

CHAPTER - IX

C O N C L U S I O N

The study on the whole covered almost all the aspects of horticulture in West Bengal. The State has been divided into three well marked physiographic regions, namely, (1) Northern Hilly Region, covering the districts of Darjiling and Jalpaiguri. The topography of these region is of diverse character sculptured by the actions of ice, snowfed rivers, heavy rainfall and cold wind action; (2) the plateau tract of West Bengal is the continuation of the Chotonagpur plateau which covers the districts of Puruliya and the western part of Birbhum, Barddhaman, Bankura and Medinipur; (3) the flat alluvial plains of West Bengal starts from the undulating land South of the Himalayan range rolling down to the sea in the south of the state covering the districts of southern part of Darjiling, Jalpaiguri, Kochbihar, Uttar and Dakshin Dinajpur, Malda, Murshidabad, Nadia, Hugli, Haora, North and South 24 Parganas and the eastern part of Barddhaman, Bankura and Birbhum. The rivers of West Bengal are grouped into (1) Snowfed Rivers with their turbulence and uncontrollable fury during the monsoon seasons; (2) Rainfed rivers, with their volume of waters and (3) Tidal Rivers with their siltation problems, cause tremendous influence in cusltivation. Ground water depth study has been done for availability of water for irrigation of horticulture crops. Agro-climatic zones, temperature, pressure, condition, rainfall categories affect the horticulture. Types of soils on the basis of geographical, environmental and social factors of five horticultural zones are classified. Orchard plan include layout, plant selection, propagation, cultural practices, training and pruning of the trees, prevention of diseases and pests are analysed. West Bengal produce a wide variety of summer and a few group of winter fruits. Being fourth State in India in mango production, West Bengal covers an area of 1,94,997 ha. The concentration of mango

production reveals that Malda, Murshidabad, North and South 24 Parganas, Nadia produce high to very high (Malda) quantity of good quality Mango which flood the markets of the state in summer. Except for the western lateritic tract banana is grown in almost all districts leading both Uttar and Dakshin 24 Parganas, Hugli and Uttar and Dakshin Dinajpur districts, which can be identified as the extension of banana belt of the neighbouring State of Assam. Darjiling district is the only proud supplier of mandarine orange but it is now under experimentation along with other citrus fruits namely, mosambi, various types of lime and lemons in Puruliya districts where winter temperature became favourable for growing the fruits. The largest pineapple producing district is Jalpaiguri trailing Dakshin 24 Parganas behind. Nadia and Dakshin 24 Parganas (Baruipur P.S.) is rich in guava production. The whole supplier of Litchi in West Bengal is Murshidabad and Nadia districts. Highest concentration of sapota is found in Dakshin 24 Parganas. The State is also producing a number of miscelleneous fruits, although not very much commercial but has immense value in common diet. The tropical and sub-tropical (the Northern districts) weather of West Bengal help to grow a very wide range of both summer and winter vegetables which is good for the home market but if care is taken with advanced Agro-Botanical technology, West Bengal can easily expsort them to the neighbouring districts, specially in Central India where heat and low rainfall cause little vegetable production. The plains of West Bengal is the golden mine of floriculture as the soils are deep loamy and rich in plant nutrients. Good precipitation helps in growing seasonal flowers. Flower is grown as backyard cusltivation and is mainly taken care by the womenfolk of the farmers and as an alternative source of income for the lean periods of agriculture, Economics related to horticulture..... West Bengal is ^{Analysed in detail} Transportation and storing facility is found poor for these highly perishable

products temperature and humidity control is highly needed to avoid decaying. Preservation of excess product have started but need much financial and technical assistant from the food technologists. A healthy and attractive packing can fetch good market. Both physical and economic problems arise in the field of horticulture as the products are highly sensitive. Apart from natural calamities, pests and diseases cause heavy loss. Proper plucking is very much important and a good knowledge is required as to when and how to pluck so that bruises can be avoided. Apart from these qualitative problems quantitative loss incurred due to transit system. Unsuitable mode of transport, defective packing system and storage problem cause immense loss. In West Bengal cold storage are used mainly for potato which is found unsuitable for keeping horticultural products. A separate arrangement is highly needed so that producers can use them at reasonable cost. Number of such centres will be sufficient to get easy access to the crops because shorter is the distance lesser is the quantitative loss. From the review of horticulture, it is found that this art of culture is nothing new to us. A good planning idea has been found from the early history regarding the site selection. To prevent the damage in orchard good selection of planting materials (saplings and hybrid seeds from the nurseries) should be distributed through Agriculture Extension Officers (Block Development Office) at reasonable costs. The State today have a number of Horticultural Research Stations and substations in each horticultural zones but the fund allocations is not sufficient to carry out the research work in plant hybridization and other works. Even the lead bank allocation is also less accordingly. Commercial houses should give priority to come forward in this field who can import ideas, technologies good equipments to promote the growers.

Economics related to horticulture discusses the success of horticulture with the quality and quantity of production through skillful harvesting operations, grading, processing, storing and transporting them to the markets in demand. Marketing system of horticulture is studied in detail. Two wholesale and two retail market is specially analysed as they have a good control over trading of horticultural products of West Bengal.

After studying the geographical analysis of Horticulture in West Bengal it has been clearly approved that there is immense scope ahead of this garden culture commercially and of course more economically. India, being one of the oldest civilization is enriched with knowledge of farming from the vedic period. Throughout the Historical era agriculture received prime importance in the riverine plains. Valuable sources of agricultural informations found from "Arthashastra" by Kautilya (Gupta period) regarding types of land, site selection, different sections of orchard practices and management. Botany of the medieval period show influence of Arabic and Persian traders. British period added a number of new progenies in India, with the establishment of "Royal Botanical Garden in 1787 and the Royal Botanical Garden in 1787 and The Royal Agri-Horticultural Society in 1820. Horticulture found its identity as a fascinating avocation of agriculture. West Bengal, blessed with almost all types of physical, climatic and soil condition provide home for wide range of flora. Being one of the outlying States of India, the State has to suffer the crucial partition of India. The siphoning of excess population due to migration from Bangladesh (East Bengal) and other neighbouring States. Political instability affects resource stability. West Bengal felt food crisis and care and attention were paid towards production of food crops.

