



Annual Progress Report 2009-10

Horticulture & Cash Crops
Development Department
Government of Sikkim

INTRODUCTION

Horticulture, over the past few years, has made remarkable progress in terms of expansion in area under different crops, increase in productivity, crop diversification, technological interventions for production and post harvest and forward linkages through value addition and marketing. A significant increase in area has been achieved in vegetables and flowers. Unprecedented growth has been achieved in off-season vegetable production and floriculture, making these sectors evolve as upcoming opportunities. Concept of greenhouse has become extremely popular. There has been a tremendous success in large scale of tomato in open field as well as under protected condition. Critical areas like pest and disease management have been given principal focus with intensification of efforts on containing decline problems especially in orange and large cardamom. Massive rejuvenation programme in orange and re-plantation in large cardamom has brought back some ray of hope in the direction of revival of these crops. A number of nurseries have been established for producing healthy and quality planting materials of orange and large cardamom. The tissue culture laboratories, in private sector, have been able to supplement the requirement of quality planting materials.

Infrastructure development to augment marketing and post harvest management are being accorded top priority. One number Integrated Pack House has been set up at Rangpo with facilities for grading, packaging and treatment of flowers. Another such facility is coming up at Melli to cater to the needs of South & West districts. Cold Rooms have been set up in various production clusters to aid production and marketing. One Integrated Processing Unit for ginger has been established at Birdang, West district under Rashtriya Krishi Vikash Yojna (RKVY) to counter the uncertainties of market fluctuations.

The Model Floriculture Centre at Namli has been strengthened with facilities for production of gerbera, rose and liliun. Another Model Floriculture Centre has been set up at Maniram, South district. The Cymbidium Development Centre has been operationalised and is fully equipped with a tissue culture laboratory and training hall for production of large quantities of planting materials and imparting trainings.

Technology Mission for Integrated Development of Horticulture, sponsored by the Government of India has played the most vital role in integrating all ongoing initiatives. In addition to this flagship programme, other initiatives under RKVY, TSP/SCSP, BADP and

State Plan/Non-Plan have made noteworthy contribution in supplementing the programmes spearheaded through Technology Mission.

The main success factors for successful programme implementation are use of high quality planting materials, adoption of clusters and constant monitoring.

STATE PROFILE

Sikkim is situated in the Eastern Himalayas spread below the world's third highest mountain Kangchendzonga (8595m). The entire region is a biodiversity hotspot with impressive botanical and zoological splendor. The state is further endowed with very rich natural beauty and landscapes. Amidst the grandeur of snowcapped mountain peaks, lush green valleys, rustling streams and fast flowing rivers, vast expanse of alpine meadows and sacred lakes, Sikkim offers to her visitors a rare and singular experience.

The State comprises of four districts and nine sub-divisions with 163 gram panchayat units. More than 70% of the total population is agrarian.

Climate:

Sikkim has a diverse climate. It is predominantly wet and moist almost throughout the year with average annual rainfall of 2000 mm to 5000 mm. In most parts of the State, there are three distinct seasons – a very short spring (March, April and 1st half of May); wet summer (2nd half of May till September) and dry winter (October till 1st week of March). The area experiences heavy rainfall due to its proximity to the Bay of Bengal. Rainfall in South district and parts of West district is comparatively less than that of the other two districts. Pre-monsoon rain occurs in April-May and monsoon (south-west) operates normally from the month of May and continues up to early October.

The mean temperature in the lower altitudinal zone varies from 5⁰C to 15⁰C during winter and 18 ⁰C to 28 ⁰C during the summer months. In the higher reaches, the average temperature never crosses 15⁰C. Maximum temperature is recorded during July / August and minimum during December / January.

The climatic zonation of Sikkim is presented below.

Sl.No.	Range	Altitude (mtrs)
1.	Tropical	Below 610
2.	Sub-tropical	610 to 1524
3.	Temperate	1524 to 2743
4.	Sub-alpine	2743 to 3962
5.	Alpine	3962 to 8153

Land Elevation:

On the basis of elevation, the different places of Sikkim are roughly divided into four zones. The places lying in the altitudinal ranges of 270 to 1500 mtrs is categorized as Lower Hills. Similarly, places between 1500 to 2000 mtrs as Mid Hills, between 2000 to 3000 mtrs as Higher Hills and places lying above 3000 mtrs with sparse vegetation are categorized at Alpine Zone.

Soil Profile:

The soils of Sikkim are generally acidic, pH ranging from 4.3 to 6.4 with mean value of 5.37. The soil texture is silty to clay loam with depth varying from a few inches to several feet. Organic matter content is high with a mean value of 2.74%. Mean value of available nitrogen is 99.21 ppm while that of available phosphorus is 46.87 ppm and of available potash is 184.71 ppm.

Economic Profile:

The economy of Sikkim is mainly based on agriculture and animal husbandry. It is estimated that only 11% or less of the total geographical area is under agriculture. Agriculture has pre-dominated the economic scenario for a long time. Now with changing times, commercial horticulture seems to be slowly replacing this subsistence agriculture. The work force participation rate as per 1991 census is 40.44%. Female participation rate in Sikkim is also much higher than the national average. Agriculture Sector accounts for 16.30 % of the total GSDP. Horticulture has contributed to rural employment generation to the extent of 29.32 lakh mandays during 2009-10.

Cultivators account for the greater majority of the people in the State. Agricultural labourers as a whole constitute only 7.81% of the workers in the state. Household and other industries labourers are negligible, but other workers (Tertiary Sector) at the state level represent a good percentage of population. The importance of agriculture can be judged by the high percentage of population engaged in it. Animal husbandry is an integral part of the house hold economy of the region.

Population Classification:

- A. Total population (Census of 2001): 5,40,493
- B. Rural and Urban Population

Sector	Male	Female	Total
Rural	2,55,386	2,25,102	4,80,488
Urban	32,831	27,174	60,005
Total	2,88,217	2,52,276	5,40,493

C. Economic Classification of Population:

- 1. Population 5,40,493
- 2. Main Workers
 - a) Cultivators 2,12,478
 - b) Agriculture Labourers 16,939
 - c) Workers in Household Industry 3,250
 - d) Other Workers 1,11,709
- 3. Marginal Workers 50,842
- 4. Non Workers 2,77,173

Horticulture Profile:

Horticulture in the State mainly comprises of fruits such as Sikkim Mandarin, pear, passion fruit and kiwi; vegetables such as bean, garden pea, exotic vegetables like tomato, cole crops, radish and various types of cucurbits including chayote; tuber crops mainly potato; spice crops like large cardamom, ginger, turmeric and cherry pepper and flowers like Cymbidium orchids, rose, liliium, gladioli, anthurium, carnation, gerbera, alstroemeria and zantedeschia. Of late, a few important diversifications have also been added to this sector

including bee keeping, mushroom, bamboo and medicinal plants. The sector has established its importance in improving land use, promoting crops diversification, generating employment and above all providing nutritional security to people. Horticulture priorities in the State have been set on the basis of inherent strengths and limitations; technological advancements within and outside the country; availability of planting materials and short term and long term goals.

The supporting areas like organic farming and protected cultivation have had far reaching impacts on the overall development of horticulture in the State. Polyhouses have played a major role in the advancement of vegetable and flower cultivation. A major breakthrough has been achieved in tomato production under protected cultivation. Rose, known to only a few for a long time has now become a major money spinner in floriculture. Revival of Sikkim mandarin which is the traditional fruit and a major cash crop has brought back the confidence of many orchard keepers.

Plenty of progress has been achieved in the area of infrastructure development. Infrastructures required for post harvest and marketing have been created in adequate measure and in all the important production clusters. Dovetailing of various schemes and integration of ongoing programmes has been one of the factors for instant results. Market linkage which is in fact the crux of horticulture development has been adequately addressed. Formation of market cooperatives, market infrastructures and strengthening of market intelligence network are some of the glaring activities in this direction.

