days taken for bud emergence after planting	Flower petal colour
DAPHNE	41.22	17.55	115.00	Orange
KOZAK	34.90	18.63	117.50	Light orange
FANNA	33.25	16.98	117.00	Light yellow
MILKY WHITE	33.00	15.80	114.75	White
WALL STREET	31.90	15.38	116.25	Light yellow

Cultivation of gerbera var. Liliac and Pre Inteze under polyhouse

Different varieties of gerbera grown under polyhouse

Table 19. Flower characteristics and vaselife of gerbera

Cultivars	Number of flowers/ clump	Length of flower stalk (cm)	Diameter of flower bud (cm)	Diameter of flower (cm)	Disc diameter (cm)	Number of petals/ flower	Vase life of flowers in 2% sucrose solution (days)
DAPHNE	14.23	29.43	1.90	5.75	2.89	52.86	8.20
KOZAK	15.35	32.05	2.02	6.12	2.74	56.90	12.58
FANNA	15.31	30.20	1.86	5.78	2.48	51.30	11.45
MILKY WHITE	14.12	30.40	1.83	5.60	2.78	55.00	8.58
WALL STREET	13.65	25.95	1.88	5.45	1.74	51.28	7.30

3.2.1. Farmers field

As per the Institute's mandate and targets of Action plan of CIH, various demonstation plots of focus fruit crops were established in farmers field to demonstrate the recent improved technology and create awareness so as to acquaint them of the horticultural technologies. The Institute has supplied all inputs and technical guidance for establishing the demonstration plots. The activities carried out and crops grown for off farm demonstration during the year 2014-15 are being mentioned in short below.

1. Banana

Banana (*Musa* sp.) is the second most important fruit crop in India next to mango. Its year round availability, affordability, varietal range, taste, nutritive and medicinal value makes it the favourite fruit among all classes of people. It has also good export potential. It is also one of the focus crops of the region and therefore, the Institute has established demonstration plot of Banana varietyw Grand Naine at Doyapur, Dimapur district in an area of 5 ha.

2. Mango

Mango *(Mangifera indica* L.*)* is one of the most important fruits of India. It is the choicest fruit and often known as the king of fruits. In India, more than thousand varieties are grown in different parts of the country. Most of the commercial cultivars are characteristically specific to geographical adoptation and their performance is satisfactory in a particular region. Therefore, selection of varieties for cultivation of mango should be based on their suitability for a particular region. During the reported period, CIH has established demonstration plot of Mango var. Amrapalli and Mallika in 1 ha area at Liphayan village under Wokha district.

Distribution of planting material of cashew and citrus by Dr. Lallan Ram, Director, CIH

Demonstration of banana plantation at farmers field

Cashewnut Plantation at farmers field

Khasi Mandarin plantation at farmers field

3. Cashewnut

Cashew (*Anacardium occidentale*), a native of Brazil, was introduced in India during the later half of the Sixteenth Century for the purpose of afforestation and soil conservation. From its humble beginning as a crop intended to check soil erosion, cashew has emerged as a major foreign exchange earner next only to tea and coffee. In North east, cashew is grown in few pockets of Assam, Meghalaya, Nagaland and Tripura. During 2014-15, a demonstration plot of 1 ha was established for cashew variety VRI-3, V-4, BBSR-1 at Liphayan village under Wokha district.

4. Guava

Guava (*Psidium guajava* L.) is known as the apple of the tropics. It is one of the most common fruits in the region. It is grown all over the tropics and subtropics. A demonstration plot for Guava variety Allahabad Safeda, L-49 and Shweta was also established by the Institute at kohima district during the period under report in an area of 0.5 ha.

5. Sweet orange and Mandarin orange

Citrus is an important group of fruits of north eastern region and it comes third in terms of area and production. The north eastern region of India has been described as one of the major centres of diversity of citrus, having about 17 species, 52 varieties and 7 possible hybrids. Citrus fruits thrive in the tropical, grow well in sub-tropical and can endure a temperate climate. Citrus fruits can be grown commercially from the sea level to an altitude of 1000m in the hills of north eastern region. During the reported period, CIH has established a demonstration plot of Sweet orange var. Early Gold and Olinda Valencia and Mandarin orange var. Khasi Mandarin at chandalashung village under Wokha district in an area of 1 ha each.

Distribution of vegetable seeds by Dr. Lallan Ram, Director, CIH

Vegetable cultivation under low cost polyhouse at farmers field

Demonstration of vegetables cultivation at farmers field

Demonstration of vegetables cultivation at farmers field

6. **Vegetables**

The diverse agro-climatic situations in the region offer excellent scope for growing different vegetable crops. A wide range of tropical, sub-tropical and temperate vegetable crops both indigenous and exotic, are grown in the region. In terms of its contribution to the national production, the region accounts for about 4.5% for vegetables. During the reported period, CIH has established demonstration plot of vegetables (broccoli, cabbage, spinach and French bean) at Bade area under Dimapur district.

3.3 HUMAN RESOURCE DEVELOPMENT

The Institute imparts trainings to state government officials of horticulture department and farmers of all North East states as per the need of the state. The trainings are conducted in respective states by inviting renowned experts from different parts of the country along with the faculty of CIH. During 2014-15, The Institute has organized 26 trainings which were attended by 1273 farmers and two training for trainers (69 officials) were conducted in identified areas of horticulture in the region. The focus area of trainings are as follows.

- Improved production technology of horticultural crops
- Nursery management and quality planting materials production
- High density planting and canopy management in fruit crops
- Organic farming and certification
- Post harvest management of horticultural crops
- Protected cultivation
- Citrus rejuvenation
- Value addition in horticulture crops
- Supply chain and marketing linkages of Agri./Horti. crops

3.3.1. FARMERS TRAINING PROGRAMMES

1. **'Destitute women and unemployed youth trained on oyster mushroom cultivation and value addition of Horticulture Crops'at SHN, Dimapur**

With a aim to promote skills for income generation as well as food security and to improve livelihood a special two days Hands on demonstration on oyster mushroom cultivation and value addition of Horticulture Crops' was organized by Central Institute of Horticulture, Medziphema in collaboration with State Horticulture, Nursery, Dept. of Horticulture, Govt. of Nagaland on 25th and 26th April 2014 at State Horticulture Nursery (SHN), 4th Mile Dimapur. Altogether, about 92 participants from different homes like Sisterhood network, Ichtus resource center, Destitute women shelter home, Prodigals home and love care home attended the programme. Hands on demonstration on oyster mushroom cultivation was demonstrated by Mr. Imlitemsu, Supervisor and Mr. Bithungo Lab Attendant from Mushroom Development centre, Department of Horticulture, Govt. of Nagaland. While preparation of Chilly pickle, Jack fruit pickle,Ginger candyand tomato sauce was demonstrated by Mr. Manzar Hossain, PHT, CIH and Ms. Sentiyangla, Horticulture specialist, CIH. Visit to pack house and mushroom development centre located at SHN, 4th Mile was also done, where the participants were appraised on the washing, grading, packing and storage of vegetables and on spawn production and structures for cultivation of mushroom.

During valedictory, certificates along with reading materials and training kit consisting of mushroom spawn and gloves was distributed by Dr. Lallan Ram, Director, CIH to all the participants. He stated that the objective of the training will be fulfilled if any of the participants adopt what they have learnt after the training, and also ensured that CIH will try to support such type of training programme for the improvement of livelihood.

2. 'Improved production technologies of Banana and citrus' at CIH, Medziphema

A one day farmers training on 'Improved production technologies of Banana and citrus' was jointly organized by Central Institute of Horticulture, Medziphema and ATMA, Wokha at CIH, Medziphema on 21st May 2014 with the aim to impart the farmers on the various scientific and improved method of cultivation. Altogether, 9 participants including farmers wokha and ATMA officials attended the training programme. Resource person Mr. A k Singh, Technical consultant, CIH, Medziphema imparted training on various aspects of improved production technologies of banana and citrus, where he emphasized on the pit size, spacing, manures and fertilizers, intercropping, training and pruning and pest and diseases management. Practical hands on demonstration on application of fertilizers, Budding, grafting, were conducted at CIH farm and nursery unit.

3. 'Banana and Pineapple fibre extraction' at CIH Medziphema

One day farmers training on 'Banana and Pineapple fibre extraction' was organized by Central Institute of Horticulture, Medziphema at CIH office on 30th May 2014. The aim of the training was to promote utilization of agro-waste of Banana and pineapple for fibre extraction as a means of self employment avenue and for additional income at the farm level. Altogether 32 farmers of Banana and pineapple attended the training programme. The training programme was graced by Dr. Lallan Ram, Director, CIH who stated that large quantity of agro waste are produced after harvest of banana and pineapple where natural fibre can be extracted which is in high demand. Dr. R Sudhakar, Chief technical officer, CTRI, Rajahmundry, Andhra Pradesh was the resource person and highlighted on the Importance and uses of natural fibre, Banana & Pineapple fibre production as a means of self employment avenue, Selection of raw materials for fibre extraction and Tips for quality fibre production.

4. 'Banana and Pineapple fibre extraction' at Jalukie

One day farmers training on 'Banana and Pineapple fibre extraction' was organized by Central Institute of Horticulture, Medziphema at Mhainamtsi village, Jalukie on 31st May 2014. The aim of the training was to promote utilization of agro-waste of Banana and pineapple for fibre extraction as a means of self employment avenue and for additional income at the farm level. Altogether 47 Banana and pineapple growers from the village of Beisumpuikam, Samzuiram, Mhainamtsi, New Jalukie and New Jalukie town of Peren district attended the training programme. The training programme was graced by Dr. Lallan Ram, Director, CIH and Mr. Chelladurai, GM, NABARD was the guest of honor. Dr. R Sudhakar, Chief technical officer, CTRI, Rajahmundry, Andhra Pradesh was the resource person and highlighted on the Importance and uses of natural fibre, Banana & Pineapple fibre production as a means of self employment avenue, Selection of raw materials for fibre extraction and Tips for quality fibre production.

The participants expressed their gratitude to the institute for conducting such new and relevant topic as huge numbers of labours are engaged in the removal of waste leaves and pseudostem and disposal becomes a big problem which was not economically viable. Director CIH assured them of full support and stated that machines present at CIH can be lend for 2-3 months while GM, NABARD also assured to provide loan and help to procure some machine to intersed groups for commercial fibre production.

5. **'Improved production technologies of Citrus' at CIH, Medziphema**

A one day farmers training on '**Improved production technologies of citrus'** was organized by Central Institute of Horticulture, Medziphema at CIH office on 3rd July 2014 for the the orange growers under Phek district farmers union (PDFU) with an aim to impart the farmers on the various scientific and improved method of cultivation in citrus for quality and quantative production. Altogether, 26 orange growers from Meluri, Pholomi, Chesezu, Thenyizu, Losami, Khomi, Tsupfume and Thetsumi under Phek district attended the training programme.

6. **'Production of quality planting material and accreditation of nursery of important fruit crops' at CIH, Medziphema**

A one day farmers training on 'Production of quality planting material & accreditation of nursery of important fruit crops' was organized by Central Institute of Horticulture, Medziphema in collaboration with District Horticulture office, Wokha, Department of Horticulture, Govt. of Nagaland on 5th August 2014 at CIH, Medziphema for a group of nurserymen who are interested to establish accredited fruit nurseries such as citrus, passion fruit, cashew and litchi. The programme was graced by Shri. N C Mistry, AMD, National Horticulture Board (NHB), GoI, Brief remark about the training was delivered by Dr. Lallan Ram, Director, CIH. Resource persons Shri. N C Mistry, AMD, NHB and Mr. A k Singh, Technical consultant, CIH, Medziphema highlighted on various aspects like Procedure for accreditation of nursery for fruit crops, NHB schemes for development of horticulture in NER, nursery infrastructures, good nursery management practices, production of quality planting material of citrus, cashew, passion fruit and litchi. Practical hands on demonstration on propagation techniques of Budding, grafting, pest and diseases management were conducted at CIH farm and nursery unit. Altogether, 35 participants from Wokha, Molvom and Pherima attended the training programme.

