CHAPTER - VII

REVIEW OF HORTICULTURE DEVELOPMENT

INTRODUCTION :

Modern civilization is very much dependent on plants and products. An adequate food supply, both for domestic and foreign markets of less fortunate countries have become of paramount importance. In the case of domestic plants, an increase in hectares, improved method of cultivation practices and post harvest technology can help a lot but for the introduction of new and high yielding species to secure satisfactory substitutes, sufficient kaolwedge of science and technology is required. According to the recommendation of the Indian Council of Medical Research, the minimum daily requirement of fruits per head is 60 gms and that of vegetables is 600 gms. At this rate,s the annual requirement of consumable fruits for 68 millions people is nearly 2 million• tons. Presuming the population rise of 15%, the requirements will alsos rise by time According to the nutritional standard average, daily consumption should be 200 to 300 gms of fresh vegetables per head. Hence, our demand is not fulfilled by our production. Thus, in order to be just self-sufficient, an increase of 30% to 40% of fruits and vegetables production is necessary.

7.1. EARLY HISTORY

The concept of garden culture in India was traced to the Rigvedic times. All decent houses of kings and nobles had pleasure garden (for flowers, creepers and other ornamental trees) and kitchen (for vegetables) gardens attached to them. Books like "Briksha Ropon Bidhi" and "Briksha - Ayurveda" by

Parasar, "Arthasashtra" by Kautilya etc. indicaste that superintendents were appointed for the construction and maintenance of all these gardens. They were required to know the art and crafts of growth, development, methods of planting, site selection plant protection, knowledge of grafting etc. The knowledge of gardening was regarded as one of the sixty four arts of livelihood according to much known writer "Vatsayana". Regarding site selection for the orchards and kitchen garden as well as pleasure garden "Arthashastra" (Kautilya) denotes, the region where foam strikes (Phenaghata) the bank is suited for creeper fruits; the outskirts of overflows for long creeper grapes sugarcane; those on the borders of wells for vegetables and roots, those on the borders of moist beds of lakes for green grass ..... The book also asserts irrigation cultivation including flower gardens, fruit orchards vegetables, wet crop fields and roots. (Bose, D.M. et.al., 1960).

A new orchard is always safe near well established fruit growing regions as the growers can get experienced advice from the local fruit growers like, purchasing of orchard equipments, nursery plants, facility of co-operative marketing and cold-storage availability etc.

7.2. PLANTING OF FRUIT TREES

Planting distance varies with the kind of fruits, tree sizes, period of maturity, soil fertility and availability of water. Close planting bears inferior quality and restricts inter-cropping. Planting season varies with types of products and irrigation facilities. Usually two seasons are in vogue in West Bengal namely monsoon (June to August) and Spring (February to March), Monsoon season is suitable for evergreen fruit trees like mango, guava, citrus group etc. Planting in Spring is done where irrigation is available and hence become expensive. To prevent damage in the orchard, a

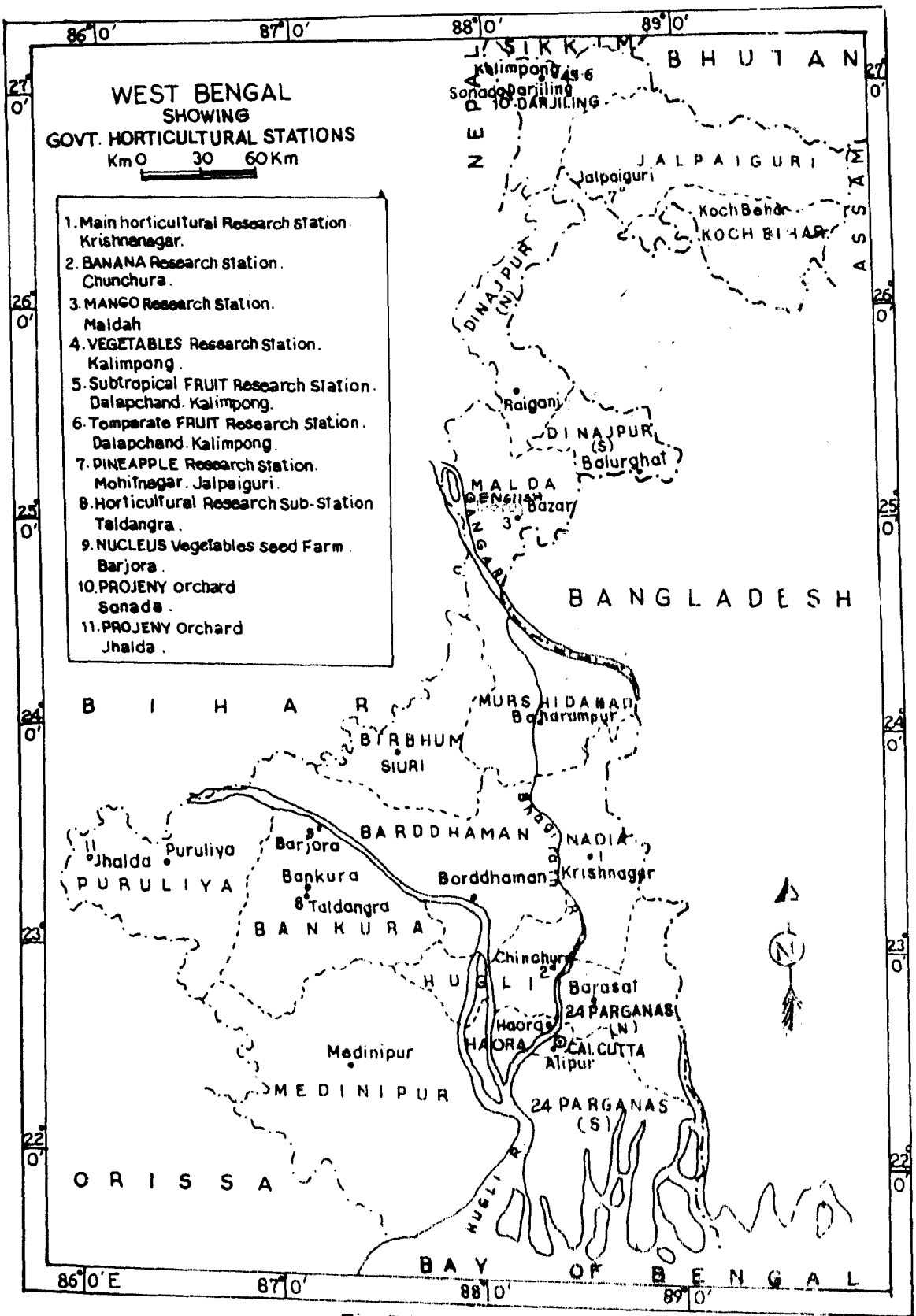
WEST BENGAL
SHOWING
GOVT. HORTICULTURAL STATIONS
Km 0 30 60 Km
1. Main horticultural Research Station. Krishnanagar.
2. BANANA Research Station. Chunchura.
3. MANGO Research Station. Maldah
4. VEGETABLES Research Station. Kalimpong.
5. Subtropical FRUIT Research Station. Dalapchand. Kalimpong.
6. Temperate FRUIT Research Station. Dalapchand. Kalimpong.
7. PINEAPPLE Research Station. Mohitnagar. Jalpaiguri.
8. Horticultural Research Sub-Station Taldangra.
9. NUCLEUS Vegetables Seed Farm. Barjora.
10. PROJENY orchard Sonada.
11. PROJENY Orchard Jhalda.
SIKKIM
BHUTAN
Kalimpong
Sonada
Darjiling
DARJILING
JALPAIGURI
Jalpaiguri
Koch Behar
KOCH BIHAR
ASSAM
DINAJPUR (N)
Raiganj
DINAJPUR (S)
Balurghat
MALDA
Bazar
BANGLADESH
BIHAR
MURSHIDABAD
Baharampur
BIRBHUM
SIURI
BARDDHAMAN
NADIA
Jhalda
Puruliya
PURULIYA
Barjora
Bankura
Taldangra
BANKURA
Borddhaman
Krishnagar
Chinchura
HUGLI
Barasat
24 PARGANAS (N)
Haora
HAORA
CALCUTTA
Alipur
Medinipur
MEDINIPUR
24 PARGANAS (S)
ORISSA
HUGLI R.
BAY OF BENGAL
86° 0' E
87° 0'
88° 0'
89° 0'
27° 0'
26° 0'
25° 0'
24° 0'
23° 0'
22° 0'