**ESTIMATES OF AREA, PRODUCTION AND AVERAGE YIELD OF MAJOR
HORTICULTURAL CROPS OF SIKKIM FOR THE YEAR 2009-10**

Sl. No.	Crops	Area (000 ha)	Production (000 tonnes)	Average Yield (kgs / ha)
1	FRUITS			
	i. Sikkim Mandarin Orange			
	a. Bearing orchards	4.360	13.136	3,013
	b. New Plantation	3.510	—	—
	Total	7.870	13.136	3,013
	ii. Passion fruit	1.465	0.293	200
	iii. Other fruits			
	a. Bearing orchards	1.649	5.076	3,078
	b. New plantation	1.206	—	—
	Total	2.855	5.076	3,078
	TOTAL FRUITS			
	a. Bearing Orchards	7.474	18.505	2,476
	b. New Plantation	4.716	—	—
	Total	12.190	18.505	2,476
2	VEGETABLES			
	i. Kharif vegetables	3.890	20.133	5,175
	ii. Rabi vegetables	4.540	22.270	4,905
	iii. Off-season vegetables	5.250	28.455	5,420
	TOTAL VEGETABLES	13.680	70.857	5,180
3	ROOT & TUBER CROPS			
	i. Kharif potato	4.800	21.801	4,162
	ii. Rabi potato	4.350	22.490	5,170
	Total Potato	9.150	44.291	4,840
	iii. Other Root & Tubers	0.650	3.316	5,101
	TOTAL ROOT & TUBER CROPS	9.800	47.607	4,858
4	SPICES			
	i. Large Cardamom	14.520	3.396	234
	ii. Ginger	8.010	43.190	5,392
	iii. Turmeric	0.830	2.858	3,443
	TOTAL SPICES	23.360	49.444	2,117
5	FLOWERS			
	i. Cut/Pot flowers (lakh nos)	0.082	107.663	—
	ii. Plants/bulbs (lakh nos)	0.093	92.337	—
	TOTAL FLOWERS	0.175	200.00	
	TOTAL OF HORTICULTURAL CROPS EXCEPT FLOWERS	59.030	186.413	3,432

DISTRICT-WISE PRODUCTION OF PLANTING MATERIALS IN GOVERNMENT FARMS

Particulars	Unit	North	East	South	West	Total
Fruits						
a. Orange						
i. Primary	000 nos	95.00	260.00	30.60	200.00	585.60
ii. Secondary	000 nos	40.00	140.00	27.00	85.00	292.00
iii. Tertiary	000 nos	35.00	140.00	5.60	15.00	195.60
iv. Ready for distribution	000 nos	–	120.00	24.50	–	144.50
b. Litchi	000 nos	–	5.00	–	–	5.00
c. Guava	000 nos	–	5.00	–	–	5.00
d. Papaya	000 nos	–	–	–	2.00	2.00
Vegetables						
a. Seedling	000 nos	200.00	170.00	–	2.00	372.00
b. Seeds						
Beans	Qtl	–	–	250.00	–	250.00
Radish	Kg	–	–	10.00	–	10.00
Rayo sag	Kg	–	–	5.00	–	5.00
Large Cardamom						
I. Sucker						
1 st year	000 nos	–	–	–	–	–
2 nd year	000 nos	–	–	225.00	–	225.00
II. Seedling						
i. Primary	000 nos	–	–	–	–	–
ii. Secondary	000 nos	–	125.00	–	35.00	160.00
iii. Tertiary	000 nos	–	–	–	40.00	40.00
iv. Ready for distribution	000 nos	–	80.00	320.00	–	400.00
Ginger						
i. Seed multiplication	MT	–	–	42.50	–	42.50
Turmeric						
i. Seed multiplication	MT	0.10	–	55.00	–	55.10
Potato						
a. Seed production	MT	–	–	190.00	18.20	208.20

DETAILS OF GOVERNMENT FARMS AND REVENUE RECEIPTS DURING 2009-10

District	Name of Farms	Gross Area (Ha)	Altitude (ft.)	Revenue Receipts (Rs.)
North	Dzongu	7.8960	3500	59,500.00
	Lachung	18.8080	8000	25,500.00
	Other receipts	–	–	1,48,000.00
	Total	26.7040		2,33,000.00
East	Mazitar	2.9000	1200	4,74,726.00
	Nazitam	2.7500	5400	3,84,432.00
	Lower Samdong	3.2000	4500	1,10,410.00
	Lingtam	5.5000	6000	1,66,176.00
	Ralap	2.4600	4000	44,985.00
	MFC Namli	4.6000	2900	3,12,265.00
	Chamerey	5.4900	4500	–
	Pacheykhani	0.8000	5400	1,96,660.00
	Total	27.7000		16,89,654.00
South	Rabongla	20.7300	6300	6,19,600.00
	Kewzing	2.5000	5800	4,400.00
	Bermiok	9.2000	2700	1,59,040.00
	Mellidara	2.9300	3350	–
	Namthang	2.5000	3500	13,500.00
	Kitam	3.0000	2800	13,500.00
	Total	40.8600		8,10,040.00
	Hilley	16.0000	8500	3,99,640.00
	Buriakhop	6.0000	5000	1,20,000.00
	Kamling	10.0000	1800	1,32,000.00
	Hee-Gaon	2.4000	3800	–
	Total	34.4000		6,51,640.00
	GRAND TOTAL	129.6640		33,84,334.00

DISTRICIT-WISE ACHIEVEMENTS MADE UNDER VARIOUS PROGRAMMES

I. TECHNOLOGY MSSION FOR INTEGRATED DEVELOPMENT OF HORTICULTURE

This is one of the flag-ship programmes for horticultural development in the State. The focus of the schemes is to establish convergence and synergy among numerous ongoing governmental programmes in horticulture sector. The main aim is to achieve horizontal and vertical integration of these programmes to ensure adequate, appropriate, timely and concurrent attention to all the links in production, post-harvest management and consumption chain to maximize economic, ecological and social benefits.

Component-wise achievements made during the year 2009-10 under Technology Mission are as under:

FRUITS

Fruits occupy an important position in the State's horticulture sector. The important fruits grown in the State include Sikkim mandarin, pear, guava, passion fruit and other new introductions like kiwi and Asiatic variety of pear. Apple was already existent in some parts of the State for a long time. Poor management and scab infestation had wiped out the entire plantations and apple cultivation had become only a history. However, with the introduction of European and Australian varieties of apple, the production area has been broadened and this has helped to revive apple in Lachung and Lachen valleys bringing back old memories. During 2009-10, an important programme that was undertaken was the introduction of Asiatic pear from the USA which is maintained as mother plants for production of bud wood and demonstration in farmers' fields.

Sikkim mandarin is the traditional fruit crop of Sikkim. There was once a time when products like squash and marmalade made out of this fruit was famous throughout the length and breadth of the country. Due to senility of plants and poor management, decline set in causing a major set-back to this once vibrant industry. With adequate and timely intervention of Technology Mission, corrective measures could be adopted to save the declining orchards. New plantations using disease free healthy planting materials and orange rejuvenation programmes have met with tremendous success.

District-wise physical achievements

Components	North	East	South	West	Total
a. Area Expansion (New Plantation)					
i. Orange					
Area (ha)	121.00	250.00	200.00	251.00	822.00
No. of beneficiaries	260	612	693	503	2068
ii. Litchi					
Area (ha)	5.00	54.00	70.00	71	200.00
No. of beneficiaries	10	107	192	140	445
iii. Guava					
Area (ha)	10.00	33.50	24.50	40.00	108.00
No. of beneficiaries	16	66	120	105	307
b. 3rd Year Maintenance (2007-08)					
i. Orange					
Area (ha)	50.00	155.00	92.07	100.00	397.07
No. of beneficiaries	37	431	242	195	905
ii. Passion fruit					
Area (ha)	—	—	—	—	—
No. of beneficiaries	—	—	—	—	—
c. 2nd Year Maintenance (2008-09)					
i. Orange					
Area (ha)	100.00	315.00	200.00	195.00	810.00
No. of beneficiaries	241	652	793	302	1988
ii. Passion fruit					
Area (ha)	—	—	—	—	—
No. of beneficiaries	—	—	—	—	—
iii. Kiwi					
Area (ha)	—	—	—	—	—
No. of beneficiaries	—	—	—	—	—
d. Orange Rejuvenation					
Area (ha)	150.00	154.00	310.00	386.00	1000.00
No. of beneficiaries	120	145	475	615	1355

Major clusters under area expansion (new plantation) of fruits and rejuvenation during 2009-10 are given under.

a. Sikkim Mandarin Orange:

North - Lum-Gor, Heegyathang, Lingdong

East - Saku, Nimthang, Sudunglakha, Seplay, Laydang, Chueribotey, Kambal, Pathok, Shalghari, Khamdong, Padamchey, Pacheykhani & Bashilakha

South - Ben, Polok, Tinkitam, Chalamthang, Hingdam, Yangang, Lingmoo, Kipchey, Mamley-Kamrang, Turuk, Tingley.

West - Rimbi, Melli-Aching, Salley, Tikjek, Meyong-Chingthang, Soreng, Hathidungha, Reshi, Zeel.

b. Guava:

North – Lower Mangshilla

East – Ankuching, Kerabari, Titiribotey, Kamerey, Lingzey, Ralap, Singbel, Reshi, Tarpin.

South – Lower Nardang, Namphing, Dalep, Mellidara, Passi-Nalam.

c. Lychee:

East – Mangthang, Lingzey, Khamdong, Singbel, Titiribotey, Reshi, Rhenock.

South – Belbotey, Pakjer, Samatar, Wok, Mellidara, Donak.

Orange Rejuvenation:

North – Lower Barfok, Heegyathang.