cash crops and fruits and vegetables in the rich soils of the State. At present, production of fruits and vegetables are only 28.35 gm. per head per day against the requirement of 56.70 gm recommended by the Indian Council of Medical Research. Under the circumstance Government of West Bengal started paying attention towards the production of horticultural crops under the Directorate of Agriculture. Different physico-climatic condition of the State allowed five horticultural zones following the five Agro-climatic zones, namely, (1) The northern Hilly Region (2) Terai Region (3) Alluvial Region of Central and lower Bengal (4) Western lateritic tract and (5) the Southern coastal Region. Each zone with their characteristics features in case horticultural crop production has been discussed in detail. An analytical study is made for each sector of fruit culture, floriculture and vegetable production. Concentration of particular crop production in favourable areas are calculated and shown by figures and tables. Problems related to horticulture from orchard to marketing centres are highlighted. Planning and development attempted so far is although a good start but not sufficient for State's demand and supply. On the basis of entire study and recommendation proposed some more ideas and plans are suggested by author for the extension development and marketing of Horticultural products in West Bengal.

Horticulture is still treated as a backyard farming or at best mixed farming in intensively cultivated small holdings. This backyard or home vegetable garden can supply adequate for the family during the growing season and for canning and storage for winter use. If properly cared for and managed, a small plot of land is excellently productive. This vegetable garden can be an integral part of landscape planning, like (Katyal, S.L., 1968)

1. Plant in rows - 30 m. of any crop is usually sufficient.

2. Perennials like asparagus, rhubarb and small fruits can be planted on one side of the garden to avoid interference with the tillage operations of the annual crops.
3. Plants having similar methods of culture can be planted together.
4. Rotation of crops can be done very methodically for conserving space and labour, e.g., early maturing crops, such as, spinach, lettuce, green onion, followed by bean, pea or tomato, pepper , and egg plant, cabbage, cauliflower, carrot, beat, pea and kahlrabi followed by snap bean, cow pea or corn; beans followed by late cabbage, cauliflower etc. Like vegetable garden fruit trees may be grown for their landscape value as well as for fruit. For example rich trees are both useful and ornamental. They display flowers in the spring and fruits in the summer and provide an attractive colour in the fall. Now, the important factor is the selection of right variety, that is (1) resistant to the pests and (2) adaptive to the local environment.

Research and development programmes under the supervision of Agro-Botanists, Food technologists in collaboration with the lead Banks operating in the district of West Bengal a very bright future is ahead for this particular sector of Agriculture, not only in the production of high quality and high yielding varieties of fruits and vegetables but also a nice contribution is expected in the Agro-economy of the State. The scope of employment provision for all sectors, like, scientific, technical and non-technical, skilled and unskilled labours can be expanded. Staff strength as found in the State's Directorate of

Horticulture is very poor according to the need which requires attention. Allied industries with horticulture should be given priority in terms of financial assistance and mentionable part of our employment programme can also be solved in this way. In preservation and packaging centres of these perishable items, a large section of women folk can work on these activities after short term training. Training centres should provide a channel for selling their products through Government and undertaking organisations so that job securities can be assured. Fruits and vegetable processing industries need more and high quality machineries, attractive packaging containers. Artistic skill is needed for labelling and advertising through different medias so that our quality products can find national markets of other states side by side with home market. Selling through co-operatives and Government agencies will help to keep the prices purchasable for common people. Horticultural industries have enough strength to come out from the "Small and Cottage Industry" level to a regular competitive industry of the State.

Throughout the research work great problem was to face about the absence of certain essential data which are reliable and relevant in order to make definite statement. Data base at household, block-level are so weak that planners, administrators or policy makers cannot adequately make plans. In order to understand the conditions and problems both hard and soft or quantitative or qualitative data are required. It is essential to have the basic data and maps for this kind of infrastructure planning and an information system to monitor this programme which will strengthen the lowest unit of development not only to increase production in the horticultural sector but also provide the basic amenities and tackle problems of unemployment in the different sections of the society. Regional development plans emphasis the identification of backward areas in order to minimise the imbalances at the grass-root level. Series of thematic maps forming an Atlas on

different topics of this particular sector will be of much help to prepare appropriate policies and programmes. For the betterment of State's Horticulture proposals ^{are suggested} to prepare a "Horticultural Atlas of West Bengal" which will cover both the physical and economic problems and prospects are Methodology for the preparation of such maps (district-wise) will consist of three component operations, namely,

- a) Obtaining the base materials/data
- b) Re-verification by ground survey or use of Satellite imagery of the combination of both and
- c) Collection, processing and depiction of the data cartographically with the initiation and joint endeavour of the State Planning Department, Survey of India, National Atlas and Thematic Mapping Organisation, Department of Agro-Agriculture of West Bengal, Soil and Irrigation departments, Ground water Board, Agri-Horticultural Society, Agro-Botanists and Research Fellows of Universities of West Bengal.

Such project can come out successfully to help all the growers of fruits, vegetables and flowers with volumes of informations regarding Horticulture of West Bengal. These maps should be available in both forms of Atlas and loose sheets (District-wise) in cheap prices as the bound volume of Atlas may be costlier and of less use to every individual. But the Atlas will be of great importance for the Horticultural Research Stations, Research Scholars and ameturists. Contents of the Atlas's proposed are as follows : Fig(8-1)

