



Annual Progress Report 2010-11

Horticulture & Cash Crops Development Department Government of Sikkim

1. Introduction

Sikkim is a land blessed by nature with bountiful resources, manifested in rich biodiversity, perennial water sources, diverse soil profile, extremely varied climate and wide ranging topographical variations. Diverse agro-ecological situations ranging from sub-tropical in the lower valleys to alpine in very high elevations present an extremely congenial environment for horticulture diversifications. Our horticulture development programmes are based on the advantages arising out of our inherent strengths and disadvantages posed by geography and topography. Nonetheless, our efforts directed towards converting disadvantages into advantage have brought about path breaking transformations in horticulture sector. Promoting farm activities that are fully compatible with our ecology and ethos forms the basic core of our development strategy.

As a result of various interventions, this sector has been able to achieve much in area expansion under different commercial crops. Increased productivity, high level of crop diversification and technological inputs are some of the manifestations of departmental interventions.

Tangible area increase under flowers and vegetables has been achieved over the years especially cultivation of off-season vegetables. Protected cultivation, a notion quite remote a few years back now has evolved into one of the most effective inputs for flowers and vegetables. Fruit cultivation is a traditional practice in the State and the resurgence of orange cultivation has strengthened our confidence and given new hope to our farmers. Similar strategy is being followed with greater zeal for controlling large cardamom decline. Climate change as everywhere has posed new challenges with threats of new pests and diseases, change in cropping pattern and shift in cropping line. The ongoing horticulture programmes are redesigned and modified to make more resilient to these new developments. The most significant step towards this is introduction of new fruit crops in nontraditional fruit belts.

Organic farming is the policy of the government and hence is a thrust area. Programmes for organic research with focus on management of nutrient, pests and diseases are being formulated. Planting materials production has been given due importance and infrastructures to support these initiatives have been developed in adequate measure.

Horticulture Mission for North East and Himalayan States is the most important programmes through which major developments are carried out. To support and integrate other initiatives, programmes under RKVY, TSP/SCSP, BADP and State Plan/Non-Plan are also taken up.

2. State Profile

Sikkim is situated in the Eastern Himalayas spread below the world's third highest mountain Kangchendzonga (8595m) lying between 27° 04' 46" to 28° 07' 48" north latitude and 88° 55' to 89° 55' 25" east longitude. To its north lies the vast stretches of Tibetan plateau of the People's Republic of China, to its west is Nepal, Bhutan and China in the East and West Bengal in South. The entire region is a biodiversity hotspot with impressive botanical and zoological splendor with beautiful offering to her visitors a rare and singular experience. The total geographical area of the State is 7096 sq kms.

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

2.1. 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. There are three distinct seasons in many parts of the State – 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). As most of South district and parts of West district lie in rain shadow area, rainfall here is much less in comparison to other two districts. Pre-monsoon rain occurs in April-May and monsoon (south-west) operates normally from the May and continues up to early October. The mean temperature in the lower altitudinal zone varies from 5°C to 15°C during winter and 18 °C to 28 °C during the summer months. In the higher reaches, the average temperature never crosses 15°C. 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

2.2. 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. Places between 1500 to 2000 mtrs are known 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.

2.3. 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%.

2.4. Economic Profile

The economy of Sikkim is traditionally agrarian based on agriculture and animal husbandry. However, with the pace of development, opportunities have sprung up in other tertiary sectors, mainly tourism. It is estimated that less than 11% of the total geographical area is under agriculture. The contribution of agriculture sector to the total GSDP is diminishing, currently accounting for 16.30 %.

3. Horticulture Profile

Horticulture in the State mainly comprises of fruits such as Sikkim Mandarin, pear, kiwi, papaya and banana; 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, liliun, gladioli, anthurium, carnation, gerbera, alstroemeria and zantedeschia. The new diversifications like bee keeping, mushroom, bamboo and medicinal plants have widened the ambit of this sector. The significance of horticulture in improving land use, promoting crop diversification, generating employment and providing nutritional security to people has increased many fold and the realization of the same by cross section of the people has further increased its importance.

The emergence of organic farming, protected cultivation, etc has added new paradigm to the development strategy. Through use of polygreen houses, major breakthrough has been achieved in vegetable and flower cultivation. Floriculture has been able to change the entire concept of horticulture, helping it to transform from hobby gardening to economic venture. Sikkim mandarin, the fruit having sentimental and economic value to farmers has been revived and is on its way to attain the past glory.

Infrastructures to support production, post harvest and marketing have been created in adequate measure and in all the important production clusters. Integrating all ongoing programmes to achieve targets has been successfully done.

ESTIMATES OF AREA, PRODUCTION AND AVERAGE YIELD OF MAJOR HORTICULTURAL CROPS OF SIKKIM FOR THE YEAR 2010-11

Sl. No.	Crops	Area (000 ha)	Production (000 tonnes)	Average Yield (kgs / ha)
1	FRUITS			
	i. Sikkim Mandarin Orange	8.320	14.390	1,730
	ii. Passion fruit	0.015	0.030	2,000
	iii. Other fruits	4.560	5.690	1,247
	TOTAL FRUITS	12.895	20.110	3,089
2	VEGETABLES			
	i. Kharif vegetables	4.033	20.991	5,205
	ii. Rabi vegetables	4.897	24.280	4,958
	iii. Off-season vegetables	5.475	29.929	5,466
	TOTAL VEGETABLES	14.405	75.200	5,220
3	ROOT & TUBER CROPS			
	i. Kharif potato	4.950	22.498	4,545
	ii. Rabi potato	4.485	23.212	5,175
	Total Potato	9.435	45.710	4,845
	iii. Other Root & Tubers	0.675	3.450	5,111
	TOTAL ROOT & TUBER CROPS	10.110	49.160	4,862
4	SPICES			
	i. Large Cardamom	15.020	3.510	233
	ii. Ginger	8.510	45.890	5,392
	iii. Turmeric	0.850	2.970	3,494
	TOTAL SPICES	24.380	52.370	2,148