Fig 7.1

carefully planning of fencing is also very importants. Thorny bush and hedges are very commonly practised. Hedges are less expensive and most effective of they are properly trimmed and maintained.

Besides plantation, selection of healthy high quality of nursery plants or seedlings are also important so that excellent cropping is available by way of total yield and quality. The horticulture section of the Directorate of Agriculture, Govt. of West Bengal is dealing with Research and Development of some commonly growing fruits and vegetables grown in the State. Research work has been carried out mainly on mango, litchi, banana, lime and lemon, sweet and mandarine oranges, papaya, custard apple, guava, jackfruit, pineapple etc. The problems under investigation are : selection of superior and high yielding varieties, cheap and quick method of propagation, fertilizer investigation, root stock trials, pollination and bearing problems, post-harvest problems etc. The work on vegetables comprises: selection of better quality and high yielding varieties, trials for determination of agro-techniques etc. Research works are mostly carried out in the main centre of the State Horticultural Research station at Krishnanagar. In addition, special research works are carried on in other horticultural sub-stations for fruits, traditionally named other crops, i.e., Mango in Malda; Banana in Chuchura (Hugli district) ; Pineapple in Mohitnagar (Jalpaiguri district); vegetables in Kalimpong (Darjiling district); Sub-tropical and temperate fruits at Dalapchand 'Khasmahal' (Darjiling district) and on various other horticultural crops at Taladangra (Bankura district). (Fig. 7.1)

7.3. ACHIEVEMENTS IN STATE HORTICULTURAL RESEARCH STATION

Achievements of State Horticultural Research Station

located at Krishnanagar in Nadia district are as follows :

7.3.1. Mango Breeding

About 75 varieties of Mango, 9 varieties of Litchi, 3 varieties of Pummelo, 3 varieties of Lemon, 1 variety of Lime, varieties of Sapota are being maintained. Recent addition are "Mallika" and "Amrapali", the two hybrids of Mango developed at the I.A.R.I. (Indian Agricultural Research Institute, Delhi). List of varieties of Mango produced in West Bengal today as collected from various sources are : (1) Abe-Hayet (2) Alanpur Banesan (3) Ali Bux (4) Alphanso (Pune and Baramasi) (5) Amrapali (6) Annas (7) Anupam (8) Bangalore (9) Bara Sinduria (10) Baramasia (11) Begum Pasand (12) Benki (13) Bhadoi (14) Bhadua Lamba (15) Bhawanichowras (16) Bhuto Bombai (17) Bimli (18) Bombai (19) Bombai (Great) (20) Bombai (Green) (21) Brindabani (22) Champa (23) Chatterjee Khas (24) Cowasji Patel (25) Dacca (26) Enayet Pasand (27) Fazli (28) Fazli (Jhumko) (29) Fazli Surma (30) Fazli (Zaffrani) (31) Gulabkhas (32) Haldemoni (33) Himsagar (34) Himayuddin (35) Jaliabandha (36) Jehanara (37) Kalapahar (38) Kancha Mitha (39) Khandeshi Borosio (40) Kishenbhog Bela (41) Kishenbhog (42) Kohinoor (43) Kohitoor (44) Kuan Paheria (45) Kumarjoli (46) Lakhna (47) Laskar Sikhan (48) Langra (49) Langra (Banaras) (50) Langra (Sabour) (51) Mallika (52) nasrat Pasand (53) Nazuk Pasand (54) Neelum (55) Piari (56) Panja Pasand (57) P.S. Special (58) Rani Pasand (59) Ragini (60) Safdar Pasand (61) Safeda (62) Safeda (Malihabad) (63) Shah Pasand (66) Shori (67) Shyndria (68) Subarnarekha (69) Sultan Pasand (70) Sundarsha (Shaharanpur) (71) Sura Babu (72) Surjapuri (73) Taimuria (74) Vanaraj (75) Zardaloo.

Mango Research Station in Malda was established in 1957. Field trials and improved methods by introducing outstanding clones and propagation method have started from 1960, so that rejuvination of old and unproductive orchards can be possible. The following varieties are being maintained under regular uniform orchard practices. (Table-7.1)

Table-7.1

Improved varieties of Mango under uniform orchard Practices

Mango Season	Varieties with clone numbers
Early	Gulab Khas (135), Safdar Pasand (51 & 75) Shori Khas (81).
Mid - Season	Enayet Pasand (156, 81, 113), Piari (94), Himsagar (33, 87) Rani Pasand (65).
Mid - Late	Sultan Pasand (91,92), Langra (149, 183), Laxmanbhog (78, 152, 153, 167).
Late	Summer Behist Chausa (6), Anupan (175).