7. '**Improved production technologies of vegetables and spices' at CIH, Medziphema**

With an aim to create adoption of greater scientific technology in traditional cultivation of vegetables and spices, a training on 'Improved production technologies of vegetables and spices was organized by Central Institute of Horticulture, Medziphema on 12th August 2014 at CIH. The training was imparted to a group of SHG from Lazami village, Zunheboto involved in farming activities. Improved production technologies in tomato, onion, ginger and Naga king chilly were imparted by Mr. Arvind Singh, Technical consultant, Ms. Sentiyangla, Horti. Specialist and Ms. Yongkongtula, Asst. Horti. Specialist, CIH. Practical on lay out, preparation of nursery bed, seed treatment, seed sowing in pro trays, application of manures and fertilizers and transplanting of seedlings in main field were done at CIH farm. Reading materials on cultivation practices and preparation of value added products were distributed to all the participant.

8. **'Value addition of important Horti. Crops' at CIH, Medziphema**

With an aim to promote home scale preservation, a training on 'Value addition of important Horticulture crops' was organized by Central Institute of Horticulture, Medziphema on 13th August 2014 at CIH where 20 participants attended in the training programme. Hands on demonstration on preparation of chilly pickle, pineapple squash, tomato sauce and ginger candy were imparted by Mr. Manzar Hussain, Post Harvest Technologist and Ms.Yongkongtula, Asst. Horti. Specialist , CIH, Medziphema.

9. **Farmers training at Tripura**

The Directorate of Biotechnology in collaboration with Central Institute of Horticulture Govt. of India has organized 10 nos of training programme in Tripura from 21-26th July 2014 , 11-12th Sept 2014 and 19-20th Sept 2014 on Improved production technologies of horticulture crops (3 Nos), Post Harvest Management of Horticulture crops (2 nos), Nursery techniques of fruit (2 nos), Organic farming (1 no) , IPNM (1 no) & IPM & IDM (1 no) with one day duration of each training. The training programmes have been conducted at Bridhhi Nagar GP,Tulakona GP under Jirania Block,West Tripura District Community canning centre Agartala, Bikram Nagar , Suryamani nagar GP under Dukli Block and South Narayanpur GP under Bamutia block. The training programmes was attended by 500 farmers. The training were pertained by the resource persons from Directorate of Biotechnology, ICAR Tripura, Department of Agriculture, Department of Horticulture, CIPMC, Govt. of India, College of Agriculture, Tripura. The topic included Improved vegetable and fruit production , green house technologies , Nursery techniques of fruit crops, production of quality planting material, grafting and budding techniques, Micro-propagation techniques, Importance of value addition in Horticultural crops, Preservation techniques of Horticultural crops, Preparation techniques of Squash,Jelly, Preparation techniques of Pickles, Organic farming of vegetable crop, preparation of biopesticide, Biofertilizer in organic farming, IPPPM techniques of crops , IPNM techniques of vegetable and fruit crops etc.

10. **'Value Addition of focus horticultural crops' at Noklak, Tuensang**

A one day farmers training on value addition of important Hortculture. Crops' was organized by Central Institute of Horticulture Medziphema on 14th October 2014 at Khiamnungan tribal council hall, Noklak, Tuensang . The aim of the training was to promote homescale preservation of fruits/ vegetables and utilisation of surplus yield to make value added products which could be useful for additional income instead of wasting. Altogether, about 56 participants from Highlander farmers society, Bidgrain society, Agro revolution society, United SHG, KTC, Nolak area famer producer attented the training programme. Hands on demonstartion on preparation of Chilly pickle, Ginger candy, orange squash and pineapple jam were demonstrated by Mr. Manzar Hussain, Post Harvest Technologist, CIH and Ms.Sentiyangla, Horticulture specialist, CIH.

Certificate along with reading materials and preservatives like KMS and citric acid were distributed to all the trainees. Feedback from the participants were also delivered and expressed their gratitude to the institute for conducting such intensive and practical oriented training programme and also mentioned that such training was first of its kind in Noklak Town and appreciated the effort to conduct within the district.

11. '**Improved production technologies of vegetables and fruits' at Arunachal Pradesh**

With an aim to create adoption of greater scientific technology in traditional cultivation of vegetables, a one day training on 'Improved production technologies of vegetables' was organized by Central Institute of Horticulture, Medziphema in collaboration with Department of Horticulture, Govt. of Arunachal Pradesh on 28th October 2014 respectively at Eco Resort, Namsai, Arunachal Pradesh. Improved production technologies in watermelon, muskmelon and broccoli was imparted by Mr.Kaushik Palik, Technician and Mr. Abdulla Daud, Asst.Technician from Known-you-seed (India) Pvt. Ltd, Kolkota. Cost benefit of the vegetables were also disused. Certificate along with reading materials on cultivation practices, new hybrid varieties of water melon, musk melon and use of yellow trap for fruit fly was distributed to all the participants for their future reference.

12. 'Value Addition of important horticultural crops' at Mokokchung

A one day farmers training on value addition of important horticulture crops' was organized by Central Institute of Horticulture, Medziphema, Nagaland on 6th February 2015 at panchayat Hall, Chungtiayimsen village under Mokokchung district, Nagaland. The objective of the training was to promote preservation of fruits/vegetables at home scale and utilization of surplus yield instead of wasting to make value added products which could be useful for additional income and nutritional security. Hands on demonstration on preparation of chilly pickle, ginger candy, orange squash and tomato ketchup were demonstrated by Mr. Manzar Hossain, Post Harvest Technologist, CIH & Ms.Sentiyangla, Horticulture specialist, CIH. TSS reading by hand refractometer was also demonstrated. Reading materials and preservative like KMS and food grade hand gloves were distributed to all the participants.

13. 'Production technology of fruit crops' at SASRD, NU

A one day farmers training on **'Production technology of fruit crops'** was organized by Central Institute of Horticulture, Medziphema, Nagaland in collaboration with HSNEI and CISH on 26th Feb. 2015, where 89 farmers attended the training programme. The resource person were Dr. S. K. Shukla, Principal Scientist, CISH, Dr. Pauline Alila, Assoc. Prof, SASRD, NU, Dr. Thirugnanavel, ICAR, Nagaland and Mr. Kathi Chishi, Entrepreneur.

14. 'Marketing tips of horticultural crops 'at SASRD, NU

A one day farmers training on 'Production technology of fruit crops' was organized by Central Institute of Horticulture, Medziphema, Nagaland in collaboration with HSNEI and CISH on 27th Feb. 2015, where 89 farmers attended the training programme. The resource person were Dr. S.J. Angegowda, Principal Scientist,ICAR-IISR Regional station, Karnataka, Dr. R.S.Jat, Sr.scientist, DMAR, Gujarat, Dr. A.K.Yadav, Former Director, NCOP, New Delhi, Mr. David, Team leader, Bioresource, Govt. of Nagaland.

15. 'Integrated pest management' at Manipur

A one day farmers training on 'Integrated pest management' was organized by Central Institute of Horticulture, Medziphema, Nagaland in collaboration with RAPA on 20th March 2015 where 50 farmers attended the training programme. The resource person was Dr. M.Thoithoi Singh, Programme Coordinator, KVK, Thoubal. Lecture cum Demonstration on Integrated Pest Management of horticulture crops was covered during the training programme.

16. 'Post harvest management of horticultural crops ' at Manipur

A one day farmers training on 'Post harvest management of horticultural crops' was organized by Central Institute of Horticulture, Medziphema, Nagaland in collaboration with RAPA on 21st March 2015 where 50 farmers attended the training programme. The resource person was Dr. Kh. Akoisana, Manager Agricultural Science Centre , Imphal East , CAU. Lecture cum Demonstration on Post harvest management of horticultural crops was covered during the training programme.

17. ' Promotion of Farmers producer organisation' at Manipur

A one day farmers training on 'Promotion of Farmers producer organisation' was organized by Central Institute of Horticulture, Medziphema, Nagaland in collaboration with RAPA on 22nd March 2015 where 50 farmers attended the training programme. Lecture cum Demonstration on Promotion of Farmers producer organisation was covered during the training The resource person was P. Tomba Singh, Horticulture Development Officer (HDO), Thoubal.

After the completion of each training programme, feedback was taken from the participants. The participants expressed their high level of satisfaction and continuous demand as been obtained from different organization in NER for conduction of such intensives and practical oriented training programmes for the benefit of youth and women. The suggestions received from participants have been well taken for further improvement in the quality of training programmes.

Table 20. Details of Farmers training programme conducted during 2014-15

Sl. no.	Topic	Date	Venue	No. of participants	Organized/ sponsored
1	Demo. on oyster mushroom cultivation & value addition of important horti. crops	25-26th April '14	SHN, Dimapur, Nagaland	92	In coll. with State hort., Nagaland
2	Improved production technology of banana & citrus	21st May '14	CIH, Medziphema	9	In coll. with ATMA, Wokha
3	Banana & pineapple fibre extraction	30th May '14	CIH, Medziphema	32	Organized
4	Banana & pineapple fibre extraction	31st May 2014	Mhainamtsi vill. Jalukie	47	Organized
5	Improve production technologies of Citrus	3rd July 2014	CIH, Medziphema	26	Organized
6	Production of quality planting material & accreditation of nursery of important fruit crops	5th Aug. 2014	CIH, Medziphema	35	In coll. With State hort. Nagaland
7	Improved production technology of vegetables & spices	12th Aug. 2014	CIH, Medziphema	20	Organized
8	Value Addition in focus horticultural crops	13th Aug. 2014	CIH, Medziphema	20	Organized

9	Improved production technology of Horti crops	21st May 2014	Briddhinagar panjayat hall, Jirania, West Tripura	50	In coll. with DBT, Tripura
10	Intigrated plant nutrient management	22nd May 2014	Briddhinagar Panjayat hall, Jirania, West Tripura	50	In coll. with DBT, Tripura
11	Improved production technology of Horti crops	23rd May 2014	Tulakona, Panjayat hall, Jirania, West Tripura	50	In coll. with DBT, Tripura
12	Nursery techniques of horticultural crops	24th May 2014	Tulakona, Panjayat hall, Jirania, West Tripura	50	In coll. with DBT, Tripura
13	Post harvest management of horticultural crops	25th July 2014	Community canning centre, Ramnagar, Agartala	50	In coll. with DBT, Tripura
14	Post harvest management of horticultural crops	26th July 2014	Community canning centre, Ramnagar, Agartala	50	In coll. with DBT, Tripura
15	Improved production technology of Horti crops	11th Sept. 2014	Bikram Nagar, Community Hall, Dukla, West Tripura	50	In coll. with DBT, Tripura
16	IPM & IDM of vegetables crops	12th Sept. 2014	Suryamuni Nagar, Community hall, West Tripura	50	In coll. with DBT, Tripura
17	Nursery techniques of horticultural crops	19th Sept. 2014	Naryanpur, Bamutia block, West Tripura	50	In coll. with DBT, Tripura

18	Organic farmig	20th Sept. 2014	Naryanpur, Bamutia block, West Tripura	50	In coll. with DBT, Tripura
19	Value Addition of focus horticultural crops	14th Oct 2014	Noklak, Tuensang	55	
20	IPT in vegetables & fruit	28th Oct 2014	Eco Resort, Tengapani, Namsai, AP	44	In coll. with Dept. of AP
21	Value Addition of important horticultural crops	6th Feb., 2015	Chungtiayimsen vill, Mokokchung	65	Organized
22	Production technology of fruit crops	26th Feb. 2015	SASRD :NU	89	In coll. with HSNEI, CISH
23	Marketing tips of horticultural crops	27th Feb. 2015	SASRD: NU	89	In coll. with HSNEI, CISH
24	Integrated pest management	20th March 2015	Ningtam Engkhol, Teckcham Maning Ching, Thoubal, Manipur	50	In coll. with RAPA, Manipur
25	Post harvest management of horticultural crops	21th March 2015	-do-	50	In coll. with RAPA, Manipur
26	Promotion of Farmers producer organisation	22th March 2015	-do-	50	In coll. with RAPA, Manipur
	Total			**1273**	