5	FLOWERS			
	i. Cut/Pot flowers (lakh nos)	0.089	114.08	-
	ii. Plants/bulbs (lakh nos)	0.099	98.42	-
	TOTAL FLOWERS	0.188	212.50	
	TOTAL OF HORTICULTURAL CROPS EXCEPT FLOWERS			

DISTRICT-WISE PRODUCTION OF PLANTING MATERIALS IN GOVERNMENT FARMS

Particulars	Unit	North	East	South	West	Total
Fruits						
a. Orange						
i. Primary	000 nos	75.00	450.00	-	-	525.00
ii. Secondary	000 nos	55.00	300.00	-	40.00	395.00
iii. Tertiary	000 nos	40.00	170.00	20.00	25.00	255.00
iv. Ready for distribution	000 nos	-	70.00	-	-	70.00
b. Litchi	000 nos	-	6.00	-	1.50	7.50
c. Guava	000 nos	-	3.00	-	-	3.00
d. Papaya	000 nos	-	-	3.00	2.70	5.70
Vegetables						
a. Seedlings	000 nos	-	1.70	-	-	1.70
Large Cardamom						
I. Sucker						
1 st year	000 nos	-	-	-	-	-
2 nd year	000 nos	-	-	80.00	-	80.00
II. Seedling						
i. Primary	000 nos	-	-	-	5.00	5.00
ii. Secondary	000 nos	-	200.00	30.00	40.00	270.00
iii. Tertiary	000 nos	-	175.00	-	25.00	200.00
iv. Ready for distribution	000 nos	-	120.00	320.00	-	440.00
Turmeric						
i. Seed multiplication	MT	-	-	2.00	-	2.00

Chilly						
i. Seedlings	000 nos	-	-	66.00	-	66.00
Potato						
a. Seed production	MT	-	-	20.00	20.00	40.00
Flowers						
. i. Calla lily	Nos.	-	-	1000.00	-	1000.00
Medicinal plants						
i. Ginseng seedlings	000 nos	-	-	14.00	4 Kg	

DETAILS OF GOVERNMENT FARMS AND REVENUE RECEIPTS DURING 2010-11

District	Farm	Gross Area (Ha)	Altitude (ft.)	Revenue Source	Revenue Receipts (Rs.)
North	Dzongu	7.8960	3500	Orange seedlings Bamboo seedlings	3,91,000.00 85,000.00
	Lachung	18.8080	8000	-	-
	Other receipts	-	-	-	-
	Total	26.7040			4,76,000.00
East	Mazitar	2.9000	1200	Orange seedlings Litchi Guava	4,86,200.00 1,08,000.00 30,000.00
	Nazitam	2.7500	5400	Orange seedlings	1,84,000.00
	Lower Samdong	3.2000	4500	Orange seedlings	30,000.00
	Lingtam	5.5000	6000		-
	Ralap	2.4600	4000		-
	MFC Namli	4.6000	2900	Cut flowers	3,12,265.00
	Chamerey	5.4900	4500		-
	Pacheykhani	0.8000	5400		-
	Total	27.7000			11,50,465.00
South	Rabongla	20.7300	6300	Potato Bamboo seedlings	4,00,000.00 25,000.00
	Kewzing	2.5000	5800	-	-
	Bermiok	9.2000	3500	Orange seedlings Bamboo seedlings	2,60,000.00 2,14,500.00
	Mellidara	2.9300	3350	-	-

	Namthang	2.5000	3500	-	-
	Kitam	3.0000	2800	-	-
	Total	40.8600		-	9,02,500.00
West	Hilley	16.0000	8500	Potato seed	2,45,600.00
	Buriakhop	6.0000	5000	Large cardamom seedlings	1,28,000.00
	Kamling	10.0000	1800	Orange seedlings Land leased for spoil dumping	60,000.00 86,270.00
	Hee-Gaon	2.4000	3800	-	-
	Total	34.4000		-	5,19,870.00
	GRAND TOTAL	129.6640			30,48,835.00

DISTRICT-WISE ACHIEVEMENTS

1. Horticulture Mission for North East and Himalayan States (HMNEH)

This programme is the back bone of horticulture development initiative in the State. The programme earlier known as Technology Mission for Integrated Development of Horticulture has now been renamed as Horticulture Mission for North East and Himalayan States with substantial enhancement in subsidy and modifications in pattern of assistance. The main objectives of the scheme remain the same with focus on establishing convergence and synergy among numerous ongoing programmes in horticulture sector. The aim of the Mission 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 and subsector –wise achievements made during the year 2010-11 under HMNEH is given under.

1.1. Fruits

The important fruits grown in the State include Sikkim mandarin, pear, guava and other new introductions like kiwi and Asiatic variety of pear, and papaya and banana as filler crops in lower altitudes. Apple cultivation was a traditional practice in some pockets of North Sikkim, which dwindled after decline hit the orchards during the late seventies. With the introduction of European cultivars, apple growing is on upswing and the interest has been rekindled amongst farmers. Sikkim mandarin is the traditional fruit of the State which has made major progress in terms of area coverage and production. Use of disease free

planting materials and rejuvenation programmes has been the two critical interventions for orange development.