East – Siplakha, Kadamtam, Nimthang, Nazitam, Bashilakha.

South – Sripatam, Namlung, Rateypani, Mamley.

West – Bhaluthang, Kyongsha, Toyang, Middle Gyalshing, Melli, Thingling, Zoom, Malbasey, Soreng, Chumbung.

Nurseries established through TM have been able to generate adequate materials. More than five lakhs materials are produced annually from the nurseries established both in public and private sector. In addition to these small nurseries, two large fully automated greenhouses have been established through RKVY support which aid in production of quality, disease free planting materials fully established in poly bags.

There is about 50000 ha dry fields which have the potential to be brought under orange cultivation. The department has plans to convert these areas into orange belts in phased manner. Keeping an annual target of about 1200 ha, there is a requirement of 330000 nos. of planting materials which could be met from the nurseries established under TM.

In addition to orange, other fruits which are being promoted in the low lying areas are guava and litchi. Guava cultivation for a long time was restricted to kitchen gardens for self consumption purpose. With increased literacy and awareness about its nutritional value, the importance of this fruit has increased markedly. Many farmers want to take up this crop on commercial scale. There is an increasing demand for this crop especially in the dryer belts of South and West districts.

Another fruit crop of recent introduction in mass scale is lychee. This crop was introduced as hobby in the State by some nurserymen some time during the fifties probably from Bihar. Encouraged by the performance of these old fruiting plants, the department has taken up area expansion of this crop in limited scale in South and West districts. This crop is grown in the lowest part of the State where no other perennial fruit crops are taken up. The department has established progeny orchard of lychee at Mazitar and Kitam Government farms in East and South districts respectively. The advantage of this crop is that due to lower temperature, the fruits ripen a month later than the ripening season of the North Indian plains. Production therefore is off-season which ensures a ready market and better price.

In keeping with the guidelines of TM, it is ensured that area expansion is strictly done on cluster basis with beneficiary selection done involving the gram Panchayat and Zilla Panchayat members with the consultation of area MLAs.

The total area under fruits till date is 12,190 ha. Production of fruits recorded till now is 18,505 MT. the maximum area is in West and East districts covering about 41 % and 38 % respectively while the least area is in North with just 2 %.

VEGETABLES

There are basically three seasons for vegetables in the State – Kharif, Rabi and off-season. Amongst these three, major thrust is laid on off-season vegetables since the farmers get maximum returns through this venture. Under off-season cultivation the major crops are tomato, cabbage and cauliflower. Tomato has of late emerged as the single most important vegetable crop for the farmers. This crop is being grown both in greenhouses and under open conditions. South and West districts have large chunks of rain shadow areas. This is a major disadvantage for horticulture. However, the department has successfully converted this disadvantage into advantage with introduction of open cultivation of tomato. In these areas, an entire cluster comprising of more than 10 villages is covered by tomato grown in open, each household growing an average of 3000 to 10000 plants on an average. The varieties found most suitable for our conditions are Romeo for open cultivation and Avtar for greenhouse cultivation. In fact the success of tomato cultivation both in the open and under protected condition has been the major breakthrough factor in vegetable production of the State. Each household during 2009-10 earned a net income of Rs15, 000/- to 25,000/- from tomato cultivation.

In the mid and higher reaches, the department has promoted cultivation of off-season vegetables mainly cabbage, cauliflower, radish, carrot and broccoli. Broccoli cultivation has received a great boost with the introduction of high performing varieties like Everest and Marathon. In addition to these exotic vegetables, cultivation of pea and beans has always remained our traditional strength in the higher reaches. The department has taken up supportive programmes to introduce these traditional vegetables to other potential nontraditional belts very successfully. In some areas, the practice of intercropping using potato and peas; maize – pea – cabbage and ginger has been very successful and the department is undertaking suitable steps to replicate these systems in other suitable belts. Cultivation of different vegetables under Cucurbitaceous family is being given emphasis in mid and low altitudes during the summer months when constraint of water does not adversely affect these crops. Different varieties of gourd, cucumber, egg plant and okra are encouraged which require less input and care.

The total area coverage during 2009-10 under vegetables is 13,680 ha with production estimated at 70,857 MT. A special programme has been launched through State Plan

support to boost vegetable production in the form of Minimum Support Price for selected vegetables and 50% transport subsidy till Siliguri without any ceiling. These two schemes have further accelerated vegetable development programme in the State.

District-wise physical achievements made during 2009-10 are given under.

Components	North	East	South	West	Total
i. Kharif season					
Area (ha)	31.75	151.48	199.60	121.42	504.25
No. of beneficiaries	157	938	1230	604	2929
ii. Rabi season					
Area (ha)	66.07	212.01	267.67	264.76	810.51
No. of beneficiaries	121	1300	2150	554	4125
iii. Off-season					
Area (ha)	84.83	202.18	389.58	315.54	992.13
No. of beneficiaries	298	705	2700	540	4243
TOTAL: Area (ha)	182.65	565.67	856.85	701.72	2306.89
No. of beneficiaries	576	2943	6080	1698	11297

The major vegetable clusters are as under:

- Kharif:** North – Gyathang, Chawang, Amtihang
 East – Kadamtam, Laydong, Siplakha, Sazong, Luing Ranka, Tenkilakha, Sapong, Tarpin, Mulukey, Chuzachen, Sumin, Kamarey, Pachak, Cheuribotey, Zitlang and Samkhey.
 South- Pakjer, Samatar, Dong, Lingi, Melli-Kerabari, Passi, Kateng, Tarku, Chalamthang, Bermiok.
 West – Peuthang, Rungdu, Bhaluthang, Omchung, Kabirthang, Kamling, Suldang, Daramdin, Malabasey, Tharpu.
- Rabi:** North – Gyathang, Ringhim
 East – Namrang, Dhanbari, Peplakha, Thangshing, Rakdong, Sazong, Assam Lingzey, Chochenpheri, Tokchi, Senti, Mulukey, Chuzachen, Pachak, Cheuribotey & Kamarey.

South- Chisopani, Bul, Melli-Kerabari, Samatar, Salleybong, Chuba.

West – Arithang, Bhaluthang, Karmatar, Tikjek, Lingchom, Omchung, Nambu, Daramdin, Malabasey, Soreng.

Off-season: North – Lachung, Menrongong

East – Peplakha, Dhanbari, Namrang, Luing, Ranka, Kayathang, Budang, Pachak, Upper Sumin, Naya Busty, Karthok, Dalapchan Phadamchen, Chuzachen and Nimachen.

South- Jaubari, Alley, Phali, Perbing, Sumbuk, Tinzir, Turuk, Mellidara, Sadam, Bul, Dong, Maniram, Yangang, Rangang, Chalamthang.

West – Nesha, Gumbadara, Hee Patal, Karzi-Labdang, Bhaluthang, Sribadam, Bhareng, Singling, Buriakhop.

Potato: The climate of the State is conducive for production of seed potato especially in the higher reaches above 6000 ft. Seed potato production is a traditional activity of some of the villages located in higher elevations. The department has extended these activities to all the suitable areas by providing foundation seeds of identified varieties obtained from Himachal Pradesh. The total area of the State is 4800 ha under seed production with annual seed production figure at 21,801 MT. Further, the area and production under Rabi potato crop, mainly for table purpose, are 4,350 ha and 22,490 MT respectively.

The physical achievements made are as under:

Components	North	East	South	West	Total
Kharif Potato					
Area (ha)	150.00	50.00	27.25	50.00	277.25
No. of beneficiaries	299	556	99	90	1044

Major clusters for potato seed production-

North – Lachen, Menrongong

East – Subaney, Tockchi, Kyongsala, Dhanbari

South –

West – Lamathang, Okharey

SPICES

Large cardamom –

Large cardamom is the traditional spice crop grown as cash crop. During the recent years, decline has been experienced caused chiefly by some kind of disease complex. The department has undertaken intensive programmes for its revival in the form of re-plantation and rejuvenation, which have started to show positive impacts. The total area that is recorded in the State under large cardamom till date is 14,520 ha and production of dry capsules is 3,396 MT.

Major Clusters:

North – Lingthem, Rongong Tumlong

East – Rolep, Lamaten, Regu, Assam Lingzey, Gairigaon, Namong, Upper Khasey, Upper Samdong, Upper Kambal, Tintek & Chochenpheri.

South- Jaubari, Chuba, Ben, Upper Borong, Tinkitam, Kewzing, Lingmoo.

West – Lower Sribadam, Buriakhop, Nambu, Upper Chongrang, Naku.

Ginger is cultivated in the tropical and sub-tropical regions of the state by all categories of farmers. It is a major cash crop for the small and marginal farmers. A high value crop, it is grown organically in the State without use of any synthetic fertilizers or pesticides which results in premium sales. A Ginger Processing plant has been set up at Birdang, West district which will provide greater impetus to this crop. Total area under this crop is 8,010 ha and production is 43,190 MT.