7.3.2. Other Fruits

Among other fruit varieties maintained by germplasam collection are the 9 varieties of Litchi (Bombai, Elaichi, Late Kasba, China, Deshi, Muzaffarpur, Purbi, Elaichi early and Naffarpal); 3 varieties of Pumelo (Krishnanagar 2,3 and Stalkart); 1 variety of lime (Pati lime); 3 varieties of Lemon (Seedless, Gandharaj and Napali Oblong); 5 varieties of Guava (L. 49, Safeda, Baruipur local,

Apple and Harijha; 8 varieties of custard apple (British Guiana, type, Allahabad, Sabour, Bangalore, Washington 98, 797, Washington 110700; Cherimuri and Hyderabad local); 3 varieties of Sapota (Gandebi Baroda, Baharu and Krishnanagar) In respect of yield and quality best fruits are : Muzaffarpur and China lichi; Krishnanagar variety of Pumelo; 2-49 and Hirija quality of Guava; British Guinea, Washington and Hyderabad varieties of custard apple and Gandevi Baroda varieties of Sapota.

7.3.2(a) Propagation

Highest success (83.5%) was achieved in case of grafting when one month old scion were grafted on eight day old seedlings. Epicotyal grafted plants of four varieties of Mango (Himsagar, Bombai, Langra and Fazli) yielded equally good results. In respect of cheap budding in winter months (50% to 75%) 'langra' responded better than 'Himsagar' (27% to 37%). Guava yield increased gradually from 277 to 493 per ha by plant population. Regulation of ripening and fruit quality, storage life, uniform colour, flavour and taste can be maintained by Ethereal treatment. Maturity standard of Banana has been determined by 105 to 109 days from shooting in winter and 95 days from shooting in summer for harvest of Robusta variety.

7.3.2(b) Plant Protection

Much improvement has been done in case of plant protection by research in Bionomics. "Shoot-gall" infestation is being codntrolled by 10% to 20% in the orchards of Malda and mite infestation in Litchi (China, Kasba, Muzaffarpur, Deshi and Elachi variety) is minimised.

7.3.2.(c) Plant Treatment

Considerable improvement has been possible in the vegetable production. 31 varieties of Brinjal, 19 varieties of Beans, 12 varieties of Tomato, 12 varieties of French bean, 12 varieties of garden pea, 1 variety each of pumpkin and gourd, ash gourd, cucumber, ladies-finger and "Katwa Data". Trials have been successful in the production of cauliflower by soil and foliar treatment (by application of Borax) so that yield of fruit gradually increased from 39.2 to 45.8 ton per ha. Brinjal plant population is increased from 17,777 to 29, 292 plants per ha. beneficial effects of seed treatment with oxalic acid significantly increased germination of watermelon and onion seeds over control.

7.3.3. Development in Horticulture

Development works done under different Horticultural Development scheme in West Bengal can be summerised as

Table-7.2

Item of Development works

Sl.No.	Item of Works	Unit	Achievements
1.	Demonstration centres on Banana, Pineapple and mango.	Nos.	115
2.	Demonstration on plant protection practices for control of mango hopper and psyllidgall.	ha.	20
3.	Introduction of package of practices in the existing orchards and high quality planting.	ha.	200
4.	Expansion of area under orange	ha.	150
5.	Distribution of grafts, gooties from Horticultural Research stn.	Nos.	47,200
6.	Distribution of Banana and pineapple suckers with fertilizer	Nos.	54,500
7.	Distribution of vegetable seeds packets with fertilizers.	No.	1,250

At present, 30 fruit development nurseries and 22 block nurseries are in operation in the State. Considerable attention have been paid on rejuvination of old and unproductive orchards through spraying, top working, manuring etc. According to the information received from the State Horticultural Department , the following item of works are of great achivement. (Table-7.3)

Table-7.3

Achievement in different fruits

	Fruits	No. of plants	Area (in ha)
a)	Mango	275	16.79
b)	Ber	1,360	46.19
1.	Top working of Mango & Ber in Grower's Plot		
a)	Mango	14,96,895	14,789.12
b)	Citrus	722	13.52
c)	Others	810	4.94
2.	Spraying of orchards against insect Pest		
a)	Mango	32,240	3,186
b)	Litchi	10,902	902
c)	Misc. fruits including guava, banana, citrus etc.	1,21,820	1,136
3.	Pruning, manuring etc. of Private Orchards.		

Source : Department of Horticulture, Govt. of W.B.

Demonstration centres have been set up with recommended Agro-techniques in some high yielding variety of banana (like cavendish). The following table 7.4 shows total member of centres in five districts as well as expanded areas for this purposes.

Table-7.4

Demonstration Centres

Name of the district	No. of Demonstration Centres		Area expanded in ha.
	State Scheme	Sponsored Sch.	
1. Hugli	5	7	74.10
2. Haora	2	2	37.05
3. Nadia	4	-	432.25
4. 24-Parganas (Dakshin)	1	4	98.80
5. 24-Parganas (Uttar)	3	2	123.50
6. Murshidabad	Nil	Nil	185.25

Source: Horticultural Research Station, Krishnanagar.

7.4. ACHIEVEMENTS IN BANANA RESEARCH STATION, CHUCHURA(HUGLI)

Banana Research Station in Chuchura has been set up jointly with the Indian Council of Agricuslture Research and the State of West Bengal in 1949 with schemes of both quality production and distribution of high yielding suckers. The remarkable quality suckers are : Gaint Governor, Robusta, Amritsagar, Amrtaman, Champa, Kanthali, Jurmony Kanthali, Beula and Baishe Chhara (the last two being culinarry variety). Inter cropping by potato (Winter) followed by 'Mung' (Summer) is an added advantage in Banana fields.

7.5. ACHIEVEMENTS IN PINEAPPLE RESEARCH STATION, MOHITNAGAR (JALPAIGURI)

Trials and experiments are carried out for optimum spacing of plants for cusltivation, maximum yield (plant population 55,555 per ha), application of chemical fertilizers (10 gm of N_2 per plant per year). Eleven germ plasm have been collected so far. Among other fruits 20 varieties of mango, 5 varieties of litchi, 4 varieties of guava, 9 varieties of banana, 15 different groups of citrus and other miscelleneous fruit crops are planted for observations about their suitability for growing in North Bengal. Out of these sweet orange, guava and banana give satisfactory results. Work has been carried out for vegetable research also. Among 9 varieties of Brinjal, 'Pusa purple round', "green oblong" and "Rajpur selection" produce highest yield. Among 10 varieties of Tomato, H - s 110 gives the highest yield followed by "Pusa Ruby" and S-12.