Nurseries in private sector and two automated greenhouses have made large scale contributions in orange. The new concept of high density orchards in guava is becoming popular amongst farmers. This concept is highly suitable in a hilly state like Sikkim where land is limited and even small and marginal farmers can allocate certain portion of their land for cultivation of guava. Banana and papaya as filler crops in the lower belts is on the rise. The advantage of these two fruits is that they give very quick returns and hence their popularity is ever growing.

Litchi and kiwi are other two fruits which have vast potential in lower and upper belts of the State respectively. Delayed ripening of litchi due to climate is a great advantage, fruits coming to market one month after the main litchi season, commanding good price. This provides ample scope for area expansion under litchi in all suitable belts.

1.1.1. District-wise physical achievements under fruits during 2010 – 11

Components	North	East	South	West	Total
a. Area Expansion (New Plantation)					
i. Orange					
Area (ha)	104.25	114.80	150.00	107.07	476.12
No. of beneficiaries	303	415	448	437	1603
ii. Litchi					
Area (ha)	-	10.00	44.00	55.53	109.53
No. of beneficiaries	-	01	158	207	366
iii. Guava					
Area (ha)	20.00	40.00	60.00	12.50	132.50
No. of beneficiaries	30	84	221	102	437
iv. Banana					
Area (ha)	05.00	15.00	16.57	3.95	40.52
No. of beneficiaries	30	216	155	126	527
v. Apple					
Area (ha)	50.00	-	-	-	50.00
No. of beneficiaries	261	-	-	-	261
vi. Kiwi					
Area (ha)	-	-	-	11.68	11.68

No. of beneficiaries	-	-	-	54	54
b. 3rd Year Maintenance (2008-09)					
i. Orange					
Area (ha)	100.00	314.00	200.00	200.00	814.00
No. of beneficiaries	241	657	849	302	2049
ii. Passion fruit					
Area (ha)	15.00	-	-	145.00	160.00
c. 2nd Year Maintenance (2009-10)					
i. Orange					
Area (ha)	121.00	246.00	200.00	251.00	818.00
No. of beneficiaries	259	612	640	550	2061
iii. Kiwi					
Area (ha)	-	-	-	240.00	240.00
d. Orange Rejuvenation					
Area (ha)	50.00	100.00	125.00	125.00	400.00

1.1.2. Important fruit clusters developed during 2010-11

(i) New Plantations

a. Sikkim Mandarin Orange

North - Hee-Gyathang, Tingvong, Lum and Gor.

East – Sazong, Pachak, basilakha, Ralap, Chandey, Burung, Kadamtam, Chota Singtam, Saureni, Tirkutam, Rewalakha, Gangyap, Zingla.

South – Sumbhuk, Pabong, Dong, Sadam, Tingley, kamrang, Legship, Hingdam.

West – Nerdang, Lower Arithang, Lower and Upper Hathidunga, Boomtafel, Chisopani, Zeel, Karthok, Lower Sangadorjee.

b. Guava

North - Lower Dzongu.

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

South - Mellidara, Turung, Lingzey, Chalamthang, Lingmoo, Pakzor, Dong.

West - Arigaon, Chongrang, Khaniserbong, Suntaley.

c. Litchi

East - Amba.

South - Pakjer, Samatar, Wok, Mellidara, Donak.

West - Salley, Kithudumra, Wok, Chalamthang.

d. Banana

North – Gyathang.

East - Ralap, Dalapchen, Sirwani, Amba, Thakchang.

South - Arigaon, Salley, Chumbung, Budang and Lower Kamling.

West – Arigaon, Salley, Chumbung, Budang and Lower Kamling.

e. Kiwi

West – Rinchenpong, Deythang, Soreng.

f. Apple

North - Lachung and Lachen.

(ii) Orange Rejuvenation

North - Lower Gor, Sangtok, Hee-Gyathang, Lower Barfok.

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

South – Pabong, Kholaghari, Turuk, Sumbhuk, Sadam, Tinglee, Sripatam, Lingding.

West - Rateypani, Yangang, Lingi, Lingmoo, Turuk, Tirikhola, Rabitar, Kamrang, Pabong, Tingley, Sumbhuk, Chalamthang.

1.2. Vegetables

Out of the three vegetable seasons in the State, focus is given to promotion of off-season vegetables which has comparative advantage over pricing. Off-season vegetables include tomato, cabbage and cauliflower. Tomato is grown both as greenhouse and open crop throughout. There are more than 8 – 9 clusters, each cluster comprising of more than 10 villages with every farmer growing 3000 to 10000 plants on an average in the rain shadow areas of South and West Sikkim. Each household now earns a net income of Rs 15, 000/- to 25,000/- from tomato cultivation alone. This successful open cultivation of tomato in the rain shadow belts of South Sikkim is a classic example of converting disadvantage into advantage. After noting the success of these areas, many more farmers have expressed interest to venture into vegetable cultivation for livelihood. South Sikkim ranks number one in vegetable production.

Going by the success of off-season vegetables, the department encourages production of vegetables comprising of cabbage, cauliflower, radish, carrot and broccoli in the higher reaches during off-season. In some pockets in higher reaches, it is common practice to intercrop potato and pea or maize, pea, cabbage and ginger. The department has taken up steps to improve this practice through use of better quality seeds and inputs with stress on timing the production with peak market demand. Efforts are being intensified to

replicate these successful practices in other suitable areas as innovation to enhance vegetable production.

Traditional vegetables like pea and beans have always remained our strength and programmes are being devised to augment seed production of these vegetables. Chayote is another traditional vegetable which can be very successfully grown in many parts of the State. South Sikkim leads in production of chayote as well. The most critical intervention to promote vegetable cultivation in the State has been the use of hybrid and improved seeds, better quality organic inputs and educating the farmers about production timing to coincide with peak market demands.