MODEL MAP
SHOWING THE CONCEPT OF HORTICULTURAL ATLAS

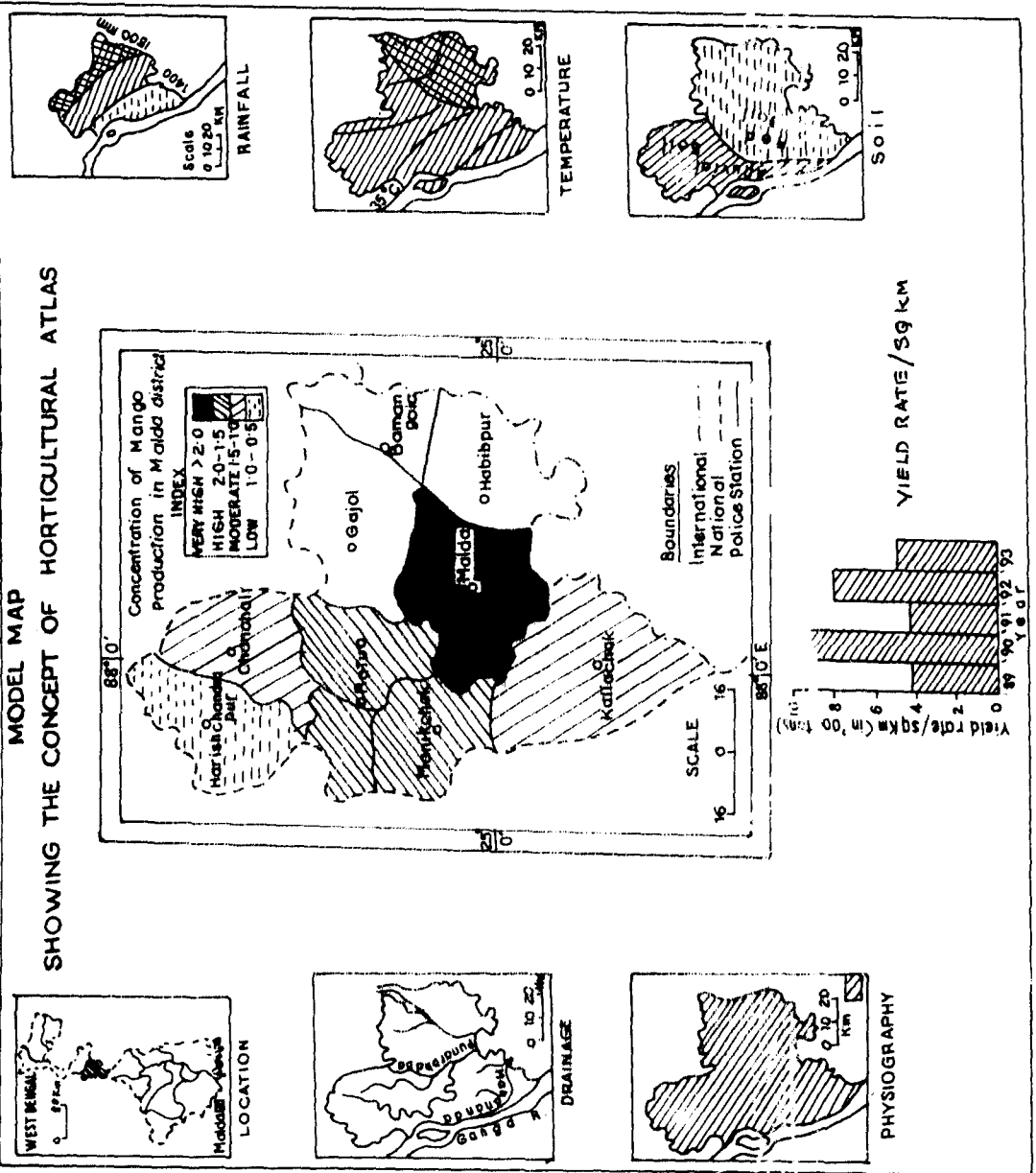


Fig-8

Theme of the Plates of the proposed Horticultural Atlas.

<u>Plate No.</u>	<u>Description</u>	<u>Page No.</u>
1.	Location map of West Bengal with administrative boundaries and divisions	
2.	Physiography with regions	
3.	Drainage Map with flood plains	
4.	Ground water situation with drought-prone areas	
5.	Temperature and pressure conditions of West Bengal.	
6.	Rainfall patterns of West Bengal	
7.	Soils of West Bengal	
8.	General landuse pattern of West Bengal	
9.	Horticultural Zones of West Bengal	
10.	Percentage area of Horticultural crops in West Bengal.	
11.	Districtwise distribution of Horticultural area(percentage) of West Bengal.	
12.	Lay out of the orchards	
13.	Area under production of fruit crops in West Bengal.	
14.	Major flower producing areas of West Bengal	
15.	Calcutta map showing important markets and supply centres.	
16.	Calcutta map showing horticultural product processing centres.	
17.	Concentration of Mango cultivation in W.B.	
18.	Concentration of Banana cultivation in W.B.	
19.	Concentration of Guava cultivation in W.B.	
20.	Concentration of Citrus fruit production in W.B.	
21.	Concentration of Papaya cultivation in W.B.	
22.	Concentration of lichi cultivation in W.B.	
23.	Concentration of Sapota production in W.B.	
24.	Concentration of Jackfruit cultivation in W.B.	

25. Concentration of Pineapple cultivation in W.B.
26. Concentration of Orange production
27. Concentration of Temperate and other fruits in West Bengal.
28. Concentration of flower production in W.B.
29. Concentration of vegetable sproduction in W.B.
30. Yield rate per sq.km. of different fruits in West Bengal.
31. Yield rate per sq.km. of different vegetables in West Bengal.
32. Moving average of the value of horticultural products.
33. Moving average of the value of horticultural processed products in West Bengal.
34. Map showing Horticultural Research Stations of West Bengal.
35. APPENDIX

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27. Appendix

Data regarding all the plates, should be placed in the Appendix. (1) Maps showing district-wise concentration of crop concentration should be placed in the centre while a series of inset maps in smaller scale showing all the themes related to horticulture will be drawn on both sides of the map or spaces wherever available surrounding the main map depending upon the shape and size of the area. (2) Explanatory notes, history, analytical reports and suggestions of priority items which need immediate attention of the development authorities of the concerned districts can be printed as back-up matter. A model frame is shown in the following figure. All factors that infringe on the scheme of development must be studied in proper co-relation in time and space. This can be done very profitably through cartographic techniques. Statistical cartography which highlights the significance of statistical data as related to geographical areas reveals the story hidden in a mass data and is a powerful modern tool for explaining the issues involved. For District level planning larger scales are needed for representation of themes. The scales will tend to be smaller as we go higher in the hierarchy. Where updated cadastral maps along with aerial photographs will be available planning maps can be done further micro level (Roy, P. et. al. 1977). As regards, the information input for the atlas computer based geographic information system would come in use. Where the assessment is required to be done for short periods like crop season and for monitoring major landuse, major changes in river courses, effects of natural disasters on regional level, satellite imagery would prove useful. This idea of Horticultural atlases will be the outcome of Horticulture of West Bengal, a geographical analysis.