GLIMPSES OF FARMERS TRAINING AT DIFFERENT PLACES

Director, CIH along with resource person and trainees on mushroom cultivation & value addition training at SHN, Dimapur

Training on Improved production technology of banana & citrus at CIH

Director, CIH and G.M, NABARD during Banana & pineapple fibre extraction training at Mhainamtsi village, Jalukie

Training on Improved production technology of citrus at CIH

Training on Improved production technology of vegetable and spices at CIH

Dr. Lallan Ram, Director CIH with trainees on value addition at CIH

A view of farmers training conducted at Tripura

Training on value addition at Tuensang

Training on Improved production technology of vegetable and fruits at Arunachal Pradesh

Training on value addition at Mokokchung

Production technology of fruit crops & marketing tips of horticultural crops at SASRD, NU

Director, CIH interacting with the trainees at Manipur

3.3.1. TRAINERS TRAINING PROGRAMMES

1. **Modulation of canopy and planting density for enhance production of focus fruit Crops**

Three days trainer's training on High Density planting and Canopy Management of focus Fruit Crops" was organized by Central Institute of Horticulture, Medziphema, Nagaland at Training centre, CIH, from 26th-28th August 2014, for the state Govt. officials of horticulture dept. Govt. of Nagaland. The objective of the training was to give individual attention to the trainees for imparting theoretical and practical knowledge on the subject who in turn will be the master trainers for the farmers of the state. Altogether 25 participants from 10 districts attended the training programme. Resource persons Dr.S K Shukla, Pr. Scientist, CISH, Lucknow , Dr. C.S Maiti, Asst. Prof., Dept. of Horticulture, SASRD:NU, Dr. A Thirugnanavel, Scientist (Hort), ICAR Jharnapani and Mr. A K Singh, Technical consultant, CIH highlighted on various aspects like Importance and Principles of High density planting and canopy management of fruit crops, HDP and canopy management in citrus, guava, cashew, litchi, banana, mango and pineapple. Practical hands on demonstration on planting densities, training and pruning, application of manures and fertilizer, blitox application for fungal control after pruning were conducted at CIH and SASRD:NU farm. Dr. Lallan Ram, Director, CIH also exhorted the participants to work as an ambassador for transfer of technology at the farmer's field.

Feedback from the participants were also delivered and expressed their gratitude to the institute for conducting such intensive and practical oriented training programme and suggested CIH to conduct similar training programme on different topics in the near future. Certificates along with reading materials were distributed to all the participants.

2. **Post harvest management and processing of horticultural crops'**

Three days trainer's training on '*Post harvest management and processing of horticultural crops'* was organized by Central Institute of HorticultureMedziphema, Nagaland at Krishak Niwas, Guwahati on 26th -28th November 2014 for the officials of state horticulture department of Assam. Altogether 45 officials attended the training programme. The resource persons for the training programme were Dr. Lallan Ram. Director, CIH, Nagaland, Dr.Bidyut Deka, Jt.Director, ICAR, Jharnapani, Dr. N K Mohan, Chief consultant , CIH Nagaland, Dr.Ananta Saikia, Professor, AAU, Jorhat, Mr. S Bhattacharjee, ED NERAMAC Ltd., Guwahati and Mr. Manzar Hossain, PHT, CIH, Nagaland. Various topics of the training include Importance, status and challenges of Post harvest management and processing of horticulture crops in NER, Smart packaging of horticulture produce, Preservation and protocols of important horticulture products, Important pre harvest factors, maturity indices and harvesting techniques in fruits and vegetables, Post harvest chain and quality standard in fruits and vegetables, Advances in Packaging of horticulture crops, Pack house, its importance & operation, Factors affecting Post harvest losses in horticulture crops, Advances in pre cooling of fruits and vegetables, Various Pre treatment & storage of fruits & vegetables and Marketing Prospects and challenges of horticulture produce in NEHR. Practical hands on demonstration on various maturity indices of fruits & vegetables were also done. Visit to Sakshi Agro Beverage, located at Amin Gaon, Guwahati was also done, where various important operation on processing, packaging, bottling were appraised by Mr.Tarun Handique, Manager cum microbiologist and quality assurance.

The training programme was wrapped up with feedback and certificate distribution by Dr. Lallan Ram, Director, CIH, Medziphema along with training materials on various aspects of post harvest management and value addition for their future reference. The training programme was proved to be very beneficial for the participants as it was more practical focused. The participants expressed their gratitude to CIH, Medziphema for organizing such training programme where the topics were very important and so relevant to them.

Table 21. Trainers' training

Sl. no	Topic	Date	Venue	No. of participants	Organized/ sponsored
1	High Density planting & canopy management of focus fruit crops	26-28th Aug. 2014	CIH, Medziphema	25	Organized
2	Post harvest management of focus horti crops	26-28th Nov. 2014	Krishak Niwas, Khanapara, Guwahati	44	Organized
	Total			69	

Trainers training on HDP & canopy management of fruit crops at CIH on 26-28th Aug. 2014

Dr. Lallan Ram, Director, CIH delivering lecture during training

Trainees visit to processing unit at Guwahati

GLIMPSES OF TRAINERS TRAINING PROGRAMMES

3.3.3. CAPACITY BUILDING

Md. Manzar Hossain underwent short term training on "Instrumental techniques in food safety and analysis" at CFTRI, Mysore from 5th – 9th Jan 2015. The training programme was conducted for five days where topics on wide areas under food safety and analysis was covered.

View of trainees at CFTRI, Mysore

3.3.4. EXPOSURE TRIPS CUM TRAINING FOR FARMERS AND OFFICIALS OF NER

CIH conducts exposure trips cum trainings for the officials, farmers and SHGs of North East Region at regular intervals to various reputed Institutions and Research centres in the country. The main objective is to build and strengthen their capacities and help them to sharpen their skills and ability. During the year 2014-15, the Institute has conducted 2 nos of exposure trips cum trainings for the officials and farmers of NER in different high tech horticulture programmes.

3.3.4.1. Exposure cum training on 'Production technology and processing of Aloe Vera' at Jaipur, Rajasthan

Central Institute of Horticulture under the Department of Agriculture & Cooperation, Ministry of Agriculture, Govt. of India as a part of its vision to promote transfer of technology for better production and productivity organized a subject oriented exposure trip for Akivi Multipurpose society, Dimapur of Nagaland to enhance skills for income generation so as to as improve livelihood at Manesh Agro Engineering & Technology, Kotputli, Jaipur, Rajasthan from 14th to 17th December 2014 on 'Production technology & processing of Aloe Vera'. with hands on demonstration on preparation of soap making, shampoo, juice and various value added products from aloe vera and amla were also shown. Field visit to cultivation of aloe vera in the desert was also done. On the 16th exposure tour to Jaipur city was done where various historical sites like Amer fort, Hawa Mahal, Jal Mahal and Albert Hall were visited. Altogether, about 22 participants attended the training programme.

A view on training on Aloe Vera

3.3.4.2. Interstate training cum exposure visit on Horticultural crops conducted at CIH

An interstate training cum exposure visit on 'Rejuvenation, propagation, Disease management of Khasi Mandarin and cultural practices of summer vegetable crops ' was organized by Central Institute of Horticulture, Medziphema in collaboration with ATMA, Tamenglong district, Manipur on 26th & 27th March 2015 at CIH. A total of 23 participants from 9 villages under Tamenglong district, Manipur attended in the training programme. The training was imparted by Dr. Thirugnanavel, Scientist (Horti), ICAR, Jharnapani, Dr. Anamika Sharma, Programme coordinator, KVK, Dimapur and Ms. Sentiyangla ,Horticulture specialist, CIH. Practical on preparation of Bordeaux paste, rejuvenation approaches, propagation techniques, diseases management for Khasi Mandarin. Lay out, preparation of nursery bed, seed treatment, seed sowing in pro trays, application of manures, fertilizers and transplanting of seedlings in main field for vegetables were done at CIH farm on the first day. Exposure cum field visit to Bade village, Dimapur was also conducted where the participants interacted with the Chairman of FPO Dimapur, Mr. Chozukhwu on various aspects of production technologies and marketing. Certificate along with reading materials on cultivation practices, propagation technique, rejuvenation of declining orchards and vegetable seeds were distributed to the entire participant by Dr. Lallan Ram, Director, CIH for their future reference.

Practical demonstration of horticulture techniques

Trainees with Director, CIH

3.4.4. AGRI-BUSINESS PROMOTION

3.4.4.1. Participation in Exhibitions/ Trade Fairs/Meets

1. 10th International Agriculture and Horti Expo at Pragati Maidan, New Delhi

The International Agriculture & HortI Expo-2014 was organized by NNS Media Group from 25th – 27th July, 2014 at Pragati Maidan, New Delhi, India. The 3 day exhibition was organized with focus on Agricultural & Horticultural Advancements and International Trade; Protected Cultivation (Greenhouse), Irrigation & Farming Technologies; Organic Farming and Fresh Fruits, Vegetables, Cereals etc.; Hi-tech Seeds, Fertilizers & Pesticides; Processed Foods & Post Harvest Technologies; Agri Finance, Insurance & Research Institutes; Cold storage & Technologies.

Central Institute of Horticulture participated as an exhibitor. The activities of the Institute were highlighted through print media. Horticulture crops were being displayed to the participants. Counseling was given to the farmers on problems related to quality planting material, production, post-harvest management, protected cultivation and marketing. Mr. Prabin Das, Marketing Specialist along with Mr. Md. Manzar Hossain, Post Harvest Technologist, Ms. Yongkongtula, Asst. Horticulture Specialist and Mr. Ngupani P S, Sr. Tech. Asst. participated in the exhibition programme. The staffs of CIH manned the stall providing technical guidance to farmers/ beneficiaries. Various horticulture produce like pineapple, ginger, lime, mosambi, king chilli, orange, chow chow, capsicum, lemon etc were displayed in the exhibition. Folders on POP of horticulture crops were distributed to the farmers. Budded plants and seedling produced by the Institute was also displayed during the exhibition. The exhibition provided a platform to the farmers to interact and learn from the staffs of CIH. The issues with regards to planting materials, production, PHM and marketing of horticulture crops were being highlighted to the farmers. The visitors who visited the stall include farmers/farm women, researchers, agri-professionals, Govt. officials, entrepreneurs, wholesalers, horticulturist, NGOs, Extension workers, students and others.

Inauguration of exhibition by Shri. Jitendra Singh, Hon'ble MoS, Science & Technology

Shri. Sanjeev Chopra, Jt. Secy., DAC at the exhibition programme

Visitors at CIH, Nagaland stall

Staffs of CIH, Nagaland with visitors in the stall

2 International Agri & Horti Show at Guwahati

The Institute participated as an exhibitor in the 2nd International Agri & Horti Show" at Guwahati w.e.f 10th – 14th Feb, 2015. The technical staffs manned the stall providing technical guidance to farmers/ beneficiaries. Various horticulture produce like pomegranate, Indian gooseberry, plum, orange, star fruit, kiwi, lime, papaya, chiku, assam lemon, pineapple, banana, cucumber, ginger, naga chive, tree tomato, capsicum, mosambi, king chilli, banana, chow chow, guava, xanthoxyllum, turmeric, large cardamon, black pepper, yam, pumpkin etc were displayed in the exhibition. Folders on package of practices of horticulture crops were distributed to the farmers. Budded plants and seedling produced by the Institute was also displayed during the exhibition.