The programme launched under State Plan to provide Minimum Support Price for selected vegetables and 50% transport subsidy till Siliguri has worked magic into the overall vegetable development programme.

Summer vegetables have added a new chapter to vegetable development programmes by increasing the vegetable basket of the farmer. The summer vegetables popular under cultivation comprise of many types of gourds, cucumber, egg plant and okra.

1.2.1. District-wise physical achievements under vegetables during 2010 – 11

Components	North	East	South	West	Total
i. Kharif season					
Area (ha)	20.00	143.00	119.40	70.00	352.40
No. of beneficiaries	169	1588	1230	175	3162
ii. Rabi season					
Area (ha)	50.00	284.00	267.66	155.00	756.66
No. of beneficiaries	211	2083	2150	386	4830
iii. Off-season					
Area (ha)	35.00	95.00	379.50	170.00	679.50
No. of beneficiaries	350	784	2700	340	4174
TOTAL: Area (ha)	105.00	522.00	766.56	395.00	1788.56
No. of beneficiaries	730	4455	6080	901	12166

1.2.2. The major vegetable clusters are as under.

(i) Kharif season

North - Ringhim, Gor, Chawang, Kazor.

East – Sawney, Duga, Samsing, Burung, Malangthang, Luing, Singbel, Amba, Pacheykhani, Dalapchen, Basilakha, Priklakha, Assam-Lingzey, Nandok.

South - Kateng, Bokrong, Wok, Mamley, Kamrang, Tinzir, Dong, Samatar, Kitam, Belbotey, Salleybong, Rabitar, Possi, Khairbotey, Legship, Hingdam, Bermiok, Gangla.

West - Middle Geyzing, Kabirthing, Toyang, Bangten, Lower Chumbong, Rungdu, Omchung, Arigaon, Nasa, Singling, Daramdin, Chakung.

(ii) **Rabi season**

North - Uppor Phodong, Nampatam, Toong, Naga, Hee-Gyathang.

East – Beliman, Marchak, Thangsing, Beng, Samasivik, Sirwani, Lingdum, Salghari, Chalisey, Tarpin, Rungdung, Aritar, Subhaneydara, Dalapchen, Chujachen, Dugalakha, Basilakha, Amba, Tareything.

South - Bul, Salleybong, Ruchung, Sadam, Samatar, Dong, Denchung, Chalamthang, Yangyang, Lingmoo, Ben, Tarku, Lingee, Rabitar.

West – Upper Lasso, Mukrung, Karmatar, Begha, Naku, Bhaluthang, Onglop, Toyang, Arigaon, Lingchom, Kyongsha, Arithang, Chumbong, Yuksam, Budang, Tharpu, Lungchok, Rumbuk, Buriakhop.

(iii) **Off-season**

North - Lachen, Saffu, Lachung, Menrongong.

East – Central Pandam, Cheuribotey, Sumin, Salghari, Berbing, Regu, Dalapchan, Chujachen, Salley, Nimachen, Dugalakha, Tirkutam, Raigaon, Mamring, Thekabong, Litgolai, Chenthang, Kerabari, Luing, Phadamchen. Pachak, Upper Sumin, Naya Busty, Karthok, DalapchanPhadamchen, Chuzachen and Nimachen.

South - Jaubari, Chemchey, Pakchey, Sadam, Gupti, Alley, Bakhim, Deything, Temi-Daragaon, Ganchung, Chuba, Khop.

West - Nesa, Dokothang, Chungdubdi, Upper Mukrung, Sinkharga, Upper Martam, Yangsum, Bhaluthang, Hee-Patal, Ribdi, Hilley, Okhrey, Tikpur.

1.3. Spices

1.3.1. Large cardamom

Large cardamom is the traditional spice crop which was in its glory during the mid and late eighties. Decline set in after nineties the cause of which is attributed to some disease complex, nutritional factors and inadequate management. This decline has had wide

ranging ramifications disorienting agrarian economy and upsetting cropping patterns. The farmers are still reeling under the impacts of this decline. However, departmental interventions comprising of scientific technology with inputs in the form of re-plantation, rejuvenation, gap filling and scientific management with support under HMNEH has started to show tangible impacts. In addition to old existing plantation, new areas have been developed bring about large non-traditional cardamom areas under new clusters.

1.3.1.1. The major clusters under large cardamom are as under.

North - Chwaang, Lingdong, Salim-Phakel.

East - Dalapchen, Deoling, Dhanbari, U. Samdong, Ari-Takul, Lingdok, Kya-Gumpa.

South – Tingrithang, Sanganath, Sangmoo, Bakhim.

West – Gyangyap, Thingling, Nasa, Buriokhop.

1.3.2. Ginger

Ginger is another important cash crop particularly for small and marginal farmers found in large cultivation in the tropical and sub-tropical belts of the State. 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 resulting in premium sales. A Ginger Processing plant has been set up in the State to provide assured market and nullify the negative impacts of price fluctuations.

1.3.2.1. The major clusters under ginger are as under.

North - Lower Rongong, Lingdok, Nampatam, Nadey, Passingdong, Lum, Gor, Sangtok.

East - All constituencies of East district.

South - Poklok, Kamrang, Namchi, Singithang, Namthang, Rateypani, Melli, Barfung, Rangyang, Ynagyang, Temi, Namphing.

West - Tikjyek, Melli, Lungik, Rathang, Tikpur, Ambotey, Lower Buriokhop.

1.3.3. Turmeric

Turmeric as a spice is gaining importance in the State. Cultivation of this crop is all the more significant for the simple reason that it has far greater tolerance to diseases and pests as compared to ginger. There is a steady rise in area under this crop. However, cultivation practice needs to be improved and standardized under local conditions.

