

Rural Production & Livelihood Systems

Essay: Vegetable Growing: Status, Future, and Issues



Post Graduate Programme in Rural Management

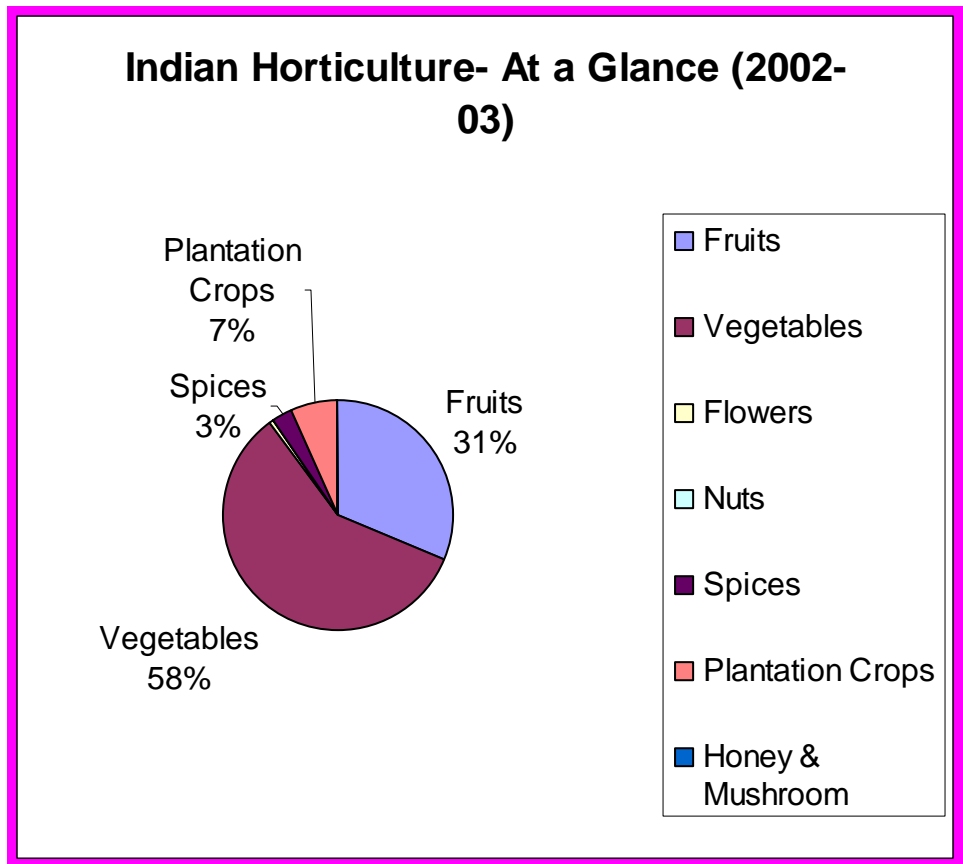
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Vegetable Growing: Status, Future, and Issues

Vegetables are so common in human diet that a meal without a vegetable is supposed to be incomplete in any part of the world. India is the second largest producer of vegetables in the world, next to China. These are grown in about 6 million hectares forming 3% of the total cropped area. Though the vegetable requirement is 300g/day/person as recommended by dietician, we are able to meet about 1/9th of that requirement only [1]. A good number of vegetables in India are an introduction from foreign countries. Therefore, a planned development in the field of vegetable production will not only improve the nutritional requirement for masses but can also meet the challenge of adequate food supply to the growing population in India. The limited cultivable area can be best utilised for growing vegetables which are known to give higher yields per unit area. Vegetable growing being labour intensive can substantially increase employment avenues too. Our country is gifted with a wide range of agro-climatic conditions which enables the production of vegetables throughout the year in one part of the country or the other and then maintaining a continuous supply of fresh vegetables. These off season vegetables are in great demand in home market as well as in the neighbouring Gulf countries.



