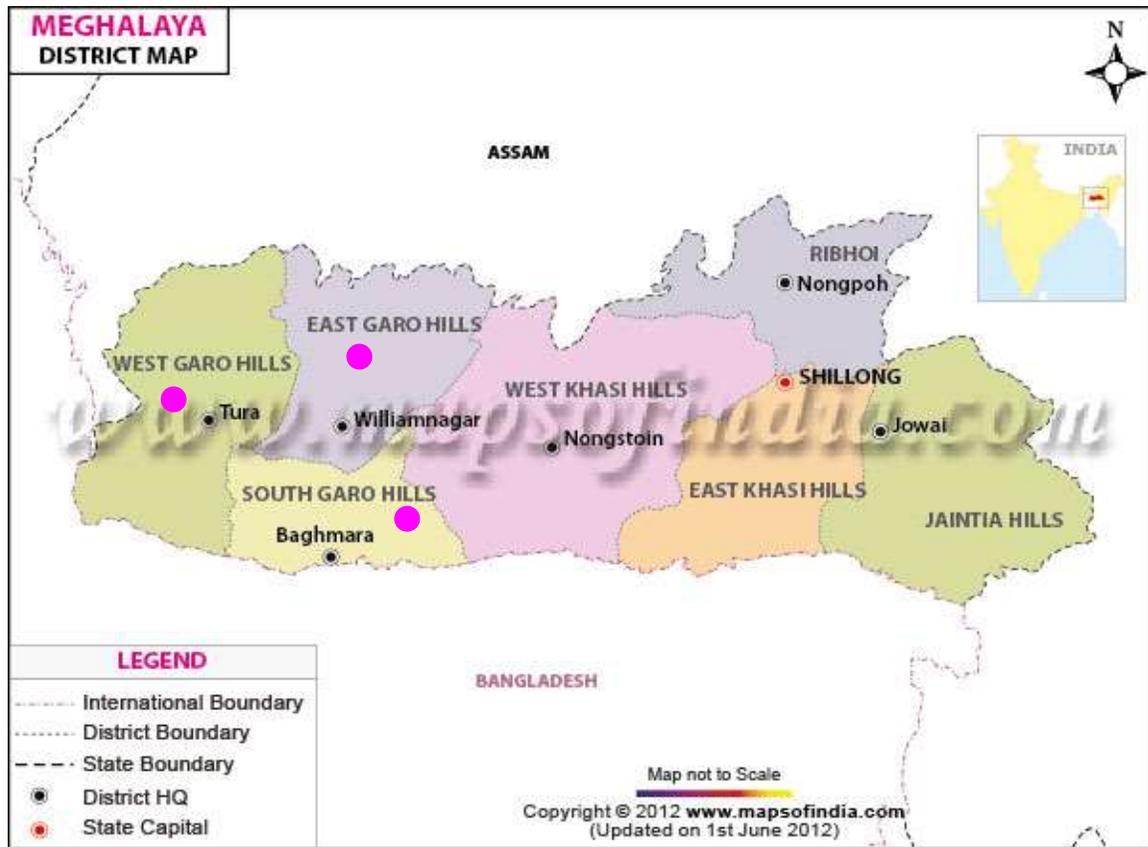


Report of the Joint Inspection Team on its visit to Meghalaya during 9<sup>th</sup> February to 15<sup>th</sup> February, 2015 to review the progress under the Mission for Integrated Development of Horticulture (MIDH)



**Districts visited by J.I.T ●**

1. West Garo Hills
2. South West Garo Hills
3. North East Garo Hills



**Mission for Integrated Development of Horticulture**  
**Ministry of Agriculture**  
Department of Agriculture & Cooperation  
Krishi Bhawan, New Delhi-110001

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## **ACTIONABLE ISSUES**

1. Despite great potential and demand of fresh vegetables, cultivation has not received the required due attention in the state, needs more focus on this component specially in Ampaty (South West Garo district) where sufficient natural water is available after paddy harvest.
2. At Bollonggitok, the rejuvenation of senile cashew plants taken up by the Department of Horticulture was not up to the satisfactory level. It needs to be corrected as advised to farmer and staff; they need training on rejuvenation and canopy management.
3. Focus needs to be shifted from arecanut to protected cultivation for growing olericulture / floriculture under protected cover along with training which should be made mandatory to staff and beneficiaries.
4. Systematic approach for implementation of the programme at field level is lacking.
5. The department is slow as far as the planting material and seeds are concerned, therefore, the existing farms and nurseries required further strengthening to produce more seeds / seedlings for vegetables. Disease free planting materials of fruits and vegetables should be supplied by department to farmers to get good production. The nursery needs to be accredited for supply of genuine planting material.
6. State should arrange to upload the monthly NHM physical and financial progress of the district level on the MIDH website on a regular basis.

## **Report of the Joint Inspection Team on its visit to Meghalaya during 9<sup>th</sup> February to 15<sup>th</sup> February, 2015 to review the progress under the Mission for Integrated Development of Horticulture**

The Joint Inspection Team (JIT) comprising Dr. Om Prakash, Chief Consultant, Mission for Integrated Development of Horticulture (MIDH) and Dr. Ram Phal Narwal, Chief Consultant (MIDH), DAC, Govt. of India, New Delhi, Sh. Steward Thabal, Joint Director of Horticulture and B. Syiem, Assistant Manager Mg SFAC, Shillong joined the team and coordinated the visit of JIT in Garo Hills area of Meghalaya.

### **State profile of Meghalaya**

Carved from the erstwhile State of Assam, Meghalaya became a full-fledged State on January 21, 1972. Bounded on the North and East by Assam and on the South and West by Bangladesh, Meghalaya is spread over an area of 22, 429 square kilometres, and lies between 20.1° N and 26.5° N latitude and 85.49 °E and 92.52 °E longitude.

#### **Meghalaya at a glance**

**Area:** 22,429 Sq.Kms.

**Districts:** East Khasi Hills, West Khasi Hills, Jaintia Hills, Ri Bhoi District, East Garo Hills, West Garo Hills and South Garo Hills.

**Civil Sub- Divisions:** Sohra, Mairang, Mawkyrwat, Amlarem, Khliehriat, Ampati, Resubelpara and Dadengiri

<b>Number of Villages</b>	: 5629
<b>Forest Area</b>	: 8510 Sq, Km.
<b>Population</b>	: 23,18,822
<b>Density</b>	: 103 Per Sq. Km.
<b>Literacy</b>	: 62.6%
<b>Racial Origin of the People</b>	: Austric, Tibeto-Burman

**Population of Shillong (Census 2001)** Shillong Urban agglomeration - 2,67,662

#### **Major Mineral Resources**

Coal, Limestone, Sillimanite, Dolomite, Fireclay, Felspar, Quartz and Glass-sand.

## **Principal Forest Produce**

Timber, Bamboo, Reed, Cane, Ipecac, Medicinal herbs and Plants, Cinnamon, Lemon-grass and Thatch-grass.

## **Principal Agricultural Products**

Rice, Maize, Potato, Cotton, Orange, Ginger, Tezpata, Arecanut, Jute, Mesta, Banana and Pineapple.

## **Climate**

The State enjoys a temperate climate. It is directly influenced by the South-West Monsoon and the northeast winter wind. The four Season of Meghalaya are: Spring - March and April, Summer (Monsoon) - May to September, Autumn -October and November and Winter - December to February.

The Monsoon usually starts by the third week of May and continues right to the end of September and sometimes well into the middle of October. Maximum rainfall occurs over the southern slopes of the Khasi Hills, i.e over the Sohra and the Mawsynram platform, which receives the heaviest rainfall in the world. The average rainfall in the State is 12,000 mm.

## **Principal Languages**

The principal languages in Meghalaya are Khasi, Pnar and Garo with English as the official language of the State. It was at the initiative of the Christian missionaries that the Khasi, Pnar and Garo languages and literature have developed and emerged in the list of Modern Indian Languages. The Khasi language is believed to be one of the very few surviving dialects of the Mon-khmer family of languages in India today.

## **Capital**

Meghalaya's capital, Shillong and also the District Headquarters of East Khasi Hills District is situated at an altitude of 1,496 metres above sea level, The capital city has a bracing climate throughout the year. This city has been the seat of Government since the consolidation of the British administration in this part of India more than a century ago.

The city is well connected with motorable roads all-over, has its own charm, different from other hill stations, and presents a natural scenic beauty with waterfalls, brooks, pine grooves and gardens. The place, the people, the flora and fauna and the climate all combine to make Shillong an ideal resort throughout the year.

Shillong is connected by the National Highway 40 with the rest of the country through Assam. It is also well connected by road with other important towns of the State.

Shillong is also the headquarters of the North Eastern Council (NEC), the Eastern Air Command the Assam Regimental Centre, the North Eastern Hill University (NEHU), Martin Luther Christian University (MLCU). A bench of the Guwahati High Court also function from Shillong. The North East Telecom Circle-I has its headquarters at Shillong. Shillong is also the Regional Head Quarters of Power Grid for North Eastern Region. NEIGRIHMS, the first and the only Postgraduate Medical Institute in the North Eastern Region and third in the country has been established in Shillong. Shillong also boasts of having the first Indian Institute of Management (RGIIM), in the North Eastern Region and the 7th in the country. The 12th National Institute of Fashion Technology (NIFT) has also been setup in Shillong.

