CHAPTER-1

INTRODUCTION
INTRODUCTION

Agriculture in India is a way of life rather than a business. For centuries, it has shaped the thought, the outlook, the culture and the economic life of the people. Being a predominant sector of Indian Economy, Agriculture continues to be at central place of all strategies for planned socio-economic development of the country. Rapid growth of this sector is essential not only to achieve self-reliance at national level but also for household food security and to bring about equity in distribution of income and wealth resulting in rapid reduction in poverty. Horticulture involving cultivation of fruits and vegetables, medicinal and ornamental plants, floriculture, preservation and processing of produce etc., is a major player of agricultural sector.

India is endowed with varied agro-climatic conditions, which offers immense scope for the cultivation of various kinds of horticultural crops. This provides an excellent platform for the country to emerge as a leading producer of horticultural crops. Horticulture has proved its credibility in improving the resources productivity, generating gainful employment, improving the socio-economic conditions of farmers and other entrepreneurs, enhancing exports and above all, providing nutritional security to the people. Diversification and value addition are proving to be the key to harness the potential of Indian horticulture. However, there are many challenges to face viz., arrangement of assured irrigation facilities, making quality inputs available in time, generating resources, creating
infrastructural facilities required for improved cultivation and post harvest technologies and giving priority to exports.

Vegetables as a major constituent of horticultural crops have been established as an important nutritive component of the daily human diet. Their nutritional values as a vital source of micronutrients viz., provitamin A, vitamin C, B₆, E as well as folic acid, iron and magnesium has been well recognized. In addition to these, vegetables also supply fair amounts of carbohydrate, protein and energy. Further more, they also provide many nutritionally less defined, yet important components of our diet, such as fibre and antioxidants. Also consumption of vegetables prevents certain types of cancer, cardiovascular diseases and various aging problems of human body. Thus, vegetable production systems in the tropical and developing countries can be considered "Anthropomorphic" (Richter, 1995)¹ because its production is determined by large population demands. In this country nearly 70 per cent of total vegetable production is consumed by urban and semi urban people. Further, the major consumers of vegetables are the families of middle income group, in addition to the upper stratum of the society.

Vegetable would not replace food grains to solve the problem of feeding teaming millions as well as to meet the calorie needs, but rather supplement them, as the role of increase in grain production on which most people depend for their calories, have slowed. Under such circumstances vegetable crops that are equally

or more efficient in producing dry matter and at the same time providing more minerals and vitamins can definitely be utilized as an alternative towards achieving the goals of nutritional security. Moreover, in India vegetables are considered cash crops and can play an important role in improving economic status of small and marginal farmers. Short and medium duration crops as they start yielding in short time, fit well in the normal cropping system as filler or mixed/inter crops. If the small farmers in the tropics and sub-tropics grow high yielding varieties resistant to pests, diseases and stresses, many of production constraints can automatically be overcome.

**Demand Projection:**

The physiological requirement of various nutrients for human beings of different age and sex groups varies. Expert committees of different countries examine the available information on nutrient requirement and national food habits and arrive which is normally called Recommended Dietary Allowances (RDA). RDA is given for different groups viz., adults, infants, children, pregnant and lactating women. The international organizations like FAO and WHO undertake this exercise on a global scale. The Nutritional Advisory Group first recommended the diatary allowances for Indians in 1944. Since then, revisions were made after every ten years in 1958, 1968 and 1978. In the year 1988, an expert group constituted by the ICMR considered the revision of nutrient allowances for Indian people. As per latest estimate the average minimum
recommended level of vegetables consumption including tuber for a healthy Indian should be 280 grams. Realistic total demand for vegetables of the country Paroda and Kumar (1999) has been estimated at 84 m. tones. On the same grounds the demand for the year 2015 has been projected at 123-151 m. tones and for the year 2030 at 151-193 m. tones.

Table 1.1: Estimated Area and Production of major vegetable crops in India.