7.6. ACHIEVEMENTS IN VEGETABLE RESEARCH STATION, KALIMPONG

The centre is busy in research on the application of chemical fertilizers and their effect of different dozes of Nitrogen and Potash on seed production. On the application of 120 kg. of Nitrogen 40 kg. of Potassium-dioxide per hectare, highest yield is possible for "Kunwari" and "Jawaharmoti" variety of cauliflower within the period of 165 days from flowering to fruiting. Application of fertilizers showed its perfection of superiority among 6 commercial varieties of pea, bean, carrot (Nantes, Pusa Kesar, danvers and half long varieties), and Capsicum (California wonder, Elephant Trunk, Bhutan local etc.)

7.7. ACHIEVEMENTS IN HORTICULTURAL RESEARCH STATION, TALDANGRA (BANKURA) :

The Horticultural Research Station of Taldangra covers the western lateritic tract of West Bengal with the districts of Bankura, Puruliya, parts of Medinipur, Birbhum and Barddhaman. Following various agro-techniques horticultural crops can commercially be grown in the marginal and sub-marginal uplands where the soil is poor in moisture retentive capacity and low in fertility status. High yielding clons resulted in highest yield per plant in case of "Bombay" variety of mango followed by langra and "Washington Naval" variety of sweet orange followed by valencia and mosambi, L-49 variety of guava become most suitable in this environment commercially in this lateritic region both in quality and quantity. Trials show possibilities of growing four commercial varieties of grapes, namely, "Anab-sahi", "Kalisahabi", Thomson seedless" and "Black Heemberg". Under local climatic conditions the following varieties of citrus fruits, perform well are.

A) Lime: 1) Sweet lime,(2) Acid lime a) Pati lime & b) Kagzi lime

B) Lemon 1) Gandharaj; (2) Seedless; (3) Nepali Oblong.

C) Pummelo 1) Stalkart ; (2) Bankura local.

D) Mandarin Orange (1) Nagpur Santara.

Rootstocks of the citrus fruit maintained are : Jamberi, Karnakhatta, Trifollate, Rangpur lime Cleopetra Mandarin, Sour Orange and Kitchili. Substantial areas of thus Research Sub-station has been put under miscelleneous fruit crops namely cashewnut, pomegranate, papaya, jackfruit,

custard apple, ber, rose apple, date palm, wood apple, etc. By seed production method watermelon (Sugar baby variety) and tomato (Pusa ruby type) are grown and distributed to the farmers.

Supply of genuine and true to type planting materials and vegetable seeds of selected varieties is one of the most important of a development programme of Taldangra Research Sub-station. The table 7.5 shows the names of planting materials and their numbers distributed in the year 1993-94.

Table-7.5

Distribution of Planting Materials

Sl.No.	Name of the Planting materials	Nos. distributed
1.	Mango budded plants	732
2.	Guava gooties	547
3.	Lemon Cuttings	434
4.	Pati lime seedlings	308
5.	Sweet Orange budded plants	550
6.	Jackfruit seedlings	175
7.	Pomegranate gooties	50
8.	Watermelon seed	1 kg.

7.8. EXPENDITURE FOR THE DEVELOPMENT PROGRAMME IN WEST BENGAL

Development of horticulture and plantation crops will help the farmers to earn more per unit area by increasing productivity ; generate more employment, specially in the lean season; help in better management of soil and water as well as will improve health standards in rural areas. The

table 7.6 shows the total expenditure incurred during 1993-94 for this purpose.

Table-7.6

Total Expenditure in Horticulture by the State Government of West Bengal.

Sl.No.	Name of the Scheme and Station	Total expenditure in '000s rupees
1.	State Horticultural Research Station, Krishnanagar.	575.18
2.	Horticultural expansion Scheme Krishnanagar	297.64
3.	Schemes for studies on post harvest physiology of fruits in West Bengal.	50.00
4.	World Bank Programme at the Horticultural Research Station, Krishnanagar.	310.63
5.	Gardener's Training Centre, Krishnanagar	30.41
6.	Applied nutrition programme, Krishnanagar.	20.48
7.	Mango Research Station, Malda Pineapple Research Station	.210.33
8.	Pineapple Research Station, Mohitnagar, Jalpaiguri.	221.99
9.	Banana Research Station, Chuchura, Hugli.	304.59
10.	Horticultural Research Sub-station, Taldangra, Bankura	306.86

Contd...

11.	Nucleus vegetable seed farm, barjora, Bankura.	283.64
12.	Vegetable Research Station, Kalimpong, Darjiling.	345.71
13.	Banana Development Scheme (State Sector) Chuchura.	209.75
14.	Pineapple development and other misc. scheme, Mohitnagar, Jalpaiguri.	207.25

Source: Department of Horticulture, Govt. of West Bengal.

It is observed that most of the horticultural crops are grown in small areas as garden culture in the small holdings of the farmers. An infrastructure has been planned by the Government under annual five year plan to bring about areas under plantation development at existing plantations for increasing production. The new scheme is envisaged the physical and financial implication to achieve the following activities.

(a) Conducting verification trials on farmer's plot to bring new informations to the farmers.
(b) Extension of education through training to popularise new agro-techniques.
(c) Coordination among bankers, financiers and farmers for easys flow of credit for the development of horticultural crops supported by refinance from the national banks.

Leading Banks are assigned to undertake a survey of the resources and potentialities of the operating areas of the districts in collaboration with other Co-operatives so that banking facilities can be conducted to the farmers. An analysis of the district wise allocation of finances in different sectors of horticultural farming will reflect the

present position of West Bengal.

7.9. DISTRICT-WISE ALLOCATION OF FINANCE FOR HORTICULTURE :

7.9.1. Darjiling District

Central Bank of India, being Lead Bank here allotted Rs. 67 lakhs in 1990-92 which includes pineapple, banana, orange, plum, peach and apple for rejuvination and maintenance of of the old and existing orchards and creating scope for new plantations. Money has been alloted for fruit sprocessing unit at Kalimpong (Rs. 8 lakhs) for marketing facilities through Co-operatives (Rs. 5 lakhs (Orange). A sum of sRs. 10 lakhs is assured to the dealers of fertilizers, pesticides, seeds etc. and Rs. 6 lakh for storage and godown purposes.

In addition to banking facilities, the Govt. of West Bengal has allotted funds in annual plan in horticultural schemes as follows:

Table-7.7

Finance allotted for Darjiling district by Govt. of West Bengal.