(Source: Department of Agriculture & Cooperation, Ministry of Agriculture)

In India, about 40 vegetable crops of varying significance are grown. For convenience, these vegetables may be classified into three categories, namely: **Underground Vegetables, Herbage Vegetables and Fruit Vegetables.**

Underground Vegetables: In these vegetables, the food is stored in underground parts. The underground vegetables may be classified into two parts: roots and underground stems, i.e. - solanum tuberosum (Sweet potato), Yams, Beta Vulgaris (Beet root), Daucus Carota (Carrot) etc.

Herbage Vegetables: They have the nutrient material stored in parts of the plant found above ground, i.e. - Spinach, Cabbage, Lettuce, Cauliflower etc.

Fruit Vegetables: The edible portion of this group is the fruit and hence called the fruit vegetables. It includes Tomato, Lolanum Melongena (Brinjal), Pepper, Chilli, Okra, Melons and Gourds [2].

In recent years, keen interest has developed in vegetable cultivation on large farms that are distantly placed from consuming centres. Various varieties of vegetables have been released in the recent past both for table and processing purposes. Judicious soil-water-fertilizer-vegetable crop management techniques have been developed. Vegetable crop calendars involving adjustment of new varieties in different cropping patterns have been formulated. Transplanting techniques of cucurbits for early and increased production and seed-plot-technique for producing virus-free seed of potato in the plains of north India have been developed. Thus, new advances in technology in this sector are leading to an increase in vegetable production in the country.

STATUS

India is the second largest producer of vegetables in the world (ranks next to China) and accounts for about 15% of the world's production of vegetables. The current production level is over 90 MT and the total area under vegetable cultivation is around 6.2 million hectares which is about 3% of the total area under cultivation in the country. Potato, tomato, onion, cabbage and cauliflower account for around 60% of the total vegetable production in the country. Vegetables including root and tuber crops occupy an important place in diversification of agriculture and have played pivotal role in food and nutritional security of ever growing population of our country. In India, about 40 kinds of vegetables belonging to different groups are being cultivated. These include solanaceous, cucurbitaceous, leguminous, cruciferous (Cole crops), root crops and leafy vegetables. Major vegetable crops grown in the country are tomato, onion, brinjal, cabbage, cauliflower, okra and peas. Significant achievements have been obtained in terms of production, which has increased to 93.9 million tones during 2000-01 from 58.5 million tones during 1991-92.

Potato is most widely grown vegetable crop in the country with a domestic consumption of 23889336MT and an export of 40341MT for the year 2002 [3]. Uttar Pradesh is the leading potato growing state in the country followed by West Bengal

and Bihar. **Tomato** occupies second position amongst the vegetable crops in terms of production. The domestic consumption of tomatoes is 7409054MT and the export for the same being 13588MT in the year 2002. Andhra Pradesh is the largest grower of tomato. The other main tomato growing states are Bihar, Karnataka, Maharashtra and Orissa. **Brinjal** occupies the third position amongst vegetable crops. West Bengal is the largest producer of brinjal followed by Maharashtra and Bihar. The other main state growing brinjal Karnataka, Maharashtra, Gujarat, Andhra Pradesh, Assam and Madhya Pradesh. **Cabbage** is the fourth most widely grown vegetable crop of our country. India is the leading country producing Cabbage. West Bengal is the largest grower of the cabbage. Orissa and Bihar occupies second and third position respectively. The other major growers of cabbage are Assam, Karnataka, Maharashtra and Gujarat. The other important vegetable crops grown in the country are onion, chillies, peas, beans, okra, cabbage, cauliflower, pumpkin, bottlegourd, cucumber, watermelon, palak, methi, carrot and radish [4].

ROLES OF INDIAN COUNCIL OF AGRICULTURE RESEARCH

ICAR acts as a repository of information and provides consultancy on agriculture, horticulture, resource management, animal sciences, agricultural engineering, fisheries, agricultural extension, agricultural education, home science and agricultural communication. It has the mandates to co-ordinate agricultural research and development programmes and develop linkages at national and international level with related organizations to enhance the quality of life of the farming community.

