

<b>Programme-</b>	<b>B.Sc (Agriculture)</b>
<b>Course -</b>	<b>Post Harvest Management and Preservation of Fruits and Vegetables</b>
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<b>Topic-</b>	Importance and scope of post harvest management of fruits and vegetables
<b>Sub-Topic-</b>	<b>Importance of fruits and vegetables</b> <b>Scope of fruits and vegetables</b>
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### **Importance of fruits and vegetables:**

The fruits and vegetables which were the corner stores of health, applying us with a wealth of vitamins, proteins, fibers and carbohydrates have assumed utmost importance after the discovery of **phyto - chemicals**.

#### **Phyto – Chemicals**

Many phyto chemicals found in fruits and vegetables act as powerful **anti - oxidants**. They are the biologically active substances in plants and that give them their color, flavor, odor and protection against plant and humans diseases. Consequently, hundreds of such plants substances are being investigated now for their role in protecting cells organs from damage caused by free radicals, neutralizing their effects.

Certain anti - oxidants alter cancer at its inception by blocking the enzyme that activates cancer genes or by preventing various substances from cancer causing agents called carcinogens. Other stop carcinogens from damaging cells, tissues and organs, or help the body produce enzymes that destroy carcinogens. Still others suppress the spread of cancer by interfering with the reproduction of cells that have already been exposed to carcinogens. They many also reduce the rich of coronary artery diseases. They have been found to lower blood pressure and cholesterol levels as well as block the oxidation of bad cholesterol.

#### **Anti – oxidants**

Another term for anti - oxidants is "free radical scavengers." This refers to their ability to provide electrons "so that the free radical can attach itself to the anti - oxidant electron and be rendered

harmless before it attach itself to a so called "healthy" radical and begin the destructive chain reaction anti - oxidants have been found to interfere with virtually every stage of cancer growth.

### **Anti - oxidant therapy for AIDS**

Scientist have now find out that anti - oxidants and nutrients may be beneficial in delaying initial Episodes of general "immune disorders" in some patients by extending the period between "HIV infection" and appearance of clinical symptoms of AIDS. Animal and Human studies have shown beneficial effects of the anti-oxidants vitamin E and beta carotene and other nutrients in slowing progression for HIV infection to AIDS and decreasing symptoms.

### **Indirect Verses Direct Anti – oxidants**

Indirect anti - oxidants work as catalyst. It does not neutralize free radicals directly, but rather boots the body's own elaborate anti oxidant systems that exert ongoing and prolonged anti - oxidant activity this as a broad spectrum of activity, cycling over and over again, that removes many free radicals. It is like an "army" of anti - oxidants ready to neutralize free radicals over a period of time, a continues to be quite effective even after the indirect anti - oxidants has left the body. Direct anti - oxidant, such as Vitamins C and E neutralize dangerous radicals to which cells are exposed or that are generated by cells themselves before free radicals can harm cells. In the process, a direct anti - oxidant molecule kinds to a free radical molecule, rendering it harmless and thus, protecting cells from damage. Once the direct anti - oxidant reacts with a radical, the anti - oxidant is destroyed and cannot be used again.

### **Anti – oxidant Vitamins**

One oxidant vitamin is vitamin C (ascorbic acid). It is soluble in water and can readily enter cells and tissues. Studies have shown that high in takes of vitamin C are associated with reduced risk for several chronic diseases. Human being receiving about 300 mg or more per day, an average 6 years longer than those who receive less the 50 mg of vitamin C daily. Another anti - oxidant vitamin E (alpha to copherol).It is a fact soluble vitamin and there is an ample evidence of health benefit from high intakes of vitamin E.

### **Anti - oxidant Rich fruits and vegetables**

The diverse climate of our country offers a variety of fruits and vegetables in which are loaded with these anti - oxidants. However, what is lacking is the knowledge of their presence and their efficient consumption in diet.