The exhibition provided a platform to the farmers to interact and learn from the staffs of CIH. The issues with regards to planting materials, production, PHM and marketing of horticulture crops were being highlighted to the farmers. A variety of products/ produce were being displayed in the exhibition by different agencies/ departments from all NE states. More than 500 people visited CIH stall and enquired on various aspects of horticulture.

CIH stall at 2nd Assam International Agri Horti Show

Visitors at CIH stall

Director, CIH with Best Regional Exposure Bio-Resource Award 2015

3.5. POST HARVEST MANAGEMENT AND VALUE ADDITION

Fruits and vegetables are highly perishable commodities due to high moisture content and higher metabolic activities. Spoilage to fruits and vegetables mainly occur due to microbial attack, auto-oxidation and insect pest attack. As a result, about 25 to 30 per cent of the production is lost after harvest. The role of Post harvest management is important for reduction of post harvest losses of fruits and vegetables and to make them available for longer period.

The Institute has carried out a number of post harvest management activities such as harvesting, sorting, grading, and packaging of horticulture crops and has imparted and trained many extension functionaries, officials, farmers and SHGs related to post harvest management and value addition of important horticulture crops in the region in order to provide gainful employment to unskilled and skilled people. During the reported year, the institute has produced value added products such as pineapple squash, peach squash, ginger candy, chilli pickle, turmeric powder and RTS of Aloe vera, jackfruit, pineapple and pumelo

Sorting of turmeric

Harvesting of banana in the field at the right stage

Peach squash prepared

Pineapple squash prepared

Mango squash prepared

Chilli pickle

Ginger candy

3.6. ACCREDITATION AND CERTIFICATION OF NURSERIES IN NER

Availability of true to type, quality planting material is crucial and has become of utmost importance for the success of horticulture development. In order to meet the ever increasing demand of genuine quality planting material especially in North east region, Central Institute of Horticulture has been authorized for accreditation of nurseries for overall development of horticulture and establish a network of quality horticulture nurseries in the North east region of India. The initiatives taken by the Institute so far are as follows in addition to publishing the guidelines for accreditation of nursery.

3.6.1. Formation of Four (4) expert committees for nursery accreditation

Nagaland & Assam

1. Dr. V.J Shivankar Former Director, NRCC, Nagpur (Chairman).
2. Dr. Lallan Ram, Director , CIH/ Representative.
3. Dr. Moa Walling Dy. Director i/c State Horticulture Nursery, Nagaland.
4. Shri. Ghanakanta Hazarika, Asstt. Director, Assam.
5. Dr. Anamika Sharma, Programme Coordinator, KVK, ICAR.

Manipur & Mizoram

1. Dr. R.K Arora, Former Professor and Head, Dept. of Horticulture, Hau, Hissar (Chairman).
2. Dr. Lallan Ram,Director , CIH/Representative.
3. Shri.Rosanglura Ralte, Deputy Director, Mizoram.
4. Shri L. Upendra Singh, Deputy Director (H), Manipur.
5. Dr. M.R. Sahoo, Scientist, Manipur centre.

Arunachal Pradesh & Meghalaya

1. Dr. R.k Pathak, Former Director,CISH, Lucknow (Chairman).
2. Dr. Lallan Ram,Director, CIH/ Representative.
3. Shri. D.J.W Ingty , Director, Meghalaya.
4. Shri. Jombo Ratan, Director, Deptt. of Horticulture, Arunachal Pradesh.
5. Dr. A.K. Jha, Sr. Scientist, Umiam.

Sikkim & Tripura

1. Dr. Yog Raj Chanana, Head of the Department, Horticulture, PAU, Ludhiana (Chairman).
2. Dr. Lallan Ram,Director, CIH/ Representative.
3. Shri. Anil Debbarma, Dy. Director of Horticulture, Tripura.
4. Shri Sonam Gyatsho Bhutia, Joint Director, Sikkim.
5. Dr. Biswajit Das, Principal scientist, Tripura centre.

3.6.2. 1st Nursery Accreditation Meeting

The 1st meeting of nursery accreditation for North East Region was held on 19th February 2015 at Banquet hall, Hotel Acacia, Dimapur under the chairmanship of Dr. S.K. Malhotra, Horticulture Commissioner, Ministry of Agriculture. Highlights of the procedure/guidelines for assessment of nursery, confirmation of committees for nursery accreditation, to create awareness about nursery accreditation to the nurseryman, provide technical guidance to the nurseryman etc were some of the agendas discussed during the meeting. Horticulture Commissioner also released a booklet on guidelines for accreditation of nurseries.

Dr. S.K.Malhotra, Hort. Comm. discussing with the members

Members present during the meeting

Dr. Lallan Ram discussing with the members

Dr. Lallan Ram, Director, CIH with the committee members

3.6.3. Preliminary monitoring of nursery at Dimapur

With an aim to monitor the existing nursery for accreditation, a preliminary monitoring to Eden nursery, Chumukedima, Dimapur was conducted on 20th Feb. 2015 by a team of experts. The assessment team monitored and examined as per the guidelines and also gave some suggestions for further improvement to the nurseryman.

Dr. V.J. Shivankar, Chairman interacting with officials of State horticulture nursery

Visit of Committee members for preliminary monitoring at Eden Nursery and State horticulture nursery at Dimapur district

3.7. INFRASTRUCTURE DEVELOPMENT

The infrastructure development of newly constructed training centre has been a challenging task for the Institute. Since inception of CIH, the office of the institute was initially housed in one of the residential quarter of SASRD, NU, little far away from the institute complex. After nearly two and half years of its existence, the office was shifted to a small four room farm house within the complex and was continued till January 2011. With the span of time it was again shifted to full fledged bamboo structure office which was inaugurated on 31st January 2011 and was continued till 14th June 2014. The new Director's office along with his subordinates is now shifted to newly constructed training centre building (Fig 1) which was formally inaugurated by Dr. S.K. Malhotra, Horticulture Commissioner, DAC, MoA, Govt. of India. All the officers has been provided separate corporate cabin and computers with internet facilities in order to have better working atmosphere and also to meet the objectives and mission of the

Institute. Further, to provide safety and security in its premises, a watch tower has been constructed along with cc pavement at the entrance of E block (Fig 2 & 3) so that farm activities can be carried out smoothly without any hurdle.

Fig. 1 Newly constructed training centre and office of the Director, CIH

Fig 2. cc pavement at the entrance of E block

Fig 3. Construction of watch tower for security

3.8 OTHER ACTIVITIES

- Apart from the above activities and achievements mentioned above, the Institute has also assisted twenty six (26) farmers/ entrepreneurs in preparation of detailed Project reports (DPR) in horticulture crops to promote the development of focus horticulture crops and link them with financing agencies.

- Production and value addition/ sale of horticulture produce like guava, banana, pineapple, mango, sweet orange, gerbera, rose and vegetables produced from CIH farm which acts as a source for generation of remuneration.

SALE OF PRODUCE AT CIH FARM

Harvested tomatoes for sale

Mango harvested from the field

Harvested peach from the field

Banana ready to harvest in the field

Grading and Packing of Gerbera flowers

Packed gerbera flowers ready to market

4. WOMEN EMPOWERMENT

Central Institute of horticulture, Medziphema, Nagaland since its inception has conducted training programmes, demonstration and exposure trips for women involved in horticulture and agriculture sector for empowerment as well as to respond to the needs of farm women. Accordingly, various activities were taken up from the year 2006 to till date. The broad areas of activities related to extensions were focused on developing resource management by women horticultural labourers, mobilization of rural women through women self help groups, exposure trips and training of farm women and beneficiaries to empower them and make them independent through self employment.

4.1. Training

During 2014-15, around more than 500 women are trained in various aspects through trainings and exposure trip. The Institute conducted trainings exclusively for women on various topics in the region which are given below.

- Demonstration on oyster mushroom cultivation
- Banana and pineapple fibre extraction
- Improved production technologies of fruit crops
- Improved production technologies of vegetable and spices
- Value addition in focus horticultural crops
- Post harvest management of horticultural crops

GLIMPSES OF TRAININGS CONDUCTED FOR WOMEN

Training on Improved production technology of vegetable & spices

PHM of Horticultural crops

Value addition training conducted at different places

Value addition training conducted at different places

Training on Mushroom cultivation

Improved production technology of horticulture crops

4.2 Exposure trip

Central Institute of Horticulture has taken lot of initiatives for the benefit of women through organizing training cum exposure trips. During the year 2014-15, CIH has organized training cum exposure trip for 21 women on Production Technology and processing of Aloe Vera w.e.f. 14-17 Dec. to Jaipur, Rajasthan.

Trainees of Aloe vera on exposure trip to Jaipur, Rajasthan

5. PUBLICATIONS

ABSTRACT OF PAPERS PUBLISHED IN SEMINAR/ CONFERENCE

Arvind Singh, A. K. Singh, Ngupani P.S, Yongkongtula, C.S. Maiti, Lallan Ram. 2014. Varietal performance of gerbera cultivars under protected condition. Intrenational conference on Technological Interventions in Agricultural Sciences for Enhanced productivity, Nutritional quality and value addition (TIAS-2014) organized by Hi-Tech Horticultural society, Meerut, U.P during 17-19 Feb. 2015

Arvind Singh, C.S. Maiti, A. K. Singh, Lily Rangnamei, Lallan Ram. 2014. Evaluation of Exotic Rose Germplasm under sub tropical foothill condition of Nagaland. Intrenational conference on Technological Interventions in Agricultural Sciences for Enhanced productivity, Nutritional quality and value addition (TIAS-2014) organized by Hi-Tech Horticultural society, Meerut, U.P during 17-19 Feb. 2015

A.K. Singh, C.S. Maiti and Lallan Ram 2014. Effect of Pre harvest foliar spray of zinc and boron on shelf life of pineapple (*Ananas comosus* L.) Cv. Kew fruits. Intrenational conference on Technological Interventions in Agricultural Sciences for Enhanced productivity, Nutritional quality and value addition (TIAS-2014) organized by Hi-Tech Horticultural society, Meerut, U.P during 17-19 Feb. 2015

Litsenthung Kikon, A. K. Singh, C.S. Maiti, Lallan Ram. 2014. Effect of plant growth substance and organic media on rooting in air layers of guava cultivars. International conference on Technological Interventions in Agricultural Sciences for Enhanced productivity, Nutritional quality and value addition (TIAS-2014) organized by Hi-Tech Horticultural society, Meerut, U.P during 17-19 Feb. 2015

M. Alen Phom, S.P. Kanaujia, Arvind Singh, A. K. Singh, Lallan Ram. 2014. Performance of Fenugreek genotypes under foothill condition of Nagaland. Evaluation of Exotic Rose Germplasm under sub tropical foothill condition of Nagaland. Intrenational conference on Technological Interventions in Agricultural Sciences for Enhanced productivity, Nutritional quality and value addition (TIAS-2014) organized by Hi-Tech Horticultural society, Meerut, U.P during 17-19 Feb. 2015

Lallan Ram and Md. Manzar Hossain. 2015. Present status and challenges in post harvest management and processing of horticultural crops for quality nutrition in NER. Intrenational conference on Technological Interventions in Agricultural Sciences for Enhanced productivity, Nutritional quality and value addition (TIAS-2014) organized by Hi-Tech Horticultural society, Meerut, U.P during 17-19 Feb. 2015

Lallan Ram and Md. Manzar Hossain. 2014. Innovation in Horticulture for Nutritional Security, conserving Biodiversity and Poverty Alleviation. International Symposium (1st SYMPHORT-2014) during 16-18th Oct 2014 at Department of Applied Plant Science (Horticulture) Babasaheb Bhimrao Ambedkar University, Lucknow.