ICAR has established various research centers in order to meet the agricultural research and education needs of the country. It is actively pursuing human resource development in the field of agricultural sciences by setting up numerous agricultural universities spanning the entire country. The Technology Intervention Programmes also form an integral part of ICAR's agenda which establishes Krishi Vigyan Kendras (KVKs) responsible for training, research and demonstration of improved technologies.

ROLES OF MINISTRY OF AGRICULTURE- GOVT. OF INDIA

The Department of Agriculture and Cooperation is responsible for the formulation and implementation of National policies and programmes aimed at achieving rapid agricultural growth through optimum utilization of the country's land, water, soil and plant resources.

The Department undertakes all possible measures to ensure timely and adequate supply of inputs and services such as fertilizers, seeds, pesticides, agricultural implements and also to provide agricultural credit, crop insurance and ensure remunerative returns to the farmer for his agricultural produce.

The Department is entrusted with the responsibility for collection and maintenance of a wide range of statistical and economic data relating to agriculture, required for development planning, organizing agricultural census, assisting and advising the States in undertaking scarcity relief measures and in management of natural calamities e.g. flood, drought, cyclone, etc.

The Department is responsible for the formulation of overall cooperative policy in the country, matters relating to national cooperative organizations, cooperative training and education. The Department also participates in activities of international organizations, for fostering bilateral cooperation in agricultural and allied sectors and for promotion of export in agricultural commodities [6].

ROLE OF ITC

ITC has finalized an ambitious investment plan of nearly Rs 1,000 crore to power its aggressive IT initiative in agriculture marketing business. Over the next 5-7 years, the company plans to connect a sixth of India's estimated six lakh villages in 14 states and bring them under its agriculture portal, e-choupal.

“Though it is difficult to quantify the actual investment that will be required, it takes about Rs 1-3 lakh to set up an e-choupal,” said Y C Deveshwar, chairman of ITC. The company currently spends around Rs 100 crore annually in areas of software, hardware and IT-enabled services.

Deveshwar projected e-choupal as the perfect example of the use of IT as a strategic tool for value creation and rural empowerment. “The initiative will help develop a trade marketing and distribution super highway for farm produce of the country and benefit lakhs of farmers who are currently at the mercy of the intermediaries,” he added.

The purpose of the e-choupal is to empower farmers with real time information on weather and prices so that they are prepared to face the ever-changing climate conditions and price fluctuations at the local mandis, he added.

ITC started with six e-choupals in 2000 and currently has 1,200 e-choupals linking 6,500 villages. In order to realize its dream, ITC would have to open four e-choupals every day over the next few years.

At present, ITC operates aqua-choupals in Andhra Pradesh, coffee-choupals in Karnataka, soya-choupals in Madhya Pradesh and wheat-choupals in Uttar Pradesh. It is also in talks with the West Bengal government to set up aqua choupals in that state.

FUTURE

With the advancement in technology and the adoption of new techniques conducive to different soil and climate types, the vegetable production in the country is poised for growth in the foreseeable future. Some of the techniques that can be adopted for increasing the yield per hectare are discussed below:

Vegetables require specific temperature, photoperiod and soil type for growth. In the case of tropical states where seasonal temperatures do not fluctuate too much, production of vegetables is not difficult and the availability of vegetables remains for longer periods. But in the case of northern hills and adjoining plains where snowfall and cold waves prevail and during summers the temperature goes very high, the growth period for each crop is much reduced. Herein lays the scope for vegetable forcing. The purpose of forcing is to grow vegetables out of their normal season by means of protection. There are major advantages to be derived from this: more income per unit area as there will be higher demand and availability of particular vegetables for longer periods [5]. Growing vegetables out of their normal season

depends primarily on two factors: expenditure on cultivation and the demand in the market. Although adjoining states may also be growing a particular vegetable due to its normal season there at a given time, they would be costly due to expenditure on transport and the loss of freshness due to the time taken in transportation.