1.3.3.1. The major clusters under turmeric are as under.

North - Rangrang, Chadey, Sajong, Lum, Manul.

East - Tumin, Dalapchan, Kamarey, Lingdum.

South - Palung, Sorok, Belbotey, Ben.

West - Som, Takuthang, Tashiding.

1.3.4. Cherry pepper

Cherry pepper is a traditional chilly extremely popular locally for its pungency and unique flavour. Besides table purpose, fresh capsules are used in processing industry for making pickles, paste and flavouring other processed food products. This is perhaps one of the most highly priced local items in the assortment of green products. Cultivation of this crop can become a highly lucrative venture for small and marginal farmers in the State, if scientifically done and supported with forward linkage.

1.3.4.1. The major clusters under cherry pepper are as under.

North - Lum, Gor, Sangtok, Nampatam, Mangshila, Rarik.

East - Siplakha, Martam, Sakyong, Berbing, Chota Singtam, Bering, Losing, Raigaon, Padamchey, Pelakha, Mulukey, Dalapchen, Sudunglakha, Rhenock, W. Pandam, C. Pandam, Mamzey, Saku, Burung.

South - Kabrey, Khanigaon, Salleybong, Lungchok, Namlung, Rucuing, Yangyang.

West - Chumbong, Lower Martam, Budang, Pakhigaon, Upper Phambong.

1.3.5. District-wise physical achievements under spice crops during 2010 – 11

Components	North	East	South	West	Total
i. Large Cardamom					
Area (ha)	175.00	89.70	88.83	91.00	444.53
No. of beneficiaries	133	102	80	184	499
ii. Ginger					
Area (ha)	80.00	143.00	200.00	200.00	623
No. of beneficiaries	230	725	720	820	2495
iii. Turmeric					
Area (ha)	25.00	38.00	36.87	25.99	125.86
No. of beneficiaries	67	173	101	69	410
iv. Cherry Pepper					
Area (ha)	17.05	79.25	115.83	72.00	284.13
No. of beneficiaries	77	295	415	283	1070

1.4. Flowers

Floriculture is an extremely important sub-sector under horticulture for Sikkim. Flowers not only are items having sentimental value to the people of the State but can be developed as products to augment rural economy. The relevance of floriculture in the rural economy

has multiplied over the years. Multifarious activities have been launched under HMNEH for development of this sub-sector. The result of all these initiatives is the growth of floriculture to unprecedented heights within a short span of 4-5 years. The tangible impacts of floriculture programmes in transforming hobby floriculture into commercial venture are manifested in increased usage of flowers for different local functions, development of floriculture clusters in many corners of the State, increased and sustained supply of flowers to various domestic markets and greater degree of floriculture entrepreneurship amongst educated youths.

Some of the important flowers included for commercial purpose include cymbidium orchids, rose, lillium, alstroemeria, zantedeschia, gerbera and carnation. In addition to enhanced growth in area and production, there has been great enhancement in quality as well.

1.4.1. District-wise physical achievements under floriculture during 2010 – 11

1.4.2.

Components	North	East	South	West	Total
i. Cymbidium Orchid					
No. of units	-	34	50	-	84
No. of beneficiaries	-	34	50	-	84
ii. Rose					
No. of units	-	10	23	09	42
No. of beneficiaries	-	10	23	09	42
iii. Gerbera					
No. of units			44		44
No. of beneficiaries			44		44
iv. Anthurium					
No. of units	-	-	-	-	-
No. of beneficiaries	-	-	-	-	-
v. Calla Lily					
No. of units	-	28	47	-	73
No. of beneficiaries	-	28	47	-	73
vi. Carnation					
No. of units	-	30	-	-	30
No. of beneficiaries	-	30	-	-	30
vii. Lillium					
No. of units	-	59	-	-	59
No. of beneficiaries	-	59	-	-	59
viii. Alstroemeria					
No. of units	-	-	30	-	30
No. of beneficiaries	-	-	30	-	30

1.5. Protected cultivation

The concept of protected cultivation has revolutionized horticulture bringing about a major breakthrough in vegetable cultivation, particularly cultivation of tomato and capsicum. Use of greenhouse fitted with automatic drip system of irrigation has substantially contributed to adoption of floriculture by farmers.

Specially designed low cost greenhouses have become very popular. The entire landscape is now dotted with such low cost greenhouses which are utilised for cultivation of tomato, various kinds of flowers and many other crops. To support rose and anthurium programme, prefabricated tubular structures have been provided in different clusters.

1.5.1. District-wise physical achievements under plasticulture during 2010 – 11

Components	North	East	South	West	Total
Protected Cultivation					
i. Tubular structures					
Area (ha)	-	-	2.606	-	2.606
No. of beneficiaries	-	-	73	-	73
i. Bamboo structure					
Area (ha)	1.461	2.613	5.36	8.33	17.764
No. of beneficiaries	109	195	400	622	1326

1.5.2. The major clusters covered under plasticulture programmes are as under.

(i) Tubular structures

South – Rabitar, Mellidara, Salleybong, Kamrang, Tarku.

(ii) Bamboo structure

North - Spread over all three constituencies.

East – Rhenock, Machong, Martam, Rumtek, Kabi and Tumin Lingzey.

West – All over the eight constituencies.

1.6. Mushroom development

Mushroom cultivation is a new horticultural diversification having great promise to provide alternative livelihood to rural farmers. The climatic condition required for cultivation of large number of mushroom species and varieties is prevalent in the region. As a result of this and lesser investments required, mushroom cultivation is becoming popular day by day.