A = Area (million hectare)
P = Production (million tones)

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>P</td>
<td>A</td>
<td>P</td>
</tr>
<tr>
<td>Brinjal</td>
<td>0.48</td>
<td>7.74</td>
<td>0.49</td>
<td>7.88</td>
</tr>
<tr>
<td>Cabbage</td>
<td>0.23</td>
<td>5.32</td>
<td>0.24</td>
<td>5.62</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>0.25</td>
<td>4.47</td>
<td>0.25</td>
<td>4.69</td>
</tr>
<tr>
<td>Okra</td>
<td>0.32</td>
<td>3.21</td>
<td>0.33</td>
<td>3.38</td>
</tr>
<tr>
<td>Onion</td>
<td>0.34</td>
<td>3.14</td>
<td>0.48</td>
<td>5.47</td>
</tr>
<tr>
<td>Pea</td>
<td>0.27</td>
<td>2.42</td>
<td>0.28</td>
<td>2.70</td>
</tr>
<tr>
<td>Potato</td>
<td>1.21</td>
<td>17.65</td>
<td>1.28</td>
<td>22.49</td>
</tr>
<tr>
<td>Tomato</td>
<td>0.41</td>
<td>6.18</td>
<td>0.47</td>
<td>8.27</td>
</tr>
<tr>
<td>Others</td>
<td>0.60</td>
<td>22.60</td>
<td>0.59</td>
<td>27.03</td>
</tr>
<tr>
<td>Total</td>
<td>4.11</td>
<td>72.73</td>
<td>4.41</td>
<td>87.53</td>
</tr>
</tbody>
</table>

* provisional.

Table 1.1 reveals that area under some of the major vegetable crops viz., brinjal, cabbage, cauliflower, tomato and pea seems to much an stagnation level with very negligible variation while that under okra, onion, potato and other vegetables still increases. On the other hand total output depicts an increasing
trend. With almost 13 per cent of world's vegetable output India occupies first position in production of pea and cauliflower; second in onion, cabbage, tomato and brinjal; and fourth rank in potato. Chillies dominate with a share of 32 per cent in total production of spices in India.

**Current scenario:**

In the past four decades, vegetable production increased from 23.45 million tonnes (1961-65) to 39.99 million tonnes in 1986. According to the latest estimate of the National Horticultural Board, total area under vegetables during the year 1997-98 was 5.60 million hectares and the domestic production stood at 72.83 million tonnes.

India is one of the largest vegetable producer countries in the world. During the year 1998-99 it was the highest producer, next only to China with an annual production of 87.53 million tonnes, including, potato production of 22.49 million tonnes (Economic survey - 2002). However, this production still does not meet our recommended dietary requirements of 280 gm per capita per day. Thus, there is a need to locate the weakness and make necessary arrangements for enhancing the domestic production and thus meet the targeted per capita supply of 280 gm of vegetables per day to our burgeoning population, on sustainable basis.

According to the latest estimate of Indian Economic Survey 2002, total area under vegetables during the year 1999-2000 was 5.99 million hectares and the domestic production stood at 90.83 million tones. The provisional estimate of total
area under vegetables during the year 2000-2001 was 6.24 million hectares and the domestic production stood at 9.80 million tones.

**Seasonality of production:**

Agricultural production by virtue of its nature is a biological process which upto a great extent is affected by the weather, soil type, topography, texture etc. Though we have made great strides on the front of production technology but seasonality in production still is an inseparable characteristics of agricultural production. Vegetable crops, like its other counterparts also depict such character. It gives rise to uneven distribution of the supply of most of the green and fresh vegetables throughout the year which in turn causes fluctuation in prices. To arrest the price fluctuations and translate it into the form of remunerative for producers and reasonable for the consumers as well as to ensure the supply of fresh vegetables throughout the year it is necessary to encourage the production of off season vegetables in the country.

The off-season crops are always vulnerable to seasonal fluctuations and technology support is necessary by way of producing suitable varieties and crop protection against diseases and pests. Another area is the problem soils with high salt concentrations which have to be properly reclaimed and suitable varieties carrying tolerance have to be developed. It is therefore necessary to think in terms of development of varieties tolerant to abiotic stress condition like semi-arid conditions.
Hybrid Technology:

Hybrid varieties in vegetable crops in India heralded a new era of vegetable production with the first release of tomato hybrid (Karnataka) and capsicum hybrid (Bharat) to the farmers way back in 1973 by a Bangalore based seed company. This has brought about a new awaking among them and consequently the vegetable seed industry, especially in private sector, has attained higher technological capabilities. Similarly, from the late Eighties imported varieties of cabbage are grown in Karnataka, Maharashtra, West Bengal and Tamil Nadu. Hybrid varieties of all vegetable crops are not uniformly economical to the same extent as in tomato. In cabbage, cauliflower, capasicum, okra and chillies, they are very remunerative. In low value crops like brinjal, gourds, melons and cucumber they only moderately economical.