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(i)

APPENDIX-I

Rainfall in different districts of West Bengal.

District	Station	Rainfall in mm.			
		Pre-monsoon	Monsoon	Post-monsoon	Annual
1. Darjeeling	a) Kalimpong	251.6	1960.3	50.4	2262.3
	b) Darjeeling	348.5	2345.3	67.6	2758.4
	c) Bagdogra	346.2	2757.0	28.3	3131.5
2. Jalpaiguri	Jalpaiguri	484.0	2828.9	38.9	3352.7
3. Coochbihar	Coochbihar	605.0	2583.5	42.1	3231.0
4. Uttar and Dakshin Dinajpur	Balurghat	197.1	1400.0	37.3	1634.8
5. Malda	Malda	147.7	1216.8	45.3	1409.8
6. Murshidabad	Balarampur	169.5	1157.8	51.6	1388.9
7. Birbhum	Suri	147.1	1093.9	44.4	1285.4
8. Bardhaman	a) Asansol	114.2	1219.8	58.2	1392.2
	b) Bardhaman	185.9	1154.9	63.1	1403.9
9. Nadia	Krishnanagar	231.9	1139.9	63.0	1434.8
10. Bankura	Bankura	143.0	1113.1	60.3	1316.4
11. Hugli	Chuchura	231.2	1209.9	79.1	1520.2
12. Puruliya	Puruliya	89.4	1188.6	29.0	1307.0
13. Haora	Ulberia	224.8	1332.4	72.5	1627.7
14. Uttar and Dakshin 24-Parganas	a) Dum Dum	214.0	1288.3	67.8	1570.1
	b) Sagar Island	190.8	1638.8	78.8	1908.4
15. Calcutta	Calcutta	189.9	1315.9	76.1	1581.9
16. Medinipur	a) Medinipur	187.6	1383.9	83.4	1554.9
	b) Contai	143.4	1607.3	73.0	1823.7

Source: I. M. D.

Different types of soils in the districts of West Bengal

Names of the Districts (1)	Names of the soil class with area in '000 ha and their % to total area									
	Laterite (2)	Red (3)	Vindhyan Alluvium (4)	Ganga Alluvium (5)	Terai/ Teesta (6)	Coastal (7)	Colluvial Skeletal (8)	Brown Florest (9)	Total (10)	Total
1. Darjeeling					53.7 (25.2)			165.3 (74.8)	219 (100.0)	
2. Jalpaiguri					453.4 (94.0)			29.1 (6.0)	482.5 (100.0)	
3. Coochbihar					204.6 (100.0)				204.6 (100.0)	
4. Uttar & Dakshin Dinajpur.		56.9 (13.1)	76.9 (17.6)	167.7 (38.5)	134.2 (30.8)				435.7 (100.0)	
5. Malda		77.8 (23.0)	17.1 (5.1)	243.5 (71.9)					338.4 (100.0)	
6. Murshidabad			147.8 (32.9)	301.3 (67.1)					449.1 (100.0)	
7. Nadia				339.2 (100.0)					339.2 (100.0)	
8. Hugli		6.8 (2.7)	184.9 (73.9)	58.6 (23.4)					250.3 (100.0)	
9. Haora										
10. Uttar & Dakshin 24-Parganas				367.7 (31.3)		808.2 (68.7)			1175.9 (100.0)	
11. Medinipur	306.7	234.2	282.4			298.8	31.1		1153.1	

Contd....

App. II Contd.... (iii)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
12Puruliya							510.2 (100.0)		510.2 (100.0)
13.Bankura	133.9 (22.2)	39.9 (6.5)	90.6 (14.9)				345.3 (56.6)		609.7 (100.0)
14.Barddhaman	62.7 (10.7)	21.1 (3.6)	333.5 (58.0)	75.5 (12.9)			92.2 (15.7)		585.0 (100.0)
15.Birbhum	85.5 (21.6)	59.8 (15.6)	96.4 (24.3)	19.3 (4.9)		134.8 (30.7)			395.7 (100.0)
Total:	588.8 (8.1)	496.4 (6.8)	1292.6 (17.8)	1572.8 (21.9)	845.9 (11.7)	1107.0 (15.7)	1113.6 (15.3)	194.4 (2.7)	7148.3 (100.0)

(iv)

APPENDIX-III

District-wise break-up of the area(ha) and their P.C. to the total area under different fruit crops in W.B.

District	Mango	Banana	Orange	Other Citrus	Pine-apple	Guava	Litchi	Sapota	Misc. fruit	Total
1. Malda	21,300 (97.0)	200 (1.0)	-	40 (0.1)	-	40 (0.1)	-	-	400 (1.8)	21980 (100.0)
2. Murshidabad	18,240 (93.6)	160 (0.8)	-	40 (0.2)	-	80 (0.4)	400 (2)	-	600 (3.0)	19520 (100.0)
3. Nadia	4000 (71.0)	160 (2.8)	-	200 (3.5)	60 (1)	400 (7)	320 (5.4)	-	520 (9.1)	5660 (100.0)
4. Hugli	8000 (59.0)	4,800 (35.2)	-	200 (1.5)	60 (0.4)	80 (0.6)	40 (0.3)	-	400 (3.0)	3580 (100.0)
5. 24-Parganas (Dakshin)	500 (25.5)	320 (16.3)	-	80 (0.4)	360 (18.4)	280 (14.4)	20 (1.0)	200 (10.2)	200 (10.2)	1960 (100.0)
6. -do-(Uttar)	8000 (88.4)	320 (3.5)	-	120 (1.3)	-	12 (1.3)	2 (0.2)	-	480 (5.3)	9060 (100.0)
7. Bardhaman	3000 (60.6)	960 (19.4)	-	160 (3.2)	-	240 (4.8)	-	-	600 (22.0)	4960 (100.0)
8. Uttar & Dakshin Dinaipur.	2600 (55.0)	1600 (33.6)	-	80 (1.7)	-	80 (1.7)	-	-	400 (8.0)	4760 (100.0)
9. Jalpaiguri	200 (5.6)	80 (2.2)	-	80 (2.2)	3000 (84.4)	-	-	-	200 (5.6)	3560 (100.0)
10. Coochbihar	120 (20.0)	120 (20.0)	-	40 (6.7)	-	-	-	-	320 (53.3)	600 (100.0)

Contd...