To support mushroom development in the State, one Integrated Mushroom Development centre has been set up with facilities to prepare casing, spawn and mushroom cultivation. The unit also has facilities and curriculum to run full fledged training course for farmers and departmental functionaries.

1.7. Organic Farming

Organic Farming is a highly relevant issue in the context of Sikkim's agriculture. The state government has taken a policy decision to encourage organic farming for greater sustainability of mountain farming systems, better economic returns for the farmers and ensuring healthier food for the people. The first step towards attainment of this goal was reducing fertilizer subsidy tapering to culminate in zero subsidy. As a result of the mass education campaigns aimed at replacing the usage of chemical fertilizers with organic amendments like vermicompost, FYM, biofertiliser, biopesticides, etc has led to a seamless transformation in the cropping practice.

Besides these activities, the most important activity in achieving the set target is to complete certification of land. So far, 3,780.34 ha land has been already certified. For this work, an integrated approach has been adopted with resources pooled in from other line departments and manpower support from service providers and local resources. By the end of 2015, total of 50,000 ha area will be completely certified in the ratio of 18,000 ha in 2010-11, another 18,000 ha in 2011-12 and the remaining 14,000 ha in 2012-13. As of now, total area of 3,791.81 ha is under conversion bringing a total area of 7,572.15 ha under internal control system.

Three livelihood schools have been established in three locations, Daramdin for West Sikkim, Tadong for East and North and Bermiok for South district. So far, 409 local youths have passed out of these schools in two batches and 225 have been absorbed as field supervisors by ten service providers to undertake certification work.

The path breaking initiative achieved in the field of organic farming is the formation of Sikkim Organic Mission headed by the Chief Minister himself and many other important dignitaries, officials and experienced farmers as members.

1.7.1. District-wise physical achievements under organic farming during 2010 – 11

Components	North	East	South	West	Total
i. Adoption of organic					

farming					
No. of unit	-	-	150	-	150
No. of beneficiaries	-	-	150	-	150
i. Vermicompost unit					
No. of unit	63	100	150	150	463
No. of beneficiaries	63	100	150	150	463
ii. Tetra vermi bed					
No. of unit	156	-	-	400	556
No. of beneficiaries	156	-	-	400	556
iii. Certification for organic farming					
Area (ha)	-	-	235	5054.57	5289.57
No. of beneficiaries	-	-	257	-	257

1.7.2. The major clusters under organic farming are as under.

(i) Adoption of Organic farming

South – Pakzor, Kamrang, Jaubari, Pachey, Sumbuk, Namthang Circle, Legship.

(ii) Vermicompost unit

North – Dzongu, Mangan, Tumlong.

East – Gangtok, pakyong, Mazitar, Rongli, Samdong.

West – Bhaluthang, Tikjyek, Mangmoo, Upper lasso, Daramdin, Rumbuk, Budang.

(iii) Tetra vermi bed

North – Dzongu and Mangan.

West – Toyang, Radhu, Martam, Namboo, Singyang, Bhaluthang.

(iv) Certification

South – Sadam-Suntaley, Poklok-Denchung, Maniram, Singithang.

West - Chingthang, Tadong-Rinchenpong, Sangadorjee, Samdong, Deythang, Takuthang, Suldung-Kamling, Mabong-Sigyang, Khaniserbong-Suntaley, Chota Samdong-Arubotey, Yangthang, Lingchom-Tikjye, Sardong-Lungzik, Bangten-Sapong, Singyang-Chumbong, Yangten-Gyalsing-Omchung.

1.8. Horticulture Mechanization

There was a time when farm activities were associated with toil and drudgery and this being one of the reasons that the educated youths of today are reluctant to venture into

any horticulture enterprise. The state government is highly concerned with the emerging challenges of manpower shortage in villages. Farm mechanization is one critical activity to counteract the emerging challenges associated with labour deficiency and also to attract younger people into farming.

Tools and implements of various kinds like secateurs, sprayers, fruit harvesters, pruning saw, etc were incorporated in programmes like orange rejuvenation, etc.

1.9. Human Resource Development

With changing paradigms in management, human resource is viewed as one of the important inputs for any venture. The output generated by well trained and skilled person any day outweighs the output of unskilled workers. Proper training not only saves time, energy and resource, but contributes to a more quality output with least chances of accidents.

Therefore, capacity building is as important as any other aspect recognized in horticulture programmes. As such, this is in-built in the Mission. While conducting training for the farmers, the following aspects are prioritized.

- 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.

1.9.1. District-wise physical achievements under human resource development during 2010 – 11

Components	North	East	South	West	Total
i. Training of farmers including women					
a. Within the district					
No. of farmers	525	1500	1600	1741	5366
b. Within the State					
No. of farmers	198	305	254	149	906
c. Outside the State					
No. of farmers	-	30	-	-	30
Total:	723	1835	1854	1890	6302
ii. Exposure visit of farmers including women					
a. Within the State					
No. of farmers	-	80	-	60	140
b. Outside the State					
No. of farmers	-	30	-	10	40

Total:	-	110	-	70	180
iii. Training / study of Technical Officers /Field functioneries....					
b. Outside the State No. of participants					23

The different places visited and programmes / training attended under the component of Training cum exposure visits outside the State is as follows:

• CIH, Dimapur	06
• Exposure visit to North Bengal	07
• Climate Change and its implication, Udaipur	01
• 2 nd North East Agri-Expo, Dimapur	09
Total:	23

1.10. Pollination support through bee keeping

Yield enhancement of crops through pollination by bee estimated to cross over 30 - 40%. Due to the fact that beekeeping does not put much pressure on resources like land, building, machinery etc, it has become a popular diversification in Sikkim. Abundance of forest flora is an additional advantage which supplies enormous quantity of food for bees. Under the given circumstances of the abundance of forest flora and the advantages that beekeeping promises, it is not wrong to presume that it constitutes a sustainable income generation activity for poor, downtrodden and tribal farmers with small holdings.