Sl.No.	Name of the Scheme	Rupee allotted in lakh
1.	Rejuvination and expansion of orange orchard(for 687 ha)	4.02
2.	Spraying in orange orchard	8.00
3.	Temperate fruit orchard	5.00
4.	Vegetable seed production (500 ha).	12.45.

Contd...

5.	Nutrition orchard demonstration	6.00
6.	Distribution of graft, gooties etc.	1.00
7.	Fruit processing plant at Kalimpong	4.00
8.	Two training centres for fruit processing and gardening.	3.00

7.9.2. Jalpaiguri District

Block-wise feasibles potential for horticultural crops in the P.L.C.P. (Public Loan Component Plant) require updation as follows.

Table-7.8

Blockwise allocation of finance in Jalpaiguri dist.

Sl.No.	Name of the Blocks	Area in ha	Financial Assistance in lakh
1.	Alipurduar (I)	3.0	2.56
2.	Alipurduar (II)	3.0	2.56
3.	Kumargram	3.1	2.95
4.	Kalchini	2.1	2.27
5.	Dhupguri	3.0	2.56
6.	Falakata	2.0	2.17
7.	Madarihat	2.0	1.18
8.	Maynaguri	2.0	1.18
9.	Mal	1.0	0.50
10.	Raiganj	3.0	2.00
11.	Jalpaiguri Sadar	3.0	2.00
	Total:	27.2	21.93

From the Table-7.8, it is found that a total Rs. 21.93 lakh have been allotted for promotion of horticulture in Jalpaiguri district. An additional area of 27.2 ha is engaged for this purpose. Small and marginal farmers are taking interest in horticulture..

7.9.3. Kochbihar District

Financial implications of bankable scheme for the year 1992-93.

Table-7.9

Blockwise allotment of finance in Kochbihar

Sl.No.	Name of the Blocks	Area (in ha)	IRDP/SCP amt. of loan (in Rs. lakh)
1.	Kochbihar I	16	4.40
2.	Kochbihar II	10	2.70
3.	Dinhata I	10	2.70
4.	Dinhata II	10	2.70
5.	Tufanganj I	10	2.70
6.	Tufanganj II	10	2.70
7.	Mathabhanga	10	2.76
	Total :	76	20.66

I.R.D.P. = Integrated Rural Development Project
S.C.P. = Special Component plan for SC/ST.

From the Table 7.9, it is found that for an additional area of 76 ha in Kochbihar has been brought under

horticultural practice and a total sum of Rs. 20.66 lakh is allotted for this purpose. Pineapple production is giving much attention with improved saplings, fertilizers and other necessary items. (Central Bank of India, 1991-92).

7.9.4. Uttar & Dakshin Dinajpur Districts

An additional area of 275 ha were brought under horticultural crops during the year 1993-94 and for 1994-95 target year. Fruit development nurseries are under action plan. They are in Raiganj, Majhia, Islampur, Kumarganj, Tapan and Karandighi. Financial outlay and bank loan given for pineapple orchard is Rs. 1.36 lack covering an area of 15 ha.

7.9.5. Malda District

Bankable projection and financial outlay for mango, lichi and guava in Malda is Rs. 2.52 lakhs for total additional areas of 147 ha almost 80% West Bengal's mango come from Malda district but deloyment of bank finance is negligible. The reasons put forward are : (a) existing orchard owners are sufficiently resourceful and hence they do not want to borrow on bank conditions, (b) at the time of replacement of old trees orchard owners earn a lot through sale of timbers, (c) maximum money transactions take place at the time of cropping to marketing of which most of it is used on transportation and marketing.

Inspite of all these reasons, banks can finance the marginal and small farmers for the activities like grafting and gooties for mango and lichi orchards. Unit cost of mango and lichi is Rs. 15,000 per ha of which Rs. 6400/ha is needed in the first year. Bank loan is available upto 85% of the unit cost. Blockwise and agencywise projection for horticultural crop development in Malda district is shown

below:

Table-7.10

Financial help for Horticulture in Malda District

Sl.No.	Name of the Blocks	Additional area(in ha)	Agency		Total Bank loan in Rs.lakh
			L.D.B.	R.R.B.	
1.	Ratua I	2 M	5.	5.44	10.88
2.	Old malda	2 M	5.44	10.88	16.32
3.	English Bazar	2 M	-	10.88	10.88
4.	Manikchak	1 M	5.44	-	5.44
5.	Kaliachak I	2 L	10.88	-	10.88
6.	Kaliachak II	2 M	5.44	5.44	10.88
	Total :	12	65.28	32.64	32.64

M - Mango
L - Litchi

L.D.S. - Land Development Bank
R.D.B. - Regional Rural Bank

7.9.6. Murshidabad District

An optimum potential of 125 ha were assessed for the district upto 1995-96. During the target period of 1990-95 an amount of Rs. 0.70 lakh has been provided as re-finance by National Banks against schematic lending under horticulture. An amount of Rs. 2.23 lakhs has been re-financed under IRDF which also correspond to bank credit of about Rs. 4.00 lakhs. Projectioin for the period 1992-93 is shown in the Table No. 7.11.

Table-7.11

Financial assistance for Horticulture in Murshidabad

Name of the fruits	I. R. D. P.		Total	
	Unit(h)	Rs. in lakh	Unit(h)	Rs. in lakh
Mango	2.0	0.14	2.0	0.14
Litchi	2.0	0.14	2.0	0.14
Guava	2.0	0.12	2.0	0.12
Papaya	2.0	0.24	2.0	0.24

Table-7.12

Blockwise Projection

Name of the Blocks	Name of the fruits							
	Mango		Lichi		Guava		Papaya	
	U	A	U	A	U	A	U	A
1. Baharampur	-	-	-	-	1.0	0.12	-	-
2. Hariharpur	-	-	-	-	-	-	1.0	0.12
3. Mur.Jiaganj	1.0	0.07	1.0	0.07	-	-	-	-
4. Lalgola	1.0	0.07	-	-	1.0	0.96	-	-
5. Farakka	-	-	1.0	0.07	-	-	-	-

U = Unit in hactre

A = Amount of Rs. in lakh.

From the Table-7.12, the blockwise allocation of finance in Murshidabad district is visualized which are given for improved nursery plants and rejuvination of old orchards.

7.9.7. Nadia district

Total estimated area of 700 ha is taken for annual planning in Nadia district. Bankable projection is as follows

Table-7.13

Bankable Projection for Nadia District

Year	'89-90	'90-91	'91-92	'92-93	'93-94	'94-95
Total Finance	0.12	2.87	3.04	3.12	3.20	3.29
Bank loan 85%	0.10	2.45	2.59	2.65	2.72	2.79
Re-finance 70%	0.07	1.72	1.82	1.85	1.90	1.95

Unit cost estimated for mango Rs. 15,000/ha over a period of 7 years, Rs. 15,000 for lichi for the same period, that of guava requires Rs. 15,000/ha for 5 years and for floriculture the money allotted is Rs. 2,05,000/ha for one year only.

