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Role of Vegetable (Olericulture) Production in Indian Economy

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INTRODUCTION

Vegetables also enrich health of man. They form the most nutritive menu of man and tone up his energy and vigour. They were appreciated even by the ancient people for their tempting succulence, pleasing flavours, high nutritive value and regulatory effects. Regular use of vegetable supplies many of the most essential health building and protecting substances, such as vitamins and minerals which arc wanting in other food materials, Vegetables, if taken fresh, are more vigorating than cooked, In many parts of the world vegetables form a major part of the diet. but in India it is not so, Those who use vegetables less or those who are not ill a position to afford them, suffer from mineral deficiency diseases, and those who take them do not know now to use them best. In India the use of vegetables ill present Indian conditions is recommended to all people, poor or rich, as plentiful supply of vegetables will eliminate malnutrition, deficiency diseases and thus can recover our impaired health, however, vegetables constitute hardly eight to ten percent of the total food intake which is distressingly low as compared to, for example, 45 per cent in Japan. Even in countries like America where animal protein and milk products are in abundance the annual consumption of vegetables per capita is almost five times that or an average Indian, In India, with a large vegetarian population, the uptake of vegetables needs to be greatly, augmented by a change in food habits.

Though an exact definition of vegetable is not possible, however, in common usage, the term vegetable is applied to the edible herbaceous plants or parts thereof, which are commonly used for culinary purposes. According to Randhawa (1966) the term vegetable includes all foods of vegetable origin, but the definition new excludes cereals and dried seeds of pulses, however, it includes grain on the cob, potatoes, sweet potatoes and several other tubers. The nutritional value of vegetables varies widely, and depends upon the edible part of that plant that is utilised as food, The edible portion may be root, tuber, bulb, stem, petiole, leaf, flower or flower bud, partially developed seed receptacle, mature seed receptacle, seed or fruit (either immature). The use of vegetables varies according to the kind of vegetable, viz., some vegetables like colocasia, pumpkin and beans are edible only after being cooked, others like turnip, onion and radish are eaten either cooked or raw, while vegetable like watermelon, muskmelon etc. arc consumed only in the fresh state. Vegetables may also be enjoyed in various ways known to the culinary art. They may be used as appetisers like fruit (cucumber or kheera, tomato, slices and radish with lemon juice or pieces of radish sprinkled with salt and other spices and lemon juice), as juices (tomato juice), soups (tomato, potato), main dishes (brinjal, ratalu, parwal), side dishes (sweet potato), salads (tomato, lettuce, onion, turnip, radish with green chillies and green coriander), garnishings (green chillies, tomato and onion), seasonings (garlic, leek, onion and coriander) and as desserts (muskmelon and watermelon), and recently in England they arc used for making milk. Vegetable growing is also known as vegetable gardening. The Latin term for vegetable growing is Olericulture and this is used in formal writing but bas not become popular.

IMPORTANCE OF VEGETABLE' GROWING

The value of vegetables as an important article of daily human diet has come to be recognised all over the world in recent years. We get many specific chemical substances needed by our body for growth, reproduction and for maintenance of health. In India where vegetarianism has been a way of life since the early days of recorded history, vegetables are very important in our daily diet. Vegetables contribute vitally to the general well-being due the following reasons:

(1) They are rich sources of 'protective' elements like minerals, salts, vitamins and other chemical substances, which the human body needs to maintain good health and cheer. (2) Per hectare yield of vegetables is very high. (3) They are an important source of farm income. (4) They have high aesthetic value. (5) More vegetable crops can be raised in one year. (6) Vegetables have export potential too.

1. Vegetables are Rich Sources of Vitamins and other Specific Chemical Substances : Vegetables play a very important role in the human diet. They are essential for a balanced diet and maintenance of good health. They are important for neutralizing the acids produced during digestion of meat, cheese and other fatty foods. They are valuable roughages which promote digestion and help to prevent constipation. They supply carbohydrates, fats, proteins,

vitamins and mineral elements. These are essential requirements for the body. Though vitamins occur in small quantities in vegetables they produce profound and specific physiological effects. If properly and regularly used, vegetables can give us a clear soft skin and bright eyes better than any cosmetic. There is no doubt in this, anybody can try it.

