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CHAPTER I

INTRODUCTION

1 THE PLACE OF AGRICULTURE IN INDIAN ECONOMY

INTRODUCTION :

Agriculture forms the backbone of the Indian economy and despite concerted effort towards industrialisation for about four decades agriculture still continues to occupy a place of pride. Being the largest 'industry' in the country, agriculture is a source of livelihood for over 70 percent of the population in the country. In India, it is not only the main source of livelihood but also a tradition and the most common way of life. It provides food, raw materials and employment opportunity to a very large portion of the population. Through exporting agricultural commodities India earns valuable foreign exchange which can be used for importing capital, technical knowhow etc. which can assist in the establishment of industry and infrastructural facilities. In India the development of industrial sector depends upon the development of agricultural sector, and vice-versa.

In a nutshell, agriculture has a dominant role in the Indian economy contributing nearly 36.68 percent (1984-85) of the national income providing employment to about 70 percent of the working population and accounting for a sizable share of the country's foreign exchange earnings. Agriculture

provides the food grains to feed the large population and fodder for an equally large cattle population. So the very economic structure of India, largely rests upon agriculture.

The significance of agriculture in the national economy can be best explained by taking the role of agriculture under different heads.

a) Share of agriculture in the National Income :

Agriculture is the most important sector of Indian economy, contributing nearly half of the national income. Figures supplied by the National Income Committee and the Central Statistical Organisation show clearly that agriculture and allied occupations (viz. animal husbandry, forestry etc.) contributed 52 percent of the national income in 1960-61 and 44 percent in 1976-77. Though Agriculture has been the mainstay of Indian economy, its share in national income has been declining steadily. The contribution of agriculture to the national income has varied from 65 percent in 1914 - 18 to 36 percent in 1984-85.

TABLE 1.1

CONTRIBUTION OF AGRICULTURE TO THE NATIONAL INCOME

Year	Percentage	Year	Percentage
1914 - 18	65.00	1960 - 61	51.2
1925 - 29	57.00	1970 - 71	50.6
1930 - 31	53.00	1980 - 81	42.00
1948 - 49	49.00	1984 - 85	36.86
1950 - 51	56.1		

Source : Tyagi B.P. : Agricultural Economics and Rural Development, Jai-prakash Nath and Co., Meerut

(U.P.), 1987, p.3, quoted from the Report of National Commission on Agriculture and Economic Survey.

The above analysis reveal that the increase in the size of the national output is still substantially dependent upon the performance of agriculture.

As against Indian agricultural contribution to the national income, the proportion in U.K. is only 3.1 percent, U.S.A. 3.2 percent, Canada 5 percent, France 6 percent and Japan 8.7 percent. The obvious general conclusion is that the more developed country, the smaller is the contribution of agriculture to national output.

b) Agriculture as a source of livelihood :

Agriculture has proved to be the main source, direct or indirect, of livelihood for the majority of the population in India. It dominates the country's economy to such an extent that 72.05 percent of the working population is dependent on agriculture, where as in developed countries this ratio is very small, being only 3.1 percent in U.K., 3.2 percent in U.S.A., 5 percent in Canada, 6 percent in France, 8.7 percent in Japan (Table 1.2). This high proportion in agriculture in India is due to the fact that alternative non-agricultural activities have not been developed to absorb the rapidly growing population in the country. This is an indication of the fact that a high proportion of working population is engaged in agriculture only in developing countries.

TABLE 1.2

DISTRIBUTION OF AGRICULTURE LABOUR FORCE AS PERCENTAGE TO TOTAL WORK FORCE

Year	Cultivators	Agricultural labour	Livestock forestry, fishery, plantation	Total Agricultural workforce	Non agricultural workforce
1951	50.00	19.7	2.4	72.1	27.9
1961	52.8	16.7	2.3	71.8	28.2
1971	43.4	26.3	2.4	72.1	27.9
1981	43.9	24.8	2.9	71.6	28.4
1984 to 1985	43.00	24.00	3.5	70.5	29.5

Source : Ibid, P.4, quoted from the Report of the National Commission on Agriculture.