Major clusters:

North – Gaire, Dzongu, Mangan

East –

South –Gangla, Rolak, Rayong, Lingi, Kolbung-Maneydara, Turuk-Ramabong, Dong, Rong Bull, Tingrithang-Pakjer, Wok-Omchu.

West – Ramgeythang, Mazgaon, Parbok-Sallay, Lower Sapong, Lower Bangten, Namperang,-Tashiding, Pewthang, Mendogaon, Upper Kamling, Upper Suldung, Lower Suldung, Tinzerbong, Samdong, Zoom, Gelling-Samsing, Tikpur.

Turmeric is mostly grown by small and marginal farmers and the crop fits perfectly in the crop combination of majority of farmers with small operational holdings in the State. The practice of cultivating this crop in marginal lands gives greater advantage to production and productivity of this crop. Over the years, there has been a steady increase in area. The efforts of the department are to promote varieties with higher *curcumin* content. The area at present is negligible.

Major clusters:

North – Sangam, Rangrang

East – Under implementation

South – Kitam-Belbotey, Dorop-Salghari, Kateng-Bokrang, Namphing.

West – Lower Chumbung, Tamatam, Takuthang, Chuchen.

Cherry pepper is a popular local spice, the crop is indigenous to the state and the fruit produced is consumed as fresh product and also utilized in processing industry for making pickles, paste and to flavor other processed food products. Assured local market and remunerative price provides high incentives to expand area under this crop. Hence, small and marginal farmers in the state consider it a lucrative venture.

Major clusters:

South – Pabong, Hingdam, Nia, Namlung, Karek, Turung, Salghari, Dong, Bull-Pallum, Mikhola, Mellidara.

District-wise physical achievements made during 2009-10

Components	North	East	South	West	Total
i. Large Cardamom					
Area (ha)	325.00	27.005	150.00	253.13	1003.13
No. of beneficiaries	447	469	372	319	1607
ii. Ginger					
Area (ha)	110.00	182.00	206.45	183.00	681.45
No. of beneficiaries	390	863	699	459	2411

iii. Turmeric					
Area (ha)	15.00	75.00	114.73	74.02	278.75
No. of beneficiaries	59	376	274	155	864
iv. Cherry Pepper					
Area (ha)	—	—	—	—	—
No. of beneficiaries	—	—	—	—	—

FLOWERS

Floriculture is a major component under Technology Mission for the State of Sikkim. Flowers do not only have sentimental value for the people of Sikkim, but has started to enhance its commercial value since the inception of Technology Mission. As a result, its significance in the economic structure of rural people has grown manifold. The most significant achievement in this sector is the motivation of farmers to adopt it as a venture as an additional source of income. This transformation is manifested in various interrelated activities like increased usage of flowers for different local functions, development of floriculture clusters all over the suitable areas of the State, increased and sustained supply of flowers to various domestic markets and greater degree of floriculture entrepreneurship.

The Horticulture department through support of Technology Mission and other government programmes has implemented multifarious schemes to augment this sector. The result of all these initiatives is the growth of floriculture to unprecedented heights within a short span of 4-5 years. The area coverage under different commercial flowers has increased manifold; infrastructures required both for production and marketing as well have been put in place; growers have been immensely motivated and production level has touched a new high.

During the year 2009-10 alone, more than 2.50 ha has been added to rose, taking the total area to 14.00 ha; cymbidium area has crossed 20.00 ha which is a new record in the country; other exotic flowers like alstroemeria, zantedeschia and liliium have increased the diversity in the floriculture basket. Production of all these flowers has registered simultaneous increase with increase in area. Not only is there improvement in quantity, but the qualitative aspect which is an equally essential component has too been markedly improved with interventions of modern technology, usage of quality planting materials and well developed management practices.

The Integrated pack House constructed at Rangpo has become operational. The cold storage facilities created in different production clusters have started to contribute in quality retention of cut flowers besides phasing production in harmony with peak market demands. The Cymbidium Development Centre has evolved into an important centre for growth of cymbidium industry. In this centre the principal activity comprises of production of high quality tissue culture plants of selected mother plants and imparting training to the growers. The centre also has many greenhouses growing a large number of imported mother plants of cymbidium to perfection. These not only help to build confidence of novice growers but also serve as practical demonstration units.

The highlight of this year's achievement is the success of gerbera cultivation in East Sikkim. The farmers who have been supported with low cost greenhouse and gerbera plants have been able to commercialize this venture by reaping a net profit of about 15-20 thousand rupees from a small unit of 134 sq mtrs. Another achievement worth mention here is area increase in rose within the same cluster of Daramdin in West Sikkim. Interestingly, rose cultivation for commercial purpose was initiated with the participation of just eight farmers in 2007 April. The growers of this region have come a long way with the total strength of the growers now touching eighty two in the same cluster. This is a multifold increase within 3 years.

Flowers that were approved during 2009-10 were cymbidium orchids, rose, anthurium, carnation, alstroemeria, zantedeschia and liliun. As usual, greater emphasis is laid on cymbidium and rose. Though carnation cultivation was introduced in the State in 2000 itself, this flower could not pick up for many reasons. The reintroduction of carnation in 2009-10 and its success has not only changed our outlook towards this flower, but renewed our belief in the concept of crop diversification as a strategy to enhance this sector. The expectation during the coming year is to venture into new areas with again focus on cymbidium which is not only the strength of the State but a monopoly.

With all these interventions, the total area under flower at present stands at 175 ha with production level at about 200 lakhs cut flowers.

The district-wise and crop-wise achievement made during 2009-10 is as under:

Components	North	East	South	West	Total
i. Cymbidium Orchid					
No. of units	10	140	52	30	232
No. of beneficiaries	10	140	52	30	232
ii. Rose					
No. of units	–	–	23	25	48
No. of beneficiaries	–	–	23	25	48
iii. Anthurium					
No. of units	–	85	44	–	129
No. of beneficiaries	–	85	44	–	129
iv. Calla Lily					
No. of units	–	25	75	–	100
No. of beneficiaries	–	25	75	–	100
v. Carnation					
No. of units	–	20	40	–	60
No. of beneficiaries	–	20	40	–	60
vi. Lillium					
No. of units	–	179	75	45	299
No. of beneficiaries	–	179	75	45	299
vii. Alstroemeria					
No. of units	–	60	15	–	75
No. of beneficiaries	–	60	15	–	75

INTEGRATED MULTICROP NURSERY PROGRAMME

Under the programme, nineteen nurseries of size 0.5 to 1.0 ha for production of healthy and disease-free large cardamom suckers were established during 2009-10 in the State with a total production capacity of 11 lakh planting materials for meeting requirement for various programmes such as re-plantation and rejuvenation.

Physical achievements made during 2009-10 is as under:

Components	North	East	South	West	Total
Small Nursery (Private Sector)					
i. Orange					
No. of nursery	1	1	2	2	6
No. of beneficiaries	1	1	2	2	6
ii. Large Cardamom					
No. of nursery	1	3	2	4	10
No. of beneficiaries	1	3	2	4	10

PROTECTED CULTIVATION

The concept of protected cultivation has really brought about a major breakthrough in vegetable cultivation, particularly cultivation of tomato and capsicum. For floriculture as well, the intervention of greenhouses and drip system has substantial contribution in the overall success. High cost greenhouse programme is implemented on demonstration as well as providing assistance to farmers.

Low cost improvised polyhouses with combination of treated bamboo / bamboo GI combination structure fixed with nut & bolt system and provided with 200 micron multilayered Gineger plastic cladding has been successfully introduced. This has not only ensured uniformity in structure and design, but has ensured uniformity in production level as well. Each greenhouse measuring 134 mtr sq has been constructed in 330 farmers'

fields. An area of 62.02 ha of low cost polyhouse in six clusters viz Chisopani-Dong (S), Bermiok-Peku (S), Lingmoo-Pathing (S), Nombu-Singyang-Chumbung (W), Yuksom-Tashiding (W) and Rhenock (E) has been covered. Most of these greenhouses are being utilized for cultivation of tomato and capsicum with some of the structures being employed for flowers.

Agro shade net programme is incorporated with anthurium and cymbidium programmes and for use in large cardamom nurseries. Drip irrigation is implemented on demonstration basis engaging Netafim Irrigation. All the high cost greenhouses are provided with irrigation and fertigation system. In the open, few big orange orchards in South and West districts are provided with this system.