Problems in the field of horticulture have been noticed in Nadia district are due to : (a) most of the land is utilised for food crops; (b) plantation is done only as subsidiary income financed under IRDP; (c) lack of fruit processing units.

To overcome all these problems attention has beensd given to district by the State's Main Horticultural Research

Station at Krishnanagar by supplying high yielding and high quality saplings, seeds of fruits and flowers. A number of private nurseries have come up at Chakdah, Ranaghat, Nakashipara, Chopra and Karimpur blocks. District Rural Development Authority approved the proposal of setting up units for preservation of fruits and vegetables. Areas are identified by the Agriculture Officers in collaboration with United Bank of India, State Bank of India, Regional Rural Bank and Land Development Banks for the purpose of formulating big schemes under plantation and horticultural sectors. Floriculture (along with Mashroom cultivation) have already taken momentum. A laboratory has been set up at Ushagram, Taherpur in Ranaghat Block I for mashroom spown. The Nadia Development Bank has sanctioned a financial outlay of Rs. 3.44 lakhs for 80 units for the period 1991-94 for job formulating schemes on mango, guava, lichi and tuberose.

7.9.8. Hugli District

There are only four blocks engaged in the horticulture in Hugli district namely, Balagarh, Chanditala II, Pursurah and Singur. Inspite of the captive market like Calcutta, the district has some inherent problems for commercial culture. They are ; (1) the land holdings are small, forcing farmers to go for cash crops or cereals like potato and paddy which give quick return. Cropping intensity of the district is about 185 p.c. and hence there is very little cusltivable waste land. Some old mango plantations are now replacing by new stocks. Total estimated potential units may be 250 ha. There is a fruit development nursery at Chuchura and 3 block nurseries at Jangipara, Dhaniakhali and Singur. For Banana, about 16 lakhs are estimated for the year 1992-93 and Rs. 20 lakh for other plantation crop.

7.9.9. Haora District

An additional area of 20 ha is being brought under horticulture every year. The district has two Government nurseries at Jagatballavpur and Shyampur and a number of private nurseries at Bagnan, Panchia, Uluberia and Shyampur for meeting the demands for seedlings at citrus, mango, papaya and floricultural plants. Government nurseries at Chandannagar is another addition. A sum of Rs. 35 lakhs is allotted as Bank loan including re-finance under IRDP (U.B.I., 1994).

7.9.10. Barddhaman District

Total estimated potential area is 800 ha and the distribution of land per crop is given in the Table-7.14.

Table-7.14

Distribution of land per crop

Name of the Crops	Areas in hactre during the years				
	'90-91	'91-92	'92-93	'93-94	'94-95
1. Mango	15	15	20	20	20
2. Guava	15	15	20	20	25
3. Lime	10	10	10	10	10
4. Papaya	20	20	20	20	20
5. Mango rejuvination.	20	20	20	20	25
*6. Others	30	30	40	40	40
Total:	110	110	130	130	140

* Others include Jackfruit, Banana, Lichi etc.

Three new nurseries have been set up at Aknksa, Jamalpur and Memari. Financial implications and Bankable projects of the district are shown in the Table-7.15

Table-7.15

Bankable projections in different crops

Name of the Crops	Y E A R S									
	'90-91		'91-92		'92-93		'93-94		'94-95	
	A	C	A	C	A	C	A	C	A	C
1. Guava	5	0.51	5	0.63	5	0.75	5	0.75	5	0.75
2. Lime	6	0.61	6	0.75	6	0.90	6	0.90	6	0.90
3. Papaya	8	1.59	8	1.59	8	1.59	8	1.5	8	1.59
4. Mango	8	0.39	8	0.39	8	0.39	8	0.39	8	0.39

A - Area in ha ; C - Cost in Rs. in lakh

From the above Table-7.15, it finds a total of Rs. 17.35 lakh have been allotted for the Barddhaman district on the above mentioned crops. A good possibility of papaya has drawn comparatively large amount followed by lime, guave and mango. The Rarh land of Barddhaman encourages drought resistant fruit crops like guava, lime etc. and hence attentions are paid on it. For an area of 189 ha. banks operating in this sector are United Bank United Commercial Bank, State Bank of India, Allahabad Bank and West Bengal Co-operative and Land Development Bank. The Blocks getting financial aids are Barddhaman, Aushgram I and II, Jamalpur, Memari, Raina I, Kalna I and II, Katwa I & II and Kanksa.

7.9.11. Birbhum District

Depending upon the potentialities of the blocks credit programme has been allocated as follows :

Table-7.16

Credit Programme in Birbhum

Name of the Blocks	Unit are in ha	Bank loan in Rs. in lakh
1. Nalhati I	2.5	0.15
2. Nalhati II	2.5	0.15
3. Muraroi I	2.5	0.15
4. Muraroi II	2.5	0.15
Total:	10.00	0.60

Being situated in the Rarh Plateau, Birbhum district proves suitable for drought resistant crops and hence citrus dsfruits and winter vegetables are encouraged and hence an additional 10 ha area and a sum of 0.60 lakh is allotted in credit programme of the lead bank there.

7.9.12 Bankura District

Block nurseries of Bankura are at Taldangra, Bankura and Sonamukhi. A new nursery has been set up at Kotulpur. The physical target and bank loan under horticulture development project for the years 1991-92 and

and 1992-93 is given as follows.

Table7.17

Physical Target and Bank loan allocated in Bankura District

Name of the Blocks	1991 - 92		1992 - 93	
	Area(ha)	Bank loan in lakh	Area(ha)	Bank loan in Rs. lakh
1. Bankura I	4.5	3.91	5.0	4.25
2. Bankura II	2.5	2.19	3.5	3.19
3. Barjora	4.5	3.91	5.5	4.00
4. Sonamukhi	5.5	4.80	6.0	5.00
5. Kotulpur	2.5	2.18	3.5	3.91
6. Taldangra	6.0	5.20	8.0	6.25
Total:	25.5	22.19	31.5	26.60

(U.B.I. Annual Report 1992-93).