The fruits have high nutritive value in the form of proteins, carbohydrate, fat, mineral matter, organic acids, crude fiber, vitamins C and E. The fruits rich in these constituents are briefly described below:

- **Proteins:** Peach, banana, pomegranate, date palm, jack fruit, cape goose berry, lime, bael, phalsa, litchi, mulberry, custard apple, graphs fruit etc.
- **Carbohydrates:** Mango, grape, banana, date palm, jack fruit, sapota, apricot, jamun, bael, phalsa, litchi, pomegranate, custard apple etc.
- **Fats:** Avocado, almond, cashew nut, lime, phalsa, walnut etc.
- **Minerals:** Apple bael, aonla, custard apple, date palm, guava, jack fruit, banana, cherry, jamun, lime, papaya, plum, sweet orange, litchi, mulberry etc.
- **Iron:** Apricot, Aonla, bar, banana, custard apple, cape gooseberry, date plam, fig, malta, mulberry, mango, guava, loquat, pineapple, phalsa, lemon, sapota etc.
- **Calcium:** Aonla, bael, custard apple, fig, guava, lime, lemon, mulberry, phalsa etc.

- **Phosphorus:** Bael, custard apple, Cape gooseberry, date plam, jack fruit, litchi, peach, pomegranate, phalsa; sapota etc.
- **Carotene (Vitamin A):** Apricot, cape gooseberry, fig, loquat, mango, orange, papaya, jack fruit etc.
- **Vitamin B1 (Thiamine):** Bael, cherry, custard apple, fig, grape fruit, pineapple, pear, mango etc.
- **Vitamin B2 (Riboflavin):** Apricot, banana, bael, custard apple, cherry, papaya, pineapple, plum, pomegranate, jack fruit, mango etc.
- **Nicin:** Apricot, bael, ber, custard apple, date palm, passion fruit, peach, mango etc.
- **Vitamin C (Ascorbic acid):** Aonla, ber, cashew nut, lime, lemon, malta, guava, strawberry etc. •
- **Water:** From food and water we drink.
- **Fiber:** From all plant food.

Each nutrient class has its own functions to perform but different nutrients that perform the same function must act in unison for effective action.

**The functions of nutrients are listed below:**

- **Proteins:**  
Proteins are precursors of regulatory and protective substances such as enzyme, hormones and antibodies. About 10% of the total energy in the diet is supplied by proteins their main function is **building of maintenance and repair those already build**. Energy supply is therefore, a secondary function of proteins. Protein excess of requirement can be converted to carbohydrates or fats and stored.
- **Carbohydrates:**  
Their chief function is to provide energy. Those cannot be used immediately for this purpose and stored as glycogen or first converted into fat and then stored, to be mobilized for energy supply when needed by the body.
- **Fats:**  
These are concentrated sources of energy, carries fat soluble vitamins and essential fatty acids. If excess fats are consumed in the diet, these may be stored as fat reserves in the body. When excess energy is supplied to the body, be it form carbohydrates, fats or proteins. It is stored as fat in the body.
- **Minerals:**  
Their function includes body building (bones, teeth and structural parts of soft tissues) and regulation (e.g. muscle contraction).
- **Vitamins:** These are needed for growth and for regulation of body processes.
- **Water:**  
An essential part of body structure. It is a carrier of nutrients as well as regulator of a number of body functions.

### **Anti - oxidant Rich Vegetables**

- **Allium vegetables:** Vegetables belonging to Allium family like garlic bulb, onion chinese leek, chinese chive, scallion and shallot bulb have been shown to possess strong activity. Garlic is likely the most important herb widely quoted for its medicinal properties. The purported health benefits include **chemoprotective**, **antibiotic** and **cholesterol lowering** properties. The characteristics flavor and pungency are due to an abundance of water soluble - containing element called "**allicin**" which is produced when the bulb is injured or crushed. Garlic components have

shown to inhibit tumorigenesis thus reducing the risk of **human cancer**. It has been strongly advocated for prevention of cardiovascular diseases. Garlic powder or tablets have been found to improve immune response.