District-wise physical achievements made during 1009-10 are as under:

Components	North	East	South	West	Total
i. Drip Irrigation					
Area (ha)	–	–	20	16	36
No. of beneficiaries	–	–	13	11	24
ii. Low cost green house					
Area (ha)	2.18	6.96	6.70	5.68	21.52
No. of beneficiaries	163	520	501	424	1608
iii. Hi-tech green house					
Sq. meter	–	3,000	6,500	6,500	16,000
No. of beneficiaries	–	7	13	13	33
iv. Shade nets					
Sq. meter	–	4,631	4,631	4,631	13,894
No. of beneficiaries	–	10	10	10	30

Major clusters:

a) Low cost green house:

Rhenock, Yangthang, Tashiding, Poklok, Kamrang, Tumin, Namphing, Yangang Rangang, Samdong, Lachen, Mangan, Kabi, Lunchok, Dzongu, Barfung, Lingee, Namchi-Singithang,

Namthang, Rateypani, Maneybong-Dentam, Gyalshing, Bermiok, Rinchenpong, Daramdin, Soreng, Chakung, Salghari, Zoom.

b) Hi-tech green house:

Kholaghari, Rateypani, Rabitar, Burtuk, Tashiding, Rinchenpong, Hathidhunga, Namchi, Sakyong, Yangthang, Wok., Budang.

MUSHROOM

Mushroom cultivation is a new horticultural diversification for socio economic up-liftment of rural farmers. Because of the favourable climate and comparatively lesser investment required for mushroom ventures, the popularity of this activity is increasing every day. It has caught the fancy of many educated young budding entrepreneurs in the State. As a result of all these factors, this sector is seeing a new light of the day.

There has been a temporary set back in this sector because of the existing mushroom spawn laboratory established under state plan being diverted for other purpose. The Integrated Mushroom Unit being established at Mazitar with a total budgetary support of Rs 50 lakhs is almost complete. Once this becomes operational, production level is expected to increase multifold.

Spawn production is being continued by the department and these spawns produced are made available to the mushroom cultivators on subsidized rates. One spawn production unit has been established at Geyzing, West Sikkim with capacity of 10,000 packets per annum.

Training forms an integral part of mushroom programme. During 2009-10, thirteen SHGs were trained within the State while 30 farmers were sent for training at Mushroom Research Centre, Solan. One SHG and 30 farmers were sent for exposure visit outside the State.

ORGANIC FARMING

Since the State envisages becoming an organic state by 2015, activities in this sector have been intensified to meet the deadline. For establishing ICS, work has been awarded to two service providers – (i) M.R. Morarka – GDC Rural Research Foundation, Jaipur, Rajasthan and (ii) Himalayan Action Research Centre, Dehradun, Uttranchal (HARC). This organization (HARC) is working in close association with local entrepreneur Mevedir.

IMO Control, Bangalore has been identified as the certification and inspection agency. For ICS, total number of farmers involved is 6941 and area covered is 6410 ha.

District-wise physical achievements made during 2009-10 are as under:

Components	North	East	South	West	Total
i. Earthworm unit					
No. of unit	1	1	60	65	127
No. of beneficiaries	1	1	60	65	127
ii. Incentive for organic farming					
Area (ha)	217.00	290.00	1013.00	900.00	2420.00
No. of beneficiaries	916	1985	3230	997	7128
iii. Certification for organic farming					
Area (ha)	–	–	2041.00	2047.00	4088.00
No. of beneficiaries	–	–	2120	1102	3222
iv. Integrated Pest Management					
Area (ha)	750	2700	1200	2850	7500
No. of beneficiaries	1125	3645	1500	3420	9690

TRAINING

Capacity building is one of the important aspects of Training and Extension education in Horticultural schemes for building various capacities of the farmers and unemployed youths in horticultural farm sectors.

Focus has been laid on the following aspects of training -

Providing education opportunities so as to enhance individual employability.

Improving the overall capacity of the farmers by imparting them essential occupational skills & knowledge to make them competent in respective fields.

During 2009-10, stress was laid on training of orange rejuvenation. 200 farmers were sent to Nagpur for exposure visit. For understanding the concept of water harvesting, 260 farmers were sent to VPKAS (ICAR), Almorah, Uttranchal. Total of 2900 nos. of farmers

have been provided training under different programs like floriculture, fruits, vegetables, etc.

650 farmers were sent for training and exposure visit to various institutes and places outside the State for various programmes to Almorah, Nagpur, NRC Nagpur, Pune and Himachal Pradesh.

District-wise physical achievements made during 2009-10 are as under:

Components	North	East	South	West	Total
i. Training of farmers within State					
No. of farmers	579	823	1050	1011	3463
ii. Training of farmers outside State					
No. of farmers	56	83	171	211	521
iii. Training of Women					
No. of farmers	100	150	100	100	450

BEE KEEPING

It has been estimated that about 30 to 50 per cent yield could be enhanced through bee pollination. It is found that beekeeping is an ideal industry for development of subsidiary occupation in a state like Sikkim by way of providing supplementary income to a large number of rural, hilly and tribal populations. Due to abundance of flora, beekeeping could be a successful venture in villages located in forest fringes and all silvi-pastoral locations.

Beekeeping is the only rural industry which does not demand resources like land, building, machinery etc but requires low capital expenditure and decentralized industry. Beekeeping can be practiced by any person without prejudice and at the same time reap maximum benefits at door step within a short timeframe. On the whole, beekeeping constitutes a sustainable income generation activity for poor, tribal farmers with small holdings. Small and marginal farmers could adopt this as a diversified option.

The Department of Horticulture under TMNE (Bee Board) has distributed more than 8000 bee hives to the farmers on subsidized rate. Capacity Building of field officials and farmers have been taken up on priority. Training programmes were conducted both by way of

providing theoretical and practical knowledge through appointment of Technical Consultants. About 2500 numbers of farmers have been trained during 2008-09 and 2009-2010.

Physical achievements made are as under:

Components	North	East	South	West	Total
i. Bee colonies					
No. of colonies	–	–	–	–	–
No. of beneficiaries	–	–	–	–	–
ii. Bee equipments					
No. of equipments	139	1221	–	900	2260
No. of beneficiaries	41	412	–	200	653

POST HARVEST AND MARKETING

Ginger Processing Unit:

Under the technical guidance of National Institute of Interdisciplinary Science and Technology, ginger processing unit with capacity of 7.5 MT per day is being established under RKVY at Birdang, West Sikkim. This processing unit will have the facilities of washing, drying, sorting, grading and waxing of fresh ginger. Ginger drying and ginger oil extraction also will be undertaken in this facility.

HORTICULTURE HIGHLIGHTS FOR 2009-10

Planting Material Production

Planting material is the most important input for area expansion programme. The success of this programme is dependent to a maximum extent on quality of planting materials. Non availability of quality planting materials in adequate quantity has always been a major bottleneck especially for development of fruits and flowers in the State. Therefore, to circumvent this constraint, the following initiatives have been taken which seem to hold high promise for the future.

Automated Greenhouse –

Two numbers of automated greenhouses of size 1500 sq mtrs have been constructed through RKVY funding – one at Mazitar, East Sikkim and another at Birdang, West Sikkim for production of disease free, high quality planting materials of Sikkim mandarin.

Tissue Culture Laboratories –

Four laboratories set up in private sector under TM for production of cymbidium clones, large cardamom, banana and other ornamentals.

Two tissue culture laboratories in public sector have been adequately strengthened to produce materials to meet up immediate demand.

Infrastructure Development

Cymbidium Development Centre –

Cymbidium is the most important flower for the State and the departmental interventions in the form of updated technology and high quality imported planting materials has advanced this sector. For promotion of this flower to a level of industry, a centre has been established at Rumtek, East Sikkim to coordinate critical activities like varietal screening, technology up-gradation training and skill development of farmers and dissemination of knowledge.

Cold Storage Facilities –

Four numbers of cold storage facilities in private sector have been established over and above two already existent and two nos. in public sector in addition to one large one. The main function of these storage facilities is to conduct pre-treatment and hold cut flowers for market. These facilities are also utilized for treatment and holding bulbs for dormancy breaking and stagger planting to coincide with flowering during peak market demands. These facilities have served as a critical intervention in maximizing returns from floriculture micro ventures.

Model Floriculture Centre –

A Model Floriculture Centre has been established at Maniram to serve as demonstration unit, act as a centre for imparting training and standardize production technology for various flowers. The centre will also function as the hub of all floriculture activities for South and West Sikkim.

Post Harvest Management

Integrated Pack House –

To ensure reduction in post harvest losses and quality retention of farm produce, one number of Integrated Pack House has been set up at Rangpo, East Sikkim to handle collection, grading, treatment, storage and various other related activities for fresh cut flowers.

Another one of the same capacity is coming up at Melli, South Sikkim to take care of the produce from South and West districts. In the same complex at Melli, one packaging centre for round type of fruits and vegetables is being set up which is expected to be fully operational by the end of coming year.