Minerals. At least ten mineral elements are needed for the proper growth and development of the human body. Out of these ten elements, calcium, iron and phosphorus are required in large quantities and these are not present in sufficient amount in other food articles except in vegetables. Besides the above mentioned elements, substances like iodine and sodium arc also supplied by them. Although they are present in minute quantities in vegetables, yet they are of considerable importance to human health. On account of the presence of minerals, vegetables are also protective foods (like milk) and thus, they are important in case of those who prefer a vegetarian diet. Important minerals are found in the following ways:

(1) *Calcium*. It is badly lacking in many Indian diets. It is needed for healthy bones and for resistance to infections. In its absence children suffer from rickets, pigeon chest, irritability and retarded growth. Their teeth become bad and lack of calcium in the diet may cause trouble in child birth due to *Osteomalacia*. It also acts as a coordinator among the mineral elements and helps to correct proportion of other elements. It aids in the economy of iron in the body. If calcium is present in abundance, much iron is not needed. Calcium is supp1ied by beans, cabbage, carrot, cauliflower, lettuce, onions, spinach, peas and tomatoes. Green vegetables also supply good amount of calcium. Therefore, to supply enough calcium to the body, seasonal vegetables from the above should be included in the daily diet.

(2) *Iron.* Vegetables are richer in iron than fruits. Most of the iron of the body requirements can be had from green leaves. Iron is essential part of the red blood corpuscles and is the best known oxygen carrier in the body. It is an essential element in the body. It can also be obtained from spinach, lettuce, cabbage, peas, beans and tomatoes.

(3) *Phosphorus*. It is essential for all active tissues of the body. It is required "for cell multiplication of both bones and soft tissues, and for the maintenance of proper I liquid content of the tissues. It plays an important role in the oxidation of carbohydrates which liberate energy. Phosphorus can be had in enough quantities from vegetables like potatoes, carrot, tomatoes, cucumber, spinach, cauliflower and lettuce than from most of the fruits.

Vitamins. The following vitamins are found in the vegetables:

(1) Vitamin 'A'. It is fat soluble and essential for growth and reproduction. Its deficiency in the diet causes:

(i) Xerophthalmia, night blindness and sore eyes. (ii) Susceptibility to. infections of respiratory and digestive tract is Increased. (iii) Formation of the stones in kidney and bladder. (iv) Dryness, pimpling, roughness and eruptions of skin and rough skin in children. (v) Growth of children is retarded and they are constantly susceptible to diseases.

Proper availability of Vitamin A in the body keeps eyes bright, growth normal, intestinal tracts and respiratory organs' in a good condition. It can be obtained from carrot, peas, turnip, beets, tomatoes, sweet potatoes and green vegetables like spinach, methi, green onions, green chillies, cabbage and lettuce. When we eat green leaves of vegetables, carotene, which is converted into Vitamin A in our body, is also consumed directly. It can be used then immediately if needed or stored in the liver for future use. The Vitamin A content of green vegetables varies according to the variety and the season. On an average 120 grams of greens contain 2,000 to 12,000 international units of Vitamin A which are adequate to meet the daily need of a person.

(2) Vitamin 'B'. Vitamin B group promotes nerve condition and' proper functioning of the digestive tract. It is considered important for promoting appetite. The deficiency of Vitamin B causes : (i) Beri beri. (ii) Loss of appetite, (iii) Loss of weight, (iv) Fall in the body temperature. It is essential for growth and reproduction. Green leaves are rich in Vitamin B. Vegetables like lettuce, cabbage, green pepper, carrot and onion contain Vitamin B. Vitamin. B is irregularly distributed in vegetables and seems to be more concentrated in seeds than in leaves of peas and beans.

(3) Vitamin 'C' (Ascorbic acid). It is soluble in water and is highly essential for keeping the blood vessels in good condition. Its deficiency in body may cause :

(i) Unhealthy gums, tooth decay and rheumatism. (ii) 'Scurvy' disease in children and adults. (iii) Loss of energy, delay in wound healing and increased susceptibility to diseases. (iv) Enlargement of heart and damage to heart muscles. Green vegetables like methi, palak, lettuce, cabbage, green pepper and other green vegetables are better sources of Vitamin 'C' than fried ones because cooking destroys a part of this vitamin. Tomatoes which can be consumed daily in adequate quantities furnish sufficient supply of this vitamin to meet successfully the body requirements. The juice of uncooked yellow turnip is antiscorbutic. Potatoes and sweet potatoes supply about 16% of ascorbic acid. A pound of green chillies contains about seven times as many milligrams of ascorbic acid as a pound of Irish potatoes. (v) The deficiency of tbis Vitamin affects joints.