Appendix-III Contd....

11. Medinipur (West)	600 (60.0)	80 (8.0)	-	40 (4.0)	-	120 (12.0)	-	160 (16.0)	1000 (100.0)
12. -do-(East)	280 (28.5)	306 (31.0)	-	80 (8.1)	-	40 (4.0)	120 (12.1)	160 (16.2)	986 (100.0)
13. Bankura	800 (59.0)	-	-	120 (8.8)	120 (8.8)	120 (8.8)	-	200 (14.7)	1360 (100.0)
14. Puruliya	60 (11.8)	-	50 (9.8)	120 (23.5)	80 (15.7)	80 (15.7)	-	120 (23.5)	510 (100.0)
15. Birbhum	60 (13.0)	-	-	16 (35.0)	-	120 (26.0)	-	120 (26.)	460 (100.0)
16. Haora	240 (38.0)	240 (38.0)	-	40 (6.2)	-	-	-	120 (18.7)	640 (100.0)
17. Darjiling	-	-	1200 (42.2)	-	1200 (42.2)	-	-	440 (15.6)	2840 (100.0)
Total	58,000 (72.8)	9,346 (10.0)	1,250 (1.3)	1,600 (1.7)	4,800 (5.1)	1,800 (1.9)	800 (0.8)	5120 (5.5)	93356 (100.0)

(vi)

APPENDIX-IV

Blockwise area under Mango Orchards (in ha)

Name of Block	Total Geographical area(ha)	Net area under cultivation.	Area under Mango(ha)	P.C. of the area under Mango over net area under cultivation
English Bazar	25,190	18,752	7.6	41.0
Old Malda	22,375	16,534	1.6	10.0
Kaliachak II	19,030	13,697	1.6	12.0
Manikchak	31,654	25,346	2.4	10.0
Ratua I	22,126	17,937	1.8	10.0
Ratua II	17,210	13,763	2.0	15.0
Gazole	50,772	40,824	4.0	1.0
Bamongola	20,380	16,061	0.2	0.2
Habibpur	3,234	32,920	1.2	0.8
Kaliachak I	13,414	9,571	8.0	8.0
Kaliachak III	20,206	15,924	1.2	0.8
Chanchal I	13,510	10,647	8.0	7.0
Chanchal II	22,895	18,244	2.0	1.0
Harishchandrapur I	17202	13,957	4.0	4.0
Harishchandrapur II	21156	16,673	6.0	3.0

District-wise distribution of vegetables in West Bengal.

Sl.No.	Name of the District.	% to total area.	Major vegetables grown
1.	Darjiling	67.88	Potato, Cole crop, Beans.
2.	Jalpaiguri	46.67	Co Crops.
3.	Coochbihar	65.09	Brinjal(Lady's finger), Vindi, Cole crops.
4.	Uttar and Dakshin Dinajpur.	48.82	Cucurbit, brinjal, chilli. cabbage, cauliflower.
5.	Malda	11.84	Brinjal, tomato, vindi & cabbage
6.	Murshidabad	34.03	Cabbage, cauliflower, pumpkin.
7.	Nadia	45.32	Tomato, brinjal, raddish, cauliflower & cabbage.
8.	Hugli	60.54	Potato, cucurbit etc.
9.	Haora	59.40	Brinjal, potato, cole crops.
10.	Uttar and Dakshin 24 Parganas.	32.07	Chilli, watermelon, vindi, cauliflower, cabbage, cucurbits beans & leafy vegetables.
11.	Barddhaman	78.32	Potato, gourd, cucumber
12.	Birbhum	77.90	Brinjal, root crops, etc.
13.	Bankura	84.40	Brinjal, root crops, cole crops
14.	Medinipur	34.07	Cucumber, Bitter gourd, onion, vindi, pumpkin etc.
15.	Puruliya	88.69	Cucurbit, brinjal, chilli, tomato, root crops etc.
State Average:		47.90	

Major flower producing areas of West Bengal

Sl. No. districts	Name of the Blocks	Important flower producing areas of the blocks.	Some important varieties	Apprx. area under floriculture in '00 ha.	Total production in '000 quintols
1. Medinipur	Tamluk	Deulia, Kolaghat, Pulshita, Khanyadihi, or	Summer Bel, Rose, Summer Products Jasmin	150	125
	Panskura	Keshapat, Debra, Loada, Baisnabchak	Ehadui Rajanigandha Winter (tuberose) products	22	220
	Daspur	Sagarbar, Gopalnagar Brindabanchak	Winter: Rose, Marygold and tuberose	225	
2. Nadia	Ranaghat Nakasipara	Nokari, Kamarfukur, Debagram, Jugalkishor, Raghunathpur, Dhantala, Punyanagar.	Summer: Tube rose, Dopati, Aparajita (clitoria Tematea) Winter: Tuberose Marygold.	75	70
	Bagnan	Heledwip, Orphully, Dharmonna, Deulti.	Summer: Bel, Jasmin rose, Tuberose. Winter: Tuberose Rose, Marygold.	25	25
3. Haora			Winter: Tuberose	37	325
			Rose, Marygold.		
4. 24-Parganas Uttar &	Gaighata, Habra, Bhangan, Sonarpur Baruipur	Ichhapur, Thakurnagar, Suntia, Shimulpur, Kachua, Chandamari, Rajapur, Patharghata.	Summer: Tuberose Dopati, Aparajita Hibiscus (Rosesinesus) Tuberose, Marygold.	125	3125
			Winter: Tuberose	20	23
			Summer: Tuberose		
			Winter: Tuberose		
			Summer: Tuberose		
5. Darjiling	Darjiling & Kalimpong.		Agapanthus, Lily Snapdragon, Carnation, Zinia		N.A.
				Total: 670.50	374.175