BULLETINS/ LEAFLETS

- Lallan, R. and Kumar, D. 2014. Preservation and protocol of Citrus fruit products. CIH/ Tech./ Pub. No. 4 / pp 1-32
- Lallan, R..2014. Guidelines for recognition of horticulture nurseries. CIH/ pp 1-16
- Shitiri, M and Lallan, R..2014. Package of practices for Cabbage. CIH/ Tech. Folder/ pp 1-6
- Shitiri, M and Lallan, R..2014. Package of practices for Cauliflower. CIH/ Tech. Folder/ pp 1-6
- Pongener, S., Shitiri, M and Lallan, R..2014. Organic package of practices for French bean. CIH/ Tech. Folder/ pp 1-6
- Shitiri, M and Lallan, R..2014. Package of practices for Okra. CIH/ Tech. Folder/ pp 1-6
- Shitiri, M and Lallan, R..2014. Package of practices for Radish. CIH/ Tech. Folder/ pp 1-6
- Singh, A.K., Shitiri, M and Lallan, R..2014. Propagation techniques in Cashew. CIH/ Tech. Folder/ pp 1-6
- Singh, A.K., Shitiri, M and Lallan, R..2014. Propagation techniques in Mango. CIH/ Tech. Folder/ pp 1-6
- Singh, A.K., Shitiri, M and Lallan, R..2014. Propagation techniques in Guava. CIH/ Tech. Folder/ pp 1-6
- Singh, A., Shitiri, M and Lallan, R..2014. Production technology of Tube rose. CIH/ Tech. Folder/ pp 1-6
- Singh, A., Shitiri, M and Lallan, R..2014. Production technology of Gladiolus. CIH/ Tech. Folder/ pp 1-6

6. SEMINARS, CONFERENCES, WORKSHOPS, MEETINGS etc

6.1. Horticulture Stakeholders' Meet

Central Institute of Horticulture, Nagaland organized a one day programme on Horticulture Stakeholders Meet on 14th June 2014, which was chaired by Dr. S.K. Malhotra, Horticulture Commissioner, DAC, Govt. of India and co-chaired by Prof. V.B. Singh, Dept. of Horticulture, SASRD, NU. The resource persons in the programme were Dr. N K Mohan, Chief Consultant, CIH, Shri. V Chelladurai, General Manager, NABARD, Dimapur, Shri. S K Singh, Deputy Director, National Horticulture Board, Guwahati, Shri. Letthang Misao, Farmer Representative, Shri. Kathi Chishi, Entrepreneurs Representative. The resource persons presented on various topics on promoting horticulture development. The stakeholders meet had 53 nos. of participants.

Chairman: Dr. S K Malhotra, HC, DAC &
Co-chairman: Prof. V B Singh, SASRD, NU

Dr. N K Mohan, Chief Consultant, CIH delivering lecture during Stakeholders' Meet

Shri. Letthang Misao, Farmer representative, speaking during Stakeholders' Meet

Dr. Lallan Ram, Director, CIH addressing the participants at the end of the Meet

6.2. International conference on "Technological Interventions in Agricultural Sciences for enhanced productivity, Nutritional Quality and value addition (TIAS-2014)"

The international conference on "Technological interventions in Agricultural Sciences for Enhanced Productivity, Nutritional Quality and Value addition" (TIAS-2014) was held at Hotel Acacia, Dimapur, Nagaland w.e.f. 17-19 February, 2015. The conference was organized by Central Institute of Horticulture Medziphema, Nagaland and Hi-Horticultural Society, Meerut and in association with Society for Recent Development in Agriculture and Scientific Educational Research Society.

The conference was organized with the objective to provide a forum for deliberating on latest technologies in the field of horticulture/ agriculture. The experiences sharing from national & international experts would really help the participants/ delegates to enhance their skills in the field of horticulture/ agriculture. The programme was formally inaugurated by Dr. K M Bujarbaruah, Vice Chancellor, Assam Agricultural University who graced the event as Chief Guest. The Guest of Honor of the programme was Dr. S V Ngachan, Director, ICAR-NEH, Barapani, Shillong. Dr. S K Malhotra, Horticulture Commissioner, DAC chaired the inaugural programme. Welcome address was delivered by Dr. Lallan Ram, Director, CIH and vote of thanks was given by Dr. Gaurav.

L-R : Dr. Lallan Ram, Director, CIH, Dr. S K Malhotra Horticulture Commissioner , Dr. K M Bujarbaruah, V.C, AAU, Dr. Gaurav and Dr. S V Ngachan, Director, ICAR-NEH, Barapani

Lightening of lamp by dignitaries.

Participants during inaugural programme

Dr. Lallan Ram, Director CIH receiving award

Release of souvenir of conference and guidelines of nursery accreditation

Resource persons presenting papers during technical session

Mr. A.K.Singh, Mr. Arvind singh and Md. Manzar Hossain from CIH receiving award during TIAS-2015

Mr. A.K.Singh, Mr. Arvind singh and Md. Manzar Hossain from CIH receiving award during TIAS-2015

Dr. Lallan Ram, Director, CIH along with Dignitaries and the awardees during TIAS-2015

6.3. National seminar on Sustainable Horticulture vis-à-vis changing environment

National Seminar on **"Sustainable Horticulture vis-à-vis Changing Environment"** was held on 26-28 Feb, 2015 at SASRD-NU, Medziphema, Nagaland. The seminar was jointly organized with Horticulture Society of North East India (HSNEI) and in collaboration with Dept. of Horticulture, SASRD, Nagaland University and Dept. of Land Resources, Govt. of Nagaland.

The main objective of the seminar is to bring multi-disciplinary scientific team, policy makers, producers, marketing professionals, development agencies and other stakeholders to a common platform for sharing their findings/ ideas/ expertise and deliberate on key issues to formulate strategies for developing sustainable horticulture in context of the changing environment.

Training programme conducted during National seminar SASRD-NU, Medziphema, Nagaland

6.4. Participation in conference/seminar/workshop/meetings

1.1.1. Participated at ASAN 16th General Conference on 3rd and 4th Sept 2014 at SASRD, Nagaland University.

1.1.2. Participated in State level Capacity Building on Future Market at NABARD's office, Dimapur w.e.f. 13th and 14th October, 2014.

1.1.3. Participated and presented Paper at International Symposium on Innovation in Horticulture for Nutritional Security, conserving Biodiversity and Poverty Alleviation (1st SYMPHORT-2014) w.e.f. 16-18th Oct 2014 at Department of Applied Plant Science (Horticulture) Babasaheb Bhimrao Ambedkar University, Lucknow.

1.1.4. Participated in 3rd Global sustainable Biotech congress at Jalgaon, Maharastra on 1-5 Dec. 2015.

1.1.5. Attended workshop on ***"Advances in spices production technology in major spices"*** from 19th -20th Jan. 2015 at ICAR Complex for NEH Region, Nagaland Centre, Jharnapani.

6.5. Meetings

6.4.1. Meeting on State level empowered committee (MIDH) conducted on 3rd Dec. 2014 in the office of Secretary (Hort), Govt. of Nagaland Kohima.

6.4.2. 1st meeting of Nursery accreditation at hotel Acacia, Dimapur on 19th Feb. 2015, where representatives from 8 North East States attended the meeting.

6.4.3. Technical Advisory Meeting (TAC) held on 20th February 2015 at CIH, Nagaland.

6.4.4. Board of Management meeting (BOM) held on 31st March 2015 at Guwahati

1st Nursery accreditation meeting chaired by Dr. S.K. Malhotra, Horticulture Commissioner

7th Technical advisory committee meeting

10th Board of Management meeting

7. IMPORTANT EVENTS CELEBRATED

7.1. Independence Day Celebration

Central Institute of Horticulture celebrated 67th Indian Independence Day along with the whole country on 15th August, 2014. Flag hoisting was done by Director CIH, Dr. Lallan Ram. All the staffs and field workers were a part of the programme.

Flag hoisting by Dr. Lallan Ram, Director, CIH

Director, CIH along with staff and farm workers

7.2. Republic Day Celebration

The Institute, with the rest of the country, celebrated the 66th Republic Day on 26th January 2015. Flag hoisting was done by Mr. A. K. Singh, Technical Consultant, CIH. A brief programme was being organized where all the staffs and field workers participated.

Flag hoisting by Mr. A.K.singh, Technical consultant, CIH

CIH staff and farm workers

7.3. Training Centre Inauguration

Central Institute of Horticulture, Nagaland organized a one day programme on Training Centre Inauguration cum Horticulture Stakeholders Meet on 14th June 2014. The training centre was formally inaugurated by Dr. S.K. Malhotra, Horticulture Commissioner, DAC, MoA, Govt. of India who graced the occasion as Chief Guest. The Guest of Honor in the inauguration programme was Prof. N S Jamir, Pro-Vice Chancellor, SASRD, Nagaland University. The invocation prayer was pronounced by

Fr. Roy M D, Principal, SFS School, Medziphema. Welcome address was delivered by Dr. Lallan Ram, Director, CIH. Brief remark was given by Shri. Pawan Kumar, Joint Director, Dept. of Horticulture, Govt. of Nagaland. Shri. A.W. Sadhankar, Executive Engineer, CPWD, gave the technical report on the construction of the building. The programme was attended by various department heads in Medziphema, state govt. Officials from agri. and allied departments, NGOs, entrepreneurs, farmers etc.

Inauguration of Training Centre by Dr. S K Malhotra, Horticulture Commissioner, DAC, Govt. of India

Dr. Lallan Ram, Director, CIH delivering the welcome address

Shri. Shri. A.W. Sadhankar, Exe-Engg, CPWD giving the technical report

Prof. N S Jamir, Pro-VC, SASRD, NU delivering the Guest of Honor address

Dr. S K Malhotra, Horticulture Commissioner, DAC during his inaugural address

7.4. Swachh Bharat Mission

Central Institute of Horticulture, Medziphema along with the rest of the nation observed Swachh Bharat Mission on 2nd Oct., 2014 by undertaking the Swachhta Bharat pledge led by Dr.Lallan Ram, Director, CIH and organized cleanliness drive of the office and campus.

10th CIH Foundation Day

Central Institute of Horticulture, Nagaland celebrated its 10th Foundation Day on 27th March, 2015 at its campus. The foundation day celebration programme began with lighting of lamp by Dr. Lallan Ram, Director, CIH. To commemorate the event a number of activities like painting and essay competition for schools in Medziphema, recreational activities for staffs and a training cum exposure visit was organized simultaneously. A total of five schools viz. SFS School, High School, King David School, Rivenburg School & Modern School participated in the essay and painting competitions Certificates/ prizes were distributed to the winners/ trainees during the closing programme. The foundation day celebration programme concluded with lighting of CIH campus.