(4) Vitamin 'D', This is a fat-soluble antiricketic vitamin. Its deficiency causes rickets. A good supply of Vitamin D is essential for proper .bone formation and healthy teeth. It helps in the calcification of bones by proper utilization of calcium and phosphorus salts. Green vegetables are rich in this vitamin.

(5) Vitamin 'E'. It is also a fat-soluble substance and is essential for reproduction and antisterility vitamin. It is found in leafy vegetables like cabbage, lettuce and in vegetable oils.

(6) Vitamin 'G' (B2) or Riboflavin. This is a growth promoting water-soluble vitamin. Its deficiency in diet causes:

(i) Loss of appetite and weight, (ii) Sore mouth, (iii) Pellagra disease and (iv) Alopecia. It is essential for growth and healthy skin. It is formed during the growth of the green plants and green leaves which are good source of this vitamin.

(7) Vitamin 'K'. This is very important in reducing the blood clogging time and greens are rich in this vitamin.

Amino acids. These are the fatty acids in which the amino group takes the place of hydrogen atom of the hydrocarbon radical. They are very necessary for the growth and development of human beings. Though the amino acid composition of vegetable proteins shows wide variations, but since these proteins are quantitatively unimportant in the human diet the variations are without appreciable effect on nutrition. Amino acid contents of some of the vegetables listed on are according to the publication of Block and Bolling (1951), Block and Weiss (1956), Orr and Watt (1957), Harvey (1958), and Souci *et. al. (*1962).

Carbohydrates, Vegetables such as potatoes, sweet potatoes, peas and dried seeds of beans are significants as energy foods or source of calories. Succulent roots, bulbs and tubers are also rich source of carbohydrates. The use of vegetables should be greatly increased in quantity when a person is on a reducing diet.

Vegetables as source of roughage. Roughage aids in digestion and prevents constipation. Most vegetables, particularly the leafy ones as spinach, lettuce, cabbage, and various Indian sags, are characterised by high water content and high percentage of cellulose or fibre. When these vegetables and most of the root vegetables are eaten they improve the tone of the muscles, especially those of the bowels. Thus by eating green vegetable we eat cellulose and chlorophyll which help in digestion also. Vegetable stems, leaves, bulbs and roots yield a spongy mass on cooking, which not only satisfies appetite but assists in pushing the food down easily through the digestive canal, thus acting as laxative and preventing constipation,

Vegetables to offset protein. Human body tissues are alkaline and it is essential that for good health proper alkaline reserve is maintained in the body. Green vegetables counteract the harmful action of proteinous food such as meat, egg, etc., which disturb the alkaline reserve of the body. It is necessary, therefore, to U~ vegetables in abundance daily.

Vegetable Milk. Vegetable plants can yield milk, It is not a science fiction but a hard fact, which has been well tried in Great Britain at Vegetable Nutritional Research Centre. Garston Hertfordshire (England). Pea-pods, outer cabbage leaves and other such green stuffs are employed for this purpose (Taken from "Advances in Farm Research" pp. 4-5 of the Indian Farming. November 1962. published by I.C.A.R., New Delhi).

Many of the deficiency diseases common in Indian household can be prevented easily by taking vegetables in the following ways:

Whenever there is skin disease, nightblindness and stunted growth in children, then vegetables such as cabbage, sweet potatoes, spinach, turnip leaves, lettuce. carrot, tomato, peas and green vegetables should be included in the diet. When a loss of appetite. constipation, lack of stamina, intestinal and nervous disorders are among the members of the family. spinach,' turnip leaves, cabbage, peas, beans and lettuce etc., should be included in the daily diet. When gums are diseased or decay is seen in the teeth or when there is loss of appetite. one should take tomato, spinach, cabbage, cauliflower, potatoes, peas, cucumber,' onion , lettuce and other such fresh vegetables. When there is delayed bone growth, defective teeth or rickets are seen in children, potatoes, beans and spinach should be increased in their food.

But there are a few very important things regarding the cooking of vegetables for preserving their nutritive contents.