In Punjab, due to extreme temperature variations over the year, the production period is very limited. Therefore, the scope of vegetable forcing is high. It is paying to increase the period of crop growth and to get crops in off-season by employing technology. A few important techniques are discussed here:

Choose right variety: There are early, main and late season varieties of various vegetables. Choose the right variety according to the climate and time of the year. For example, radish can be produced throughout the year by growing the appropriate variety according to season. Similarly, cauliflower season can run from June-July to February-March. Brinjal, cucurbits, okra (bhindi), etc., can be grown more than once a year.

Protection: Vegetables are produced in plastic tunnels, cold beds, hot frames, glasshouses or plastic houses. A tomato nursery is sown in the last week of October and transplanted in the first week of December and protected with *sarkanda* till the risk of frost is over. In this way we can get an early tomato crop. Similarly, tomato and chili nurseries are grown under polythene sheets during winter. During the day the sheets are removed and put back at night. These nurseries are ready to transplant in February, when the risk of frost is over. This gives an early crop.

The off-season technique of vegetable production is, therefore, advantageous to the farmer from both profit and diversification points of view. Adoption of high yielding cultivars, hybrids and disease and pest resistant varieties and a sound seed production programme with suitable production programme with suitable production technologies have largely contributed to higher production and productivity. A scheme on Integrated Development of Vegetables including root and tuber crops is being implemented in the country. The major focus is on replacement of old cultivars with improved high yielding varieties, dissemination of latest improved technology on production and post harvest management through demonstration, training and visits,

mechanization, popularization of on-farm Zero Energy Cool Chambers, handling and market intelligence.

Fruits and vegetables would continue to be harvested manually in the future. While small land holdings and non-availability of good quality planting material have been the major issues of concern, it is expected that quality of planting material would improve in the long run due to selection, hybridization, breeding and tissue culture. For poor farm management practices, there exists strong need for extension education and training for the growers. Cooperative and contract farming may solve the problems for small land holdings towards improved yield and quality in the long run. Application of fungicides/pesticides and chemical preservatives would be phased out and would be replaced by more environment friendly technologies in the long run. While marketing of fruits and vegetables is expected to be dominated by cooperatives and middle men in short term, organized direct sourcing supermarkets are likely to emerge dehydrated products, fruit juices, pickles and other forms of preserves are likely to emerge as popular processed products. Change in consumer taste, food habits & life style, convenience, nutritional value and purchasing power are the likely reasons for preference of processed products. While the level of processing would hover around 5-10% in the next 10 years, 15-20% of fruits and vegetables may be processed in the long term. While the small scale processing units would dominate in the short term, an advent of large/medium scale units is likely in the long term.

EXPORT OF VEGETABLES AND RELATED ISSUES

The farm sector is changing throughout the world. Cereal farmers are adding vegetables to their crop rotations in response to increased consumer demands. Assuming a 3.5 and 5.5 percent GDP growth rate in India, the projected demand for vegetables in the year 2030 for India alone is 151 and 193 million tones respectively. Without increasing the area to achieve the target, the yield increase should be 190 to 200 per cent.

In 2003-04, India exported 17 vegetables to the tune of 0.92 million tones valued at 183.3 million dollars. In addition, a total of 0.22 million tones of 14 processed vegetables worth 125.9 million dollars were also exported. Major vegetables exported

included green bean, green chilli and pepper, cucumber and gherkin, eggplant, garlic, lettuce, onion, pea and tomato. Since India grows a tremendous number of diverse vegetables, 175 in all, there is a large scope of export many more vegetables to countries within and outside and region.

Quality of export vegetables

The uniformity in size and colour are considered to be general quality traits of universal acceptance for any crop apart from several other specific qualities for the export.