On the basis of the above figures, agriculture provides employment at large level. If we see this in other countries it is very small, U.K. 50 percent, USA 5 percent, Austrelia 16 percent, France 14 percent, Japan 21 percent and USSR 32 percent.

c) Role of Agriculture in the field of International Trade :

Agriculture provides a large proportion of India's traditional exports (Table 1.3). Roughly, agricultural exports contributed about 50 percent to total export earnings, manufactures with agricultural contents, about 20 percent - making the total to 70 percent of the India's total exports.

The chief items of exports being tea, coffee, cashewnuts, spices, tobacco raw hides and skins, raw jute, raw cotton, sugar, jute and cotton, textiles, leather goods, oilcakes, vegetable, oils, nuts, lac, gum etc.

TABLE 1.3

THE SHARE OF AGRICULTURAL EXPORT TO TOTAL EXPORTS

Year	Export of selected Agricultural commodities in crores	Total export from India in crores	Percentage of Agri. export to total export
1965 - 66	33,490	80,556	41.6
1970 - 71	56,490	1,52,439	37.1
1973 - 74	1,00,675	2,51,834	40.0
1974 - 75	1,40,146	3,32,331	42.2
1975 - 76	1,68,546	4,02,592	41.9
1976 - 77	1,75,828	4,96,783	35.4
1980 - 81	-	-	34.00
1984 - 85	-	-	32.00

Source : Sharma A.N. : Economic structure of Indian Agriculture, Himalaya Publishing house 1984, Table 20.6, p. 496, quoted from the Indian Agriculture in Brief, 18th edition, p. 155.

It is clear from the above table, that the share of agricultural export has been decreasing in recent years. It is because of an increase in the internal demand, inadiquate production due to bad weather conditions etc. Still agriculture play an important role in the country's total export.

d) Importance of Agriculture for Industrial Development :

Agriculture has been the source of raw materials to India's leading industries, cotton and jute textiles, sugar, tobacco, edible and non-edible oils, leather, plantation industries all these depend on agriculture directly. Besides many others like processing and preservation of fruits and vegetables, dal milling, rice husking, gur making, oil crushing and handloom weaving also draw on agriculture for their raw material requirements. According to the United Nations Survey, in 1958, the industries with raw materials of agricultural origin accounted for 50 percent of the value added and 64 percent of all jobs in the industrial sector.

e) Increased purchasing power of the entire population :

Agriculture helps to increase the purchasing power not only of those who are engaged directly in agriculture but also of those who are engaged in industrial and tertiary sectors. According to Ashok Thaper, 'when farmers earn more, then they also spend more. In this process they create new markets and new opportunities for hundreds of blacksmiths, carpenters, masons, weavers, potters, leather workers, dhobis, tailors, cotton ginners, oil pressers, dyers, transporters, petty caterers and countless others.'[1]

f) Agriculture is the main support for transport :

Agriculture is the main support for the railways and roadways, which transport bulk of agricultural produce from the farm to the mandies, factories and the markets. Internal

trade is also enhanced by agricultural products. Besides the finances of the Government also depend to an extent, upon the prosperity of agriculture.

g) Agriculture provides fodder for livestock and poultry :

Agriculture also provides fodder for livestock (Rs.35.33 crores) and poultry (Rs.11.5 crores). Cattle, buffaloes and hens provide protective food in the form of milk, eggs and meat. They also provide drought power for farm operations and of commercial products like wool and hides.

h) The prosperity of the entire economy depends on the prosperity of agriculture :

It may be said that agriculture is the backbone of Indian economy and prosperity of agriculture can also largely be responsible for the prosperity of the entire Indian economy. Economic historians generally concur that there are no cases of successful development of a major country in which a rise in agricultural productivity did not precede or accompany industrial development. The Rostow stages-theory of growth has historically observed that agriculture plays a distinct but multiple and converging role in the transitional process of the 'take off into self sustained growth.' The operation of planned development in India over the last 38 years bears witness of this fact.

CONCLUSION :

It may, thus, be observed that agriculture occupies a major place in the dualistic set-up of the national economy. Its development operation has snow-ball effects over the whole of the economy. It constitutes the most important constraint on the process of growth because it conditions and determines the over-all rate of growth of the economy by supplying food for the population, by supplying some basic raw materials for expansion at certain consumer goods industries, by enlarging the demand for industrial output through an increase in agricultural income and through extending the capacity to absorb the monetory flow of industrial investments, by employing a large pool of labour-force and by raising foreign exchange earnings through export. It is unfortunate that Indian agriculture continues to be backword having multidiversional facets.