AVERAGE AMINO ACID CONTENT (mg) PER 100 g PROTEIN

Vegetable	Arginu nie	Cys tine	Histid ine	Isolu cine mine	Leu cine ne	Lys ine an	Methi onie	Phyn ylala	Thre omi ne	Tryo toph	Tyro sine	Val ine	Ala ni	Asp artic	Glula mic acid	Glyc ine acid	Prpl ome	Ser ine
Bean Snaps	5.9	1.1	2.9	5.4	7.7	5.4	0.5	3.4	2.6	1.0	3.0	5.1	2.6	6.6	1.4	3.7	4.5	5.9
Beets	5.8	1.0	3.2	6.1	8.2	7.0	1.3	6.2	4.6	1.3	-	6.6	-	-	-	-	-	-
Beets tops	6.1	1.4	1.9	3.2	6.2	3.5	2.4	5.0	4.2	1.3	4.5	5.1	-	-	-	-	-	-
Broccoill	5.8	-	1.8	3.8	5.3	5.4	1.8	3.0	3.4	1.3	-	4.2	-	-	-	-	-	-
Cabbage	7.5	1.6	1.8	2.9	4.2	3.7	1.0	2.6	2.7	0.8	2.1	3.4	-	-	-	-	-	-
Carrots	3.5	-	1.4	4.3	5.8	4.5	1.1	3.7	3.8	0.8	-	5.4	-	-	-	-	-	-
Cauliflower	4.2	-	0.2	4.3	6.2	5.4	2.1	3.4	4.2	1.3	-	5.8	-	-	-	-	-	-
Peas	8.6	1.0	1.8	5.0	6.9	5.3	1.0	4.0	4.0	1.0	4.2	4.6	3.8	8.6	3.2	6.1	-	-
Potatoes	5.3	1.3	1.4	4.5	4.6	5.0	1.6	4.2	3.7	1.3	2.9	5.1	4.2	17.1	23.8	1.9	2.6	2.7
Spinach	4.5	-	1.4	4.0	6.4	5.1	1.8	4.5	4.0	-	5.1	-	-	-	-	-	-	-

(1) Add only a minimum quantity of water when cooking vegetables. Whatever water is added or produced during the cooking of vegetables should not be thrown away after cooking as it will contain mineral salts brought out of the vegetables.

(2) Do not overcook the vegetables on a high flame. The greater the heat is applied. the greater will be the loss of vitamins in them.

(3) As most of the vitamins and minerals, rich parts of vegetables, lie just beneath the sKifl, so cook them along with the skin or peel them thinly.

(4) Vegetables once cooked should never be reheated. Whatever is left over, should be served in such forms which do not require heating.

(5) For better taste, look and to have more food values in them, add them to boiling water and cook for the shortest time. It is always better to cook vegetable in the last or just before they are served.

(6) Addition of soda bicarb and strong condiments during the cooking should be avoided. They are detrimental to the nutritive value of the vegetables.

(7) Vegetables, specially the green leafy ones, should be used as soon as possible after they are harvested or brought from the market. If they become wilted or dried, their nutritive value is lost. If they are to be stored for a day or so, keep them In a dark damp place away from dust and flies.

(8) Vegetables should also not be cut unless it is necessary. They should be cut into as big pieces as possible. and that too just before cooking or serving. Cutting them into big pieces will enable exposing very little cut surface to the air or to boiling water. Never cut them first and wash. but first wash then cut them.

(9) They should not be soaked in water. as water dissolves and removes all the valuable nutrients such as vitamins and minerals from them. Wash them just before cooking to remove din etc.

(10) Stirring. sieving and straining of foods should be avoided as they are not helpful in keeping the nutritive values intact. In doing any of these operations. air gets mixed with the food. with the resultant loss of vitamins. On the other hand. keeping the vegetables uncovered for a few minutes when they are being cooked does the nutritive values good.

Vegetables requirement for a family. About 350 gms. vegetables per adult are needed per day (200 gms. green and 150 grns, root). but on an average keep it 250 gms. per day.

Although, the recommendations of the dieticians are 115 g of leafy and other vegetables and 70 g of root-vegetables, but the per capita consumption of vegetables in India is very low i.e., 18.5 kg while it is 44.1 kg in Ceylon, 21. 1 kg in Brazil, 30.6 kg in Burma (now Myanmar) 64.5 kg in Australia and 95. 5 kg in U.S.A.

2. Per Acre Yield of Vegetables is Very High : The use of vegetables as food has received. remarkably large adoption during the past few decades. these are a cheaper source of basic necessary nutrients and natural supplementary food. 'Their yield when compared to cereals, pulses are much higher nearly three to four times. As the duration of vegetables is shorter, so they can be cultivated very intensively, can reduce the pressure on cereals.