- **Ginger:** Ginger is best source of "**gingerol**". It is known to increase the production of substances that protect the stomach lining, preventing formation of ulcers, stimulate gastric activity, causing the stomach to empty more quickly, stimulate gall bladder, promoting healthy digestion and helps alleviate nausea caused by pregnancy and motion sickness.
- **Beans:** Soybean is best source of "**genistein**" (an iso - flavonoid) "**phytosterols**" and "**sapronins**". It suppresses the growth of cancer cells in the large intestine and enhances immunity against many cancers. Other compounds in soybean also reduce blood cholesterol.
- **Cruciferous Vegetables:** Direct "**sulforaphan**" (glucosinolate) a naturally occurring compound found in cruciferous vegetables and broccoli sprouts, may provide health benefits than previously realised. Now studies show that it may be even more versatile and effective than vitamin C and E in protecting cells from oxidative damage. Scientists at John Hopkins University found that lab animals fed with cruciferous vegetables had a 90% reduction in their cancer rate after being exposed to "**aflatoxin**" a deadly cancer causing agent. Other sources are broccoli, cabbage, and cauliflower, kale, kohlrabi, collard, radish, rutabaga and turnip.
- **Red and dark green vegetables:** Vegetables like carrots, pumpkin, cantaloupe, kale and yellow corn are rich source of natural "**alpha carotene**", whereas potatoes, carrots and pumpkin, spinach and leafy vegetables are rich in beta carotene. Alpha carotene reduces the risk of lung cancer and boosts the immune system. Beta carotene functions as a powerful anti - oxidant protecting the protein, fat and DNA in cells from free radical damage.
- **Chilli peppers (Capsicum annum):** '**Capsaicin**' the phyto - chemical present in chilli, impedes carcinogens such as **nitrates** and **cigarette smoke** at the transition to cellular material, thus preventing formation of **cancer cells** that can cause ulcer.
- **Tomato:** Red is reassuring sign at least in vegetables. '**Lycopene**' The compound is responsible for red color of tomato protects the human body from the ravages of cancer and cardiovascular diseases. Eating over 10 tomatoes / week has shown to reduce cancer by 35% and is also effective in reducing **cholesterol**.

#### Anti - oxidant rich fruits

- **Amla:** It is rich in "**polyphenol**" and "**ascorbic acid**". It is valued as an antiscorbutic, diuretic, laxative and antibiotic. One or other part of the plant could be used in treating chronic dysentery, bronchitis, diabetes, jaundice, dyspepsia and cough. The fruits are processed into "chavanprash" and "triphala" in Ayurvedic system of medicine.
- **Apples:** Apples according to scientists are a nutritional treasure trove. Apple skin ward off "cancer" through a unique mix of molecules called "**flavonoids**" and polyphenols. Studies show that apples check proliferation of most liver cells and colon cancer cells. The fruit supplies a range of nutrients such as iron, copper, vitamin 'C' malic acid and calcium. It also plays a role in preventing heart diseases. The fruit also prevents diseases like rheumatism and arthritis.
- **Bael:** It is a source of **riboflavin** and **ascorbic acid**. The pulp of the fruit although a little acid bitter is aromatic and acts as a sweet cooling tonic. The pulp contains a large amount of mucilage and gum as a result of which it has the important curative properties as "**appetizer**" and is often prescribed for stomach problems.

- **Jamun:** Its fruits known for their acrid and astringent taste are useful for curing **diarrhoea** and **diabetes**. It is stomachic and diuretic apart from having cooling and digestive properties. Its seeds are high in phenolics and are prescribed in diabetes, diarrhoea, dysentery, ringworms and blood pressure.
- **Mahua:** Both flowers and fruits of mahua are eaten in various ways. Mahua flowers are regarded as cooling tonics, demulcent. They are also used in cough and cold.