2 HORTICULTURE A TYPE OF FARMING :

MEANING OF HORTICULTURE :

Horticulture is concerned with those plants whose cultivation brings rewards, whether monetary profits or personal pleasure, sufficient to warrant the expenditure of incentive effort. This art which entails judicious timing and many skills has an ancient tradition. But modern horticulture involves the integration of many natural phenomena with man-made effects and so is a scientific discipline in its own right.[2]

The origins of horticulture are intimately associated with the history of mankind. The term horticulture is probably of relatively recent origin and first appears in writings in the 17th century. The word is derived from the Latin hortus, garden, and colere, to cultivate. The concept of the culture of gardens - as being distinct from the culture of fields, that is, agriculture - is a medieval concept, indicative of the practices of that period. Agriculture now refers broadly to the technology of raising plants and animals. Horticulture in its present concept is that part of plant agriculture concerned with so called 'garden crops' as contrasted with agronomy.[3]

Horticulture deals with an enormous number of plants. Garden crops traditionally include fruits and vegetables, all the plants grown for ornamental purposes, as well as spices and medicinals. Many horticultural products are utilized in the living state and are thus highly perishable, water is a necessary constituent of quality. In contrast, the usable products of agronomic and forest crops are often utilized in the non living state and are usually high in dry matter. Custom has delineated the boundary-line for some crops, for example, tobacco and, in some locations, potatoes are considered agronomic crops in the United States. In the main, however, horticulture deals with crops that are intensively cultivated, that is, plants that are of high enough value to warrant a large input of capital, labour and technology per unit area of land.[4]

'Horticulture is the branch of agriculture concerned with intensively cultured plants directly used by man for food, for medicinal purposes, or for esthetic gratification.'[5]

'Horticulture is the cultivation of fruits, vegetables and ornamental plants.'[6]

Horticulture is an ancient art, and many of its practices have been empirically derived. However, modern horticulture, as agriculture has become intimately associated with science, which has served not only to provide the methods and resources to explain the art, but has become the guiding force for its improvement and refinement. Horticulture will never become wholly a science nor is this particularly desirable. Its curious mixture of science, technology and esthetics makes horticulture a refreshing descipline that has continually absorbed man's interest and challenged his ingenuity. The science of horticulture nevertheless remains the dynamic influence in the proper use and understanding of the horticultural art.

The art or practice of horticulture is an applied plant science as distinguished from the pure plant science of botany. In addition to horticulture the applied sciences include agronomy and forestry. These applied sciences are distinguished from each other by one or more of the following factors :

i) intensiveness of production

ii) purpose for which a crop is grown

and

iii) custom.

Since horticulture is the cultivation of fruits, vegetables and ornamental plants, the purpose for which horticultural crops are grown is two-fold, for human food or for a esthetic value. Thus the boundaries of horticulture cannot be specifically established by definition. However, the borderline examples help to emphasize the relationship of horticulture to other plant sciences of agriculture.

THE CLASSIFICATION OF HORTICULTURE OR TYPES OF HORTICULTURE :

A classification is only temporary structure, which not only can but must undergo changes in accordance with the growth of factual knowledge.

There are many diverse species of plants include in horticulture. It is only natural that there be a classification, a division of interests and specialization among those engaged in the field. Many of the divisions of horticulture are further subdivided where certain crops or groups of crops are of general commercial significance.

Since ancient times man has named and categorised the many plants that surround him and upon which he is dependent for his very existance. One can readily surmise that his earliest classifications simply divided plants into the harmful

ones and the useful ones. Additionally he probably divided the plants according to their uses. Such classifications thus met the need of arranging what must have been an otherwise bewildering array of objects. Practical systems are of course, perfectly valid provided they are logically concieved, consistant and, therefore, capable of predictive use.