3. Vegetables are Important Source of Farm Income : Vegetables are sold at a higher rate than cereals and grains. If they are sold at a cheaper rate in the peak production season, then, due to their high yield, they have high monetary value. During rainy season pumpkin and other rainy season vegetable crops give very good income in comparison to grain and fodder crops. Market gardeners create substantial income from intensive cultivation of limited lands. Thus vegetables are important source of farm income, but for this they must be sown early in the season so that they are available quite early in the market. It is also evident that hybrid vegetable seed production with very high yields is giving good profit compared to fresh vegetable trade.

4. Aesthetic Value of Vegetables : Those who grow vegetables can very well tell the joy they have from the sowing to the harvesting of vegetables. The following extract from the Indian Horticulture, Vol. V., No.3, April-June, 1961, regarding the kitchen garden by its editor throws some light about the aesthetic value of vegetables:

(1) Kitchen gardening gives an opportunity for contact with the soil, a way of life totally denied to the city dwellers.

(2) A piece of land adjoining the house if worked well with a little effort will produce many vegetables without difficulty, by which a lot of saving can be made on this item in the expenditure. But for this as in any other sphere of activity, what is wanted is will, a certain attitude of mind.

(3) Only those who have caused a seed to sprout in the' soil can fully comprehend the glory of the act. Sow a seed, water it for two days, and then, gradually, you will get a feeling in the morning, which can be ' fully realised only if experienced. You are called to the garden by a strange reflex and that is a part of that same power as draws the cultivator to the soil. From the moment you see the sprout to the moment of flowering and fruiting, nature holds you in her thrall and the spare moments become charged with creative joy without any effort on your part. Any cultivation is thus a sadhana. Even a tiny kitchen garden can give you this feeling, you need not even consciously cultivate this attitude as a pre-requisite. Nature herself will draw you into that mood. But an effort should be made first and that effort is simply the sowing of a seed. The city man need not be completely divorced from the soil. Even kitchen garden can give him, to a limited extent, the joy and aesthetic ties of cultivation.

5. More Vegetables can be Raised in One Year : Vegetables as compared to crops can be raised throughout the year. Many of the vegetables like spinach, potato, brinjal, pumpkin, bhindi (Lady's finger), etc. can be grown twice and even thrice in the year. Some green vegetables are ready for harvesting within 45-60 days. Many early varieties of vegetables are available now-a-days, which can grow earlier than the normal season. We can take several vegetables one after the other throughout the year if facilities for irrigation are available.

6. Vegetables have Export Potential too : India has diverse agro-climatic conditions, therefore, numerous , varieties of vegetables, - tropical, subtropical as well as temperate are produced throughout the year. There is a great demand of vegetables in compared to other exporting countries and earn good foreign exchange by exporting them. By the exports of preserved and dehydrated vegetables we earn 2.5 to 4.5 crores of rupees as foreign exchange.

VEGETABLE INDUSTRY IN INDIA

According to Shri Katyal, Additional Agricultural Commissioner, Government of India, the total area under vegetables in India was about 1.625,000 ha with a total production of 1,60,00,000 tons during 1962-63. For a well balanced diet about 300 gms. of vegetables arc needed per captia (90 gms. root vegetables, 120 gms. green leafy vegetables and 90 gm. other vegetables). According to this standard the vegetable production is less than even half of our daily requirements. Thus, it is clear that we must increase the vegetable production in India to meet the requirements of our growing population which is about 90,00,00,000. AI present 2,00,00,000 tons of fruits and vegetables are produced in India, but we need 7,40,00,000 tons every year (All India Radio, New Delhi). So every citizen should contribute his share by growing vegetables, whether he lives in small house, ill cities or in suburbs or outskirts of towns or in the villages. The Government of India had also launched Vegetable Production Scheme in the Third Five Year Plan to provide improved seed, technical advice and other facilities to the growers. Though the vegetable preservation and canning industry is still in its infancy, yet it has recently made much progress in India and made possible a continuous supply of vegetables throughout the year. The autotruck has also made it possible for a vegetable producer to take advantage of selling his produce in distant markets. However, farm canning and home canning of vegetables, the preservation and supply of perishable vegetable products, storage and refrigeration facilities still require further development, so that vegetable producers, growers and kitchen gardeners may have greater profit from their produce when markets are glutted.

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