Dr. Lallan Ram delivering Foundation Day lecture

CIH staff

Recreational activities ofstaff

Painting and essay writing competition organized for school students

8. AWARDS AND RECOGNITIONS

8.1. AWARDS

CIH received the **"Best Regional Exposure-Bio Resource Award 2015" in the** 2nd International Agri & Horti Show at Guwahati held on 10th – 14th Feb, 2015

8.1.1. Dr. Lallan Ram

Distinguished Scientist Award 2015 of Hi-Tech Horticulture Society, Meerut for Outstanding contribution and recognition in the field of Horticulture during TIAS -2014

8.1.2. Mr. Arvind Singh

Gold Medal araed 2015 of Hi-Tech Horticulture Society, Meerut for for Outstanding contribution and recognition in the field of Horticulture during TIAS -2014

8.1.3. Mr. A.K. Singh

Gold Medal araed 2015 of Hi-Tech Horticulture Society, Meerut for for Outstanding contribution and recognition in the field of Horticulture during TIAS -2014

8.1.4. Mr. Arvind Singh and Dr. Lallan Ram

Award for 2nd best paper during TIAS -2014 at Hotel Acacia, Dimapur, Nagaland on "Evaluation of Exotic Rose Germplasm under subtropical foothill condition of Nagaland"

8.1.5. Mr. A.K. Singh and Dr. Lallan Ram

Award for best poster paper during TIAS -2014 at Hotel Acacia, Dimapur, Nagaland on "Effect of plant growth substance and organic media on rooting in air layers of guava cultivars"

8.1.6. Dr. Lallan Ram and Md. Manzar Hossain

Award for 3rd best paper during TIAS -2014 at Hotel Acacia, Dimapur, Nagaland on "Present status and challenges in post harvest management and processing of horticultural crops for quality nutrition in NER"

8.2. RECOGNITIONS

8.2.1 Dr. Lallan Ram

- Appointed as Councilor of Indian Society of Citriculture for NER
- Expert member of the Assessment Committee to evaluate for promotion of Professor/equivalent under Career Advancement Scheme (CAS) in CCS, Haryana Agricultural University, Hisar and Babsaheb Bhimrao Ambedkar University, Lucknow
- Appointed for evaluation of thesis of 2 nos. of M.sc (Ag.) students of NU-SASRD, Medziphema
- Appointed as external examiner for Ph.D scholars oral comprehensive Examination of Horticulture Department, NU-SASRD, Medziphema

- Organizing Secretary of International conference on "Technological Interventions in Agricultural Sciences for enhanced productivity, Nutritional Quality and value addition (TIAS-2014)" from 17th-19th Feb., 2015 at Hotel Acacia, Dimapur, Nagaland
- Co-convener of National Seminar on "Sustainable Horticulture vis-à-vis Changing Environment" from 26th-28th Feb., 2015 at SASRD, N.U, Medziphema Campus, Nagaland.
- Chaired Technical Session during TIAS-2014 on 17th Feb., 2015
- Delivered brief remark during valedictory programme of National Seminar on "Sustainable Horticulture vis-à-vis Changing Environment" on 28th Feb., 2015 at NU- SASRD, Medziphema.
- Member of Hi-Tech Society, Meerut
- Member Secretary of Board of Management and Technical Advisory Committee of CIH
- Member of Nursery Accreditation Assessment committee of CIH.
- Member of NSLIC (MIDH) of Govt. of Nagaland
- Member of Indian Society of Noni Sciences , Chennai

9. EXTERNALLY FUNDED PROJECTS

9.1. Seed System development in major Spice crops (Ginger, Turmeric and Naga Chilli) of NER through *in vitro* techniques

Project funded by : Department of Biotechnology, Govt.of India
Name of PI : Dr. Lallan Ram, Director, CIH

Objectives

- Validation, refinement and scaling up of available micro-propagation protocols for large scale production of disease free quality planting material of Ginger, Turmeric and Naga Chilli for commercial use in the NER.
- Demonstration and evaluation of field performance of *in vitro* raised micro propagated planting material under various growing conditions of NER.

Micro-rhizomes ready for transplanting

Growth of microrhizomes

Rhizomes developed

Activities and progress under the project at CIH

1. Micro rhizome production under shade net condition.

Objectives :

- Production of elite planting materials for the production of disease free certified seed materials for the growers.
- Less requirement of space for transferring planting materials.

Materials and Methods :

- Matured micror hizomes grown in protrays and ready for transplanting supplied by the collaborating project Institute NU:SASRD, Medziphema were planted .
- Plantlets were transferred to raised beds supplemented with biofertilizers.

Table 22. Yield performance of ginger cv Lakadong

Cultivar	No. of fingers		Average weight of rhizomes (g/plant)
	Primary	Secondary	
Lakadong	6.8	23.6	498.66

Single node Mini rhizomes production of Ginger cv. Nadia and Turmeric cv. Lakadong and field transfer.

Trial for single node mini rhizome production and field planting of Ginger and Turmeric with the objective to reduce the amount of seed material requirement. The conventional method of direct planting method of rhizome propagation has certain constraints due to less availability of quality planting material, heavy requirement of planting material and high cost of planting material. An investigation was therefore conducted on Ginger cv. Nadia and Turmeric cv. Lakadong during the year 2014-15 under the project at Central Institute of Horticulture farm, Medziphema to study the influence of various organic nutrient sources on growth and yield of single bud rhizome, which has the advantage of earlier rhizome development with lower seed rate. Diseases free healthy rhizomes of turmeric cv. Lakadong and Ginger cv Nadia were collected from farmer's field. Rhizome were cleaned, cut into single bud nodes then treated with1% Bavistin and kept overnight for wound healing. These rhizomes were planted on beds supplemented with mixture of cocopeat:sand @ 1:1 to induce sprouting. After sprouting, theses buds were transferred to portrays supplemeted with presterilized cocopeat:FYM:sand: soil @ 1:1:1:1 under 50% shade net house with regular watering. The plantlets were transplanted to the main field after it attained 2-3 leaf stage.

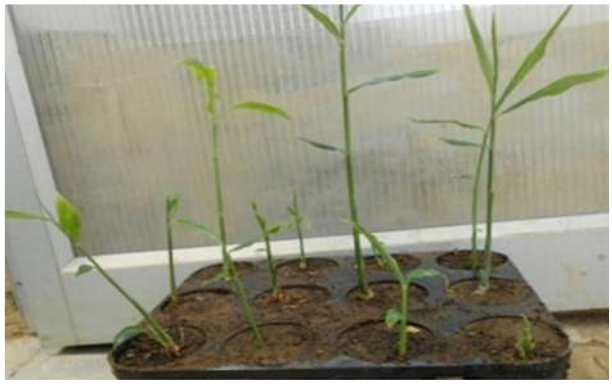
i. Single node Mini rhizomes production of of Ginger cv. Nadia and field planting.

The results revealed that all the treatments exhibited significant variation in their performance in terms of growth and yield characters. Treatment with pig manure was found to be superior over other sources of nutrients with regard to height (69.25 cm), number of leaves (24.03) and number of tillers/heel (8.00). The highest number of fingers/rhizome (9.0), fresh rhizome yield (1.546kgs/m^2) and yield/ha (6.871 t/ha) was recorded with the treatment pig manure followed by Farm Yard Manure (6.782 t/ha). Among the biofertilizer sources, Azospirillum was found superior in enhancing the growth and yield attributes.

Single budded Ginger in cocopeat

Emergence of sprouts

Portray planting



Ready for transplanting

Main field

Harvested rhizomes

ii. Single node Mini rhizomes production of Turmeric cv. Lakadong and field planting.

In the present investigation, Phosphotica was found to be significantly better over all other biofertilizer treatment in enhancing the yield as well as other attributes. The favourable influence of biofertilizer might be due to favourable micro-climatic conditions for phosphotica which caused more nutrient release from the soil and further absorbtion by plant enhancing more yield. Among the organic manures, vermicompost gave superior yield (8.12 kgs/m^2) and better number of fingers in comparison to other organic manures.

Single budded Turmeric in cocopeat

Portray planting

Ready for transplanting

Main field

Harvested rhizomes

10. PERSONNEL

PRESENT STAFF POSITION AT CIH

Director	:	Dr. Lallan Ram
Administrative officer	:	Mr. Babu Singh
P A to Director	:	Ms. Imtinaro Jamir
Stenographer	:	Mrs. Shrada Devi
	:	Mrs. Achibeni Yanthan
Technical consultant	:	Mr. Anjani Kumar Singh
	:	Mr. Arvind Singh
Horticulture Specialist	:	Mrs. Meribeni Shitiri
	:	Mrs. Sentiyangla
Post Harvest Technologist	:	Mr. Manzar hossain
Marketing Specialist	:	Mr. Prabin Das
Assistant Horticulturist	:	Ms Yongkongtula
Senior Farm Manager	:	Mr. Diganta Gohain
Senior Technical Assistant	:	Mr. Ngupani P.S
	:	Ms. Eloni Felicity
Field Assistant	:	Mr. Eliyamo Humtsoe
	:	Mr. Anukul Roy

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 17 comprising of technical, administrative staffs and 54 outsourced labours.

11. BUDGET

Table 22 : Budget allocation and expenditure of CIH for the financial year 2014-15

HEAD OF ACCOUNT	Allotment of (Rs. in lakh) fund -2014-15	Amount Re-ppropriated (Rs. in lakh)	Expenditure (Rs. in lakh)
2401-Crop Husbandry 119-Horti & Veg. crop 42-Estt. of CIH			
420001- Salary	25.00	25.00	24.54
420002- Wages	45.00	34.00	33.58
420006- Medical Treatment	5.00	3.00	2.88
420011- D T Expenses	20.00	5.00	5.00
420013- Office Expenses	110.00	38.00	37.60
420014- Rent rate & taxes	2.00	0.00	0.00
420016- Publication	5.00	3.00	2.80
420020- Other Admni. Expn.	70.00	59.00	36.47
420026- Advt. & publicity	3.00	3.00	0.40
420027- Minor works	60.00	38.00	5.20
420028- Prof. services	5.00	5.00	0.00
420050- Other charges	150.00	125.00	124.62
Total (2401Crop Husbandry)	500.00	338.00	273.09
4401 CO on Crop Husbandry			
119-Horti. & Veg. Crop			
14-Estt. of CIH			
420051-Motor Vehicle	15.00	0.00	0.00
420052- Machinery & Equip.	10.00	0.00	0.00
140053- Major Works	75.00	84.84	19.79
Total – Major Head 4401-	100.00	84.84	19.79
Grand total	600.00	422.84	292.88

12. IMPORTANT CONTACT DETAILS

12.1. Board of Management Members (BOM) of CIH, Medziphema

Sl.	Address	Contact No.
	Chairman	
1	Dr. S.K. Malhotra, Horticulture Commissioner, Department of Agriculture & cooperation, Govt. of India, Khrishi Bhawan -110001, New Delhi	011-23381012(O) -23383712
	Members	
2	Secretary (Horticulture), Govt. of Arunachal Pradesh, Itanagar: Arunachal Pradesh -791110	0360-2212595 (O) -2212446 (F)
3	Secretary (Agriculture), Govt. of Assam, Guwahati: Assam -781022	0361-2237277 (O) -2547406 (F)
4	Secretary (Horti. & Soil Cons.), Govt. of Manipur, Imphal : Manipur -795001	0385- (O) - (F)
5	Secretary (Horticulture), Govt. of Meghalaya, Shillong : Meghalaya -793003	0364-2211081(O) -2225978(F)
6	Secretary (Horticulture), Govt. of Mizoram, Aizwal : Mizoram-796001	0389-2322123 (O) - 2335916 (F)
7	Secretary (Horticulture), Govt. of Nagaland, Kohima : Nagaland -797001	0370-2243025(O) -2244042 (F)
8	Secretary (Horticulture), Govt. of Sikkim, Gangtok: Sikkim-737102	03592-231960 (Telefax)
9	Secretary (Horticulture), Govt. of Tripura, Agartala : Tripura-799001	0381-2416036 (Telefax)
10	Vice Chancellor, Assam Agriculture University, Jorhat-785013, Assam.	0376-2340013(O) -2340001 (F)
11	Vice Chancellor, Central Agriculture University, P.O.Box -23, Imphal-795004, Manipur	0385-2410450(O) -2415933(F)
12	Prof.D.P.Ray, Ex-Vice Chancellor of OUAT, HIG-105, K-5, Kalinga Vihar, PO:Bhubaneshwar-751 019	07351036054(M) 0674-2475093(R) dpray1949@gmail.com
13	Dr.Jagmohan Singh, Ex-VC, Y.S.Parmar University of Horticulture Solan, Kothon Village, P.o Shamti, Solan, Himachal Pradesh -173212	09418156047(M) jschauhan88111@gmail.com
14	Secretary, Ministry of DONER, Vigyan Bhavan Annexe, Mulana Azad Road, New Delhi-1100011	011-23022026(O) -23022307 (F)