**Total Area** 6436 Sq. kms.

**Altitude** 1496 metres

**Population** 223366

**Rainfall** 241.5cm.

**Language** Khasi, English and Hindi

**Clothing** Summer (April to October): Light Tropical. Winter (November to March): Woolen.

**Climate** Summer - Max.23°C-Min. 15°C Winter - Max. 15°C-Min.03°C

## **STATUS OF IMPLEMENTATION OF MISSION FOR INTEGRATED DEVELOPMENT OF HORTICULTURE (MIDH)**

### **A. Horticulture Mission for North East and Himalayan States (HMNEH)**

The Centrally Sponsored Scheme of Horticulture Mission for North East and Himalayan States (HMNEH) is being implemented in Meghalaya since 2001-02 in all the districts of the state thereby covering important horticulture crops with 100% GOI contribution. From 2014-15, HMNEH scheme has been subsumed under Mission for Integrated Development of Horticulture (MIDH).

#### **Progress till 2013-14**

Salient physical progress till 2013-14 is as follows:-

- An additional area of 46,192 ha of identified horticulture crops have been covered.
- In all, 244 nurseries have been established for production of quality planting material.

- An area of 2152 ha has been covered under rejuvenation of old and senile orchards.
- Organic farming has been adopted in an area of 769 ha for promotion of organic cultivation of horticultural crops. Besides, 2751 vermi compost units have been set up.
- IPM practices have been adopted in an area of 6360 ha.
- An area of 163.86 ha has been covered under protected cultivation.
- During this period, 1412 community water harvesting structures have been created.
- Under horticulture mechanization, 5329 power machines/tools have been provided for improving farm efficiency in carrying out horticulture operations.
- Under the component of Post Harvest Management, 6 Processing units have been established.
- A total of 13 market infrastructures have been set up for marketing of horticulture produce.
- So far, 35,322 farmers have been trained under various horticulture activities.

An amount of Rs. 278.62 crore was released to the State till 2013-14 and the State Government has reported full expenditure.

#### **Programme for 2014-15**

- An outlay of Rs. 50.00 crore has been approved for the State to implement HMNEH related activities during 2014-15. Funds to the tune of Rs. 12.60 crore have been released towards first instalment. Physical progress is yet to be posted on the website of HMNEH.

#### **B. National Bamboo Mission (NBM)**

National Bamboo Mission (NBM) is being implemented in Meghalaya since 2006-07 by Social Forestry Division Development Agency (SFDDA), Meghalaya, for the development of bamboo sector. With effect from 2014-15, NBM has been subsumed under MIDH.

#### **Financial Achievements**

Till 2013-14, an amount of Rs. 16.30 crore was released to Meghalaya and Rs. 16.16 crore has been spent so far. During 2014-15, an outlay of Rs. 3.09 crore has been earmarked and Rs. 0.97 crore has been released toward first instalment.

## **Physical Achievements**

Since inception, 5574 ha has been covered with new bamboo plantations. An area of 553 ha of existing bamboo plantations have been improved for higher productivity. In addition, 34 nurseries have been established to supply quality planting material. During this period, 716 farmers and 279 field functionaries have been trained in various activities of bamboo sector and nursery management.

## **C. Coconut Development Board (CDB)**

COCONUT DEVELOPMENT PROGRAMME (CDP) is being implemented by the Coconut Development Board, Kochi in the State since 2009-10. With effect from 2014-15, CDP has been subsumed under MIDH.

### **Progress (2009-10 to 2013-14)**

- i. During the period, an area of 79.82 ha. has been brought under coconut plantation with financial achievement of Rs. 3.76 lakh.
- ii. 0.50 lakh nos. of seedlings were produced in established Regional Coconut Nurseries with financial achievement of Rs. 6.25 lakh.

## **WEST GARO HILLS DISTRICT**

### **Background**

Situated on the western side of Meghalaya West Garo Hills district is one of the larger districts of the State with headquarters in Tura, which is the second largest town after Shillong. The district was bifurcated and the South West Garo Hills districts was formally inaugurated on 7<sup>th</sup> August, 2012 with its headquarter at Ampati by the Chief Minister Dr. Mukul Sangma.

The West Garo Hills district lie on the western part of the state and are bounded by the East Garo Hills district on the east, South Garo Hills on the South-east, the new district of North Garo Hills on the North, Goalpara and Dhubri districts of Assam on the North and North-West and Bangladesh on the south.

The district are situated approximately between the latitude 90<sup>o</sup> 30' and 89<sup>o</sup> 40' E, and longitudes of 26<sup>o</sup> and 25<sup>o</sup> N.

West Garo Hills has both mountainous and plain areas. In mountainous region, in general land utilisation under Horticultural corps tend to yield the highest level of both social and economic benefits and therefore the thrust of the Department is to develop horticulture to achieve the twin objectives of maximising social and economic benefit.

The geo- climate situation of West Garo Hills offers an excellent scope for growing of different types of Horticultural crops including fruits, vegetables, spices, plantation, medicinal, aromatic and flowers of high economic values. A wide range of tropical and sub-tropical fruits such as mandarin orange, pineapple, banana, lemon, litchi, guava are grown all over the district. A large variety of vegetables both indigenous and exotic like brinjal, pumpkin, colocasia, beans, chilly, snake gourd etc. are grown in many places of the district. In winter potato, cole crops, tomato, leafy vegetables are grown. Tuber and root crop such as sweet potato and tapioca, spices such as turmeric, ginger, black pepper grown abundantly. Plantation such as tea, cashewnut, coconut, Arecanut are coming up with promise. Recently low volume, high crops like Anthurium, dendrobium, chrysanthemum, gerbera, broccoli, coloured capsicum have introduced and performing very well.

### **Geography and Climate**

West Garo Hills with its headquarter at Tura cover 3,09,200 sq.m of area. It has boundary of East and South Garo Hills in the east, Assam in the North, Bangladesh and South West Garo Hills in West and South. It has 2 (two) sub- division namely Tura Sardar and Dadenggre Sub-Division. There are 6 (six) block development offices that is Dadenggre, Dalu, Gambegre, Rongram, Selsella and Tikrikilla. Many rivers flow through the district to North, South and West. Ganol starting from Tura hills flows west and join Brahmaputra, Bugai flows to South and then to Bangladesh. District has

average rainfall of 2667 mm of rainfall with maximum 35 ° and minimum 7 ° temperature with relative humidity 75.

In the hills and rolling and undulating pediment has humid and warm with an average rainfall between 1270-2032 mm. agro climatic features. Soil in the region is light or medium texture with depth varying between deep to very deep, whereas agro-climate in the rolling and undulating pediment and valley land having depression areas it is humid and hot, rainfall vary from 2800-4000 mm the soil in this region is light to heavy texture depth varying from moderately deep to very deep.

## **HORTICULTURE DEVELOPMENT**

West Garo Hills has been shifting towards horticulture from agriculture. All the increase in gross cropped area took place only in the horticultural crops and area under traditional crops remained stagnant. The share of horticulture in cropped area increase and the sector moved from second position to first position. It should be noted that the scope for the development of horticulture has not reached saturation stage because huge extent of cultivable waste and fallow land is available and it can be productively used for horticulture development.

West Garo Hills is naturally endowed with near perfect agro-climatic conditions and profuse diversity of flora and fauna and Horticulture development had been identified as a key to accelerated economic growth and viable means of sustainable livelihood for the largely farming community of the district. The Directorate of Horticulture having identified generic strengths in the area, devised various ways of providing integrated support to farmers for enhanced productivity which includes central and State subsidies, demonstrated programmes, area expansion and multiple cropping. As a result West Garo Hills is a major producer of cashew nut, pineapple, arecanut, ginger and orange. Among the crop area nut stands first with area of 5447 hectare and follows cashew nut 4665 hectare and pineapple (2467 hectare), ginger (2467 hectare), banana (1881 hectare).

Recent interventions under the Technology Mission for the Integrated Development of Horticulture in Meghalaya have further catalysed a spurt of new activities in the district especially in the area of commercial low-volume-high-value crops like Strawberry, Gerbera, Anthurium, Leather-leaf-fern etc., under both open and protected cultivation. Initiative in the food processing sector such as value addition of fresh fruits like pineapple, cashew and convergence of technology mission with BRGF (Backward Region Grant Fund) in area of protected vegetable cultivation gave an additional fillip.

The first Horticultural hub in West Garo Hills was set up at Rongram in 2008 which has provided a much needed nucleus and infrastructural support for increase and more remunerative horticultural production in the district. The Zikzak farm functioning earlier as an agriculture nursery was upgraded to a Horti-Hub in 2010 and formally inaugurated by the Chief Minister Dr. Mukul M. Sangma in January, 4<sup>th</sup>, 2012. The

Rangmalgre Cashew nursery which was established to provide quality cashew planting material to the farmers in West Garo Hills of Meghalaya which has ideal agro climatic conditions for growth of that fruit has also been upgraded into a Horti-Hub. Further in 2012, identifying the vast potential for oranges and other citrus fruits in West Garo Hills, the District Horticulture Office also established the Waribokgre Citrus Nursery which will be providing quality planting material to the farmers.

## **SWOT ANALYSIS OF HORTICULTURE IN WEST GARO HILLS**

### **Strengths**

- Comparative advantage with respect to the diverse agro-climatic condition of the state suitable for growing different types of fruits, vegetables, oil palm, plantation and spice crops, medicinal, aromatic and flower crops.
- Comparative advantage of the geographical location of the state ensures good prospects for marketing (export) of horticultural produce to other states of the country and abroad.
- Availability of abundant waste and marginal lands that can be utilised for cultivation of horticultural crops.
- Availability of abundant land based resources besides congenial agro-climatic conditions has much scope for integrated development of horticulture in the state.