Export of onion

Onion is grown throughout the world and major producing countries comprise China, India, USA, Turkey, Pakistan, Iran, Japan, Russian Fed, Spain and Brazil. After China, India is the second largest onion producing country in the world with the annual production of 5.25 million tones from an area of 0.49 million hectares during the year 2001. Onion constitutes around 8.2 per cent of the total cropped area covered under vegetable crops and it shares 6 per cent of the country's vegetable production. The leading onion producing states in the country are Maharashtra, Karnataka, Gujarat, Andhra Pradesh, M.P, Tamil Nadu and U.P.

Onion ranks first in export of fresh vegetables from India and constitutes 73.94 per cent of the export of fresh vegetables. The major onion export destinations are UAE, Singapore, Sri Lanka, Bangladesh and Malaysia. The export of onion in year 2003-04 was almost double as compared to previous year. India exported 8.6 lakh tones onion of worth Rs 715.87 crores.

Export of potato

Although our exports have generally been less than 0.5 per cent of our domestic production, yet, India has tremendous potential of exporting table, seed and processing quality potatoes along with the processed potato products. India being the only sub-tropical country in the world that has its own seed production programme, it

has a potential of emerging as major seed exporter to many sub-tropical and neighboring countries.

The possibility gets further strength from the fact that a large number of our potato varieties and hybrids are officially grown in nine countries under their Indian names or modified local names while there are many countries, which are growing Indian potato varieties/hybrids unofficially too. Establishment of Agri Export Zone for potato at Mohali is a step to exploit this opportunity. Chambal Agritech Limited, a private sector company is in the process of exporting seed potatoes to our neighboring countries during 2004-05.

India possesses untapped potential of exporting off-season fresh table potatoes as there is a shortage of fresh potato in Northern Hemisphere when we harvest most of our produce. At present we are exporting table potato mainly to Sri Lanka, U.A.E, Nepal, Mauritius, Pakistan, Maldives, Singapore and Saudi Arabia. Government of India has already taken note of it and has established three out of five AEZs for potato, namely Agra and Farrukhabad in U.P. and Hooghly in West Bengal in table potato growing areas.

ISSUES

Although the future of vegetable production in the country seems very bright with the adaptation of some of the techniques mentioned above, but the issues that hinder a smooth walk for the adaptation of these techniques and also in realizing the full potential of the vegetable sector of India, are listed below. Some of these have also been elaborated upon for better understanding:

- Lack of education and awareness about opportunities.
- Lack of market knowledge and marketing skills.
- Lack of professionalism and small land holding.
- Falling water levels and lack of irrigation facilities.
- Expensive credit.
- Many intermediaries who increase cost but do not add much value.
- Laws that stifle private investment.
- Controlled prices.
- Poor infrastructure.

- Inappropriate R&D- agriculture is a state subject, and most states have little funds to invest in vegetable R&D.

Infrastructure

Vegetables are an item of daily consumption, they are essential in human diet but they are very perishable in nature. Therefore, the cultivation of vegetables is generally concentrated around towns and cities, so that they can be harvested and transported to the market immediately and in fresh form. With the increase in transport and communication facilities, vegetable cultivation has spread in interior areas where irrigation facilities are available. This is because growing vegetable crops is more profitable than any other seasonal crop particularly the food grain crop. The spread of vegetable cultivation in rural areas has created new problems, particularly of transport, handling, packing and storage which are still in their formative stage. There is also some regional specialization in growing some vegetables. They are grown in one area but marketed in other areas for creating wider market and also to fulfill the demand of some people, who have liking for them. This also involves long distance transport. For this purpose, good roads in the interior villages are necessary. Fortunately there are good state and national highways, but there are no good roads in the interior. This brings us to the problem of marketing of vegetables grown. The producer cannot go to wholesale market or long distant market and he has to depend on some intermediaries to sell his vegetables. Therefore, in the marketing of vegetables costs are involved for grading, packing, transport, loading/unloading, fees, etc. In addition, the intermediaries also take some margins for them. These costs and margins determine the final price to be paid by the consumer. After deducting market costs and margins from the final price paid by the consumer, farmer gets his net price, which is referred to "Farmer's share in consumer's price". This determines efficiency of marketing.