Public Private Partnership

Expansion of JVC, Sikkim Flora Ltd –

Under the PPP mode two joint ventures are already operating in the State – Sikkim Himalayan Orchids Ltd for Cymbidium orchids and Sikkim Flora Ltd for anthurium. Sikkim Flora has been expanded with addition of 5000 sq mtrs thereby taking the total project area to one ha and thus upgrading its production potential.

CRITICAL INTERVENTIONS

Water Harvesting –

Water in some pockets of the State is quite scarce. Even though the State is blessed with abundant rainfall, distribution is not uniform and scarcity of winter rains further aggravates the situation. These situations cause major setback to rabi vegetable cultivation and severe water stress conditions in orange orchards. To negotiate these adverse situations, the department has introduced the concept of dug out sunken ponds in orange orchards to store rain water for use during critical periods. These have become highly successful and have contributed immensely to enhancing the overall output.

Under RKVY, many roof and rain water harvesting tanks have been constructed with capacity of 10,000 litres in vegetable and flower belts.

Fruit fly Control in Citrus –

Fruit fly is a major pest in orange causing severe fruit drop reducing yields almost to the extent of 50%. In order to check this menace, use of male annihilation technology through

para-pheromone traps (methyl eugenol) has been introduced which has recorded high rate of success. Fruit drop has been reduced to level of 20% after the use of MAT. This programme will be continued further till this pest is brought below the ET level.

Planting Material Introduction –

In the temperate and sub temperate belts, introduction of apple and pear respectively have noted major success. Introduction of low chilling Asiatic varieties of apple has served as a critical intervention for revival of apple orchards in Lachung and Lachen, once known as the apple valleys of Sikkim. It is proposed to replicate this success in other potential apple areas in other districts as well.

Introduction of Asiatic varieties of pear from the USA for mother plant purpose is another significant achievement in fruit development strategy of the department.

Minimum Support Price and Transport Subsidy –

To promote vegetable development in the State, the government has launched a special programme under state plan to provide minimum support price for selected vegetables. In addition, for promotion of marketing of these vegetables and flowers, the department has started transport subsidy programme of 50% till Siliguri for all vegetables and 50% for flowers for transport to anywhere within the country.

Organic Certification and Ginger Processing Unit –

To counter the negative impacts of high price fluctuation in ginger and vegetables, the ginger processing unit at Birdang and organic certification of about 7000 ha land is going to greatly enhance and stabilize price of these two important commodities.

SUCCESS STORIES IN HORTICULTURE SECTOR

1. Gerbera Cultivation at Pacheykhani, East Sikkim

Not far away from Pakyong in East Sikkim, which is getting popular as the site of upcoming green field airport, the future air link to Sikkim, is located the village of Pacheykhani. The village is beset with a large number of problems out of which the main one is lack of water for irrigation. This has been the major bottleneck for over years for development of agriculture. The farmers in this village are engaged in traditional agriculture growing chiefly maize, millets and recently vegetables basically for local market.

The Horticulture department with its commitment to transform agriculture into lucrative horticulture activities embarked upon the mammoth task of starting a new journey in this village. The villagers having interest in new and non conventional agricultural activities were identified and motivated into floriculture. A series of intensive training was given to them along with exposure visits to other successful gerbera ventures of South Sikkim. Gerbera was chosen for the reason that it is a comparatively easy crop and the returns are much quicker.

In the beginning a flower growers' association of 10 farmers was constituted. Each of them was told to allocate a special place for construction of greenhouse. Land leveling was done with total plinth area of 100' X 20'. On this land was constructed the departmentally designed, newly improvised low cost treated bamboo polyhouse of 134 sq mtrs area. After the erection of these greenhouses, bed preparation using top soil and other additives was done. Each farmer was provided with 800 nos. of tissue culture plantlets of gerbera in net pots. The departmental supervision was continued for about six months, i.e. till the time good marketable flower stalk production started.

At present, each farmer produces about 25000 to 30000 flowers, which sell for Rs 2/- on average. Net earnings from each greenhouse is about Rs 40 – 50 thousand. One farmer in

fact recorded a net income of Rs 50,000/- in one year, selling flowers at average price of Rs 2.50 per stick. The farmers are now highly motivated and have started to expand their project on their own. More farmers have started to show interest. The department has already made plans to support 20 more farmers during the ensuing year.

Glimpses of the Gerbera Success of Paheykhani



View of the Gerbera



The leader of the Growers' Association in her Greenhouse

2. Off-season tomato cultivation

1. NAME OF FARMER: Smt Meena Kumari Subba
2. HUSBAND'S NAME: Shri P D Subba
3. AGE: 33 years.
4. EDUCATION QUALIFICATION: Class VII Passed
5. PROFESSION: Farmer
6. VILLAGE: Naibutar, Namcheybong, Pakyong
7. NAME OF GPU:
8. DISTRICT: East Sikkim

9. HI CIRCLE: Pakyong
10. TOTAL LAND HOLDING: 2.5 ha
11. TOTAL NOS OF FAMILY MEMBERS: 5 Nos
12. CROP GROWN BEFORE: Millet, Maize, Potato, Cherry pepper
13. CROPS GROWN AFTER: Off –season Tomato.

Shrimati Meena Kumari Subba, wife of Shri PD Subba belongs to Naibutar, Pacheykhaney Pakyong in East District. Her main source of income is through traditional farming .It is difficult to sustain from traditional farming and even children's education is difficult. With the technology of protected cultivation under **TM MM II “ On Farm Water Management “** she is able to construct 134 m² area of Low cost polyhouses in 2006 where she started cultivation of indeterminate variety of tomato.

She was given intensive training on protected cultivation by the extension workers of the Department. She planted 268 Nos of tomato seedlings in the polyhouse and was able to harvest average 12 kg per plant. The total yield obtained from 268 Nos of plants was 32.16 Quintals annually and could sell the produce in the nearest market @ Rs 20/- per kg leading to gross income of Rs 64,320/-. Her total cost of cultivation was Rs 15,000/- and could generate a net income of Rs 50,000/-.

With this income today she is able to manage her family smoothly and also educate her children in a better way. She has started to lead a comfortable life. Everyone in the village have started to emulate her success and have started tomato cultivation.

Average annual income from 134 m² greenhouse

Sl. No	Crop Variety	Total annual Expenditure (Rs)	Total annual Yield in Qtl	Average Annual selling rate(Rs / Qtl)	Total Amount (Rs)	Net Amount profit (Rs)
1	Tomato Avtar / 7711	64,320.00	32.16	2,000/-	64,320	50,000

3. Vegetable Cultivation

Name: Mr. Shyam Chettri

S/O: Prem Bdr Chettri

Age: 26 year

Education Qualification: Class VIII passed

Address: Namcheypong
Basnet Gaon
P.O Pakyong ,Gangtok

Sri Shyam Chettri, a young farmer from a small village called Basnet Gaon under East District is a marginal farmer having only 2.5 Acres of land. For the past one year he has been cultivating cabbage, cauliflower and brocolli all through the year and has realized a vast difference in income as compared to cereal crops which was practiced by his family in the early days.



Shyam Chettri at his field

Seed source: - Horticulture & Cash Crop Development Department

Planting Season: - Feb-March, May –June & Sept-Oct.(Throughout the year)

Varieties: - Rare ball, White excel, Everest

Spacing: - 1'X1' (Plant to plant and Row to Row)



One acre area under Cabbage

Keeping in view the young man's interest, the Department has supported him with all the facilities like training, technical knowhow and other inputs for vegetable cultivation under. At present he is a burning example in the village as an adaptor and has become an idol amongst the villagers. Right now he motivates the farmers around him to grow vegetables for distant markets as well as local markets. With his keen sense of market intelligence, he has been able to get good price for his produce.

Influenced by his success, his peers have also been motivated to vegetable cultivation in the locality. It has been noticed that most of his produce reaches the nearby market, Pakyong and even supplies the Institutions around the area and this is how vegetable cultivation has become a regular source of income for the farming community at Namcheypong, Basnet goan. Mr. Shyam Chettri is identified as a leader farmer to share his experiences with his fellow farmers.