### **Weaknesses**

**Weak Extension Linkage in the Department-** although the Department of Horticulture is one of the major departments in the State, the extension personnel available at the grass root level is negligible. No extension personnel are available at village level. This results in inadequate technology transfer.

**Inadequate supply of quality planting material-** with the existing infrastructure available in the farms and nurseries, the Department can meet only 25% of the total requirement of planting material with respect to fruit crops. The supply of planting material under plantation and spices and flower crops, the much lower compared to the demand. Under vegetable crops, the department's role is negligible as far as the planting material is concerned. Therefore, the existing farms and nurseries require further strengthening.

**Upgradation of Technical knowledge-** the technical advances in the field of Horticulture is tremendous both within and outside the country. The departmental personnel are not properly exposed to these advances, resulting in inadequate transfer

of advanced technology. There is a need for intensification of training programmes for farmers and extension personnel.

- ❖ Area Expansion on unscientific basis leading to declined productivity and fluctuation in market prices.
- ❖ Inadequate infrastructure for marketing, handling, and processing of horticultural produce.
- ❖ Inadequate air cargo and rail cargo facilities in the district.
- ❖ Inadequate facilities for post- harvest handling of horticultural produce especially during glut seasons.
- ❖ Inadequate power supply in the state and exorbitant power tariff for the floriculture and processing sectors as these enterprises are considered as an industry.
- ❖ Regional imbalance in the development of horticulture within the State.
- ❖ Monocropping system of cultivation and hence increase in incidence of diseases and pest and production.
- ❖ Increase in prices of plant protection chemicals and fertilizers.
- ❖ Failure in market stability.
- ❖ Complexity in the incidence of pest and diseases.

### **Opportunities**

- ❖ Abundant land added with congenial agro climatic conditions for future horticulture development through area expansion to achieve doubling of present area as envisaged.
- ❖ Scope for development of Horticulture in the State owing to the increase in demand for horticultural products including flowers, both in the domestic and international markets.
- ❖ Introduction and development of new potential crops such as orchids, anthurus, medicinal and aromatic plants, vanilla and import substitution crops like cocoa, oil palm and cashew.
- ❖ Production of hybrid vegetables and fruits to gear up production to meet the National per capita recommendation of fruits and vegetables as protective and nutritious foods.
- ❖ Scope for establishment of processing and post harvesting units in and around production centres to prevent the losses.
- ❖ Scope for introduction of different cropping systems to overcome endemic problems and regional cropping imbalances.
- ❖ Scope for extensions of area under drip irrigation for horticultural crops.
- ❖ Opportunities for conversion of waste lands into productive lands through dry land horticulture.

- ❖ Scope for generating large surpluses of horticultural crops for the export market.
- ❖ Horticulture based exports have potential to become one of our major foreign exchange earners.
- ❖ Scope for developing value addition to horticulture like organically grown vegetables and fruits, cleaned and graded products, processed products ready to serve horticulture food products, spice encapsulation, oleoresins, dry flowers, potpourris, etc.
- ❖ Potentiality to develop protected cultivation of flowers and vegetables like green house cultivation along with other necessary inputs.
- ❖ Scope for the horticulture sector to spearhead the economic development of the state.

### **Threats**

- ❖ Endemic pest and disease problems due to mono cropping.
- ❖ Vagaries of monsoon during the cropping seasons.
- ❖ Fragmentation of land holdings.
- ❖ Entry of middlemen and pre-harvest contractors at the time of marketing.
- ❖ Levy of tax on certain horticulture produce is exorbitant.

### **Land Availability**

West Garo Hills has abandoned jhum and marginal land with diverse agroecological condition which are suitable to cultivate many horticultural crops like fruits, vegetables, flowers, spices, plantation crops, root and tuber, medicinal and aromatic crops etc. As per the State statistics there are about 14,080 ha. of cultivable waste land in West Garo Hills. Which provides excellent opportunities to increase area and production of Horticultural crops thereby raising the income of the farmers. Availability of abundant land based resources besides congenial agro-climate condition has much scope for integrated development of horticulture in the district.

### **Rangmalgre Horti- Hub**

#### **(West Garo Hills District, Meghalaya)**

The Rangmalgre farm has been upgraded to a Horti-Hub to provide quality cashew planting material to the farmers in West Garo Hills of Meghalaya. Although Garo Hills has already established a name for itself in cashew production there is still immense scope for enhanced growth in this sector which the cashew Hub would stimulate through the following objectives:

1. Raising the high quality planting materials by the technology of soft wood grafting.
2. Replace and rejuvenate the senile plants with recommended variety.
3. Train the farmers on the soft wood grafting technology.

### **Waribokgre Model Citrus Nursery-cum-Orchard (West Garo Hills District, Meghalaya)**

Waribokgre is approximately 22 kms from Tura just off the Tura-Paikan highway. It initially started as a Centre of Excellence for production of passion fruit but this was not successful due to various reasons. In 2011, the 20 acre complex was converted to the Waribokgre Model Citrus Nursery-cum-Orchard and is now taking shape to the nucleus for citrus fruit expansion programmes all over the district. Oranges, mosambi, Valencia are all doing extremely well in West Garo Hills and the nursery with its high tech inputs is creating a source for ensuring quality planting material in citrus plants. The land for the Nursery incidentally was donated by the Nokma of the area so that developmental activities could take place in his area.

Waribokgre is cooler than Tura and Rongram and is at a height of 600 MSL. It is not only a nursery for healthy seedlings and quality planting material but is also a model orchard with hundreds of trees planted on the sloping hillsides. The trees are expected to bear fruit next year. Its basic objectives are:

1. Propagate healthy and quality planting materials.
2. Act as demonstration unit for good orchard management.
3. Provide training in budding technology.

To achieve its objective the Waribokgre nursery has:

1. Mother root stock block- for raising quality root stock.
2. Scion bank for budding Khasi Mandarin
3. A Primary Nursery

4. Three secondary Nurseries
5. Demonstration orchard block of Khasi Mandarin, Nagpur Mandarin, Mosambi and Valencia.
6. Two water harvesting ponds.

Root stocks are of rough lemon, Rangpur lime and Citrus Volkmeria. There are over 3000 plants, both root stocks and scion in the various green houses spread over the complex. Separate green houses have also been erected for trial production of strawberry and Khasi Mandarin under protected cultivation. The Demo Orchard is also for production of true type planting materials which are Phytophthora free saplings. This is a soil borne disease mainly affecting nurseries.

Accordingly to various governmental schemes the planting material are distributed to interested and motivated farmers who are also given hand on training.

**TOTAL AREA AND CLASSIFICATION OF AREA IN EACH BLOCK OF WEST GARO HILLS DISTRICT FOR THE YEAR ENDING 2014**

West Garo Hills Geographical Area	Reporting Area for Land Utilisation Statistics	Forest	Not available for cultivation						Fallow Lands				Area sown more than once	Total cropped area
			Area under non-agricultural uses						Cultivable Waste Land	Fallow Lands other than current Fallows	Current Fallow	Net Area Sown		
			Water logged land	Social Forestry	Land under still water	Other land	Barren & uncultivable land	Land under misc. Tree crops & groves (not included in net area sown)						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
309200	309249	134660	250	5984	300	11184	6086	21614	14080	32248	9189	75270	18987	94037

## Availability of Planting Material

Sl. No.	Name of Nursery	Name of Crops	Total Seedling available	Remarks
1.	Model Citrus Nursery cum Orchard Waribokgre	1) Orange (Khasi Mandarin)	82,000 nos	Budded sapling
		2) Nagpur orange	1,000 nos	Budded sapling
2.	Model Citrus Nursery cum Orchard Waribokgre	1) Sweet orange, (Mosambi)	2,000 nos	Budded sapling
3.	Rongram Horticulture Nursery & Hurti- Hub	1) Orange (Khasi Mandarin)	28,000 nos	Budded sapling
4.	Rangmalgre Horti Nursery	1) Orange (Khasi Mandarin)	2,000 nos	Seedling from seeds.

### Rongram Horti- Hub (West Garo Hills District, Meghalya)

Rongram Horti-Hub is located at Rongram farm which is only 15 kms from Tura the district headquarter, on the Tural Paikan NH-51. It is endowed with relatively warm to moderate climatic conditions, temperatures ranging from 12<sup>0</sup> C to 32<sup>0</sup> C with high relative humidity and good sunshine. The soil is rich in humus and consists of red laterite as well as black loamy soils.

#### The Horti-Hub objectives are:

1. Holistic centre of excellence for market demand driven crops with a distinct business model set up under technology mission.
2. Provide state of the art infrastructure for hi-tech horticulture in the district on pre-identified cluster basis.
3. Facilitate induction of latest technology.
4. Hands of demonstration based on principles of commercial horticulture in PPP mode.
5. Focus on low-volume-high-value crops.
6. Training & demonstration centre, collection centre, technology clearing house, grading & packing centre, a forward link for farmers and backward link for the private sector.

7. Responsible for expansion of market demand driven by horticultural crops in the district.
8. Foster interagency linkages for pooling of resources for activities complimentary to food processing.
9. Quality assurance through better production process and capacity building.

Rongram Horti-Hub was sanctioned in August, 2008 and work started within a month. During the last 5 years it has achieved over 12000 sq. m. protected area under poly-houses, two water tanks having capacity to store over 5 lakh litres, pump house, generator room, fertigation room, grading & packing hall, cold room, a primary hardening unit for tissue culture plants / germination chamber, high poly tunnels for Strawberry mother plants (for multiplication through suckers) and a training hall (using pre-fabricated bamboo structure).