Tremendous interest in the anti - oxidant components in fruits and vegetables and their possible health promoting effects has stimulated worldwide research to identify potential resources. In this context, there is a direct need to document the anti-oxidant potential of our indigenous wealth of fruits, vegetables and medicinal herbs in terms of their free radical scavenging to establish them as functional and health food.

- **Pomegranate:** Every part of the pomegranate is used in the treatment of dysentery, diarrhoea, stomach ache, dyspepsia, bronchitis and cardiac. These therapeutic properties are due to the presence of betulinic acid and ursolic acid and different alkaloids pseudopelletierine, pelletierins, isopelletierine, and methyl pelletierine. The unripe fruits and flowers are useful in inducing vomiting and the rind of the fruits is given in diarrhoea and dysentery. It is also useful in sore throat and eyes, brain diseases and chest troubles.
- **Kokum:** It has a fine flavour and makes excellent beverages. It is known to reduce obesity and regulate blood cholesterol level to keep heart healthy. It has the fine flavor and makes an excellent beverage.
- **Citrus Fruits:** Oranges, limes, lemons and grape fruits are the principal sources of vitamin C. They are also high in a class of phyto - chemical called limonoids. This anti-oxidant has been found to be very effective against cancer.
- **Berry Fruits:** Besides especially colored like cranberry, strawberry, blackberry, aronia, bilberry and whortle are rich sources of flavonoids and phenolics. According to breakthrough research at Rutgers University New Jersey, blue berry is number one anti - oxidant fruit. It has been found to be beneficial in fighting off urinary tract infections of blocking or prohibiting the growth of bacteria. Concentrated extracts of anthocyanins also benefits visual activity as well as provide protection against muscular degeneration, glaucoma and cataracts.
- **Grape and Wine:** Flavonoids and other Phenolics are present in grape and its products have been shown to possess anti - carcinogenic, anti - inflammatory, anti - thrombotic and anti - oxidant effects. The ability of phenolic substances in prevention of atherosclerosis and risk reduction of cardiovascular diseases has been aptly demonstrated by the benefits of red wine consumption often referred as 'French Paradox'. The paradox refers to epidemiological findings that in certain parts of France where wine consumption is high, coronary disease mortality is low despite relatively high cholesterol levels in population.

Phytochemicals are naturally found in fruits and vegetables. Therefore, garlic, ginger, broccoli and cruciferous vegetables, beans, orange, red and dark green vegetables, citrus fruits, banana, aonla, apple etc. are highly recommended to overcome a number of ailments.

### **Scope of fruits and vegetables:**

Fruits and vegetables are important supplements to the human diet as they provide essential minerals, vitamins, fiber, etc. for sustaining health. Fortunately, our country with its wide range of soil and climatic conditions is ideal for growing a large variety of fruits and vegetables. India

has made a fairly good progress on horticultural map of the world with a total production of fruits and vegetables touching over 377 million tonnes during 2011-12. India is the second large production of fruits (121 million tonnes) and vegetables (156 million tonnes).

Preservation and processing of fruits and vegetables assume a key position in the agro industrial based processing industries can stimulate the commercial growers to cultivate high quality crops for better economic returns to generate, in turn, enormous employment opportunities in production sphere of activities.

However, for various reasons this abundance of production is not fully utilized and about 30-40% of wasted due to spoilage. Most fruits and vegetables are seasonal crops and perishable in nature. In a good season there may be a local glut, particularly of fruits, but because of insufficient transport facilities, lack of good roads and poor availability of packaging materials.

**Scope:** Development of horticulture specially in hill areas and through export of value - added products, earn more foreign exchange.

The surplus cannot be taken quickly enough to the natural markets in urban areas. Moreover, the surplus often cannot be stored for sale in the off season because of inadequate local cold storage facilities. Thus, the producers do not get a good price for their produce because of glut and some of it is spoils resulting in complete loss.

High degree of perishability of certain fruits and vegetables particularly produced and grown in abundance in the remote centers / pockets of the region, warrant scientific post - harvest management and processing to appreciate high value for the products. Proper marketing arrangement for fresh fruits and vegetable are not available in our country. Hence they are wasted.