(1) POMOLOGY :

Fruit growing branch is known as Pomology. It includes the culture of apples and pears, stone fruits, citrus fruits, nuts, grapes, the various berry crops and miscellaneous temperature, subtropical and tropical fruits. The tree fruits represent a longterm investment because if the time required to grow trees to bearing age. In case of fruit growing orchardists must be keenly aware of the ravages of insects, diseases and inclement weather and take the necessary precautions for producting high quality crops. Grape and berry crops are shorter term investments. They are adaptable for both fresh market and processing.[7]

(2) OLERICULTURE :

Vegetable production is the another important kind of horticulture and it is a large commercial industry and a very popular home and farm enterprise. Certain crops in areas of favourable soil and climate have been developed into large commercial enterprises. Large scale production with good shipping and refrigeration facilities have brought the produce to distance market in good condition. Market gardeners in

local production hear metropolitan areas have felt the competition of the more distant production areas. Vegetable growing is a pastime for many people.[8]

(3) ORNAMENTAL HORTICULTURE :

It includes the culture and use of many hundreds of species of plants. Subdivisions are based on types of culture in the various grouping.

Floriculture :

It is an art of growing, setting, designing and arranging flowers. Flowers are in demand throughout the year. The local flowrist may grow flowers himself or have them shipped from other areas. There are many hobyists in floriculture. Trees and shrubs are important ornamentals for homes, farmsteads, parks, public building, avenues and recreation areas. Turf grasses receive considerable attention as ornamental plantings.[9]

(4) LAND SCAPING :

Land scaping is receiving increased attention from both the home owner and home builder. This phase of horticulture consists of planning and arrangement of home grounds and farmsteads, public areas and business establishments. It involves not only the use of and placement of horticultural plants but also placement of buildings, walks drives forces, service areas, recreation areas and other part of the landscape.[10]

Nursery production provides a commercial source of plants used in the home, orchard, and garden. Wholesale nurseries produce tremendous quantities of trees, shrubs, flowering plants, fruit plants or vegetables. Seed production is a vital part of vegetable and flower growing. Some retail and mail order nurseries are also in the seen business. Processing and storage of horticultural crops have effected tremendous changes in the eating habits of people throughout the world within the period of single generation.[11]

Often superimposed on the practical systems of classification are those based upon growth habit or other gross physiological characteristics. Another classification of obvious importance to the horticulturists is based on life span and divides plants into annuals, biennials and perennials. Plants can also be variously classified according to their temperature tolerances. Plants are some times also classified according to their temperature requirements during the growing season.[12]

Plants in horticulture are either herbaceous or woody. Herbaceous stems are softer, more succulent, and less fibrous than are woddy stems. Lilies and tamatoes are herbaceous, Liliac and pines are woody.

Some plants complete their life cycle seed-plant-seed, during a single season. These are annuals. Other plants require two years to complete their life cycle and are called biennials. They grow during one season, store their

manufactured food, and produce seeds the following year. The long lived plants, those living more than two years, are perennials. Annuals and biennials are usually herbaceous Perennials may be woody or herbaceous.

Woody plants may be either evergreens or deciduous. The evergreen retains living leaves at all times. It loses its leaves gradually, never at all one time and forms new leaves before the old ones are lost. A deciduous plant is without leaves during the winter in temperature climates or during the dry season in tropical climates.

Some horticultural terms, are difficult to define but are so common place they require no definition. These include such terms as tree, shrub and vine. Other terms have slightly different meanings from the botanical description or definition and so require delineation.

FRUITS :

To the botanist, a fruit is simply a ripened ovary. To the horticulturist, from common usage of the term, a fruit is the fleshy, edible product of a woody or perennial plant which in its development is closely associated with a flower. Thus we can readily see how the range from the apple or orange to the strawberry or pineapple is allin inclusive.

(I) Fruits borne on woody plants :

A) Tree fruits : (1) Deciduous :

(a) Pome : Apple, pear, quince.

(b) Drupe (Stone fruits) : Peach, plum, apricot, cherry.

2) Evergreens :

a) Citrus : Orange, grape fruit, tangerine, lemon, lime.

b) Palm : Date, coconut.

c) Avocado

d) Papaya

B) Small fruits :

1) Grape
2) Brambles : Rasberry, Blackberry, Boysenberry.
3) Blueberry and cranberry.
4) Currant and gooseberry.

(II) Fruits borne on herbaceous perennial plants :

A) Prostrate growth:

Strawberry (also considered a small fruit)

B) Upright growth

Banana, pineapple.

Fruits may also be grouped according to climatic adaptability as temperature, sub-tropical and tropical.