The commercial crops cultivated in this hub are Gerbera (3600 sq.m.), Anthurium (1000 sq.m), Chrysanthemum (1000 sq.m.), leather leaf fern (1000 sq. m), vegetables (1600 sq.m.) and orange nursery (1200 sq. m.), Mist Hardening Chamber (1500 s. m.), Arecanut (500 sq. m.), Dendrobium (512 sq.m.). Strawberry crop in an area of 4970 sq. m. was taken up as open cultivation from October 2008 with a plant population of 15000 plants and vegetable open cultivation of 1000 sq.m.

The Horti-Hub has been actively implementing its goal of being a training & demonstration centre, collection centre, technology clearing house, grading & packing centre, a holistic centre of excellence for market driven horticultural crops with a distinct business model and also providing state of the art infrastructure for hi-tech horticulture for farmers and other stakeholders to visit and observe horticultural activities.

**Demonstration Units-** at present demonstration units of Gerbera, Anthurium, Leather-leaf-fern, Strawberry and orange / arecanut / vegetable nursery, irrigation systems are in place for growers and visitors. Another unit of Dendrobium orchid (512

sq.m.) started in 2011 for demonstration. Vegetable demo unit and Grading & packing unit along with cold room are already in place.

**Trainings-** A 3-day duration training is provided for Gerbera, Anthurium, Carnation and leather-leaf fern. Several trainings of 2 day duration in batches of 30 farmers have also been organized for vegetable and strawberry SHG beneficiaries who got vegetable poly houses under Technology Mission in convergence with BRGF. Trainings on fruit crops under area expansion have also been given. Training of Departmental personnel at the Hub is an ongoing process with at least one 3-day training every quarter.

**Supply of planting material-** Production & supply of planting material are initially planted to primary nursery beds, transferred to secondary nursery beds and then distributed to beneficiary farmers along the spokes of the Hub. Schedules maintained with number of seedlings raised or new crops vary depending on area expansion demand.

**Vegetable seedlings raised in nursery-** Vegetable seedlings raised in the Hub nursery are during the period 4<sup>th</sup> Week of January and distributed to farmers in 3<sup>rd</sup> week of February, off-season vegetable seedlings raised under protected cultivation in 1<sup>st</sup> week of June and distributed June end to mid- July and lastly raised in 1<sup>st</sup> week of September and distributed to farmers in the last week of the month.

**Flower seedlings-** planting materials for seasonal flower and ornamental foliage were raised in the Hub from March, 2011. Initially 15,000 seasonal flower seedlings and 2500 foliage potted plants were raised and subsequently increased based on demand.

Field Testing and validation of all crops and technologies are conducted by officers.

### **Crop Focus of Hub-**

1. **Floriculture:** Anthurium, Gerbera, Chrysanthemum, Dendrobium & Leather-Leaf-fern
2. **Vegetables:** Capsicum, Broccoli, Cherry Tomato, Tomato, Zucchini & Beans.
3. **Fruit Crops:** Strawberry & Orange
4. **Planting material:** Strawberry, Orange, Vegetables (Tomato, Broccoli, Beans, Capsicum, Cabbage, Cauliflower, Lettuce, etc.),

### **Infrastructure and assets-**

Existing Buildings:

- a) Office (Assam type-3 rooms)
- b) Training Hall (Pre-fabricated bamboo structure)
- c) Labour-shed (Pre-fabricated bamboo structure)
- d) Office-cum-residence for Hub Manager (RCC)
- e) Duplex quarter (RCC for ANI and Chowkidar)
- f) Grading & packing Hall (RCC with cold room of 3x3x3 m size)
- g) Generator & Fertigation rooms (RCC)

### **Greenhouse / polyhouse/high poly-tunnels:**

1. Gerbera (2688 sq.m.)
2. Anthurium (960 sq. m.)
3. Chrysanthemum (1152 sq. m.)
4. Leather-leaf fern (960 sq.m.)
5. Bamboo poly house (512 sq.m. for vegetable)
6. Orange Nursery Shade house (1296 sq.m.)
7. Germination chamber (512 sq.m.)
8. Vegetables (1400 sq.m.)
9. Dendrobium (500 sq.m.)

**Water Tanks:**

1. Tank- A (RCC, 2.10 lakh litre capacity)
2. Tank-B (RCC, 3.00 lakh litre capacity)
3. Tank- C (RCC, overhead, 0.15 lakh litre capacity)

**Farm Equipments:**

All requisite farming equipment are available at the horti-hub including power sprayers, hand sprayers, power tiller, wheel barrows, electric pump sets, diesel pump set, fertigation tanks, sand filtration tank, hand watering cans, drip irrigation systems, fogger system, cold room, spades, jumples, khurpis, etc.

**Water availability:**

Since the farm is located by the side of Rongram river, adequate water is available with a total storage capacity of 5,25,000 litres at a time in the Hub. However, there is a need to set up a water treatment plant to filter various pollutants.

**Future plans:**

A Farmers' hostel has been constructed opposite the Hub and once commissioned will be giving hand on training to batches of farmers.

## West Garo Hills

S. No.	Name of the Beneficiary	Address	Crop Component /	Year of Plantation / Start	Area in Ha./ Unit	Total unit planted	Survival as on date /status	Remark
1.	Elison Marak	Durankantragre	Orange	2010-11	1.15	400	394	<ul style="list-style-type: none"> <li>• Subsidy availed.</li> <li>• Pruning to be done</li> <li>• Leaf miner not controlled.</li> </ul>
2.	Smt. Sanitha Marak	Durakantragre	Strawberry	2014-15	0.5	5000	45%	<ul style="list-style-type: none"> <li>• Crop is under fruiting.</li> <li>• Subsidy availed.</li> <li>• Total 1,25000/- subsidy @ 25 per plant.</li> </ul>
3.	Shri Jonen Sangma & Cluster of 10 beneficiaries	Durakantragre	Strawberry	2014-15	0.2	5000	95%	-do-
4.	Smt. Kalnath Marak	Durakantragre	Strawberry	2014-15	0.5	5000	95%	<ul style="list-style-type: none"> <li>• Training on propagation of planting material to be given to farmers</li> </ul>
5.	Smt. Metrida M. Sangma	Dakopgre	Anthurium (Poly house)	2014-15	0.2	1800	85%	<ul style="list-style-type: none"> <li>• Subsidy Rs. 2,16000 given @ 20 per seedling.</li> <li>• Growing well.</li> </ul>
6.	Smt. Crystal B. Marak	Rangkxon, Songital	Poly house (Anthurium)	2014-15	0.2	2200	95%	<ul style="list-style-type: none"> <li>• Subsidy availed.</li> <li>• Flowering started.</li> <li>• Sold @ 10-15 per plant.</li> </ul>

7.	Sri Balwan Sangma	Gimbilgre	AEP of cashew nut (cv. Priyanka)	2010-11	3.0	400	360	<ul style="list-style-type: none"> <li>• Subsidy availed.</li> <li>• Tea mosquito incidence was high, advice to control.</li> </ul>
8.	Shri Nangren Sangma	Didenggre	Cashew nut (Cv. Pryanka) cum water harvesting structure	2013-14	4.00	880	680	<ul style="list-style-type: none"> <li>• Rs. 14,160/- cash &amp; planting material @ 40 per plants Rs. 32000/-</li> <li>• Rs. 1,30000 for water pond given.</li> </ul>

## **OBSERVATIONS**

### **WEST GARO HILL DISTRICT (HQ – TURA)**

1. Strawberry cluster under rain fed condition in the village was well maintained by the farmers of the area. Farmers were very much enthusiastic because of good return from this crop. This village is in remote area and not well connected by road. The efforts of HDO are appreciable.
2. Horticulture hub at Rongram was well maintained but seems shortage of manpower. Only one person was technical (manager). There should be at least two persons to look after a station.
3. Nursery of orange at Waridokgre was well maintained. Till now about 1 lakh grafted material has been supplied to the department. Scion stock of Khasi Mandrin in net house was maintained but it should be fully covered by net.
4. Organic farming of cashew at some farmer's field has been started under HMNEH without proper marketing.
5. Rain water harvesting tank under NHEM is done which praise is worthy.
6. Area expansion of pineapple on hill slope at village Chioksongitl is good site to see.

Sh. A.B. Savio Chosim (DHO, Tura), Sh. James Waren Sangma (Asstt. Director, Tura), Salma G. Monin (HDO, HQ, Tura) and Apurva Hajong (HDO, Selsella) from the district accompanied the team.

## **SOUTH WEST GARO HILLS**

### **Background Information**

South West Garo Hills has the natural advantage of diverse agro climatic conditions, which enables production of wide range of horticultural crops. South West Garo Hills is bestowed with rich bio-diversity and varied agro-climatic conditions, ideal for growing a large variety of horticultural crops. The sector, which includes fruits, vegetables, floriculture, spices and medicinal & aromatic plants, has gained importance in terms of enhanced income per unit area, providing nutritional security, source of raw material for many food processing industries, leading to socio-economic improvement of the people. Keeping the above importance of horticulture in the national economy and the economy of the state, in particular, a systematic and scientific effort of developing horticulture in the District has been made. The objective, therefore, is to formulate programmes aimed at developing the potential that exists for growing a variety of horticultural crops, to raise income and to generate employment and to achieve a growth rate in the horticultural crops, to raise income and to generate employment and to achieve a growth rate in horticulture sector. This is also well known that horticultural produce like fruits, vegetables, spices, mushroom and honey play a major role in nutritional security. By increasing horticultural production activities right from sowing to its maintenance, irrigation, harvesting, cutting, marketing, processing and value addition etc. can help in creating Employment opportunity.