The current status of adoption of hybrid technology among the eight vegetable crops listed can be seen in Tables 1.2. Tomato, cabbage and cauliflower top the list covering an area slightly above 30 per cent. There has been a steady increase in hybrid coverage in brinjal, okra and chillies. Among all these, imported hybrid are exclusively grown (more than 90 per cent) in cabbage.
Table 1.2: Estimated share of hybrid vegetable crops (1997-98).

<table>
<thead>
<tr>
<th>Crop</th>
<th>Total area (hect.)</th>
<th>Area under F₁ (hect.)</th>
<th>Share of the hybrid (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brinjal</td>
<td>4,79,095</td>
<td>85,300</td>
<td>17.80</td>
</tr>
<tr>
<td>Cabbage</td>
<td>2,42,150</td>
<td>76,000</td>
<td>31.39</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>3,04,156</td>
<td>10,000</td>
<td>30.29</td>
</tr>
<tr>
<td>Chillies</td>
<td>5,73,529</td>
<td>14,000</td>
<td>2.44</td>
</tr>
<tr>
<td>Gourds</td>
<td>4,09,270</td>
<td>10,000</td>
<td>2.44</td>
</tr>
<tr>
<td>Melons</td>
<td>1,69,150</td>
<td>6,000</td>
<td>4.02</td>
</tr>
<tr>
<td>Okra</td>
<td>3,71,665</td>
<td>20,000</td>
<td>5.38</td>
</tr>
<tr>
<td>Tomato</td>
<td>4,85,520</td>
<td>1,53,000</td>
<td>31.51</td>
</tr>
</tbody>
</table>


Plant biotechnologies are now available for achieving quality improvements in different crops. In advanced countries, a number of examples are available where transgenic varieties suitable for processing have been developed. Brusi resistant tomatoes, tomatoes with delayed ripening characteristics and tomatoes with higher sucrose and reduced starch content are now available. Higher starch content in potato, dwarf lettuce for individual serving size and broccoli with slow ripening and longer staying (green) capacity have been evolved.

Researches in plant biotechnology are gathering momentum and new research projects, specifically for improving quality characteristics in vegetable crops need to be initiated. These technologies are no doubt much expensive and new generations of improved varieties of vegetable crops with upgraded quality parameters have to be one of the important goals of vegetable improvement in this century.
Post Harvest Technology:

It is long felt that a lot more attention to be given to post-harvest management of vegetables. The post harvest operations consist of handling, storage, transportation and processing of vegetables. An improvement has to be brought about in these so that the post harvest losses, which erode the margin and pushes up consumer prices may be minimized. There is a considerable gap between the gross production and net availability due to heavy post-harvest losses. Taking the loss rate as about 30 per cent (worth over Rs. 3,000 crores) the net availability would be only 50 million tonnes out of 72 million tonnes (1997-98), with the anticipated growth rates in production the total loss will increase simultaneously. In addition, processing i.e. quality addition as well as preservation of vegetables to enhance their longevity and maintain freshness is also gaining desired momentum, now a days. It is only the operation through which most of the vegetables and fruits are made available in the market throughout the year. The Indian Economic Survey reports 37 per cent post harvest loss in the year 2000-2001.

Proper packaging with pre-cooling system to remove field heat of the produce is the basic step and the introduction of palletisation and containerization would reduce the losses in handling and transportation. The most important component is the management of temperature during storage with emphasis on low cooling system based on evaporative cooling. Further, faster and careful
transportation will greatly mitigate the losses. Keeping in view the increasing production of vegetables, the system of "coal chain" - which consist of precooling units at farm sites refrigerated transportation, cold storage and refrigerated retail outlets has become necessary to maintain sustainable supply and for reducing the huge post harvest losses. This system integrates production with marketing services.