His Brocoli Field



Field Officers interacting with Shyam Chettri



His cabbage field



Freshly harvested cabbage ready for marketing

Comparative Statement of Shyam Chettri's Total Income of Cereal Crops vis-à-vis Vegetables

Particulars	Year	Area	Expenditure (Rs)	Gross Income(Rs)	Net Income (Rs)
Cereals crop	Till 2008	2.5 Acre	6,700	30,000	23,300
Vegetable crops	2009	2.5 Acre	43,000	1,12,000	69,000

4. Ginger Cultivation in South Sikkim

1. NAME OF FARMER: Sri J. B. Rai
2. FATHER'S NAME: Sri Pradeep Rai
3. AGE: 43 Years
4. EDUCATION QUALIFICATION: Class-VII
5. PROFESSION: Farmer
6. VILLAGE: Salghari
7. NAME OF GPU: Salghari-Dorop
8. DISTRICT: South
9. HI CIRCLE: Assangthang
10. TOTAL LAND HOLDING: 3.25 ha
11. TOTAL NOS OF FAMILY MEMBERS: 5
12. NOS. OF FAMILY MEMBERS WORKING IN FIELD: 4
13. SUCCESS ACHIEVED IN CROPS: Ginger
14. CROPS GROWN IN AREA: 2.00 ha



J.B. Rai

The Journey -

Salghari is one of the dry areas of South District. His father Sri Pradeep Rai used to grow maize in kharif season. With progress of time his children became older and their demands started increasing. He started facing financial problems as the earnings were not sufficient to support and maintain his family. All adult family members used to work in the field. He had no other source of income. He used to earn some amount of money from the sale of his country poultry birds, sometimes goats, pigs.

In the year 2005 Sri Jas Bdr Rai was provided with 200 Kgs of ginger seed from the Horticulture Department. He planted them and harvested 1000 kg ginger. He sold the mother rhizomes and partially recovered the expenditure involved in cultivation. Out of 1000 kg, he sold 500 Kg and harvested good return, while the remaining 500 kg was sown. During the following year, he harvested 2500 kg of ginger. Out of the total produce, he retained half for seed purpose and sold the remaining. This way he continued multiplying and producing quality seed ginger for years. He is now enlisted as one

GINGER SEED MULTIPLICATION



HEALTHY GINGER CROP

of the most progressive producer of certified ginger. His continuous zeal and interest did not go unnoticed by the department. Field officials started to pay continuous visits to his farm and assisted with technical and other ancillary inputs to help him produce quality ginger seed.

He supplied ginger seed to the department in 2008 and earned about Rs 80,000/- Since that time, he has been continuously selling certified ginger seed to the department and also to other farmers. He is at present one of the well known ginger seed growers in the village. Production and sale of ginger seed has markedly improved his overall economy and has constructed a RCC building in village. He has now diversified into other trade of grocery shop in the village, but continues to cultivate ginger shih is now not only his passion but his love.



FIELD INSPECTION OF GINGER

HIS ACHIEVEMENTS DURING THE YEAR 2009-10

Sl No	Crops grown and sold at market	Production (Qtls)	Returns (Rs)
1	Mother rhizomes	15.00	18,000.00
2	Seed quality ginger	130.00	1,95,000.00
3	General quality ginger	80.00	80,000.00
	Total earning	-	2,93,000.00

Technical Intervention -

Trainings on ginger cultivation and management of insect pests and diseases were received from Horticulture Department. Sent on exposure visit outside the state. He has been provided with organic manures, bio-pesticides and a spray machine. Practical trainings were given in his farm itself. Field Officers used to visit his farm to deliver technical inputs very frequently. Being an educated young entrepreneur farmer he adopted new technology and learnt the innovations. His strengths are -

1. Strong will power and industrious nature.
2. Good plot of land near Namchi, district head quarter.
3. Educated and keen to adopt new technology.
4. Good source of FYM of his own.
5. Use of good quality seeds with scientific cultivation practices.
6. All his family members including himself work in the field.

What he thinks of Horticulture?

He believes that our lands have the capacity to give us returns commensurate to our efforts in terms of quality seeds, optimum nutrition with good management. Continuous efforts with willingness to adopt scientific methods of crop cultivation are prerequisites for success. Use of quality seeds, optimum quantity of manures, regular care and maintenance of farm are extremely important. Apart from this, one has to use his own skill. We must try to produce and sell our product when there is a good market price. Although, Salghari is totally dry area, one can profitably cultivate ginger and turmeric. Officers and staffs of Horticulture department are readily available for technical advice and logistic support.



Inspection of Ginger Seeds



Practical Training on Ginger Cultivation

Conclusion -

Through the intervention of Horticulture Department in the form of technical guidance and other physical inputs, his production has increased many fold thus multiplying his income tremendously.

He believes in hard work and through which any one can live a healthy life in village also. Today, he is a leader in quality ginger seed production in the village. He is willing to share his knowledge with his fellow farmers. Nowadays, he is known to all ginger traders of Namchi, the head quarter of South district. He is always thankful to Horticulture and Cash Crops Development Department for all the support and help.

NATIONAL BAMBOO MISSION

Bamboo is a versatile group of plants which is capable of providing ecological, economic and livelihood security to the people. It is a valuable resource that can be used as a means of promoting economic development and employment generation. By virtue of its being a highly renewable plant, and the development of appropriate technologies and management practices, bamboo has remarkable potential to generate economic activities based on different value-added products and applications, and to minimize dependence on fast-depleting timber resources.

Importance of the crop as a source of raw materials for industrial and domestic use with its growing demand all over the country necessitated its cultivation in farm lands as well. Keeping in view of the vast untapped potential of bamboo, a scheme on National Bamboo Mission was launched during the year 2006-07, by Department of Agriculture & Cooperation, Ministry of agriculture government of India.

Bamboo is regarded as green gold with multifarious uses. Bamboo has various applications such as handicrafts, furniture items, various household items, cosmetics, textiles, charcoal, carbon, construction materials such as bamboo mat, board, poles, corrugated roofs, etc and bamboo houses. It has potential to substitute timber.

The CSS scheme – National Bamboo Mission has recommended 13 species out of which 6 species are available here indigenously.

Mission objectives:

- To promote the growth of the bamboo sector through an area based regionally differentiated strategy;
- To increase the coverage of area under bamboo in potential areas, with suitable species to enhance yields;
- To promote marketing of bamboo and bamboo based-handicrafts;
- To establish convergence and synergy among stakeholders for the development of bamboo;
- To generate employment opportunities for skilled and unskilled persons, especially unemployed youths.

Thrust areas -

- Cover large expanses of unproductive wastelands within 5 years.
- Establish handicraft centres at different locations.
- Set up Bamboo Bazar in and around Gangtok – an exclusive showroom for bamboo materials and bamboo products.
- Marketing outlets in four districts.
- Establishment of bamboo treatment plant.

- Set up a bamboo processing factory for manufacture of bamboo board, bamboo blinds, toothpicks, chopsticks, incense sticks, etc.
- Explore the possibility of bamboo houses and hotels in rural areas.
- Set up a Bambusetum (bamboo botanical garden) for germplasm collection and tourism purpose.

Bamboo Plantation

Under bamboo plantation programme during 2009-10, we have covered 1730 ha Non-Forest areas. The species planted were *Dendrocalamus hamiltonii* (Choya ban), *Malocanna baccifera* (Philing bans), *Oxytenanthera parviflora* (Hill jati), *Bambusa balcooa* (Dhanu bans) and *Bambusa nutans* (Mala bans). The cluster areas in the district area as follows;

BAMBOO PLANTATION UNDER NATIONAL BAMBOO MISSION,2009-2010

Sl. No.	District	Seedlings			Rhizomes			Total Amount (Rs.)
		Area(ha)	No. of Seedling	Beneficiary	Area(ha)	No. of Rhizomes	Beneficiary	
1	East	994.00	413717	1024	2.00	805	19	21,64,205.00
2	West	427.00	103900	394	12.30	5115	370	10,64,209.00
3	North	179.60	74715	417	44.08	18539	417	9,52,714.00
4	South	452.76	188350	769	51.71	21510	98	15,32,237.00
	TOTAL	2053.36	780682	2604	110.09	45969	904	57,13,365.00

Training

Training is very important integral part of the National Bamboo Mission. Hence training was frequently organized for nursery management, plantation under area expansion and improvement of existing stock. Total of 50 nos. of Farmers and artisans were sent for the study cum exposure tour to CBTC Guwahati, NBRC Dimapur and Kerala.

Innovative Programmes:

- a. Under this innovative programme, we have been able to establish one Bamboo Processing Unit at Directorate of Handloom and Handicrafts with the total cost involvement of Rs.17.31 lakhs. With the establishment of this unit the bamboo artisans of Sikkim shall be able to make various kinds of bamboo crafts, furniture, incense sticks and bamboo blinds.
- b. One Bamboo Treatment Plant has been established at Rangpo at the cost of Rs.11.00 lakhs
- c. Under this programme, we have been able to set up one Bambusetum at Tokal Bermiok, South Sikkim. So far 32 species of bamboo available within the country are planted in the Bambusetum.
- d. Under this innovative programme, we have constructed 337 nos. of Green Houses in seven constituencies of the East District at a cost of Rs.153.12 lakhs.

NATIONAL MISSION ON MEDICINAL PLANTS (NMMP)

The National Mission on Medicinal Plants, a CSS has been launched in the State during the year 2009-10. The Ministry of Health & Family welfare, Department of AYUSH, through National Medicinal Plants Board (NMPB), Government of India is funding the scheme. The Department of Horticulture Government of Sikkim is implementing Agency in the State. The following programs have been taken up in the year 2009-10.