Horticulture has emerged, as one of the major agricultural activities as there has been a substantial increase both in area and production of horticulture crops. Horticulture crops have the inherent advantage of providing higher productivity per unit area of land as compared to other crops, resulting in higher income and employment generation in rural areas. One important trend observed in the last few years is that horticulture development has gradually moved out of its rural confines into urban areas and from traditional agricultural enterprise to the corporate sector. This trend had led to

the adoption of improved technology, greater commercialization and professionalism in the management of production and marketing of different horticulture crops. As a result, we today witness a perceptible change in the concept of horticulture development in the State.

The horticulture scenario of the country and the state has been changing rapidly both in terms of production and productivity. National Horticulture Mission Scheme has helped in the areas of development of planting material, production and productivity improvement programmes.

As per the tentative estimates of census 2011,

No. of Villages:	505
No, of Households:	33,866
Population as per 2011 General census	Male-87,135
	Female-85,360
	<b>Total 1, 72,495</b>

In order to cater the need of fruits, vegetables and other horticultural crops as per the recommendation of India Council of Medical Research, the production level of these crops need to be multiplied. Further, the requirement for value addition and processing purpose, quality production. The area, production and productivity of horticulture crops has considerably increased as the state and central Govt. have paid focused / attention towards these crops. More income per unit area and employment generation in short span of time have attracted the enterprising farmers of the state, which resulted in diversification towards horticulture crops. These crops have proved to be the boon to the small and marginal farmers of the State who accounts for more than 90% holding of the State. This is more important because nearly 70% of the population is dependent on agriculture.

The diverse and suitable agro-climatic and agro-ecological situations have enormous potential for horticultural crops production in the District.

During coming years, the planning of horticulture development in a holistic manner by identifying the critical gap in infrastructure, well knitting the linkages of

production to harvesting, processing to value addition and exports to achieve the objectives of National Horticulture Mission in the State and country at large.

Under 12<sup>th</sup> five year plan, following priority areas have been proposed for horticultural development.

Increase the horticulture growth rate and Promotion of capital investment for development of critical infrastructure for horticulture development. Ensure availability of quality seeds and planting materials in and planned manner and dovetailing the same with area expansion programme. Prioritization on the basis of focus crop and production cluster / area. Reduction in cost of cultivation by efficient technology and farm mechanization. Restructuring of the department and business process re-engineering.

Promotion of high quality and productive horticultural crops production suitable for processing especially orange, Banana, Arecanut, Pine apple etc. for export to National markets. Training of farmers, self-help group/horticultural cooperative societies groups in the horticultural development activities. Development of infrastructural facilities and post harvest management.

## **Geography & Climate**

**Date of creation of the District: 27<sup>th</sup> July, 2012**

The District Boundaries :

- North- West Garo- Hills District
- South- Bangala Desh.
- West- Assam
- East- West Garo Hills District

It spreads over a large area and the plains of the state area quite distinctly differently from the high mountains in the north. The climate of South West Garo Hill scan also vary widely, with temperatures as high as 35<sup>0</sup> C in summer, and as low as 8<sup>0</sup> C in winter.

Tropical monsoon climate of South West Garo Hills is marked by three distinct seasons:

1. **Summer** (March- June): Hot & dry (temperatures rise to 30- 35<sup>0</sup> C
2. **Monsoon** (June- September): average annual rainfall of 800-1500 mm. Relative humidity ranges from 70-85.
3. **Winter** (October- February): Cold (temperatures drop to 7-8<sup>0</sup> C, clear skies; foggy conditions in some tracts.

South West Garo Hills is a small District having geographical area

: 56,500 sq. k.m.

District Headquarters- Ampati

N' Latitude-

E' Longitude-

Elevation-100 m. above msl.

Azimuth-

### **Potential of Horticulture**

Horticulture sector has started getting focused attention as result there has been significant increase in area, production & productivity of horticulture crops in the State. Due to the efforts made under various plan scheme of horticulture development, this sector has come to the fore by now. In fact, with the increase in the purchasing capacity of the consumer, the demand of horticulture produce is increasing. Thus, this sector has provided opportunity for crops diversification and efficient viable option for small and & marginal farmers of the district as well as state.

Horticulture crops comprises of a wide variety of crops viz. fruits, vegetables, flowers, spices, nuts, aromatics and medicinal plants, beekeeping, mushroom cultivation, betel-vine and other crops, which are important for food security, nutritional security and allied components. This District is blessed with diverse agro climatic conditions; in fact, those area conducive for cultivation of varied horticultural crops round the year. South West Garo Hills hold a vast potential for the development of horticulture.

### **Land Availability**

The land use statistics of the South West Garo Hills are given below:-

<b>S. No.</b>	<b>Item</b>	<b>Period</b>	<b>Area</b>
1.	Net sown area	2010-11	5106 ha.
2.	Area sown more than once	2010-11	6187 ha.
3.	Land under non-agril use	2010-11	4606 ha.
4.	Current fallow land	2010-11	1461 ha.
5.	Other fallow land	2010-11	3645 ha.
6.	Reported area under land use	2010-11	58,500 ha.
7.	Forest	2010-11	23,333 ha.

8.	Uncultivable land	2010-11	1305 ha.
9.	Permanent pastures and other grazing land	2010-11	N.A.
10.	Cultivable waste land	2010-11	1190 ha.
11.	Permanent pastures and other grazing land	2010-11	N.A.
12.	Land under other trees & shrubs	2010-11	2809 ha.

## SWOT ANALYSIS OF HORTICULTURE IN SOUTH WEST GARO HILLS

- Comparative advantage with respect to the diverse agro-climatic condition of the state suitable for growing different types of fruits, vegetables, oil palm, plantation and spice crops, medicinal, aromatic and flower crops.
- Comparative advantage of the geographical location of the state ensures good prospects for marketing (export) of horticultural produce to other state of the country and abroad.
- Availability of abundant waste and marginal lands that can be utilized for cultivation of horticultural crops.
- Availability of abundant land based resources besides congenial agro-climatic conditions has much scope for integrated development of horticulture in the state.

### Weaknesses

- **Weak Extension Linkage in the Department-** although the Department of Horticulture is one of the major department in the state, the extension personnel available at the grass root level is negligible. No extension personnel are available at village level. This results in inadequate technology transfer.
- **Inadequate supply of quality planting material-** with the existing infrastructure available in the farm and nurseries, the Department can met only 255 of the total requirement of planting material with respect to fruit crops. The supply of planting material under plantation and spices and flower crops, the much lower compared to the demand. Under vegetable crops, the department's role is negligible as far as the planting material is concerned. Therefore, the existing farms and nurseries require further strengthening.
- **Upgradation of Technical knowledge-** the technical advances in the field of horticulture is tremendous both within and outside the country. The departmental

personnel are not properly exposed to these advances, resulting in inadequate transfer of advanced technology. There is a need for intensification of training programmes for farmers and extension personnel.

- Area Expansion on unscientific basis leading to decline productivity and fluctuation in market prices.
- Inadequate infrastructure for marketing, handling, and processing of horticultural produce.
- Inadequate air cargo and rail cargo facilities in the district.
- Inadequate facilities for post harvest handling of horticultural produce especially during glut seasons.
- Inadequate power supply in the state and exorbitant power tariff for the floriculture and processing sectors as these enterprises are considered as an industry.
- Regional imbalance in the development of horticulture within the state.
- Monocropping system of cultivation and hence increase in incidence of disease and pests and reduce production.
- Increase in prices of plant protection chemicals and fertilizers.
- Failure in market stability.
- Complexity in the incidence of pests and diseases.

### **Opportunities**

- Abundant land added with congenial agro climatic conditions for future horticulture development through area expansion to achieve doubling of present area as envisaged.
- Scope for development of horticulture in the state owing to the increase in demand for horticultural products including flowers, both in the domestic and international markets.
- Introduction and development of new potential crops such as orchids, anthuriums, medicinal and aromatic plants, vanilla and import substitution crops like cocoa, oil palm and cashew.

- Production of hybrid vegetables and fruits to gear up production to meet the national per capita recommendation of fruits and vegetables as protective and nutritious foods.
- Scope for establishment of processing and post harvesting units in and around production centres to prevent the losses.
- Scope for introduction of different cropping systems to overcome endemic problems and regional cropping imbalances.
- Scope for extensions of area under drip irrigation for horticultural crops.
- Opportunities for conversion of waste lands into productive lands through dry land horticulture.
- Scope for generating large surpluses of horticultural crops for the export market.
- Horticulture based exports have potential to become one of our major foreign exchange earners.
- Scope for developing value addition to horticulture like organically grown vegetables and fruits, cleaned and graded products, processed products ready to serve horticulture food products, spice encapsulation, oleoresins, dry flowers, potpourris, etc.
- Potentiality to develop protected cultivation of flowers and vegetables like green house cultivation along with other necessary inputs.
- Scope for the horticulture sector to super head the economic development of the state.

### **Threats**

- Endemic pest and disease problems due to mono cropping.
- Vagaries of monsoon during the cropping seasons.
- Fragmentation of land holdings.
- Entry of middlemen and pre-harvest contractors at the time of marketing.
- Levy of tax on certain horticulture produce is exorbitant.