Proper Marketing Channel

The market reforms in agricultural commodities have so far been limited mainly to food grains only. The marketing of vegetables has so far received little attention of the government. At present, there are a large number of intermediaries in this trade

between the producer and consumer which has resulted in a wide gap in the producer and consumer price of these commodities which needs to be reduced to enable farmers receive remunerative prices for their produce and boost their production and consumption in the country. The union government has not made any common regulation for the marketing of vegetables applicable all over the country; however, some of the state governments have enacted laws and Acts. The marketing of vegetables is under regulation in Rajasthan, Maharashtra, Bihar, Delhi, Uttar Pradesh and Karnataka and outside any regulatory purview in Tamil Nadu, West Bengal and Jammu & Kashmir. At present, the wholesale markets for vegetables on a country-wide basis are concentrated in 10 large cities i.e. Delhi, Calcutta, Bangalore, Chennai, Mumbai, Jaipur, Nagpur, Vijayawada, Lucknow and Varanasi. These cities account for the arrival of 75 per cent of vegetables marketed in major urban areas in India. Delhi, Calcutta, Mumbai and Pune alone account for the arrival of 55 per cent of vegetables.

Use of quality inputs

Another problem being faced is that in India, the vegetables are typically grown in field conditions. The concept is opposed to the cultivation of vegetables in green houses as practiced in developed countries for high yields. The average yield for various vegetables in India are low compared to those experienced in other countries of the world. The vegetables sector also suffers from lack of availability of good quality planting material and low use of hybrid seeds. Poor farm management and manual harvesting practices also apply to the vegetables cultivation. Land ceiling has also been a major deterrent for large scale cultivation of fruits and vegetables especially in the organised sector.

Ecological issues

In recent past, indiscriminate use of fertilizers, water and chemicals in vegetable crops has threatened the environment and ecological balance [7]. Hence, to increase production, protect environment and soil, increase profitability, reduce residual effects of chemicals on fresh vegetables, it is imperative to undertake research activities on vegetable production technology including organic farming, integrated nutrient

management, off season vegetable production, integrated pest management including bio-control and residual effects of chemicals, post harvest technology and development of export oriented varieties.

Quality control

Although India is the world's second largest producer of vegetables after China, but hardly 1 per cent of the produce is exported. The main constraint is the quality of vegetables. The quality requirements for vegetables for export differ from those for domestic needs. Though uniformity in size and color are universally accepted attributes, there are several other specific quality requirements for the world market. Some of our country's export consignments have been rejected at the destination for not meeting the recommended international standards due to pesticide residues and contamination with fungicides and other agro chemicals.

Different markets require different qualities. For example, Japan and European markets demand yellow or brown varieties of onion, whereas West Asian and Southeast Asian countries require light to dark red varieties. The quantity demanded also differs in various months owing to no local production, particularly in Southeast Asian countries. In European markets the requirement is mainly from November-December to April-May, when there is no local production or stored produce is not available or preferred by the consumer. We also have a lack of varieties with good shelf life and demand in the export market. Since we do not have good and a uniform variety in any crop, a lot of labor and money is wasted in sorting and grading operations. Moreover, quality control measures at grading and packing levels are also not perfect.

Post harvest management

Owing to the highly perishable nature of vegetables, about 25-40 per cent of the produce gets wasted due to lack of adequate post-harvest handling, which cuts down the export quantities and increases competitiveness. Another reason why India has not been very successful in the export market is that most of the produce is purchased from the wholesale market or from contractors. In such conditions the exporter does

not have any knowledge about the pre-harvest care during the growth period. Latent infections therefore appear by the time the produce reaches the importing country. This is a big setback to our exports. The only solution to this problem is contact farming under the supervision of exporters. Non-availability of air cargo space and high freight rates are other major constraints in increasing exports.