15	Secretary, Ministry of DONER, North East Council, Nongrim Hills, Shillong, Meghalaya -793003	0364-2522645 (O) -2522643 (F) sect_nec_meg@nic.in
16	Director ICAR, Umroi Road, Umiam-793103, Meghalaya	0364-2570257(O) -2570355(F)
17	Dr.V.B.Singh, Professor &Head (Horti. Deptt.), SASARD-NU, Medziphema- Dimapur-797106, Nagaland	03862-247212 (O) -247255 (F) vbs_horti04@rediffmail.com
18	Chairman , NABARD, Plot Np-c24, G Block, Bandra Kurlar Complex, P.O.Box-8121, Bandra East, Mumbai-400051	022-26524748(O) -26530092 -265300113(F) chairman@nabard.org
19	Representative of M/S.ITC Ltd., 6th Floor, Peace Enclave, G.S.Road, Ulubari, Guwahati -781007	0361-2735370(O)
20	Mr. Ostander Lyngkhoi, General Secretary, Ri-Bhoi Strawberry Growers Association, House No-59, Lower Nongshilliang, Nongthymmai, Shillong-793014, Meghalaya (Progressive farmer of NER)	09862042137(M)
21	Mr.Th. Joykumar Singh, Thangjam Agro Industries, Chingmeirong East, Imphal, Manipur -795001 (Successful entrepreneur of NER)	08974009452(M) thangjamagro@gmail.com
	Member Secretary	
22	Dr. Lallan Ram Director, CIH, Medziphema- Dimapur-797106, Nagaland	03862-247707(O) -247088 (F)

12.2. Technical Advisory Committee (TAC) members of CIH, Nagaland

Sl.No	Name & Organization	Contact details
1	Dr.Shyam Singh, Ex Director, NRC-Citrus, Nagpur B-8, Chintaman Nagar Somalwada, Nagpur-440025 –Maharashtra	09423680541(M) 0712-2282911 shyamsingh_5@yahoo.co.in
2	Dr. W.S.Dhillion, Director PHT & Ex ADG, ICAR, PAU, Ludhiana	09888070460 wasakhasingh@yahoo.com
3	Dr.N.K.Mohan, Chief Consultant of CIH & Ex Chief Scientist, HRS, Kahikuchi,, Milan Nagar (VIP), Near St.Claret School, P.O.Guwahati Airport, Guwahti, Assam -781015	09435145039(M) nalin.k.mohan@gmail.com
4	Dr.Ramesh Kumar, Ex Director, DFR, Ex Director of Research, PAU, Ludhiana	09815202495 rameshuk19@yahoo.com
5	Dr. R.A.Ram, Principal Scientist, CISH, Lucknow	09415459464(M) 09919899994 (M) raram_cish@yahoo.co.in
6	Dr. M.S.Jairath, Director, NIAM, Bambala, Kota Road,Jaipur-302033	09829210017 0141-2795105 msjairath@gmail.com
7	Dr. B.C.Deka, Jt. Director, ICAR- Jharnapani, Nagaland	09436349416(M) 03862-247241(O) bidyutdeka@yahoo.com
8	Dr. A.K.Srivastava, NRC-Citrus, Nagpur	09422458020 0712-2500249 -2500615 0712-2500813 aksrivas2007@gmail.com
9	Dr. L.C.Bora, Professor, AAU, Jorhat, Assam	09854022454 (M) boralohitc@gmail.com
10	Dr.V.B.Singh, Professor, Dept of Hort., SASRD-NU, Medziphema, Nagaland	09436018409(M) 03862-247212 (O) -247255 (F) vbs_horti04@rediffmail.com
11	Dr.Awani Kumar Singh, Sr. Scientist, CPCT, IARI, New Delhi	09013439110(M) singhawani5@gmail.com
12	Dr. Lallan Ram Director, CIH, Medziphema- Dimapur-797106, Nagaland	09436276767 (M) 09423404432 (M) 03862-247707(O) -247088 (F)

12.3. Commissioners/ Secretaries (Horticulture) in NER

Sl. No.	Name	Address	Tel. no.	Fax/Email
1	Shri.Amlan Baruah (IAS)	Secretary (Agriculture), Govt. of Assam, Guwahati: Assam -781022,	0361-2237277	0361-2547406
2	Shri.Sudhir Kumar (IAS)	Secretary (Hort.) Govt. of Arunachal Pradesh, Itanagar Arunachal Pradesh 791110	0360-2212595	0360-2212446
3	Shri.T.Pamei (IAS)	Comm.(Hort.) & Soil Conservation, Govt. of Manipur, Imphal : Manipur 795001	0385-	0385-
4	Shri.P. Kharkongor (IAS)	Principal Secy. (Horti.) Govt. of Meghalaya, Shillong : Meghalaya 793003	0364- 2211081	0364- 2225978
5	Shri.B. Lalhmingthanga (IAS)	Secretary (Hort.) Govt. of Mizoram, Aizwal : Mizoram 796001	0389-2322123	0389-2335916
6	Shri.C.M.Tsanglao	Secretary (Hort.) Govt. of Nagaland Kohima : Nagaland 797001	0370-2270120	
7	Shri.K.Bhutia (IAS)	Secretary (Hort.) Govt. of Sikkim, Gangtok: Sikkim 737102	03592- 231960	secy_agri@sikkim.gov.in
8	Shri. G.Ayyangar (IAS)	Principal Secretary(Agri.) Govt. of Tripura, Agartala : Tripura 799001	0381-2416036	

12.4. Director (Horticulture) of NE States

Name	Address	Tel. no	Fax.No	E-mail
Dr.K.Borkakati	Director Department of Horticulture Govt. of Assam Khanapara, Guwahati -781022	0361- 2334115	0361- 2332796	directorhortassam@ yahoo.co.in
Mr.Jombo Ratan	Director Department of Horticulture Govt. of Arunachal Pradesh Itanagar-791110	0360- 2203220 -2203616	0360- 2203223	jomboratan@gmail.com
Mr. K. Ngachan	Director Department of Horticulture Govt. of Manipur Sanjentlong, Imphal -795001	0385- 2449765	0385- 2451089	manipur-tm@nic.in
Mr. Daniel Jingty	Director Department of Horticulture Govt. of Meghalaya New Agri. Complex Cleve Colony, Shillong -793003	0364- 2227434	0364- 2227434	hort_meg@nic.in
Mr.R.Zotawna	Director Department of Horticulture Govt. of Mizoram, Aiz- wal-796001	0389- 2314370	0389- 2329725	dir_horti@yahoo.co.in mizoramhorticulture@ gmail.com
Smt. .Watienla	Director Department of Horticulture Govt. of Nagaland, Ko- hima-797001	0370- 2221311	0370- 2221311	hortidte09@gmail.com
Mr.P.T.Bhutia	Director Department of Horticulture Govt. of Sikkim,Gangtok-737102	03592- 232511	0359- 231960	
Mr.Saradindu Das	Director Department of Horticulture & Soil Conservation, Govt. of Tripura Paradise Chowamuhani P.O.Agartala-799001	0381- 2324739 -2317227	0381- 2324739	dhctripura@yahoo.co.in

13. METEOROLOGICAL DATA

Table 23. Meteorological data April 2014 – Jan 2015 at CIH, Nagaland

MONTH	Temperature (°C)			RH (%)	Rainfall (cm)	Wind Speed (km/h)	Wind Gust (km/h)	Solar Rad (wat/ m²)
	MAX	MIN	MEAN					
April 2014	36.7	14.8	25.8	54	44.1	2.60	31.5	177.15
May 2014	34.3	17.7	26.0	74	133.2	5.35	29.0	155.70
June 2014	34.9	21.4	28.1	67	118.3	3.5	22.0	183.45
July 2014	32.7	22.1	27.4	67	283.5	0.7	18.5	145.17
Aug 2014	33.8	20.7	27.3	69	201.2	2.5	16.0	174.00
Sept 2014	31.3	18.7	25.0	63	229.3	0.4	16.0	126.75
Oct 2014	31.4	15.1	23.3	50	83.7	0.3	8.5	134.6
Nov 2014	29.5	10.9	20.2	46	2.7	0.3	13.0	151.15
Dec 2014	25.8	8.7	17.3	40	9.4	0.5	17.5	119.00
Jan 2015	25.4	7.3	16.4	46	21.5	0.4	13.0	109.6

14. ANNUAL ACTION PLAN 2015-16

Sl	Components	Physical Targets	Approx. Cost per unit (Rs. In lakh)	Approx. Financial Implication (Rs. In lakh)
A	Demonstration of production technologies at Institute level			
A.1	Management of existing demonstrations			
	a) Purchase of fertilizers, chemicals, manures etc for farm & polyhouse	13 ha		5.00
	b) Repair & maintenance of poly house	11 nos.	0.72	8.00
	c) Maintenance of Organic model farm	1 unit	0.20	0.20
	d) Repair & re-installation of drip irrigation system in fruit blocks including plastic mulching	5ha	2.00/ha	10.00
	e) Developing and maintenance of landscape of office compound & proposed training centre	18000sqft	27.78/ sqft	5.00
	Sub total			28.20
A.2	Demonstrations of improved Technology in the Institute			
	a) Plantation of orchids in poly house	500 plants	500/ plant	2.50
	b) Performance of high value vegetables under protected cultivation (tomato, sweet pepper,Cucumber & filler plants)	2500 sqm	40/sqmtr	1.00
	c) Organic cultivation of Turmeric (On farm)	0.5ha	0.05	0.05
	d) Comparative study on performance of Naga King Chilli under Protected Cultivation & open field condition	500 sq.m each	0.12	0.24
	e) Production of kharif season onion var.Agri found dark/light red	0.25 ha	0.30	0.30
	f) Performance of cole crops (cabbage, cauliflower & broccoli)	0.25 ha	0.50	0.50
	g) Intercropping of Papaya var.Arka Surya/Coorg honey dew & Pusa delicious/Pusa Majesty with fruit crops	0.25ha	0.45	0.45
	h) Plantation of windbreak/shelter belts (Naga Neem & Banana var. Bhimkal/ Athia kal)	6 ha	0.17	1.00
	i) Mushroom cultivation	1nos	0.50	0.50

	j) Intercropping of cowpea var.Assam Valley in between fruit crops	3ha	0.10	0.30
	k) Cultivation of indigenous fruits & vegetables of Nagaland	0.25ha	2.00	0.50
	l) Plantation of Cocoa	0.25	2.00	0.50
	m) Low cost organic input production unit	1 unit	0.40	0.40
	Sub total			8.24
B.	Demonstration of improved Technologies in NE States			
	a) Demonstration on fruit crops in NER	1 ha each	3.00	3.00
	b) Demonstration on Mango & Guava at Nagaland in collaboration with CISH, Lucknow	In process		
	c) Construction of Naturally Ventilated Poly house in Assam & Tripura & Procurement of Planting material (Gerbera and Rose)	1250 sqmt	1760/ sqmt	22.00
	e) Citrus rejuvenation in Nagaland & Assam	3ha	1.00	1.00
	Sub total			26.00
C.	Quality Planting Material & Seed Production			
	a) Establishment of mother block (gap filling of guava, citrus, cashew, pomegranate& passion fruit etc)	1000 nos.		0.50
	b) Mass multiplication of quality planting material			
	i) Asexually propagated plants (Cashew, citrus, mango, guava & rose)	50,000 nos		9.00
	Sub total			9.50
D	Accreditation of Horticulture Nurseries in NER	10 nos.	2.50	25.00
E	Human Resource Development			
	a) Farmers Training	50 nos.(50 trainees/ batch		25.00
	b) Training of Trainers	08 nos. (40 trainees/ batch		27.00
	c) Capacity Building of CIH Staffs & State officials	04 nos.		2.00
	d) Exposure trip cum training	03 nos.		8.00
	Sub total			62.00
F	Certificate Course	4 courses		35.42