In order to support this programme, interventions in the form of bee colonies and hives coupled with technology and equipments have been devised under the HMNEH.

1.10.1. District-wise physical achievements under pollination support through bee keeping during 2010 – 11

Components	North	East	South	West	Total
i. Bee hives					
No. of hives	-	-	-	2,165	2,165
No. of beneficiaries	-	-	-	2,012	2,012

1.10.2. The major clusters under bee keeping are as under.

(i) Bee hives

West – Sakyong, Tikjyek, Martam, Karmatar, Hathidunga, Tafel, Soreng.

1.11. Water Management

Despite the State being blessed with abundant rainfall, water scarcity is experienced throughout the State during winter and in some pockets during other times as well because of non-uniform distribution of rainfall. The concept of dug out sunken ponds introduced for orange and vegetables has been a critical intervention contributing immensely to enhancing the overall output. The provisions of community water tanks, on farm ponds and water reservoirs available under ‘Creation of Water Sources’ under HMNEH has been highly helpful to mitigate water scarcity in many ways.

The dug out ponds created in orange orchards have contributed to enhanced survival percentage of new plantations, while the same have been able to promote large scale cultivation of rabi vegetables.

1.11.1. District-wise physical achievements under Creation of Water Sources during 2010 – 11

Components	North	East	South	West	Total
i. Community tanks					
No. of units	02	05	04	04	15
No. of beneficiaries	40	243	88	108	479
ii. Dug out ponds					
No. of units	120	-	-	290	410
No. of beneficiaries	120	-	-	290	410

1.11.2. The major clusters benefited through the scheme ‘Creation of Water Sources’ are as under.

(i) Community tanks

East – Bhasmey, Thakchang, Rewalakha, Tirkutam, Lingtam.

South – Wok, Diu, Gangla, Chalamthang.

North – Phyagu, Lingdong.

West – Deythang, Ambotey, Lower Budang, Omchung.

(ii) Dug out ponds

North – Dzongu and Mangan.

West – Geyzing, Martam, Bhaluthang, Tashiding, Melli, Toyang, Hathidunga, Malbasey, Chumbung, Lungchok.

1.12. Infrastructures - Development & Management

The importance of infrastructural support for the success of any capital venture has been duly recognized. In order to draw maximum advantage out of the various programmes under implementation and to give a meaningful direction to the development initiatives, efforts have been directed towards strengthening the existing infrastructures and to sustain them through various measures.

Ginger Processing Unit – the ginger processing unit has been made operational.

One Centre of Excellence has been established in South Sikkim with a total outlay of 500.00 lakhs. Unlike other centres of the past, this is totally different. This is an exemplary centre with all horticultural crops, operations, programmes and activities concentrated in this centre.

The integrated mushroom development unit has been completed. Operations are expected to start from September 2011.

2. NATIONAL BAMBOO MISSION

Bamboo has been termed as Green Gold, a name aptly coined due to its immense potential to generate economy besides providing ecological and livelihood security to the people. 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. 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.

In order to recognize its importance as an alternative to timber for its use as a source of raw materials for industrial and domestic purpose, programmes have been devised to popularize its cultivation in farm lands as well. For economic and ecological exploitation of the vast untapped potential of bamboo, a scheme called National Bamboo Mission was launched during the year 2006-07, by Department of Agriculture & Cooperation, Ministry of agriculture government of India.

2.1. The main objectives of the NBM are given under.

- 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.

Progress made during 2010-11

2.2. Area Expansion

Under area expansion component, 860 ha was allocated by Government of India under Non-forest Area during 2010-11, out of which 837 ha has been achieved. The species planted are *Dendrocalamus asper*, *Dendrocalamus hamiltonii*, *Melocana baccifera*, *Bambusa tulda*, *Oxytenanthera parvifolia*, *Dendrocalamus strictus*, and *Bambusa nutans*.

2.2.1. The district-wise achievement is as under.

	District	Cluster Area	Physical (Ha.)		Total No of Beneficiary
			Target	Achievement	
1	North	Ramom Shipgyer, Nampatam, Men Rongong, Tanek, Lingdong, Dzongu, Sangtok.	110.00	108.00	172
2	East	Mangthang, Singbel, Rakdong, Rakshey, Basmay, Kalikhola, Tarpin, Reshi, Premlakha, Subhaneydara, Baliman, Malangthang, Luing-Pangthang & Burtuk.	200.00	186.00	191
3	South	Wok, Mellidara, Pakjor, Sadam, Manaydara, Lower-Borong, Lingi, Lingmoo, Yangang, Kamrang, Dozok.	250.00	249.00	342
4	West	Gelling-Samsing, Arubotay Chota-Samdong, Mendogaon, Melliaching, Chingthang, Bermiok.	300.00	294.00	381
		TOTAL	860.00	837.00	1086

2.3. Maintenance of Plantation

Under maintenance, gap filing was done to compensate for losses due to mortality, in areas with survival percentage below 60%. Activities like weeding, thinning and mulching

along with application of vermicompost were carried out in these areas. Total 1942 ha area was covered under this programme.