7.9.13. Medinipur District

Cultivation of flower as cash crop is very much important in Medinipur district and they are mostly cultured in six blocks namely, Medinipur east covering an area of 5,032 ha which produce 2,404 metric tons of flowers. Coverage and production in Panskura blocks I and II are 4,850 ha and 23 metric ton respectively contributing about 96% of the district's activity and is the chief source of Calcutta flower markets. An additional area of approximately 60 ha is being brought under horticultural plantation every year.

Yearwise phasing for different crops is as follows:

Table-7.18
Yearwise phasing of crops

Name of the crops	Unit areas in hectre				
	'90-91	'91-92	'92-93	'93-94	'94-95
1. Mango	8	8	8	8	8
2. Guava	5	5	5	5	5
3. Floricuslture	15	15	20	20	20
4. Others	55	35	65	75	75
Total:	83	83	98	108	108

The Table-7.18 shows a good potentiality for floriculture in Medinipur district and an additional area of 20 ha is brought under this purpose.

The government nursery at Panskura I is supplying the planting materials in the district along with the new one set up at Khirpai. The Table-7.19 shows the financial implications of Bankable schemes.

Table-7.19

Financial implication and Bankable Schemes

year	Name of the crops					
	Guava (ha)	Cost (Rs.lakh)	Others (ha)	Cost Rs.(lakh)	Floriculture(ha)	Cost Rs.(lakh)
1990-91	5	0.35	20	41.00	2	0.13
1991-92	5	0.42	20	41.00	4	0.29
1992-93	5	0.51	25	51.25	4	0.37
1993-94	5	0.63	25	51.25	5	0.52
1994-95	5	0.75	25	51.25	5	0.63
Total:	25	2.66	115	235.75	20	1.94

From the above table, the fact is clear that cost of production in horticulture has been increased from 1991 to 1995 considerably and this is due to increase in cost of fertilizers, pesticides and transportation. Floriculture added lands quite hopefully.

7.9.14. Puruliya District

The agro-climatic conditions of the district need adoptation in-situ soil moisture conservation along with other dry land farming techniques. The State Department of Agriculture has provided a list of 20 micro-watershed in the district where soil conservation schemes have also taken up. Financial implications for dry land farming and horticultural development is shown in the Table-7.20.

Table-7.20

Schematic allocations for Puruliya

Blocks	Schematic Allocations					
	1990 - 91		1991 - 92		1992 - 93	
	Unit (ha)	Amount Rs.(lakhs)	Unit (ha)	Amount Rs.lakh	Unit (ha)	Amount Rs.(lakh)
1. Balarampur	50	1.5	100	3.0	100	3.0
2. Jhalda I	100	3.0	100	3.0	100	3. 0
3. Jhalda II	100	3.0	100	3.0	200	4.0
4. Puruliya I	50	1.5	100	3.0	100	2.0
Total;	300	9.0	400	12.0	500	15.0

The Table-7.20 shows that horticulture in Puruliya has been increased almost double in both area and financial assistance which has been given for citrus farm and for winter vegetable productions in the above mentioned blocks.

Both the Planning Department & alongwith Soil Survey (Conservation and Management wing) and the Department of Agriculture has taken up integrated development programme for wasteland in Puruliya. Horticulture, under the principal agricultural officer is now under such plans. There are Govt. nurseries for the production of planting materials at Hatwars, Jhalda, kashipur and Para. The target under horticulture and plantation is taken at 95 ha. including 20 ha. under schematic lending, sanctioned to United Bank of India. The programmes are shown in Table-7.21.

Table-7.21

Schematic Programme for Puruliya undr I.R.D.P.

	Schematic	
	Units(ha)	Amount (Rs. lakh)
1. Land Development (Schematic)	500	18.00
2. Horticulture (Sponsord)		
a) Guava and Mango	30	2.00
b) Lime and papaya	25	2.46
c) Others	40	2.00
Total :	95	6.46

7.9.15(a)Uttar 24-Parganas

Potential assessed in this sector is about 250 ha assuming an annual growth of 50 ha of which mango 20 ha, banana - 10 ha, guava - 5 ha, citrus - 5 ha, sapota - 5 ha, and lichi - 5 ha. Fruit development nursery of Manmath Nagar is presently taking care of the orchards here. There are proposals for reviving nursery at Deganga and two new nurseries are set up at Bongaon and Barrackpore. The district plan allocated Rs. 0.72 lakhs for 1991-92 for reorganisation of horticultural development. The sustainable credit programme is as follows.

Table-7.22

Credit Programme for Uttar 24-Parganas

Crops	Area (ha)	Financial Assistance by IRDP	S.C.P.(in Rs. lakhs)
1. Fruits	0.5	1.06	
2. Flowers	2.5	1.25	

7.9.15(b) Dakshin 24-Parganas

The total estimated potential is 240 ha. assuming an annual increase of 40 ha (for mango - 10 ha, guava - 10 ha, sapota - 10 ha, lichi - 5 ha and others - 5 ha). The government nursery in operation is at Bishnupur. Plans are underway to start another one at Kakdwip. Horticultural crops are grown mainly as backyard crop in this district. Floriculture is getting bank loan and the programme is mostly covered under Integrated Rural Development Project (IRDP) and Special Corporate Plans (S.C.P.) for schedule casts and tribes. Allocation of performance budget for different banks for the years 1990-94 and the corresponding refinance requirements are presented in the table 7.23.

Table-7.23

Bank-loan for Horticulture in 24-Parganas (South)

Name of the Banks	Preference Bank loan (in Rs. lakhs)	Refinance in (in Rs. lakh)
1. United Bank of India.	1.50	1.05
2. Canara Bank	0.56	0.39
Total :	2.06	1.44

The Table-7.23 proves a bright future in horticulture for 24-Parganas as the lead banks allotted re-finance under different projects.

7.10. PROMISING FUTURE :

Although there is a good demand for fruits and flowers for the markets of the metropolitan city of Calcutta, there is no good organised marketing machinery to help the small growers. Marketing arrangements are done by intermediaries always and as usual. Floriculture, today has secured a second position in the State's economy. Other than small farmers, people of different classes have also come forward with a view of profitable business. From field survey, a promising picture can be drawn. Mr. Sunil Manna, a resident of Haora district started floriculture as regular job when failed to secure other job when with plain B.A. degree. Jogesh Biswas of Nadia district, a school teacher is engaged, with his unemployed brothers, in flower production. According to Kalipada Biswas of Nadia district, a sum of Rs. 1 lakh to 3 lakhs can be earned from 1 ha. producing flowers. The culture is less expensive than other commercial crops. "Floriculture is very much luck dependent" said Subrata Mandal. Seasonal fluctuation of price is to be admitted. One kilogram of tube rose which cost Rs. 4 to Rs. 5 in the off-season rise upto Rs. 70 to Rs. 80 during festive seasons. The cost of rose rises from Rs. 10 to Rs. 50. When the supply is poor one can profit significant amount by selling of rose but on the other way the loss is hard to face. Interviews with the growers like Dilip Mandal of Deulti, Mukunda Jana of Bhagpur, it has been cleared that with the help of bank loan and assistance from State Horticultural Schemes floriculture now a means of square meal for many families in the area.