G	Seminar/ Workshop/ Conference/Meetings			
	a) National level (3 days event)	1 no		5.00
	b) Technical Advisory Committee (TAC) & Board of Management (BOM) meetings	2 nos	1.50	3.00
	Sub total			8.00
H	Exhibitions/ Trade Fairs/ Meets/Mela			
	a) Horticulture Fest (Exhibition cum seminar cum Buyer Seller meet) (To organize)	1 no		9.64
	b) National/ State level exhibitions (To participate)	2 nos		5.00
	c) NE Kisan Mela (To organize 2 days event)	1 no		8.00
	Sub total			22.64
I	PHM & Marketing			
	a) Promotion of SHGs (technology for processing, packaging & marketing of processed products like pineapple, aloevera, turmeric)	3 SHG groups	1.00	3.00
	b) Setting up of pilot processing plants in the Institute (Machines/ Equipments required)			
	iii. Solar tunnel dryer	1 no	2.50	
	v. Sealing machine	3 nos	0.60	
	vi. Juice pasteurizer	1 no	1.00	
	vii. Working table	2 nos	0.60	
	ix. Value added product		0.30	
				5.00
	Sub total			8.00
J	Machineries & equipment			
	a) Farm tools & implements			2.50
	b) Tractor drawn weed cutter	1 nos.	2.50	2.50
	Sub total			5.00
K	Chemical & glassware's for laboratory			2.00
L	Minor works			
	a) RCC platform for citrus primary nursery	3 Nos. x1mx2ft)	1/unit	3.00
	b) Land development and construction of polyhouses for nursery unit	2 Nos. (500 sqm)	3/unit	6.00
	c) Construction of terracing for farm development	2 ha	2.50	5.00
	d) Soil sterilization unit	1nos.	5.00	5.00
	e) Construction of disinfectant chamber in poly houses (double door)	10 nos.	0.40	4.00

	f) Construction of Labour shed (For Block E)	1 Nos.	1.00	1.00
	g) Construction of open shed garage for tractors, power tillers & other farm implements.	1 No. (60 x 20ft)	6.00	6.00
	h) Maintenance of office building/Bamboo structure			2.00
	i) Geomembrane sheet (150-200 micron) lining in existing water harvesting structure to control water seepage	1 nos. 3.5x40.5x3 mtrs)	6.00	6.00
	j) Bore well construction	01unit	13.00	13.00
	k) Renovation of laboratory	1nos	7.00	7.00
	l) Miscellaneous works			2.00
	Sub total			60.00
M	Publication			
	a) Annual Report 2014 – 2015	1		3.00
	b) Technical bulletin			
	i.Bulletin on Nursery management and production of quality planting materials.	1		1.00
	c) Success story on various demonstration of focus horticulture crops carried out in different NE states by Central Institute of Horticulture	1		1.00
	Sub total			5.00
N	Motor Vehicle - Bus 32 seater	1	15.00	15.00
O	Others			
	a) Salaries			25.00
	b) Wages			45.00
	c) Medical			5.00
	d) Rate, Rent & Taxes			2.00
	e) Advertisement & publicity			3.00
	f) Domestic travelling Expenses (DTE)			20.00
	g) Professional services			5.00
	h) Contractual staff remuneration			50.00
	ii. Office Expenses			
	a) Office furniture			1.00
	b) Telephone bill			4.00
	c) Electricity bill			5.00
	d) Repair of motor vehicle			3.00
	e) Purchase of rubber stamp			0.10
	f) Stationary			1.00
	g) Office equipment			1.00
	h) Computer			1.00
	i) Contingent staffs remuneration			1.00

	j) Stores			5.00
	k) Printing & binding jobs			0.20
	l) POL			7.00
	m) AMC			6.00
	n) Postage & telegraph			2.70
	iii) Training hall/Guest house furnishing			12.00
	Sub total			205.00
	Grand total			**525.00**

BUDGET PROJECTION FOR THE YEAR 2015-16		
Sl	**Head of Account**	**Estimated Budget for 2015-16 (Rs. In Lakhs)**
A	Major Head -2552	
1	Salary	25.00
2	Wages	45.00
3	Medical Treatment	5.00
4	Domestic Travel Expenses	20.00
5	Office expenses	50.00
6	Rent, Rates & Taxes	2.00
7	Publication	5.00
8	Other Administrative Expenses	70.00
9	Advertisement & Publicity	3.00
10	Minor works	60.00
11	Professional Services	5.00
12	Other Charges	210.00
	Sub Total	500.00
B	Major Head -4552	
1	Major works	375.00
2	Machinery & Equipment	10.00
3	Motor vehicle-Bus	15.00
	Sub Total	400.00
	Grand total	**900.00**

15. RECOMMENDATION OF TAC AND BOM COMMITTEE

15.1. Recommendation of Technical Advisory Committee

The actions which could not be carried out in 2014-15 were suggested to be taken up during the next financial year 2015-16, which are as follows:

a. It was advised to take up on priority the plantation of Naga neem and banana var.Bhimkal/ Athia kal as wind breaks as they would not only act as wind breaks but also serve many other purposes.

b. It was once again advised that, the Institute should publish folders or articles only on those demonstrations undertaken by the Institute/technology developed and suitable in NER.

c. It was advised that, on all matters related to planting material and other aspects of floriculture, the station at Kahikuchi and IARI should be contacted.

d. It was once again advised to develop a model kitchen garden in a small area with crop rotation of vegetables throughout the year inorder to demonstrate to the farmers the cost benefit ratio of maintaining kitchen garden and also to educate them of the nutritional value of vegetables.

e. It was advised to take up citrus rejuvenation programme in four NE states in 2015-16 and cover the remaining states in the following years.

f. Since HRD programme was an important mandate of the Institute, it was advised to compile the impact factor of the trainings conducted by CIH so far.

1. Action Plan of CIH 2015-16

a. It was advised to grow in determinant tomato, cherry tomato and english cucumber in the polyhouse.

b. It was advised to go for comparative demonstration of Naga King chilli both in protected as well as open field condition and also to study the effect of pruning the crop on its yield.

c. For on farm demonstration of intercropping with fruit crops, it was instructed to plant only leguminous crops for nitrogen fixation of the soil.

d. For demonstration of Mango and Guava in Nagaland in collaboration with CISH, Lucknow, it was advised to go for medium density planting instead of High density planting whereby spacing of 5/5 mtrs for mango and 6/3 mtrs for Guava.

e. The members observed that, the Citrus scion plants in the institute were highly diseased; therefore, it was instructed to remove the infected plants and to go for virus indexing on the remaining healthy plants by seeking help from IARI and AAU, Jorhat.

f. It was advised to set up low cost input production unit of organic inputs with a budget projection of 1 lakh.

g. It was suggested to organize a Kisan Mela inviting farmers from 8 states of North East Region for 2 days with a budget projection of 10 lakhs for the programme.

h. It was suggested to include dry flowers production as a product under promotion of Self Help Groups apart from other processed products.

2. Enhancement of remuneration of contractual staff

Taking serious note of the rising inflation in the country and the meager increase in consolidated remuneration of the contractual staffs of the Institute in 2014, it was strongly recommended by the members to put up a proposal for enhancement of remuneration of the contractual staff as per the inflation rates of the country and 6th pay commission. It was also mentioned that, under ICAR and DBT remuneration of the contractual employees under various projects were enhanced handsomely, therefore, the remuneration of the staffs of CIH should also be enhanced in the same line. Further, the members also opined that, the institute requires regular employees for fulfilling the mandates of the Institute, therefore, the mode of recruitment needs to be changed to Direct recruitment and not on deputation basis as so far no one has turned up for deputation basis even though advertisement has been given several times.

3. Enhancement of the number of outsourced labours

The members also observed that, the present 54 number of outsourced labours were not sufficient to properly maintain the large area under various plantation crops and polyhouse in the Institute. Thus, the members recommended for enhancement of outsourced labours as the Institute was growing rapidly and expanding the area of cultivation in the farm.

4. Suggestions and opinions from members

a. It was suggested that, besides demonstration of Orchids, the Institute should also demonstrate on cultivation of bird of paradise, haleconia, ginger flower and other foliage plants.

b. It was advised to use shade net curtains in the polyhouses whereby, the curtains should be kept open during winters and closed during summers and also to use fan pad from time to time as per the temperature inside the polyhouse.

c. It was also suggested that, the Institute should go for vertical/soilless farming inside the polyhouses.

d. It was also advised to put polysheet liner inside the rainwater harvesting structure in front of the main gate.

e. It was advised to popularize the use of low cost naturally ventilated polyhouse structures to the farmers.

f. For propagation activities, it was advised to use cleft grafting for Cashewnut and Guava and only T-budding for Citrus. It was also suggested that, once a rootstock fails in budding, it should not be further used for cleft or budding purpose. But, it can be used for plantation around the boundary or in rootstock mother block for seed production.

g. It was suggested to maintain open filed precision farming in the Institute.

h. It was advised that, the concern staffs should visit Department of Post Harvest Technology, PAU, Ludhiana and CPCT, IARI, New Delhi for capacity building progrmmes.

i. It was felt by the members that, the staffs of the Institute were very young and lacked experience and thus, senior personnel's with experience should also be recruited.

j. It was suggested that, various meetings/trainings and programmes of the Institute should be held in various states of NER apart from Nagaland as the main objective of the Institute was to support the horticulture sector of the whole NE States.

15.2. Recommendation of Board of Management

1. Approval of Action Plan 2015-2016 of CIH

Director, CIH presented the annual action plan 2015-16. He appraised that Annual Action Plan was discussed in Technical Advisory Committee meeting held on 20.02.2015 and the plan was finalized after thorough discussion. He presented and was approved by the Board of Management after thorough deliberation with the following considerations and suggestions:

a. It was advised to explore possibilities for introduction of filler plants like limonium, gypsophilla, Sadilago etc for promotion of new ornamental crops among farmers apart from the flower crops as fillers were in huge demand in the flower industries

b. It was advised to plant gynodioecious varieties of papaya like Arka Prabha,Arka Surya etc developed by IIHR, Bangalore inorder to popularize the varieties and also to limit the import of papaya seeds from other countries.

c. To increase the training of trainers from 6 nos. to 8nos. so as to conduct one training each in all the 8 North East States. For which Director, CIH was advised to write letters to all the states of NER to submit their requirements for the trainers.

d. As certificate courses will begin from this year, it was advised to prepare course design, list of panel of experts from nearby Agriculture universities and various Institutions and also to include one lecture each from NABARD on credit, insurance etc and SFAC for formation of Farmer Producer Organisation (FPO), marketing and preparation of DPR with templates at the end of each course for equipping the trainees to easily avail loans/subsidy etc from banks & financial institutions.

e. To prepare training calendar for Farmers training, Trainers training and certificate course along with dates for the entire financial year and upload in CIH website for wide publicity training.

f. To include purchase of bus in action plan as the institute will be conducting more of HRD programmes.

2. Any other with the permission of the chair

The Chairman gave time to all the members to share their suggestion and inputs, which are as follows:

a. It was expressed that, if an organised wholesale market was established in Guwahati, it would greatly help the farmers of NER to market their produces at a better remunerative price. In this regard, the Chairman informed that, there was a scheme under MIDH whereby any interested individual can set up small as well as big market yards for which they may contact their respective State Horticulture departments.

b. Representative of the State of Meghalaya shared that their State requires Trainers training and certificate courses for many of their officials and farmers/unemployed youths. Chairman asked the States to send request to Director, CIH along with list of participants.

c. Representative of the state of Sikkim requested to conduct a trainers training on disease and pest management in large cardamom and ginger under organic cultivation- training.

d. It was advised by NABARD representative to identify cluster of farmers while providing farmers training.

e. It was advised that CIH should also focus on production of quality planting material and while planting orchids for demonstration at the Institute, it should make collections of orchids from different NE States.

f. It was also advised that, the Institute should develop integrated farming system models for training purpose.

g. It was also suggested to develop basic office infrastructure including arrangements for security aspect of the Institute.

Further, it was advised that, faculty of CAU Pasighat, Arunachal Pradesh should also be utilized as resource persons for various trainings. Chairman, in his concluding remarks expressed his happiness over the good progress made and mentioned that CIH need to play the major role in catering the NER needs for HRD and accreditation of more number of nurseries.

Dr. Lallan Ram, Director

CENTRAL INSTITUTE OF HORTICULTURE

DEPARTMENT OF AGRICULTURE AND COOPERATION

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