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

Climatic conditions of Horticultural crops

Name of the horticultural products	Storage Temp. in °C	Relative humidity in %	Approx. storage storage life
Apple, Apricot	-1° C - 4° C	85-90	Apple 4-8 weeks
Cherries, Grapes			Cherry - 2 weeks
Melon, Plum,	4-6 weeks.
Pomegranate, Sapota, Litchi, Berries.			
Banana Green	18° - 20°	80 - 85	1 to 2 weeks
Ripe	15° - 17°	85 - 99	3 weeks
Mango	7° - 10°	85 - 90	4-7 weeks.
Orange	5° - 10°	85 - 90	6-12 weeks.
Papaya, Lime	10° - 15°	80 - 85	Papaya 1-2 weeks Lime 3-6 "
Cabbage, Lettuce			
Celary, Onion,	1° - 1°	80 - 85	3-6 weeks.
Carrot, Beet			
Garden Peas			
Potato	4° - 7°	75 - 85.	
Cut-flowers except orchid and gladiolus	1° - 2°	80	
Capsicum, Squash			
Pumpkin, Sweet	13° - 18°	70 - 75	
Potato flowering bulbs			

Source : Fundamentals of Horticulture by Edomend etc.

Season, Major production areas and products of fruit crops

Fruits/growing season	Estimate of Total annual production ('000 M.Ton)	Major production Areas	Some products
1. Mango May to July	180 - 408 (180 in off year)	Malda, Murshidabad, Nadia, Hugli, 24- Parganas.	Pickle, Chutney, Jam, Jell., Juice, Squash, Pulp Slice, Bar.
2. Pineapple (April to Nov.) (Main season July to August.)	180 - 200	Siliguri P.S., Chopra P.S., Islampur P.S.	Squash, Ring, Bar, Joice, Jam, Jelly, Tooti-Fruity.
3. Banana Throughout the year (main season in Sep.to Dec.)	170 - 180	Hugli, Dakshin 24- Parganas, Nadia, Murshidabad.	Flake, finger, dried powder chip.
4. Papaya (Throughout the year)	125 - 130	Hugli, Uttar/Dakshin 24 Parganas, Nadia, Murshidabad.	Papain, Tooti-fruity, mixed fruit, Jam etc.
5. Mandarin orange Dec.-January	17 - 20	Darjeeling	Squash, Jam, Marmalade, Juice, Candy from Peel, Peel oil etc..
6. Guava July to Sept.	40 - 45	Dakshin 24 Parganas, Murshidabad.	Jelly, Squash, Flake, Cheese.

7. Jackfruit July to August	40 - 45	Jalpaiguri, Coochbihar	Pickle, can flake, nectar, pectin from rind.
8. Litchi (May)	12 - 15	Murshidabad, Malda, Dakshin 24 Parganas.	Can, Squash, dried (nut)
9. Other misc. fruits(Bacl, Karamcha etc.) April to June.	70 - 80	Throughout the State,	Powder, preserve, drink.
10. Cashewnut (June.)	2.2 - 2.4	Medinipur East	Nut roasted, Shell liquid, cashew, apple drink.
11. Coconut (Throughout the year).	1800 - 2000	Uttar 24 Parganas, Medinipur East.	Oil, Coirbased industry, bottled drink.
12. Sapota May/June.	7 - 8	Dakshin 24 Parganas	Preserve.

N.B. Production range based on past 2-3 years estimate.

(xii)

Season, major production areas and products of vegetables

Crops/ growing crops.	Estimate of total Annual production(in '000 t)	Major production area	Some products
1. Potato January to April.	4200 - 4500	Hugli, Barddhaman.	Powder, mashed potato, chips, Alcohol.
2. Tomato January to March.	200 - 250	Uttar 24 Parganas, Dakshin 24 Parganas, Nadia.	Sauce, Ketchup, Paste puree, juice.
3. Cabbage (September)		Uttar 24-Parganas, Nadia Murshidaba, Hugli, Barddhaman.	
4. Cauliflower Nov. to Mar.	300 - 325	-do-	Pickling.
5. Raddish (Oct. - Feb.)	200 - 250	-do-	-do-
6. Carrot Oct.-Feb.	12 - 15	-do-	-do-
7. Cucumber January-July.	200 - 220	-do-	-do-
8. Pea January - March.	12 - 15	Nadia, Hugli, Uttar 24 Parganas.	Can, dehydration.
9. Brinjal Throughout the year.	850-900	Hugli, Barddhaman	Pickling.

Contd.....

10. Onion	200 - 220	Hugli, Barddhaman	Pickling, Dehydration.
March to April.			
11. Lady's finger	200 - 250	Uttar 24 Parganas, Dakshin	Pickling.
April to Sept.		24 Parganas, Nadia, Murshidabad, Hugli, Barddhaman.	
12. Bitter Gourd	250 - 300	-do-	-do-
April to Sept.			
13. French bean	-do-	Uttar 24 Parganas, Dakshin	Can
January to March.		24 Parganas.	
14. Spinach	-do-	-do-	Can
October to March.			
15. Watermelon	70 - 90	Medinipur (East), Dakshin	Drink
March to May.		24 Parganas, Uttar 24- Parganas.	

N.B. : Production range based on past 2 to 3 years estimate.