2.3.1. The district wise achievement is as under.

Sl. No	District	Clusters	Physical (Ha.)		Total No. of Beneficiary
			Target	Achievement	
1	North	Shipgyer, Chadey, Upper Singhik, Men Rongong, Toong Naga, Namok, Lum.	200.00	200.00	123
2	East	Tareythang, Tirkutam, Singbel, Amba-Mamring, Thakchang, Rabdang.	600.00	600.00	700
3	South	Kolbung, Nalam, Lower Kabrey, Maneydara, Lower Maneydara, Ramram, Kali-Khola, Rabi-Khola, Barfung-Zarong, Upper Dorop, Upper Salghari, Phalidara, Bul, Singtam, Palum, Phongla, Lower Poklok, Lower Borong.	430.00	430.00	479
4	West	Melliaching, Labing, Gerethang, Arubotey, Mendogaon, Chuchen, Takuthang.	500.00	498.00	504
	Total		1730.00	1728.00	1806

2.4. Improvement of Existing stock

Sikkim has more than 31 indigenous species of bamboo. Under this, the activities currently taken up include management of old existing grooves by way of cleaning, thinning and removal, discarding of unwanted culms. Out of the total target of 150 ha under Non-forest Area, 144 ha has been achieved.

2.4.1. The district- wise achievement is as under.

Sl.	District	Cluster Area	Target	Achievement
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No.			(Ha.)	(Ha.)
1	North	Lower Singhik, Sharyong, Lower Tumlong.	20.00	20.00
2	East	Dalapchen, Lingtam, Lower Samdong, Kamerey, Chalumthang, Raigaon, Pacheykhani, Takchung.	40.00	40.00
3	South	Pabong, Kholaghari, Pakzor, Tingrithang.	40.00	39.00
4	West	Middle Geyzing, Pakkigaon.	50.00	48.00
	TOTAL		150.00	147.0

2.5. Training & Exposure tour

Training and capacity building is an integral part of development of bamboo anywhere. Hence, as a part of the ongoing programme, training was organized on regular basis for nursery management, plantation under area expansion and improvement of existing stock, covering around 200 farmers.

2.6. Innovative interventions

The following programme was covered under innovative intervention during 2010-2011.

2.6.1. Out sourcing of tissue culture seedlings

Out of the total fund of Rs 15.00 lakhs earmarked for outsourcing, Rs 3.15 lakhs was spent for procurement of tissue culture seedlings of Moso-bamboo from Institution of Himalayan Bio-Resource Technology, Palampur, Himachal Pradesh. The remaining fund was utilized in procurement of tissue culture seedlings of *Dendrocalamus asper*, *Bambusa nutans* and *Bambusa tulda* from Arunachal Pradesh and Assam.

2.7. Establishment of Bamboo Retail Outlet with common facility centre

For the establishment of two numbers of Bamboo Wholesale and Retail Markets near important cluster villages, the Directorate of Handicrafts and Handloom under the Department of Industries has been entrusted with the work and a sum of Rs 10.66 lakhs transferred.

2.8. Participated in World Bamboo Day & Kerala Bamboo Fest.

World Bamboo Day cum North East International Bamboo Festival 2010 was celebrated at Kisama, Kohima, Nagaland. A team of 10 delegates, comprising of three officials from Horticulture & Cash Crops Dev. Deptt., five officials from Directorate of Handicraft & Handlooms and two artisans participated in this programme.

Kerala Bamboo Fest was celebrated from 9th to 12th December 2010 at Ernakulum. A team comprising of three officials from Horticulture & Cash Crops Dev. Deptt. and 7 Nos. of artisans attended this festival.

3. NATIONAL MISSION ON MEDICINAL PLANTS (NMMP)

The National Mission on Medicinal Plants, a CSS has been launched in the state during 2009-10. The scheme is funded by Ministry of Health & Family welfare, GOI, through National Medicinal Plants Board (NMPB). The Horticulture & Cash Crop Development Department Government of Sikkim is the implementing agency in the state. The following activities were taken up during the year 2010-11.

Production of planting materials:

Cultivation of medicinal plants on commercial basis needs production of elite planting materials both in public and private nurseries. However, due to fund constraint, the department could establish only two public sector Model nurseries and one private nursery with investment of balance of 2009-10.

The Public sector Nurseries are located at Lachung Government farm in North district and Rabongla Government farm in South district.

One nursery has been set up under private sector at Yuksom called Sewalung Nursery.

Detail Physical and financial achievements made during 2010-11

(Phy in Numbers and Financial in Rs.lac)

Sl. No.	District	Public sector Nursery				Private sector Nursery				Total Financial
		Model		Small		Model		Small		
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	
1	North	1	20.56	-	-	-	-	-	-	20.56
3	South	1	22.00	-	-	-	-	-	-	22.00
4	West	-	-	-	-	1	0.238	-	-	0.238

	Total	2	42.56	-	-	1	0.238	-	-	42.798
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Cultivation of medicinal plants.

The department had identified only five species for cultivation during the year 2010-11. Limited areas have been covered under high value medicinal crops such as Nardistachys jatamanshi, Swertia chirata, Picrorhiza kurroa. However, about 130 Ha areas covered under Gloriosa superba mostly in the Turuk – Sumbuk in the south district and Timberbong in West district.

(Phy in Ha. Fin in Rs.lac)

Sl. No.	Crop	Asstt. Per Ha.(Rs)	Disrtict								Total (Fin)	
			North		East		South		West			
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin		
1	N. jatamanshi	151500								1.23	1.87	1.87
2	S.Chirata	61875								4.20	2.60	2.60
3	P.kurroa	84375								0.91	0.77	0.77
4	Aloevera	8500			15.79	1.35						1.35
5	G. Superba	68750					100	68.75	30.40	15.77	84.52	84.52
	Total				15.79	1.35	100	68.75	36.74	21.01	91.11	91.11