VEGETABLES :

The group of plants known as vegetables includes many diverse types, and the lines of delineation are not clearcut. In general a vegetable is the edible product of a herbaceous garden plant. Overlap or lack of a clearcut delineation between fruits and vegetables is similar to combinations or dual characteristics in other pursuits.

Vegetables can be grouped according to length of life-cycle as annuals, biennials, and perennials. They can be classified as cool or warm season types. Sometimes vegetables are described by edible portion of the plant. They are frequently placed in categories of similar characters because of the similarity of culture within the group. Such a classification follows -

Root crops :

Carrot, beet, rutabaga, turnip, radish, parsnip, sweet potato.

Bulb crops :

Onion, garlic, shallot

Tuber crops :

White potato, jerusalem, artichoke.

Vine crops :

Cucumber, pumpkin, squash, cantaloupe, watermelon.

Cole crops :

Cabbage, broccoli, cauliflower, Brussel's sprouts, kale, kohlrabi.

Greens :

Spinach, chard, chicory, mustard.

Salad crops :

lettuce, celery, cress, endive, Chinese cabbage.

Perennial vegetables :

Asparagus, rhubarb, horse-radish.

Solanaceous fruits :

Tomato, pepper, eggplant, husktomato.

Pod crops :

Bean, pea, okra.

Corn :

Sweet-corn, popcorn.

ORNAMENTALS :

By the very wide usage of the term, ornamental plants, one would expect a great many kinds and types. A fairly complete nursery catalogue shows this to be true. If the nursery catalogue is well illustrated it is a good means of becoming acquainted with ornamentals.

(I) Woody ornamental plants :

A) Trees :

1) Deciduous : Elm, oak, linden, ash, beech, birch willow, poplar larch.

2) Evergreen :

a) Narrow-leafed : Pine, fir, hemlock, cedar, spruce.

b) Broad-leafed : Citrus, holly.

B) Shrubs :

1) Deciduous : Spirea, lilac, honeysuckle, mock orange, barberry, privet.

2) Evergreen :

a) Narrow-leafed : Spreading junipers, arbor vitae, Mugho pine.

b) Broad-leafed : Boxwood, rhododendron, gardenia.

C) Vines :

1) Deciduous : Clematis, bittersweet, virginia creeper.

2) Evergreen : Winter creeper, Baltic English ivy.

(II) Herbaceous ornamental plants :

A) Perennials :

1) For flowers : Peony, lily, tulip, delphinium, phlox, geranium.

2) For foliage : Coleus, peperomia, sanseveria, the lawn grasses

B) Biennials :

Hollyhock, foxglove, canterburry bells.

C) Annuals :

Marigold, zinnia, petunia, alyssum, nasturtium.

Ornamentals are also classed according to use such as bedding, border, shade, screening, specimen, etc. Other criteria for grouping include hardiness, response to day length, and light intensity requirements.

MISCELLANEOUS PLANTS :

Herbs, spices, drugs (dill, nutmeg, spearmint, quinine, digitals).

Beverage plants, nonalcoholic (coffee, tea, cacao, mate).

Oil yielding plants - tung, sunflower.

Rubber plants - Pararubber tree

Plants yielding gums or resins : sweet gum, slash pine.

Christmas trees - balsam fir, scotch pine.

Each of these divisions of horticulture can be a science, an art, a business, or an industry in itself. They all have characteristics which fit into the meaning of horticulture. The field of horticulture is complex, often highly specialised and yet it is within the realm of every citizen to participate in one or more of the horticulture activities so omnipresent in everyday life.

IMPORTANCE OF HORTICULTURE :

In the economy of the wrold and within each nation, horticulture is a basic industry. It is an important source of the food supply of the world. Production, processing and marketing of horticulture crops provide gainful occupations for many citizens of the world. Horticultural crops enter interestate commerce and world trade as fresh fruits, vegetables and ornamental plants. Even greater quantities of fruits and vegetables are shipped in a processed form.

With intensive production the low percentage of cropland in horticulture provides a large portion of the food supply. This feature of horticultural crops, high production per unit of land, offers promise for the future for expanding populations. Arid and semiarid areas which have been developed for irrigation have become important horticulturally. Irrigation is usually costly to install and operate, thus, most operators turn to intensive production which is characteristic of horticultural crops.[13]

Horticulture is extremely important in our daily living in a case of nutrition. Nutritionists have discovered basic facts concerning the relationship of our health and the foods, we eat. Today we are a much better fed people than were ancestors. Fruits and vegetables play a vital role in satisfying the nutritive requirement of the humanbody. The banana nd date are among the few fruits high in carbohydrates.