Marketing of vegetables

Marketing of agricultural produce is as critical to better performance as farming itself. Inefficient marketing system become a stumbling block to increase agriculture production Agricultural marketing envisages performances of all business activities involved in moving of agricultural product from producers to consumers through storage (time utility), transportation (place utility), processing (form utility) and transferring ownership (possession utility) at various levels in the markets by purchase and sale. The marketing infrastructure (facilities) and services are means for effective performance of marketing functions. The marketing facilities provide basic ground for performance of marketing function, for determination of marketing channels and for behaviour of marketing firms. While marketing infrastructure and physical facilities constitute hardware elements, the operational technology, coordination and market administration are software’s of marketing improvement programme. In India, the development of
Agricultural marketing network mainly revolved around setting up and expanding physical markets and facilities involving supporting services.

Marketing of vegetables, upto a large extent, is different from marketing of other agricultural commodities because of their high perishability, concentration of trade in a few hands and a large number of un-organised and scattered producers. The produce has to be handled carefully during transportation, assembling and packaging. The post harvest losses during these operations mainly depend upon the nature of producers and distance between consuming and producing units.

Vegetable marketing issues can be decomposed into three sub-groups i.e. problems, analysis and policy implication. The marketing problems may relate to either structure or efficiency which gives rise to concentration of marketing power in few hands charging excessive margins resulting to wrong price signals. Distribution of marketing power is associated with market structure, conduct and performance. Vegetable marketing analysis may be divided into three categories (i) The application of structure, conduct and performance analysis, (ii) The analysis of marketing margins and (iii) The analysis of supply and demand relations and the explanation for price movements over time and space. Finally a series of marketing policy initiatives stems from (i) Price controls, (ii) The formation of producer marketing groups and boards, (iii) Taking various initiatives aiming at improving marketing efficiency.
Introduction

The practical problems faced by vegetable growers in their marketing are associated by high degree of its perishability, bulkiness, existence of large number of middlemen in their trade etc. Vegetables are generally grown by the small and marginal farmers most of which are illiterate. It accumulates into poor adoption of modern technologies both in production as well as in marketing, low quantity of marketable surplus as well as poses them to be cheated in the market. The middlemen manipulate the situation by offering low prices to the growers under the pretext of low demand and falsely rejecting the produce as sub-standard. In addition, the cultivation of vegetables is area specific because of the unevenness due to climatic conditions, which give rise to uneven distribution of supply of a particular vegetable over space.

The level of profitability of the vegetable crops depends upon the ways and methods of marketing adopted by the farmers. Time of sale, price and agency through which they are sold are some of the factors which influence the net receipt of the farmers. High transport and packing costs, overwhelming number of intermediaries, existence of malpractices and undue charges reduce the producers share in the price paid by consumers. These are the points of great concern, which need to be corrected to improve in the marketing efficiency of vegetable growers.

Organised marketing of vegetables is almost absent in the country. Consequently, fluctuation in daily prices and a large margin between the wholesale and retail prices has become a regular feature. The large margins are
meant to cover risks of loss due to perishability of the produce accentuated by the very weak post-harvest infrastructure.

To overcome problems of marketing most of the agricultural markets in the country have been brought under Agricultural Produce Marketing (Regulations) Act. Unfortunately the act does not cover all the vegetables. Only onion and potato (the semi-perishable) are covered under this market legislation. The market fees, weighing practices, labour charges for the green and leafy vegetables are not regulated till the date. So far no grading in the real sense is in operation. It is only at the retail level that these are sorted out depending upon variety, size, colour, shape etc. This does not in any way help the primary producer. Most of the wholesale markets built decades ago are congested and lack physical facilities.

However, India has about 4,000 regulated markets for fruits and vegetables, most of which are in urban and semi-urban areas and using almost primitive methods. These function under the agencies guided by Agricultural Produce Marketing Act. Any attempt to introduce organised marketing using modernized systems at the wholesale level will have to be done under the purview of the act in the face of stiff opposition of the vested interests. Subramanyam (1983) observed that 70 to 90 per cent vegetables are mostly disposed off through commission agents. The marketing cost varies from 17 to 21 per cent of the

market price in vegetables, which includes commission at the rate of 7 to 10 per cent of the market value of the produce, which is quite high.