At times, because of failure of a particular crop in India, increased local demand and restrictions on export lead to uncertainty in the export position of the country. Another problem is domestic demand and prices of vegetables are high, which hinders regular export. There is major competition now from neighboring Asian countries, so India has to honor a minimum export quantity and agreed delivery for a period of 10 years.

A few enterprising farmers from Punjab have started exporting snow peas to markets in the UK, UAE, Denmark, France, Germany and Holland. While the variety of vegetables traded is large, exclusive dependence rests on onion, which accounts for more than 70 per cent of the total foreign exchange earned from fresh vegetables.

The Agricultural and Processed Food Products Export Development Authority (APEDA) has identified traditional and non-traditional vegetables with good export potential. As many as 63 varieties vegetable are traded in the world market. The Punjab Agri Export Corporation (PAGREXCO) had achieved success in marketing of fresh vegetables (2000 kg) from Punjab to the UK. No doubt, the quality of these vegetables does not compete in the international market, but they are accepted by Indians living there.

India has also been exporting canned and dehydrated vegetables and various other products like pastes, frozen vegetables, ketchup, pickles, juices and powdered vegetables (onion and garlic) mainly to West Asian markets. These markets are receiving only 4.5 per cent of their fresh vegetables from India; so a tremendous potential exists in increasing export to these markets. Among dehydrated vegetables, beans, onion and garlic are important and among frozen vegetables prospects for peas, cauliflower, French beans, baby carrot and okra are bright. Chili oleoresin is another important export item, earning foreign exchange worth Rs 88 crore every year.

Use of technology

There is a need to establish and promote new processing units, net houses/ protected cultivation for minimum use of insecticides, organic farming, refrigerated vans, cold storage facilities, modern storage and packing centers, more cargo space and pesticide residue testing laboratories. There should be a close linkage between exporters and producers of exportable surplus. Moreover, it is necessary to have a proper survey of foreign markets as to their requirements of quality/types of crops and accordingly enter new markets with suitable varieties.

Policy issues

The Government should encourage partnerships between research institutions, agricultural and engineering universities, NGOs and private industries to address constraints and link vegetable farmers to national and international markets.

With economic liberalization, globalization, and the WTO, policies should be carefully drafted to see that the private sector, through contract farming and other methods, encourages small-scale farmers to grow quality vegetables. The Government should assist in the development of markets, move forward with vegetable fairs to attract foreign buyers, and create more awareness of the importance of safe vegetables in diets. The ministry of agriculture and the ministry of food processing industries should jointly organize such initiatives.

The Government should assist small-scale units to come up with attractive brands and creative labelling of products with safety assurance, which the international and domestic buyers can rely on. The Government should encourage women entrepreneurs to take up vegetable production, processing and marketing. [8]

Conclusion

Though India has acquired a position of prominence as a producer and supplier of vegetables, there is scope to strengthen the position further as it has suitable agro-climatic conditions for production of all types of vegetables throughout the year in

one or the other part of the country. It is estimated that around 20-25% of the total vegetables is lost due to poor post harvesting practices. Less than 2% of the total vegetables produced in the country are commercially processed as compared to 70% in Brazil and 65% in USA. Around 1.5 lakh MT of vegetables is sold as processed products. Vegetable growers and specialists have not equipped themselves with the qualitative aspects of production and pre- and post-harvest care, which play a vital role. The required infrastructure facilities should be in position to facilitate grading, packing and movement of produce from the field to the final consumer in the shortest possible time. This requires governmental intervention and also sizeable investment in research and development. Setting up of 20 agri export zones in the new EXIM (export-import) policy 2002-2007, is one of the major steps the Government of India has taken to promote export. It is also necessary to familiarize growers and exporters with the technologies related to qualitative aspects; it is no longer sufficient to serve the stomach's need.

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