Careless and improper handling of fruits and vegetables reduces the market value and shelf life ultimately causing enormous losses and depriving rightful benefits to both producers and consumers. Beside these quantitative losses, the loss suffered in quality before actual consumption can hardly be estimated. At present, more than 25% of the fruits and vegetables value 67500 million is reported to go waste annually. Although, the R and D efforts on the development of post - harvest handling has helped in reducing the spoilage, considerable losses continue to occur. Even if 70% of the spoilage could be prevented during the glut season at the producing centers by converting them into new categories of processed products, there will be saving of 67500 million (Potty, 1988).

Two approaches are quite possible for solving this problem. One is the creation / expansion of cold storage facilities in fruit and vegetable producing regions themselves as also in major urban consumption centers, to ensure supply of fresh fruits and vegetables throughout the year. Another approach is to process the fruits and vegetables into various products which could be preserved for long time and add to value of products. With increasing urbanization, rise in middle class purchasing power, change in food habits and the dying out of the practice of making preserves in individual homes, there is increasing demand for domestic markets e.g. mangoes both fresh and canned fruit juices, salted cashew are good foreign exchange earners.

In spite of all this, the fruits and vegetable preservation industry at present is utilizing less than 1% of the total production for conservation into products like canned fruits, juices and their beverages, pulps, squashes, jams, jellies, pickles etc. as against 40-60% in developed countries. Thus, there is considerable scope for expansion of the industry, which in turn would give a fillip to development of horticulture especially in hill areas, and through export of value-added products, earn more foreign exchange.

Advanced technology of processing has great potential to expand the farm produce markets beyond the region and country, because of conversion of perishable produce into stable forms that can be stored and shipped to distant markets round the year, expanding the availability of processed products and retaining their nutritive value and palatability. Recent advances in fruit and vegetable processing in the horticulture sector include growing use of mechanical harvesting; bulk handling, automation, scientific canning, freezing, dehydration and application of modern biotechnologies to generate a wide range of end products of cater to mass consumption at low price.

The rural house makers who play a considerable role in food production have not been exposed to modern methods of preservation. While disseminating a processing technology in the rural situation appropriateness of the technology should be assessed. The technology to be appropriate should meet the criteria of low cost, low output, low risk, rural bias, suitable for creativity. Constraints faced by rural families during processing of fruits and vegetables are as under:

- Lack of sufficient capital.
- Lack of information about loaning schemes.
- Non-availability of modern processing technologies.
- Availability of machinery and equipment at a high cost.
- Lack of recognition and appreciation in the family.
- Excessive burden of work and responsibility.
- High cost and distant place for the availability of raw material.
- Difficulty in getting money from buyer after sale.

The following various factors are to be taken into consideration while setting up fruit and vegetable processing industry:

- Product mix
- Availability of raw material
- Man power
- Capital
- Lack of awareness
- Marketing facilities
- Transportation facilities
- Availability of containers
- Publicity