Production of planting material:

Model Nursery –

The cultivation of medicinal plants on commercial basis needs production of elite planting materials both in public and private nurseries. The Department has established five numbers of model nurseries in the Government farm, with the financial implication of Rs 60.00 lakhs. The district wise government farms, for production of quality planting materials are as follows:-

North District:	Lachung Government Farm
South District:	Rabang and Bermiok
West District:	Hilley and Birding

The Department has also established 6 Nos. of small nurseries in government farms with financial involvement of Rs 24.00 Lakhs. The Government farms are as follows:-

North District	Gnom-Samdong
East district	Nazitam and Lower Samdong
South District	Namthang and Mellidara
West District	Buriakhop

Similarly, 12 numbers of small nurseries have been established in all four districts and one model nursery in the South District under private sector with financial involvement of Rs 34 lakhs.

The details are as follows:

(Rs in Lakhs)

Sl No	District	Public Sector				Private Sector				Total Financial
		Model nursery		Small Nursery		Model nursery		Small Nursery		
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	
1	North	1	20.00	1	4.00	-	-	2	4.00	28.00
2	East	-	-	2	8.00	-	-	2	4.00	12.00
3	South	2	40.00	2	8.00	1	10.00	4	8.00	66.00
4	West	2	40.00	1	4.00	-	-	4	8.00	52.00
	Total	5	100.00	6	24.00	1	10.00	12	24.00	158.00

Cultivation:

The Department has identified only seven species of medicinal plants for cultivation during 2009-10. The selected crops are mostly grown in the high altitudes. The programmes have been taken up in cluster areas such as Lachung, Yuksom, Lamathang, Ribdi, Okhrey, etc.

The following is the list of selected crops under the Mission.

- 1 Aloe vera
- 2 Gloriosa superba
- 3 Panax pseudoginseng
- 4 Aconitum heterophyllum
- 5 Swertia chirata
- 6 Picrorhiza kurrooa
- 7 Nardostachys jatamansi

Capacity Building

Medicinal plants being introduced as new cultivated crop in the farmers' field, it is felt necessary to transfer the new technologies on cultivation, post harvest, value addition and processing to the stakeholders for sustainable cultivation. The Department of Horticulture & CCD had organized training to the field officials and farmers and also to provided exposure visit to the stakeholders.

Sum of Rs 9.50 has been utilized under the capacity building & Training program.

Summary of capacity building programme

1.	Total Nos. of Training organized	20
2.	Total number of farmers / growers trained	643
3.	Total Nos. of officers trained	40
4.	Total Nos. of workshops / seminars organized	2
5.	Total Nos. of participants participated in the workshop / seminar.	120

Physical and Financial achievements

Sl No	Crops	% Subsidy	Assistance /Ha (Rs)	Districts								Total (Fin)
				North		East		South		West		
				P	F	P	F	P	F	P	F	
1	Aloe vera	20	8500	20	1.70	40	3.40	50	4.25	50	4.25	13.60
2	Gloriosa superba	50	68750	10	6.875	20	13.75	20	13.75	20	13.75	48.125
3	Panax pseudo-ginseng	50	151500	2	3.03	-	-	-	-	20	30.30	33.33
2	Aconitum heterophyllum	75	82500	5	4.125	-	-	-	-	10	8.25	12.375
3	Swertia chirata	75	61875	5	3.09	-	-	5	3.09	10	6.18	12.37
4	Picrorhiza kurrooa	75	84375	-	-	-	-	-	-	10	8.4375	8.4375
5	Nardostachys jatamansi	75	151500	-	-	-	-	-	-	10	15.15	15.15
	Total			37	15.73	80	17.15	95	21.09	112	86.318	143.382

PROGRAMMES IMPLEMENTED THROUGH OTHER SOURCES OF FUND

STATE PLAN

Floriculture –

For development of floriculture, a sum of Rs 20.00 lakhs was provided. The fund was utilised for strengthening of the Cymbidium Development Centre by making purchases of important materials and fixing of assets for training hall.

Fruits –

For development of fruits, provision of Rs 5.00 lakhs was available which was utilised for development of banana and papaya plantations. 16000 nos. of tissue cultured seedling of banana variety Grand Naine was procured from local tissue culture laboratory and planted in five hectare area in areas of Pakzor and Mellidara in South and Pakyong surrounding in East. 10000 nos. of papaya seedlings – variety Sinta Hybrid was raised in government farms and distributed to farmers.

Rastriya Krishi Vikas Yojana is an Additional Central Assistance over and above State Plan for Agriculture and allied sectors launched in the year 2007-08 with the basic objective of achieving 4% growth in Agriculture and allied sectors during the 11th Plan. Under this scheme, 75% fund is provide for project based programmms - Stream I and the remaining 25% is allocated for gap filling mode for such programmes which cannot be met from funds provided through other sources like Technology Mission, Macro Management, etc.

The scheme is applicable to all sectors like agriculture, horticulture, animal husbandry and fisheries.

The various activities projected and funds sanctioned for horticulture sector during 2009-10 is given as under.

Sl.No.	Programme	Sanctioned Amount	Remarks
1.	Production of Planting materials of Orange	96.00	1. Established Six No. Public Sector nurseries in the Government Farms. 2. Established twenty PVT. Nurseries in all the four districts. With a production capacity of about 4,50,000 Nos. Quality planting materials.
2	Establishment of Large Cardamom nurseries	124.00	Establishment of 50 Nos. large cardamom nurseries in the private sector with a production capacity of about 25,00,000 Nos. quality planting materials.

TSP / SCSP

As per fund earmarked in proportion to the population of Scheduled Caste and Schedule Tribes in the State during 2009-10, the two programme implemented by the department under TSP & SCSP are –

1. Distribution of Tetra Vermi beds to scheduled farmers.
2. Construction of EDKE type poly houses to the scheduled caste farmers.

Vermicompost has become an integral part of organic farming system for supplementation of plant nutrient and refurbishing soil health. Tetra Vermi bed is an improvised technology to produce vermicompost in less expensive way compared to traditional cemented pits. Likewise, improvised polyhouse popularly called EDKE type has become an important means for cultivation of flowers and vegetables for supplemental income for these marginalised population.

These two programmes would contribute greatly in poverty alleviation and creation of employment opportunities in the State.

Programme details are as follows –

Sl no	Programme	North	East	South	West	Total
1	Distribution of Tetra Vermi Bed under TSP	156	531	416	416	1519
2	Construction of EDKE polyhouse under SCSP	6	33	21	24	84

MARKETING ACTIVITIES PROMOTED BY NERAMAC

North Eastern Regional Agricultural Marketing Corporation Ltd (NERAMAC) under the Ministry of Development of North Eastern Region (DoNER, Govt. of India), New Delhi has its head quarter at Guwahati. The Sikkim Zonal Office is located at Tadong, Gangtok. The main objective of NERAMAC is to provide better price to the farmers of North Eastern States for their agricultural and horticultural produces. The zonal office of Sikkim started functioning from 2nd June 2008.

The gist of activities undertaken during 2009-10 is given under –

1. **Marketing of Sikkim Mandarins** – NERAMAC procured about 17 lakhs mandarins directly from the farmers of the /state for marketing through sales at the Wholesale Regulated Market at Siliguri, Darjeeling markets and other important terminal markets in the country. The orange growers were satisfied with price realisation. Following price realisation was achieved.

• Big size	Rs 2.50 per pc
• Medium size	Rs 1.70 per pc
• Small size	Rs 1.40 per pc
• <i>Thuli</i>	Rs 0.70 per pc
• <i>Chhant</i>	Rs 0.50 per pc

2. **Green ginger and vegetables** – NERAMAC procured about 60 MT fresh ginger and about 35 MT fresh vegetables from farmers of South, East and West districts thereby eliminating middlemen to a great extent.

3. **Supply of horticulture inputs** – NERAMAC supplied the following horticulture inputs to the Horticulture department.

Planting materials of lychee	19,900 pieces
Planting materials of guava	15,500 pieces

4. **Construction of hi-tech greenhouse** - NERAMAC has completed construction of two nos. of time bound projects of hi-tech greenhouses - one at Mazitar and another at Birdang through RKVY funding. With the success of the above two green houses, NERAMAC has been awarded the contract to construct one similar green house at official residence complex of Vice President of India tat New Delhi.

5. **Marketing of other produces** – NERAMAC ventured in the marketing of medicinal herbs, pulses, spices, etc.

6. **Seminar and Workshops** – The officials of NERAMAC participated in various training programmes and seminars organised within the State by Spices Board, NABARD, ICAR, KVK, local NGOs, Panchyats, SHGs and MPCs. NERAMAC organised one national level seminar on 'How to manage food business enterprises for better market access' at Gangtok on 28.01.2010.