Fruits and Vegetables preservation centres of West Bengal

1. 24, Convent Road, Calcutta
2. P.93, Lake Road, Calcutta
3. 2, Manmath Datta Road, Calcutta
4. U.B.I. Building, Station Road, Barasat, 24 Parganas
5. Rishi Bankim Nagar, Baruipur, 24 Parganas (S)
6. Swarnamoyee Pukur, Krishnanagar, Nadia
7. 68, Ukilabad Road, Baharampur, Murshidabad
8. Tamalipara Road, Chuchura, Hugli
9. Haora, P.O. & District - Haora
10. Sarkar Villa, Kalibazar, Barddhaman
11. G 41, 1st Street, Sashtri Avenue, Bidhan Nagar, Durgapur
12. Ghoradhara, Jhargram, Medinipur
13. Bankura, P.O. & Dist. Bankura
14. Puruliya, P.O. & Dist. Puruliya
15. Rabindranath Thakur Road, Suri, Birbhum
16. Manaskamana Road, P.O. & Dist. Maldah
17. Balurghat, P.O. & Dist. Balurghat, West Dinajpur
18. Dey Bhavan, Bidhan Road, Siliguri, Darjiling
19. Kshetri Building, A.C.Mistri Road, P.O. Kalimpong, Darjiling
20. Byangchatra Road, P.O. & Dist. Koch Bihar
21. Jalpaiguri, P.O. & Dist. Jalpaiguri.

Source: Department of Agriculture Marketing,
Govt. of West Bengal.

Yield rate of Horticultural crops

Fruits	Y E A R					Mean
	1989	1990	1991	1992	1993	
1. Mango	421	959	435	815	392	604.4
2. Banana	46	48	69	83	58	60.8
3. Pineapple	404	2250	2250	NA	NA	1634.7
4. Mandarin						
Orange	Nil	Nil	81	81	366	176.0
5. Guava	45	45	454	409	795	349.6
6. Papaya	740	756	893	1148	957	898.9
7. Jackfruit	276	526	401	426	414	408.6
8. Litchi	504	641	504	605	656	582.0
9. Sapota						
(Chikoo)	11	14	20	20	20	17.0
10. Temperate	51	61	51	52	44	51.8

FLOWER

Area (ha)	Summer Season	YR	Mean value	Winter Season	YR	YR/Sq.
1. Medinipur 37500 ha (37.5)	1,25,500	3346	172750	220,000	5866	
2. Nadia 17500 ha (17.5)	7,000	400	8750	10,600	600	
3. Haora 6250 ha (62.5)	2,500	40	2875	3,250	52	
4. 24-Parganas 3250 ha Uttar & Dakhin(32.5)	3,125	96	2702	2,300	70	

Vegetables	1989	1990	1991	1992	1993
1. Brinjal	5744	1979	5642	4751	5691
2. Lady's finger	2484	1720	3344	1911	1720
3. Cabbage	4374	5832	11664	6926	11664
4. Cauliflower	6251	1868	3736	3269	3736
5. Tomato	4972	7458	17403	9945	14917
6. Radish	-	140	-	-	-
7. Onion	1970	2787	3252	2434	1858
8. Cucumber	2140	1990	2488	3981	3732
9. Watermelon	9.2	-	-	1408	-
10. Pumpkin	1286	1103	1345	1588	1845
11. Other					
Gourds	2732	2468	4874	2644	5288
12. Sweet					
Potato	2398	-	2284	2284	2741
13. Carrot	805	575	920	805	920
14. Pea	-	2363	3940	-	4727

Prices in Rs. '000 as on the months of June and September

Sl.No.	Name of the Crop	Area (in 1000 ha)	Average annual production ('000 tons)	JUNE				SEPTEMBER						
				1989	1990	1991	1992	1993	1989	1990	1991	1992	1993	
1.	Mango	54.56	408	22970	52346	23786	44472	21420	-	-	-	-	-	-
2.	Banana	14.60	168	672	705	1008	1226	856	655	890	672	1243	688	688
3.	Pineapple	8.76	219	3547	19710	19710	-	-	8212	7117	-	-	-	-
4.	Mandarin Orange	2.09	17	-	-	170	170	765	-	-	178	170	-	-
5.	Guava	4.51	41	205	205	2050	1845	3587	155	82	2173	1976	1517	1517
6.	Papaya	5.21	133	3857	3990	4655	5985	4987	3657	3325	5652	6118	4987	4987
7.	Jackfruit	7.97	40	2200	4200	3200	3400	3300	-	-	-	-	-	-
8.	Litchi	3.17	16	1600	2032	1600	1920	2080	-	-	-	-	-	-
9.	Sapota	1.37	8	16	20	28	28	28	-	20	28	25	24	24
10.	Temperate and other fruits	6.78	39	351	417	351	358	302	206	222	780	331	319	319
<u>Total :</u>		109.02	1089	35518	83625	56558	59404	37325	12885	11656	9983	9863	7535	7535

(xix)

Price in Rs. '000 as on the months of June and September

Sl. No.	Name of the Crop	Area (in 1000 ha)	Average annual production in '000 tons	JUNE					SEPTEMBER					
				1989	1990	1991	1992	1993	1989	1990	1991	1992	1993	
1.	Brinjal	88.4	875	48125	17500	49875	42000	50312	3750	49 75	39375	61250	72187	
2.	Lady's finger	47.1	225	11700	8100	15750	9000	8100	3750	10125	13500	9900	11700	
3.	Cabbage	35.8	522	15660	20880	41760	24795	41760	20880	20880	28183	23490	31320	
4.	Cauliflower	33.4	312	20880	6240	12480	10920	12480	10920	6300	9360	10920	15600	
5.	Tomato	18.1	225	9000	13500	31500	18000	27000	16875	13500	14242	16875	27000	
6.	Raddish	24.0	225	-	337	-	-	-	337	405	562	450	562	
7.	Onion	22.6	210	4452	6300	7350	5502	4200	5775	9975	11550	5775	13650	
8.	Cucumber	21.1	210	4515	4200	5250	8400	7875	4830	6930	8400	9030	6300	
9.	Watermelon	12.5	80	1216	-	-	1760	-	-	-	-	-	-	
10.	Pumpkin	37.4	275	4812	4125	5032	5940	6902	3987	4675	7232	6050	9075	
11.	Other Gourds	31.2	275	8525	7700	15207	8250	16500	6875	7425	15565	11687	15207	
12.	Sweet Potato	19.7	225	4725	-	4500	4500	5400	-	-	8100	-	-	
13.	Carrot	1.13	13	910	650	1040	910	1040	780	845	2080	1300	1560	
14.	Pea	3.3	13	-	780	1300	-	1560	-	-	1602	2600	-	
Total:				395.73	3685	134520	90312	191044	139977	183129	12159	130935	159756	204161

Moving AverageTable No. 5.14

Prices in Rs.'000 as on the months of June and September
for the years 1989, 1990, 1991, 1992 and 1993

YEAR	FRUITS		VEGETABLES	
	June	September	June	September
1989	35102	12885	134520	121759
1990	83625	11656	90312	130935
1991	56558	9483	191044	159756
1992	59404	9863	139977	159327
1993	37325	7535	183129	204161

B. FRUITS

1989	June	-	35102	23993.5	
	September		12885		---- 36124.25
1990	June		83625	47640.5	47947.75
	September		11656	34107	40873.75
1991	June		56558	33020.5	33563.75
	September		9483	34443.5	33732

Contd...