- Role of Government
- ❖ Establishments of canning earning centers
- ❖ Training
- ❖ Research
- ❖ Commercial production
  - **Product mix:** The product profile of the fruit and vegetable processing industry has remained static and is only dependent on a few fruits and vegetables like mango, pineapple, citrus, tomato and peas. The production of new products besides being necessary for survival and growth of the processing industry, would also meet new taste and demand in home as well as export market.
  - **Availabilities of raw material:** A contract between growers and the processing units should ensure the continued availability of good quality raw materials at predetermined rates to the industry.
  - **Man power:** India is fortunate, as compared to developed countries, in having a large reservoir of man power, but skilled man power in some trades is in short supply and productivity in general is low. Proper training in factory or industries, good working conditions and reasonable wages would go a long way to increase productivity.
  - **Capital:** This is an important consideration for food processing industry as in the case of any other industry. In recent years, with government support, a number of big industries have diversified into the area of fruit and vegetable processing. There is however, scope for small - scale units which require less capital for the establishment.
  - **Lack of Awareness:** This is the main constraint for establishment of fruits and vegetable processing industries. Most commercial growers are not aware of the market for preserved products and do not have the necessary technical knowhow to undertake processing themselves. The Central and State Governments have started projects to impart different levels of preservation and canning.
  - **Marketing Facilities:** Now - a - days, there is huge demand for preserved and canned products in domestic and international markets and is likely to grow in future, there are not readily available in small towns due to reluctance of shopkeepers in stocking such items. The establishment of grower's cooperatives would help in the marketing of such products and it is the policy of the Govt. to encourage the establishment of such cooperatives.
  - **Transport Facilities:** Earlier, there was a serious problem for the rapid transportation of fruits and vegetables in good condition from one part of the country to another for processing, because of paucity of roads, their bad condition and shortage of trucks and rail wagons. There is now considerable improvement in both road and rail transport and the day is not far off when even remote rural fruit and vegetable producing areas will be connected to processing factories in distant parts of the country.



- **Availability of Containers:** Food industry requires two types of containers i.e. bottles and cans. Earlier these had to be imported, but now the manufacture of bottles of the required specification has been taken up by a number of manufacturing factories.

At present there is a great difficulty in availability of cans since there are very few manufacturing companies in our country. Metal Box Company of India is the premier manufacturer, with factories in different parts of the country. There is a great need for setting up more factories of cans to meet the demand of the country.

- **Publicity:** Proper publicity of the preserved food is the only way to attract the consumer and give him information about the new products in the market. These products can also be popularized by displaying in exhibitions and fairs in backward areas as the majority of the population does not have knowledge of these products. Radio, T. V., documentary films may also be used for the preserved products popularization.

### **Role of government**

At present both the central and the state governments are encouraging fruits and vegetables preservation. Govt. of India, has established in 1984 the National Horticulture Board, Gurgaon, Ministry of Agriculture, Department of Agriculture and Cooperation Haryana.

Considering the role of horticulture to be played, constraints and also considering the mandate of doubling food production in the next 10 years and reducing the gap between requirements and availability. The following thrust areas have been identified:

Developing infrastructure for the post harvest handling and marketing of horticulture commodities particularly Perishables using improved technology with primary objective of reducing losses and improving quality of products shall receive emphasis in NHB.

- To improve modern marketing system eg. pack houses in production areas, farmers auction houses, electronic bidding. Cool chain, further markets (commodity exchanges) for commodities like onion, potato and fruit crops.
- To launch promotional activities to meet the requirements of small and marginal farmers as well as encouragement for establishment of small and medium enterprises to increase employment generally in the rural areas.
- To catalyse all round development of horticulture sector i.e., fruits, vegetables, floriculture and medicinal plants. Emphasis would be laid on increasing production with an objective of achieving composite.
- To emphasize on the indigenous fruits, vegetables and flowers would be laid from the view point of integrated development of these species leading to commercialization including exports as exotic items. To set up mechanism for crop forecasting and quick information dissemination.
- To catalyze shift in food habits from quantity food to quality food through increased availability and mass media promotion of health oriented benefits of the consumption of the fruits and vegetables.
- To stimulate private investment particularly in the field of hi-tech commercial production, post harvest infrastructure, marketing of R and D.

- To organize production to orient towards the special needs of processing industry and exports.