Multinational companies have come forward to cooperate with the agriculturists (who grow flowers as interculture) and local growers (in small holdings) so that surplus can

find foreign market also. Village "Baharu" in the district of 24-Parganas being located only 45 km. away from the Megacity of Calcutta is now ready with such project. "The Sundarban Horticulture and Hybrid Centre" have started a farm to produce flower, seed, nursery plants specially for export purpose. The new farm is getting assistance from the Central Institute of Medicinal and Ornamental plants, Indian Institute of Horticulture (Bangalore), National Botanical Research Institute (Lucknow), alongwith some Investors, Agro-Botanists and local farmers. The main object of this farm is to give knowledge to the local growers as to how very commercially the flowers can be grown, hybrid plants and seeds can be produced so that more modern floricultural farms can come out to place West Bengal in a sound position in India in this sector. This half - a - million rupees project is in operation step by step. According to Dr. S.Basu, Director of this farm, this project will have to earn profit at the end of 2nd year and the estimated figure of profit will be Rs. 40 lakhs at the end of 1995 and Rs. 75 lakhs by the end of 1997. The farm is starting with the export of cut-flowers and hybridization by tissue culture of flowers like rare variety of roses, chrysenthemu Anthurium, varieties orchards and mother plants of various fruits from which seedlings can be prepared for sale. If successfully cultured, only Anthrurium can earn lakhs of rupees from foreign markets as the cost of a single plant ranges from Rs. 35 to Rs. 40. (Ananda Bazar Patrika, 24th Feb. 1994)

Promising future of floritulture in West Bengal has been reflected in the emergence of a good number of flower boutiques side by side of prestigeous flower stalls of New Market, the shopper's paradise in Calcutta. Research analysis of some well known florists activities and boutique business is discussed as follows.

The most luxurious flower market in Calcutta is New Market. In this flower range "P. banerjee and Sons" are

engaged in business for last century. Flowers are collected from Panskura and Kolaghat of Medinipur as well as from other states like Bangalore (Karnataka). Varieties are different types of roses, tube rose, hibiscus, gladioli, Carnation, Authrurian etc. Specialists prepare fancy baskets (Ring, Chair, Round), bouquet etc. Price is ranging from Rs. 20 to 200 for bouquet and Rs. 75 to 100 per basket. They also take contracts for decoration of public Halls for different occasions. (Plate - 20)

70 years old 'Das and Company' has their own nursery in Datta Pukur (North 24-Parganas). Artistic arrangements of bouquet, basket fetch a very good priceBouque ranging from Rs. 20 to Rs. 500 and fancy decorated buskets from Rs. 50 to Rs. 1000 is available here. Their "Home Delivery" cover an wide area outside Calcutta, that is Ranaghat, Asansol, Durgapur etc. Rabindranath Basu of "Bose and Sons" is regarded in floriculture since 1946. Flowers are brought from Kolaghat, Kalimpong (West Bengal), Mumbai and Bangalore. Flower bouquet, basket wreth all are available always with a price range of Rs. 50 to Rs. 5,000 depending upon the size, fashion and quality and variety of flowers, orchids and ornamental plants. They occupied three to four stalls in the flower range of New Market and hold a good position as florist. Being a member of International florist Association, namely 'Inter flora' they also get contract for decoration in British, French and Russian High Commission Offices . Veteran florist Mohini Mohan Biswas of Luna nursery has his own garden at Galudi (Tata). Home delivery, Pandal decoration etc. are their specialistics.

Flower Boutiques are the finest gift of 21st century. keeping view with the fast life these boutiques are always ready for floral presentation. "Expression" in Sarat Bose Raod "Yours" in Elgin Road. "Upavan" in Royd Street,

"Phulwari" in Hungerford Street, Plants and Flowers" in Shakespear Sarani, "Nalini Florist" in Camac Street, "Blossoms" in Salt Lake, "Khoosbu" in Sarat Bose Road are all names of high fashion flower boutiques which sell floral decorations. Price ranges of the articles are Rs. 10 to Rs. 500 so that all classes of people get interest in it.

CONCLUSION :

After studying planning and development of Horticulture it has become clear that although the agro-climatic condition of West Bengal is very much suitable for horticulture; the progress is not very satisfactory. production of vegetables and flowers are still largely treated as backyard farming in small holdings and mostly as inter-culture. Government of West Bengal has started paying interest in horticulture and keeping budget in State Planning. States Horticultural Research Station at Krishnanagar (Nadia district) is carrying out works on high quality plant breeding, propagation works, fertilizer investigation plant treatment etc. Among other developmental works the Research Station are engaged in demonstration programmes on plant protection, introduction of package practices, distribution of grafts, gooties for mango, guava etc, distribution of suckers of banana and pineapple along with vegetable seed packets. Other Research Sub-station which are in progress with their regional characteristics of produces are : Pineapple Research Station in Mohitnagar (Jalpaiguri), Banana Research Station at Chuchura (Hugli), vegetable Research Station at Kalimpong (Darjiling) and Taldangra Research sub-station at Bankura for citrus and other fruits.

Apart from State Department lead Bank have come forward to finance under Integrated Rural Development Project and Special Component Project for schedule caste and schedule tribe, to promote horticulture as special income to the farmers specially in lean season for some extra bucks. From lead Bank Survey reports showing allocation of finance to different projects in the districts of West Bengal, it is found that although various schemes have been taken up the amount by the banks but of sanction is very poor and conditional. After feeding all the sections of agriculture the State allow a small amount of fund which is not at all sufficient to grow horticultural crops of good quality profitably. Among the horticultural products of West Bengal floriculture is comparatively rich with prospect. Business houses is coming forward to invest on floriculture to find foreign market side by side a regular home market. One such model farms is in Baharu (24 Parganas) namely, the Sundarban Horticulture and Hybrid Centre where Agrobotanists, investors, local growers are working together. A good number of cultivators ranging from small and marginal growers to quiet affluent florists are interviewed to find out the bright prospects in floriculture today.

An awareness to the people about horticulture is very much important for general progress. The following chapter VIII finds future prospect in Horticulture as a subject which can improve this section of agriculture considerably.