Minerals are not needed in large quantity but green vegetables supply mineral for our health and diet. Most vegetables and fruits are sources of one or more of the vitamins or vitamin-complexes needed for good health. In many instance of vitamin in efficiency fruits and green leafly vegetables have not been part of the diet. If people eat adequate amounts and variety of fruits and vegetables there is rarely need for vitamin pills as a supplement to the regular diet. In case of proteins and fats, horticultural foods are not generally considered high in either protein or fat except nut crops.[14]

Trends in food consumption are influenced by the public interest in modern nutrition, the capacity of the human stomach, and the kind of work that people do. Many people have become aware of the vitamin value of fresh fruits and vegetables and tend to shift their eating habits accordingly. This increase in per capita consumption must thus reflect a decrease in other foods. Those affected have been the high energy food such as potatoes and sweet potatoes. In an age of technology, where much labour is done by machine, the 'human machine' needs less of the fuel supplyong foods. Thus with an increased consumption of salad crops we have a decreased use of high carbohydrate, high energy, vegetables on a per capita basis. As more of our work is done by machine as leisure time increase, and as the nature of our work changes people become more caloric conscious. It is reflected in eating habits. The problem of obesity can often be corrected by judicious use of fruits and vegetables.[15]

Horticulture become a part of our homes. Throughout history beauty has played an important role in the development of cities, homes, country sides, architecture, the fine arts, music, personalities. We have it with us today in ever increasing importance in its broad aspects. Beauty can be considered one of the major industries of the world. Exclusive of any mandeveloped versions, beauty occurs abundently in nature. The horticulturist combines these beauties of nature with artistic beauty to enhance the overall beauty of our

homes to make them more pleasent places in which to live. Plants of diverse types are used to provide a setting for the house or farmstead. They are further used to blend the man-made structures with their surroundings.[16]

Much of our planning is for convenience. In our work, in our play, in our various routines, we like to be efficient. Efficiency goes hand in hand with convenience. Convenience for maintanance and upkeep of lawns, hedges, fruit trees, drives, walks, buildings etc. is an important part of home development.

Horticulture is an integral part of our homes as a means of comfort and relaxation. After long hours in the sun, when the day's work is done, shade trees and an inviting lawn are conducive to quiet solitude in summer's heat. General health and happiness of the family are major objectives and results of a good horticultural programme for the home. In addition nutrition from fresh fruits and vegetables the home ground also provide exercise through work and play, all of which may be conducive to good health.[17]

Horticulture is also an important part of the home when considering monetory values. Homegrounds that are well planned attractive and functional are appealing to the eye. Good horticultural practice increases the real estate value of homes and farms. Many people's first impressions are frequently based on the appearance of the home or farmstead.

It is difficult to ascertain the precise position of any large and diverse industry in our economy. This is particularly true of horticulture, which involves not only the many facets of production, but the added increments of processing service and maintanance. The replacement of large tree and shrubs is usually economically prohibitive and is often horticulturally impossible.

In areas of low rainfall horticultural crops would play a major role in times to come. Plantation of fruit crops in those areas where jhum cultivation is in vogue could prove immensely helpful in ameliorating not only the socio-economic status of the people but the ecosystem.[18]

Fruits play a unique role in developing countries like India, both in economic and social sphere for improving income and nutritional status, particularly of rural masses. Along with these, orchards help in maintaining ecological balance. Further horticulture, being a labour intensive crop, production of these commodities should be encouraged in a labour abundant and capital scarce country like ours.[19]

Given the terrian and agro-climate, features, horticulture is the only vocation through which higher income per unit of land can be generated. Fruit forming helps in profitable utilisation of areas not so well suited for growing creals and other field crops and in soil conservation

as well. Fruit cultivation allows optimum utilisation of the gift of nature in making it possible to upgrade inferior fruit trees into superior ones by top working and by adopting other techniques of vegetative propogation.[20]

Given suitable combination fruit farming can even be taken as a complementory occupation in such areas to set of other business. propositions.