### **Zikzak Horticulture Hub:**

Zikzak Horticulture Hub initially called as border horticulture farm is located under South West Garo Hills district. It is 70 k.m. away from West Garo Hills HQ. Tura. It has started somewhere in 1960's. where nursery, plants and grafts of some horticulture crops are produced to cater the need of the farmers of the surrounding areas. This border horticulture farm is look after by one Asstt. Horticulture Development Officer. He is assisted by one demonstrator. Ten to fifteen daily farm labourers are engaged in the farm for day to day maintenance of the farm.

It was in the year 2010 that this border horticulture farm was upgraded to Horticulture Hub and formally inaugurated on 4<sup>th</sup> January, 2012. This horticulture hub is being look after by one Horticulture Development Officer, assisted by one Asstt. Horticulture Officer and one Horticulture Demonstrator.

This Horticulture Hub becomes the centre of production of quality planting materials. It also becomes the model which displays all horticulture crops to the farmers and public in general. This Horticulture Hub also caters the need of the farmers of the surrounding areas for quality planting materials.

Activities like raising of seedling like Arecanut, Coconut, Lemon, Tea, Litchi is being done in this Horticulture Hub. The seedlings are sold to the farmers on 50% subsidy. Growing of Orchids (Dendrobium), Anthurium and Gerbera are also being done. The flowers are being sold in the market and thereby revenue generation is being created.

### **Zikzak Horti-Hub**

(South- West Garo Hills District, Meghalaya)

Ampati, the headquarters of the new district South West Garo Hills, is 50 kms from Tura. Further ahead on the Mehendraganj road lies Zikzak Block one of the oldest administrative blocks in Garo Hills and 2 kms from the block headquarters is locate the Zikzak Horti-Hub. Functioning as a agriculture nursery earlier the farm was upgraded to a Horti-Hub in 2010 and formally inaugurated by the Chief Minister Dr. Mukul Sangma in January, 4<sup>th</sup>, 2012.

Having approximately 8 hectares of land the Zikzak Horti- Hub has a large stretch of land profusely covered by the litchi trees which flower in March/ April and yield luscious fruits in May/ June. To the west of the Hub are 9 poly houses, each of 1000 sq. mtr size. Two of the polyhouses are full of flowering dendrobium orchids of the Singapore white variety and D. Sonia whose flowers are purple and white. There are 2 green houses under lilium in different colours- flaming yellow, pink and white. One

green house is full of sweet orange (Mosambi) budlings, experiment with anthurium which is doing very well in Wet and East Garo hills at higher altitudes, and lastly vegetable seedlings. Every year litchi graft and coconut seedlings are also made.

Farmers of the Zikzak and Betasing blocks collect seedlings and budlings from the farm at subsidized rates, while cole crops such as cabbage, cauliflowers and broccoli and also tomato and chilli are distributed to farmers free. The Hub is also raising indigenous fruit seedlings including citrus and distributing them to beneficiaries at subsidized rates. Sale proceeds from the mature litchi, arecanut and coconut fruits adds to the Hub activities and percolates down to the marginal farmers.

Water, the main ingredient for any horticultural activity is not a problem as the Hub is located on the banks of the Rongkai river, where water is pumped up and store in a 3,00,000 litre reservoir with a sand filtering system. Developmental activities are continuing in the newly created Hub and with RKVY funds a large access road has been built, the entire complex fenced off and transformer fixed for power escalation. A standby generator of 30 KVA is also there.

Staff quarters are within the complex for the Hub Manager, the Asst. Horticulture Inspector, the Demonstrator and other junior staff. The Inspector and Demonstrator look after the extension services.

Being the only Horti- Hub in South West Garo Hills, detailed planning is on for future expansion including a Farmers' Training Centre with Hostel.

### South West Garo Hills District

S. No.	Name of the Beneficiary	Address	Crop Component /	Year of Plantation / Start	Area in Ha./ Unit	Total unit planted	Survival as on date /status	Remark
1.	Sh. Rakesh Sangma	Ampati, South West Garo Hills	Cabbage, Cauliflower, Broccoli, Brinjal	2014-15	1.5	1500	96%	<ul style="list-style-type: none"> <li>Area needs to be developed as vegetable hub, to grow vegetable after paddy crop since, sufficient water and good land is available.</li> </ul>
2.	Smt., Pulmothy D. Marak	Ampati, South West Garo Hills	Poly house (orchid)	2014-15	0.4 ha	1600	90%	<ul style="list-style-type: none"> <li>No IPM Technology followed.</li> <li>Just initiated the cultivation.</li> </ul>
3.	Sh. Molen Sangma	Bollonggitte S.N. Garo Hills	Cashewnut	1990	2 ha	150	93%	<ul style="list-style-type: none"> <li>Rejuvenation not done properly, demonstrated and advised to do as per recommendation of NRC, Puttur</li> </ul>
4.	Sh. Witseng B. marak	Chirengpara, Beta Singh block S. W. Garo Hills	Pineapple	2013-14	2 ha	15000	98%	<ul style="list-style-type: none"> <li>Planting material supplied, plants are growing well.</li> <li>Kew variety is given.</li> </ul>
5.	Mingjon B. Marak	Chirangpara, SWGaro Hills, Zikzak Block	Pineapple	2013-14	2 ha	15000	98%	<ul style="list-style-type: none"> <li>Good growth needs more nutrient to attain good growth.</li> <li>Proper cleaning is needed</li> </ul>

								or mulching to be done, damage leaf miner noticed.
6.	Sh. Kuldeep A. Sangma	Chopapara, Zikzak block, SW, Garo Hills	Orange	2014-15	3 ha	400	97.5%	<ul style="list-style-type: none"> <li>• Seedling orange are grown.</li> <li>• Leaf Miner noticed.</li> <li>• Leaf midge is very serious advised accordingly.</li> </ul>
7.	Nengjan Mozim	Chopapara, Zikzak Block, S.W. Garo Hills	Sweet orange	2014-15	3 ha	200	96%	<ul style="list-style-type: none"> <li>• Leaf Miner noticed.</li> </ul>

## **OBSERVATIONS**

### **SOUTH-WEST GARO HILL DISTRICT (HQ – AMPATI)**

1. Rejuvenation of cashew trees at village Bollonggitok was not done properly. For such activity HDOs and farmers should be given proper training from time to time.
2. Area expansion of Pine apple in rain fed condition at village Chiringpara under HMNEH is being done.
3. Community pond (capacity – 2.5 lac litre) for rain water harvesting at village Chopara was constructed but no water available during JIT visit.
4. Under AEP of citrus, plantation of orange was done by seedlings which are not correct.
5. There is tremendous scope for flower / vegetable cultivation in fallow paddy land with sufficient water as more area is required to be covered under vegetable crops.
6. Orchid crop was raised under net house but it was not well managed. However, the planting material was given by department.
7. Field level demonstration (FLDs) on organic vegetable crops was done at Ampati but no IPM was followed by department.
8. Zikzak Horti-Hub was well maintained and has varieties of different fruit crops.

## NORTH EAST GARO HILLS

### NORTH GARO HILLS

#### Physical & Administrative Features;

<b>Total Geographical Area (Sq km)</b>	<b>1666</b>
No. of Sub Division	Nil
No. of Blocks	3
No. of village (inhabited)	559
No. of Household	25472
Population	137329

#### Soil & Climate:

- a) **Agro-climate Zone:** The district lies between 25.24 N and 26.10 N latitude and 90 E and 91.3 longitude.
- b) **Climate:** The climate is tropical, the monsoon rain feed the district by heavy rainfall & high humidity.
- c) **Soil type:** Hilly, plain & loamy soil contains about 10% organic matter with high nitrogen content.

#### LAND UTILISATION (Ha)

Total Area Reported	260300
Forest Land	124525
Area Not Available for Cultivation	6643
Permanent Pasture and Grazing Land	NA
Land under Miscellaneous Tree Crops	25214
Cultivable Wasteland	36917
Current Fallow	4915
Other Fallow	20238
Net Sown Area	37009
Total or Gross Cropped Area	42346
Area cultivated More the once	5337
Cropping Intensity (GCA/NSA)	1.14

#### RAINFALL & GROUND WATER:

Rainfall (in mm)	Normal	Actual	2011-12	2012-13	2013-14
	2800	2813	3098	2604	2475
	Variation from Normal		298	196	325

## 5. Distribution of Land Holding:

Classification of Holding			Holding		Area	
			Nos	% to Total	Ha.	% to Total
<=1 Ha			10455	46	5779	16
>1 to < = 2 Ha			5916	26	7881	22
> 2 Ha			6557	29	21973	62
<b>Total</b>			<b>22928</b>	<b>100</b>	<b>35633</b>	<b>100</b>

## WORKERS PROFILE (in '000):

### LAND UTILISATION (Ha)

Main cultivators	55.156
Marginal cultivators	22.234
Agricultural Labourers	8.054
Workers engaged in Main Household Industries	1.240
Workers engaged in Marginal Household Industries	1.235
Main other workers	19.486

## INFRASTRUCTURE & SUPPORT SERVICES FOR AGRICULTURE:

Fertiliser / Seed / Pesticide outlets (Nos.)	NA	Agriculture Pump sets (Nos.)	150
Total N/P/K Consumption (MT)	486	Pumpsets Energised (Nos)	NA
Certified Seeds Supplied (MT)	NA	Agro Service Centres (Nos.)	NA
Pesticides Consumed (MT)	NA	Soil Testing Centres (Nos.)	NA
Agriculture Tractor (Nos.)	7	Plantation nurseries (Nos.)	NA
Power Tillers (Nos.)	131	Farmers' Clubs (Nos.)	2
Threshers / Cutters (Nos.)	NA	Krishi Vigyan Kendra (Nos.)	Nil