1992	June	59404		34538.5
			34633.5	
	September	9863		29113.75
			23594	
1993	June	37325		23012
			22430	
	September	7535		
C. <u>VEGETABLES</u>				
1989	June	134520		
			128139.5	
	September	121759		117080.5
			106035.5	
1990	June	90302		108329.5
			110623.5	
	September	130935		135806.5
			160989.5	
1991	June	191044		168194.5
			175400.5	
	September	159756		162633.5
			149866.5	
1992	June	139977		149749.2
			149652	
	September	159327		235266
			171228	
	June	183129		182436.5
			193645	
	September	204161		

September

Fruits	1989	1990	1991	1992	1993
1. Banana	44	61	46	85	47
2. Pineapple	937	812	-	-	-
3. Mandarin Orange	-	-	85	81	-
4. Guava	34	18	481	438	336
5. Papaya	701	638	1084	1174	957
6. Sapota	-	14	20	18	17
7. Temperate & Other fruits	30	32	115	48	47

Vegetables	1989	1990	1991	1992	1993
1.Brinjal	4949	5642	4454	6928	8166
2.Lady's finger	1433	2149	2866	2102	2484
3.Cabbage	5832	5832	7874	6561	8748
4.Cauliflower	3269	1886	2802	3269	4670
5.Tomato	14971	7458	7868	9323	14917
6.Raddish	14041	16875	23416	18750	23416
7.Onion	2555	4413	5110	2555	6039
8.Cucumber	2289	3284	3981	4279	2985
9.Pumpkin	1066	1250	1933	1617	2426
10.Other gourds	2203	238	4989	3746	4874
11.Sweet potato	-	-	4111	-	-
14.Pea	-	-	4854	7879	-

Processed Fruit & Vegetable products produced in West BengalDuring 1990 - '92

Sl.No.	Gr. No.	1990		1991		1992	
		Qty. in '000 kg.	Value in Rs. '000	Qty. in '000 kg.	Value in Rs. '000	Qty. in '000 kg.	Value in Rs. '000
1.	Canned & fruits	163.5	8621.7	566.4	8737.3	707.9	13744.8
2.	Canned Vegetable	695.	8104.5	251.1	3945.4	559.1	9527.9
3.	Jams, jellies & marmalades	1732.3	26667.6	956.6	17143.4	509.0	11990.1
4.	Fruit juice	949.6	6178.3	894.6	7154.6	267.2	2780.8
5.	Fruit pulps	464.3	3700.1	93.7	804.9	503.2	3970.3
6.	Squashes, crushes cordials	343.9	4593.7	365.6	5479.1	261.7	3498.6
7.	Fruit Syrup	6.4	121.1	-	-	20.2	421.9
8.	Fruit Nectar	4.4	92.5	-	-	-	-
9.	RTS Fruit Beverages	3647.2	27784.2	6499.1	62716.5	8807.9	93543.9
10.	Fruit Chutney	2001.9	21217.4	1816.2	18602.3	144.6	18728.1
11.	Pickles	345.6	7601.1	310.1	7161.1	294.4	7606.1
12.	Mango slices in brine	561.2	1678.3	333.2	730.0	37.1	200.6
13.	Preserves	0.2	4.4	0.2	3.3	0.2	4.5
14.	Candied, crystalized fruits & Peels	170.4	1700.1	268.9	3371.9	353.0	4022.9
15.	Tomato Products	313.5	4589.1	211.7	3369.5	229.3	3710.0
16.	Sauces (other than tomato)	934.3	10487.0	940.4	11893.9	921.3	11831.9
17.	Soups (other than tomato)	0.5	7.6	-	-	-	-

Contd.....

18.	Synthetic jellies	80.4	1769	43.4	956.4	60.5	1601.6
19.	Synthetic syrups	165.8	3763.5	274.8	5574.9	277.1	6906.7
20.	Brewed vinegar	3.4	48.3	3.4	44.1	3.3	56.1
21.	Synthetic vinegar	146.2	1114.5	161.1	1243.6	161.7	1383.8
22.	Sweetened aerated water	17125.3	125591.5	20260.0	166473.9	22199.3	177373.4

Grand total of all products	30365.5	265435.9		34257.3	32540.8		37616.9	365925.6
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Total of fruit based products	12848.0	133196.6		13518.1	151157.1		14920.5	185660.2
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Total of synthetic products	392.3	6647.8		479.3	7774.8		498.3	9892.1
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Total of fruit products	13240.3	139844.4		13997.3	158931.9		-15419.7	195552.2
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Processed Fruits and Vegetables Product Group

<u>Group Code</u>	<u>Products</u>
A	: Canned bottled Fruits & Vegetables
B	: Jams/Jellies/Marmalades
C	: Fruit Juice/Pulp/Nector
D	: Squashes/Cordials/Sy p/Sharbat
E	: RTS Fruit Beverages
F	: Chutneys
G	: Pickles
H	: Preserves/Candied & Crystallised Fruits & Peels
I	: Tomato Products
J	: Sauce/Ketchup
K	: Vinegar
L	: Mango slices in Brine
M	: Acrated water
N	: Soups

CATEGORY UNDER E.P.O. RULES & REGULATIONS

Large Scale = Annual Production above M.T.

Small Scale B = Annual Production upto 250 M.T.

Small Scale A = " " " 100 M.T.

Cottage Scale = " " " 50 M.T.

Home Scale B = " " " 10 M.T.