According to Sargent, 'In premitive stages of agricultural development, agriculture remains the main occupation of the people. In the transitional stage of economic development agriculture carried immenic burden in the drive for economic growth. However, during maturing phase the main emphasis still remains on the maintanance of balanced role for agriculture, but horticulture became more important.[21]

The productivity of dry land is low and unstable due to soil degradation and uneven distribution of rainfall. There is a large scope to develop horticultural crops in the dry land for maximising and stabilising farm income.

HISTORY OF HORTICULTURE :

The history of horticulture starts from a long time. Men began to plant crops, in order to supplement the wild-seeds, roots, and fruits. They would naturally choose the annuals and only at a later stage, with the development of

more permanent abodes, would trees find a place in premitive agriculture. But very little is definitely known about the very early history of agriculture.

History begins in the development of the great centres of civilization, India, China and tropical America, people concentrate only where agriculture has been developed. Casson (1939) says that agriculture started at Sumeria (Present day Iraq). In about 3,500 B.C., when grains like wheat, barley and fruits like pomegranates (one of the worlds earliest cultivated fruits) constituted the earliest crops at that time. This is brought out clearly in gold jewelery and ornaments of Sumerian Kings. By one religious record this dates back to 7000 B.C. and spread throughout the mediterrian world. The date achived importance in Egypt in the third millennium B.C.

There is also reference to the peach and almond in an Egyption manuscript of about 1300 B.C. The first extensive references to fruits in the mediterrianean region are in the writings of the Greeks and Romans. Homer (962-927 B.C.) refers in his Odyssey to the apple, pear, pomegranate, fig and olive. Xenophon and Theophrastus (Father of Botany) made important contributions to horticultural literature in Greece in fourth century B.C. Cato (239-149 B.C.) and Varro (116-28 B.C.) wrote works on agriculture specially in horticulture crop Grape.[22]

Fruits played a prominent role or part in the life of the ancient hebrews. Reference to the Grape, the fig and olive abound in the old Testament, including those parts written more than 1000 years B.C. The Chinese have been among the world's best gardeners for many centuries and have developed a number of excellent fruits. In China a Treatise on the litchi written in 1054 A.D. is said to be the first book in the world dealing only with fruit growing.

In tropical America horticulture developed much latter than in Europe and Asia. Although this region has produced a number of valuable fruits including the avocado, guava, papaya and custard apples.

In India fortunately great wealth of material is available about horticulture. But it is in Sanskrit writing. In Sanskrit literature written before the Christan era, there seems to be little mention of fruit. The Arthashastra, believed to have been written in the fourth century B.C. refers to land suitable for grapes. Two early Sanskrit medical works of great importance, the Charaka, Samitha and and Susruta Samhita, mention large number of medicinal plants, including some fruits. Among the fruits, aonla, bael, bullock's heart, citron, wild date, wild fig, grape, hog, plum, jack fruit, jambolan, two species of ber, karanda, khirni, lemon, lime, mango, monkey jack, mulberry, sweet and sour oranges, paniala, phalsa, plantain, pomegranate and wood apple, walnut, almond pistachio, chiraunji and coconut were in cultivation.

Also in Puranas many fruits are mentioned. The Matsya Purana added some other fruits - fig, rose apple, breadfruit, jackfruit, The Sukra Niti, written in 16th Century mentions in addition to other fruits two types of dates, one of which may be the cultivated species.

Independent testimony had been introduced by Yuan Chwang (Hiuen Tsiang or Huan Tsan) (Beal 1884, Walters 1904), a Chinese Buddhist pilgrim who was in India from A.D. 629 to 645, By their record mango, tamarind, ber, wood apple, aonla, ficus glomerata, plantain, coconut, jackfruit, pomegranate, pears, plums, grapes were in cultivation at that time.

The next contribution to the history of pomology in India is that of the Emporor Babar. His record is very accurate. His comments are also important, i.e. about Mango 'Such mangoes as are good and excellent. Many are eatan but few are good of their kind. It is the best fruit of Hindustan.'[23] Also he mentioned about Pomegranates that the Indian pomegranate was better than that of Afghan. This is also in Ain-I-Akbaari written about 1590 A.D., giving further detailed information.

Several European visitors collected records about Indian horticulture Eden 1577, Macro Polo, Bracciolini 1857, Watt 1908, John Huyghrn Van Linscehoten (Bunell and Tiele 1885).

So India has a great history of Horticulture.