This can be avoided to a large extent if the marketing is undertaken by the farmers organization specially co-operatives or production is taken up under a contract farming system which is gradually becoming popular, particularly for exports and processing (Kaul, 1997). At present there are 12 state/central level co-operative societies and 275 farming/marketing societies directly engaged in this activity which are handling only 4 to 5 per cent of the total production. The turnover of these co-operatives amounted to Rs. 362.10 crores, Rs. 437.90 crores and Rs. 471.60 crores in three consecutive years 1993, 1994 and 1995, respectively. There is no exclusive federation of fruits and vegetable-co-operative at the national level for marketing of horticultural produces. This work is being undertaken by the National Agricultural Co-operative Marketing Federation of India (NAEED) in collaboration with State federation and primary marketing societies.

Agricultural marketing policy vision for 2020 envisages;

♦ Ensuring food and nutritional security.

♦ Increasing efficiency of existing marketing system through professional management scientific operation/handling of agricultural produce.

♦ Creation of necessary infra-structure for value addition at rural level.

♦ Development of cool chain/cold storage facilities for perishables.

1 Kaul (1997) "Horticulture in India-Production marketing and processing" Indian Journal of Agricultural Economics Vol. 52(3), pp. 561-573
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♦ Shortening of marketing channel. Promoting direct marketing, thereby restructuring cost and margin and achieving vertical integration between producer and final consumers.

♦ Development of rural periodic markets in the country numbering nearby 28,000 for increased market access to producers.

♦ Upgradation / improvement of wholesale markets, handling food grains, fruit and vegetables, floriculture, livestock, fisheries etc.

♦ Modernization of mega markets/ developing specialized physical markets, for promotion of exports, facilitating bulk buying of required standards.

♦ Strengthening/ improvement in retail market chain to safeguard consumers interests.

♦ Expanding domestic quality assurance viz., grading network to ensure purity and quality of edible products consumed by common man in daily life, from local markets. The grading base of MFPO products would also be widened.

♦ Strengthening marketing extension with special emphasis on production planning, standardization, healthy hygienic and environment friendly package of practices right from farmer to the consumer.

♦ Promotion of rural storage with pledge finance facilities for ensuring minimum support price benefits to the small and marginal farmers.

♦ Easy accessibility to institutional credit to meet marketing needs.

♦ Promotion of group marketing to secure price benefits based on market intelligence information.

♦ Development if facilities for quick transport and communication system for inter market linkages.
Practical and Scientific utility of the study

Agricultural development presupposes an increase in agricultural production per unit of land. Judging from the point of view of production theory, there are two alternative means of achieving this. In the first instance, it can be possible through technological changes involving improvement in the quality and methods of use of input and in second, it may be possible through reallocation of resources among relatively more productive crop enterprises, even if there is no change in technology.

In context of the above, inclusion of high value cash crops like vegetables in the crop rotation would increase the income and employment of the framers. Also the increased vegetable production, in the area, would expand the scope for processing, packaging and transport service which in turn may strengthen the infrastructural amenities in the area. Further more, specific conclusions drawn through this study, besides augmenting to the existing store of knowledge, would be helpful for state in making policy decisions regarding increase in farm and off-farm income and employment in the rural areas and check the socio-economic evils.

OBJECTIVES:

The continuous increase in human population and increasing emphasis on sustainable development in farming sector necessitate the demand for development of farming technology and marketing infrastructure for all crops including fruits and vegetables. Many studies have been conducted on economics of production and marketing of vegetable crops. Most of the references which may have a direct or indirect bearing with the study have come across, mainly from
Himachal Pradesh and hill region of Uttar Pradesh. However, no systematic study with regard to economics of production and marketing of vegetables have been reported from the rest of the zones of Uttar Pradesh specifically from planes. The present study is an effort to put forth the real sketch of vegetables economy of the plane region of the state of Uttar Pradesh in general and the district of Azamgarh in particular. Specific objectives of the study are:

1. to examine the proportion and place of vegetables in existing cropping pattern on the sample farms;

2. to estimate the cost and returns in cultivation of selected vegetables;

3. to work out the marketing cost and producers share in consumers rupee and analyse the price spread of selected vegetables for different marketing channels to measure the efficiency of vegetable marketing;

4. to study the effect of variation in consumers prices on the share of producer sellers; and

5. to suggest the policy measures, emerging from the observation and findings of the study, for increasing the income and employment through vegetable cultivation in the area under study.

The study would provide an insight into the working of vegetable production and marketing which would be helpful to producers and traders, market authorities and policy makers in their decisions related to production, marketing, organization and policy.