### **Objective of the National Horticulture Board**

- To encourage, promote and develop the Horticulture Industry.
- To stimulate and support the growth of the diverse activities of the Horticulture Industry.
- To advance the economic and social well being of the farmers of growers in need of such advancement.
- To assist the establishment and maintenance of growers and farmers societies and other similar institutions as part of the development of Horticulture Industry.
- To coordinate the activities of different departments and organization at the Central and the State level engaged in activities remaining to Horticulture Industry.
- To assist in the establishment and development of infrastructure for the development of post harvest technology and development of intelligence and information system.
- To institute and implement the Horticulture Development Programme of Project in the interest of the development and progress of the Horticulture Industry.
- To encourage the participation of small and marginal farmers and growers in Horticulture Development Programmers so that they become beneficiaries of the growth of the Horticulture Industry.
- To provide technological and other assistance in organization of consultancy services, preparation, monitoring and evaluation of project, related to the Horticulture Industry, including but not limited to, transfer of improved technology for production, processing, quality control and marketing and matters allied or incidental thereto
- To promote integrated development of the Horticulture Industry with particular reference to potato, onion, tomato, cauliflower, cabbage, ginger, turmeric, apple, pineapple, mango, grape and the citrus fruits and other Horticulture crops on priority basis.
- To take appropriate measure for assisting farmers and growers to get incentive prices but having due regard to the interest of consumers.
- To organizes Udyan Pandit competitions, fruit shows, award prizes and incentives to fruit and vegetable grower, farmers and manufactures of Horticulture and other allied products.
- To assist, encourage, promote coordinate and finance horticultural, technological, industrial or economic research on horticulture and its products and setting up the required ancillary facilities.
- To organize programmes for training of personnel engaged in horticulture development including training of extension staff securities, promissory bills of exchange of other institutions and securities whether negotiable or transferable or not.
- To co-operate with Food and Agricultural Organization and other international agencies and organizations for the purpose of exchange of technical know and financial assistance.

- To prepare feasibility studies on marketing, processing plants, cold storage, transportation system for raw and processed perishable horticultural products and other related fields and undertake designing, planning and setting up of project on these grounds.
- To undertake publicity and dissemination of improved methods of horticultural technology.
- To assist and advise in the matters of transportation of perishable horticultural products to consumers.
- To establish and maintain liaison with the Railways, Minister of Shipping and Transport and other concerned departments and organizations, as considered appropriate.
- To import equipment and expertise as and when required for the development of horticulture industry.
- To acquire and accept, grant, gifts, donation, subscriptions and contributions from any source whatever, including but not limited to, the Central Government for the furtherance of the objects of the Society.
- To create, establish, maintain and operate funds with the money and securities received from the Central Government any State Govt., banking and financial institution, voluntary international organizations and agencies by way of grant, donation, in addition to other money, income and securities earned and acquired by the Society in any other manner for promotion of the objects of the Society.
- To utilize a part or whole or such funds towards the capital and recurring carefully of the Society.
- To make investment or deal with the funds in any other ways the Society may find it necessary for the purpose of its objects.
- To acquire by ways of purchase or gift or to take on lease or hire or otherwise any movable or immovable property.
- To sell, assign, mortgage, lease, exchange transfer, or otherwise deal with all or any property, movable or immovable, of the Society as it may consider necessary.
- To own, develop, renovate, expand or alter any building movable or immovable property in the possession of the society in the way as necessary and take action for proper maintenance of any such property.
- To borrow or raise funds from any source with securities or without securities or otherwise, however in such manner as the Society shall deem fit.
- To draw, accept make, endorse, discount, execute, sign, issue or otherwise deal with cheque, hundies, drafts, certificates, receipts, Govt. securities, promissory notes, bills of exchange of other institutions and securities whether negotiable or transferable or not.
- To create administrative, technical, ministerial and other posts under the Society, and to make appointments there to accordance with rules of the Society.
- To employ requisites staff and establish and maintain provident fund and other benefit of such staff.

- To make rules and bye - laws for the conduct of the affairs of the Society, and add, amended or vary the same from time to time, but subject always to the approval of the Central Government.
- To constitute such committee or committees with or without representatives of other countries and international organization as the Society may deem fit for all or any of its objects.
- To adopt and undertake any other duties which the Society may consider necessary or advisable in order to carry out any of the objects of the Society.
- To do any other things which are incidental or corollary to the objects of the society. The National Horticulture Mission (NHM) was launched during the year 2005-06 to provide a thrust to development of horticulture in the country

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