## IRRIGATION COVERAGE (Ha)

Total Area Available for Irrigation (NIA + Current Fallow)	14565
Irrigation Potential Created	NA
Net Irrigated Area (Total area irrigated at least once)	9650
Area irrigated by Canals/ Chennels	NA
Area irrigated by wells	NA
Area irrigated by tanks	NA
Area irrigated by other sources	NA
Irrigated Potential Utilized (Gross Irrigated Area)	11241

**Area, production and productivity of major horticultural crops of the district.**

Sl. No.	Name of Crops	Particulars	Samanda Dev. Block	Songsak Dev. Block	Rongjeng Dev. Block	Total Prod. of E.G.H.	Remarks
			2012-13	2012-13	2012-13		
1.	Banana	Area in Ha.	264	285	310	859	
		Prod. in (mt)	3305	3564	3891	10760	
		Yield per ha. (in kg.)	12520	12505	12550	37575	
2.	Pineapple	Area in Ha.	247	340	232	819	
		Prod. in (mt)	4150	5746	4060	13956	
		Yield per ha. (in kg.)	16800	16900	17500	51200	
3.	Orange	Area in Ha.	244	39	84	367	
		Prod. in (mt)	1020	167	351	1538	
		Yield per ha. (in kg.)	4192	4296	4175	12663	
4.	Strawberry	Area in Ha.	0.5	0.5	0.3	1.3	
		Prod. in (mt)	1	1	1	3	
		Yield per ha. (in kg.)	2000	2000	1666	5666	
5.	Tomato	Area in Ha.	6	5	5	16	
		Prod. in (mt)	5	4	3	12	
		Yield per ha. (in kg.)	900	800	600	2300	
6.	Cabbage	Area in Ha.	5	4	3	12	
		Prod. in (mt)	4	3	2	9	
		Yield per ha. (in kg.)	670	780	750	2200	
7.	Cauliflower	Area in Ha.	4	3	2	9	
		Prod. in (mt)	3	2	1	6	
		Yield per ha. (in kg.)	780	600	500	1880	
8.	Chilli	Area in Ha.	122	105	75	302	
		Prod. in (mt)	73	63	45	181	
		Yield per ha. (in kg.)	600	597	603	1800	
9.	Ginger	Area in Ha.	1276	1032	1741	4049	
		Prod. in (mt)	5863	4626	46.5	15124	
		Yield per ha. (in kg.)	4595	4483	2662	11740	
10.	Black pepper	Area in Ha.	10	15	NIL	25	
		Prod. in (mt)	1	2	NIL	3	
		Yield per ha. (in kg.)	100	133	NIL	233	

**AVAILABILITY OF PLANTING MATERIALS IN THE STATE NURSERIES AND  
OUTSOURCING DURING SEASON 2015-16 UNDER HORTICULTURE  
DEPARTMENT, EAST GARO HILLS**

**A. Garo Hills Nursery (Big Nursery):**

<b>Sl. No.</b>	<b>Particulars / Crops</b>	<b>No. of plants</b>
1.	Arecanut seedlings in poly bag	70,000
2.	Orange Seedlings (Khasi Mandarin)	60,000
3.	Mango Amrapali	6,000
4.	Coconut seedling W/C	600
5.	Chinnara (indigenous crops)	2,000
6.	Gasampe indigenous crops)	1,500
7.	Rubber plant in poly bag	2,000
8.	Mother Plant:	40
	i. Mango Amrapali	
	ii. Litchi Shahi	30
	iii. Litchi seedless	30
	iv. Guava L-49	40
	v. Guava Red flesh	10

**B. Rikwarenggre Private Nursery:**

<b>Sl. No.</b>	<b>Particulars / Crops</b>	<b>No. of plants</b>
1.	Orange (Seedlings)	15,000
2.	Budded Orange	4000
3.	Rough Lemon	7000

**C. Elite Nursery:**

<b>Sl. No.</b>	<b>Particulars / Crops</b>	<b>No. of plants</b>
1.	Budded Orange	4,000
2.	Rough Lemon	4000
3.		7000

## **MODEL FLORICULTURE CENTRE, DAWAGRE**

Model Floriculture Centre, Dawagre is located in East Garo Hills District which is 8 kms. Away from Williamnagar town. It is on the way to Shillong Nongstoin road via Rongjeng. The hub was established in the year 2013. The total geographical area of the hub is 25 hacs, out of which the crop area under Horticulture is only around 5 ha. So the maximum area under hub is still available and can be utilised for growing fruit crops like banana, pineapple, orange & black pepper etc. Since the set up of these hub horticultural crops like fruit crops, plantation crops, spices, vegetables including floriculture (anthurium & leather leaf fern) are being taken up on commercial basis. The present area under cultivation is 1 ha. in banana, 1.5 ha. in orange and 1 ha in pineapple.

The area under this hub is endowed with the rich natural resources. The land is very fertile and not much of the forest cover is destroyed. The District enjoys varied type of climate like tropical, sub-tropical and temperature which favour for growing various types of field crops, fruits, spices, plantation, medicinal and aromatic flower etc.

### **Objectives, goals & targets in order of priority:**

- Act as a demonstration centre for farmers and other stakeholders.
- To visit and observe horticultural activities
- Training of farmers and growers.
- Production and supply for planting materials.
- Field testing and validation of crops and technologies
- Training of departmental personnel.
- Collection and grading / packing of horticultural produce for onward transmission to markets.

### **Infrastructure and Assets**

- Grading Hall with walk in coolers- 1 No.
- Training Hall cum Hostel-1 no.
- Chowkidars Shed-1 no.
- Shade houses-1 no.
- Hi-tech Green Houses-3 nos.
- Water tanks-1 no. (Capacity: 20,000 litres)
- Water Harvesting Pond-1 no.
- Go-down-1 no.
- 10 KVA Kirlosker Generator Set- 1 No.
- Bolero-1 no.
- Power Tiller-1 no.

- Computer-1 no.
- Xerox Machine-1 nos.

Fund Flow: Year 2013-14

Rs. 1,00,000/-

### Feature Plans

- Expanding the area under banana, pineapple, orange etc. as mother plants.
- Raising the ornamental plants and taking up cutting of mother flower plants etc.

## HORTI-HUB, SAMGONG, WILLIAMNAGAR, EAST GARO HILLS

**Location:** Samgong, Williamnagar, East Garo Hills

Area: 13.3 ha

Soil: Lateritic

Climatic condition: Tropical & sub-tropical with hot humid in summer and very cold in winter.

Temperature: Summer:	Day	Night	Humidity
Max:	35 <sup>0</sup> C	26 <sup>0</sup> C	92%
Min:	24 <sup>0</sup> C	22 <sup>0</sup> C	65%
Temperature: Winter:	Day	Night	Humidity
Max:	32 <sup>0</sup> C	23 <sup>0</sup> C	89%
Min:	24 <sup>0</sup> C	17 <sup>0</sup> C	76%

It started as Samgong Horticulture Farm in the year 1986 at the land (measuring about 10.3 ha) allotted by GAD. However, barring some activities like growing fruit trees, such as Litchi, mango, cashew for mother plants and tea plantation, no major activities were taken up in the farm till the year 2004, when the Centre of Excellence for Anthurium came into existence. Since then many activities on Horticulture development are going on.

**Horti-Hub:** As mentioned, the Horti- Hub since it's inception in 2004 as Centre of Excellence for Anthurium, is today, functioning as a demonstration centre for farmers and other stakeholders to visit and observe horticulture activities, imparting training to farmers as well as Field functionaries, producing and supplying of planting materials to farmers / other departmental units, field testing and validation of crops and technologies, collection and grading of horticultural produce for onward transmission to market.

Area under Samgong Horti- Hub

Total Farm Area= 13.3 ha

Sl. No.	Name of Crops	Nos	Area covered	Remark
1.	Anthurium	40266 nos	6040 sqm.	
2.	Leather Leaf Fern	-	1152 sqm.	
3.	Gerbera	2880 nos	480 sqm.	
4.	Gerbera	6000 nos,	1000 sqm.	
5.	Vegetables	-	500 sqm.	
6.	Coloured capsicum	-	1000 sqm.	
7.	Xanandu	-	450 sqm.	
8.	Vegetables	-	576 sqm.	
9.	Chrysanthemum	-	500 sqm.	
10.	Nurseries for traditional crops	-	4000 sqm.	
11.	Nurseries for seeds, flowers etc.	-	150 sqm.	
12.	Mist Chamber	-	360 sqm.	
13.	Orchid	1800 nos	200 sqm.	
14.	Heliconia	250 nos	500 sqm.	
15.	Bird of Paradise	980 Nos	1000 sqm.	
16.	Vegetables	-	2500 sqm.	
17.	Tea	333 nos.	2000 sqm.	
18.	Mango	192 nos	1200 sqm.	
19.	Guava	47 nos.	450 sqm.	
20.	Banana	256 nos	1024 sqm.	
21.	Pineapple	4547 nos	0.1 ha.	

**Green Houses**

Sl. No.	Name of crops	Current inside the green house	Crop the	Variety	Spacing	Date of planting	Expected Output
1.	Anthurium	Anthurium		Tropical	20x15 cm.	April, 2005	11,20,000 Nos.
2.	Anthurium	Anthurium		Tropical & Savia	20x15 cm.	April, 2005	
3.	Anthurium	Anthurium		President, Nexia, Yang, Savia, Rosa, Chicas, No. 274, Esmerelda etc.		April, 2005	
4.	Anthurium	Anthurium		Esmerelda,	30x25 cm.	Sept, 2008	
5.	Anthurium	Anthurium		Pot plants	-	Sept, 2008	

6.	Xandu	Xandu		30x25 cm.	2005	
7.	Leather Leaf Fern	Leather Leaf Fern		25 cm x 25 cm.	2006	3,00,000 nos
8.	Gerbera	Gerbera	Suzy, killi	30x25 cm.	2012	12,50,000 nos.
9.	Colour Capsicum				2014	9000 kg.
10.	Gerbera	Gerbera	Manfred, black bird, burgundy, Ibiza yellow & Red	30x25 cm.	2008	2,00,000 Stem
11.	Chrysanthemum	Chrysanthemum	Yellow 1, Salvador, Calabria, Yellow 2, Laguna, Rossi Pink, Collami	5x5cm.	21/1/2014	20,000 stem
12.	Flower Nurseries	Flower seedlings, flower planting material	Marigold, pansy, petunia, ornamental pineapple, alamanda, Xandu seedlings etc.,		2005	-
13.	Mist Chamber	Color capsicum seedlings, vegetable seedlings etc.				

The plant density, productivity and average price of some of the above crops are under:

Sl.No.	Crop	Plant Density / sq.m	Productivity	Avg. Price/stem /piece
i.	Anthurium	8-10 Nos.	5-8 flowers/plant / year	Rs. 7.00-9.00 each
ii.	Leather leaf Fern	8-12 Nos.	20 piece / plant/yrs	Rs. 1.00-1.50 each
iii.	Gerbera	6 Nos.	20 stems/plant/ yr	Rs. 2.00-3.00 each
iv.	Coloured Capsicum	4 Nos.	3-4 kg/plant/season	Rs. 70.00 / kg
v.	Chrysanthemum	40-50 Nos	40-50 Nos./ plant every 3 months Rs. 3.00-7.00 each	

Besides this, Heliconia, Bird of paradise, Vegetables, Tea, Guava, Sapota, banana, pineapple are also being taken up under open cultivation.

Further the Hub caters to the need of the farmers in terms of planting material like orange seedlings, Arecanut seedlings, vegetable seedlings etc.

### **Infrastructure and assets:**

- a) Grading Hall cum Office-1 no.
- b) Training Hall-2 nos.
- c) Labourers Barrack-1 no.
- d) Irrigation and fertigation chamber-1 no.
- e) Shade houses-6 nos
- f) Hi-tech Green Houses-8 nos
- g) Water tanks-3 nos (Capacity: 3,00,000 litres)
- h) Major farm equipment:
  - i) 62.5 KVA Silent Generator-1 No.
  - j) Cold rooms-1 no.

### **Water availability and storage-**

Adequate / Inadequate- Inadequate during summer

### **Minor Equipments:**

- a) Knapsack Sprayer-3 nos.
- b) Power Sprayer- 2 nos.
- c) Pressure Sprayer-2 nos.
- d) Watering cans-20 nos.
- e) Secateur-11 nos.
- f) Spade-12 nos.
- g) Dao-12 nos.
- h) Crowbar-3 nos.
- i) Trolley-6 nos.

**Present Stock Position of planting materials:**

1. All spice-2000 nos.
2. Clove-700 nos.

	<b>Year</b>	<b>Amount</b>
	2004-05	Rs. 67,38,000.00
	2005-06	-
	2006-07	Rs. 9,00,000.00
	2007-08	Rs. 18,00,000.00
MFC	2007-2008	Rs. 70,00,000.00
	2008-09	Rs. 18,00,000.00
	2009-2010	-
	2010-11	Rs. 6,25,000.00
	2011-2012	-
	2012-13	-
	2013-2014	Rs. 6,25,000.00

**Major deficiencies in infrastructure:**

No hostels for the Trainees, No buildings for Officer & Barrack, No godown.

**Spokes**

Williamnagar, Samgong, Williamnagar Balsri Gittim, Williamnagar Warima, Samanda, Chinemgre, Samanda Rikwarenggre, Mikgilsimgree, Sawegre, Sonegre, Songsak A'galgre, Napak, Rongjeng, Resubelpara.

**Objectives, goals & targets in order to priority:**

- To function as a demonstration centre for farmers and other stakeholders to visit and observe horticultural activities.
- Training of farmers and growers.
- Production and supply of planting materials to farmers / other departmental units.
- Collection and grading / packing of horticultural produce for onward transmission to markets.

**Impact to the farmers:**

The functioning of the centre on a Hub and Spoke business model has encouraged farmers to take up the venture of low-volume high value crops which has enabled them to reap rich dividends thereby improving their livelihood and economic prosperity.

- Number of spokes developed around the hubs: Williamnagar, Samgong, Williamnagar Balsri Gittim, Williamnagar Warima, Samanda, Chinemgre, Samanda Rikwarenggre, Mikgilsimgre, Sawegre, Songsak Bonegre, Songsak A'galgre, Napak, Rongjeng.
- All the above mentioned units located at the spokes are functional.

### North East Garo Hills

S. No.	Name of the Beneficiary	Address	Crop Component /	Year of Plantation / Start	Area in Ha./ Unit	Total unit planted	Survival as on date /status	Remark
1.	Molica marak	Gokul Pamendal, North Garo Hills	Vegetable seed production	2014-15	2.0	-	-	<ul style="list-style-type: none"> <li>• Tomato cabbage, Brocoli, cauliflower (open pollinated).</li> <li>• Good growth except Blight in tomato.</li> </ul>
2.	Piperson Marak	Bangalmura PO Daram, North Garo Hills	AEP of Guava L-49	2012-13	1.0	193	95%	<ul style="list-style-type: none"> <li>• Water sucker to be removed.</li> <li>• Plants to be trained properly.</li> </ul>
3.	Sinje Marak	Bakenang Nalsa, P.O. Bajengdoha, North Garo Hills	AEP Strawberry with drip	2014-15	1.5	2240	95%	<ul style="list-style-type: none"> <li>• Good growth and fruiting well.</li> </ul>
4.	Dinesh Marak	Dingrepa, PO Mendal, North Garo Hills	AEP of pineapple	2014-15	1.5	5250	4725 (90%)	<ul style="list-style-type: none"> <li>• Rs. 10000 subsidy given as cash.</li> <li>• Growing well.</li> </ul>
5.	Silseng Sangma	Dingrepa Po Mundal, North Garo Hills	AEP of pineapple	2014-15	1.5	5250	4725 (90%)	<ul style="list-style-type: none"> <li>• Rs. 10,000 subsidy as cash.</li> <li>• Plants are coming up well.</li> </ul>
6.	Kririne Marak	Village Gokul, North Garo Hills	Nursery, Marry Gold (Calendula)	2014-15	-	-	-	<ul style="list-style-type: none"> <li>• Subsidy given.</li> <li>• Poly house is needed for dendrobium</li> </ul>

								cultivation.
7.	Smt. Serille Marak	Balsinjittin, North Garo Hills	Polly house (150 sqm) Anthurium + drip	2010	150 sq.m.	1000	75%	<ul style="list-style-type: none"> <li>• Good growth but old plants needs replacement.</li> </ul>
8.	Dotin Sangma	Rangmal Badim, William Nagar, North Garo Hills	Tomato (Romeo) under poly house + drip	2012-13	250 sq.m. x2 = 500 sq.m	898	-	<ul style="list-style-type: none"> <li>• Plants are young but growing well.</li> </ul>

## **OBSERVATIONS EAST AND NORTH GARO HILLS**

### **EAST GARO HILL DISTRICT (HQ – WILLIAM NAGAR)**

1. Floriculture in poly house at village Barsrigittin where all inputs including structure was financed by the department under HMNEH.
2. Samgong Hort. – Hub (Area = 13.5 hectare, Crops – Anthurium, Gerbera). Plantation of Anthurium was very old, needs to be replanted. Hub needs some improvement in management because hub Incharge is overloaded having many responsibilities.
3. Floriculture at Dawagre (Area = 25 hectare) is new station under development. Grading Hall for flowers and water storage tank are built under HMNEH. Water harvesting is being done having good catchment area.

### **NORTH GARO HILL DISTRICT (HQ – RESUBALPARA)**

1. Cluster of Arecanut and area expansion of pineapple at village Generapa was good.
2. Cultivation of strawberry by lady farmer at village Bakenalnalsa was worth praising. Planting material, mulching sheet, net and drip irrigation system was given under MIDH.
3. Guava cultivation under MIDH programme was seen by JIT but crop needs proper management.

# PHOTOGRAPHS

# JIT Meghalaya



Cultivation of pineapple on Hills



Private nursery



Pineapple under Arecanut



Drip under Pineapple



Strawberry cultivation



Tomato cultivation under bamboo poly house

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Cashew rejuvenation



Faulty rejuvenation



Pineapple cultivation



AEP of pine apple

## JIT Meghalaya



Cashew growers



Flowering in cashew under AEP



Water Harvesting Structure



Pond with polythene lining



AEP of strawberry in open



Anthurium cultivation under poly house

## IT Meghalaya



Training demonstrated in citrus



Discussion with growers



Leaf gall midge in citrus



Strawberry cultivation



Close up



Orchid cultivation in poly house