FOOD-NUTRITIONAL & AESTHETIC SECURITY FOR FUTURE INDIA BY HORTICULTURE

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Abstract: India is the second populous country next to China. By 2050, India will be the most populous country in the world with a population of about 2.0 billion. Nearly 30 per cent of our population is suffering from malnutrition and the nation ranks 63 in global hunger index which indicates the malnutrition burden. Apparently invisible improvement over the present status compelled the Government to promise food security for underprivileged people which may appear hectic without nutritional security. Industrial development and urbanization devoid of aesthetic concept made us detached from the Mothernature and propelled into extremely busy schedule to become insensitive for its maintenance when left over land inside the city has become almost unavailable for beautification or at least for the children to play. Therefore, for achieving food-nutritional and aesthetic security modern horticultural practices with diversified horticultural crops can be the best available resources. Fruits and vegetables as food and diet supplements have gained immense popularity in most of the countries especially among the people of non-vegetarian food habit. Nutrient rich fruits, vegetables and spices, thus, offer promise for the future amelioration of nutrient deficit disorders due to malnutrition. In addition, recent experimental evidence has shown the growing importance of fruits and vegetables in the prevention of non-communicable diseases. On the other hand, medicinal and aromatic plants have immense potential to supply medicines for human welfare. The main aim of this article is to explore the importance of horticulture for the proposed food-nutritional and aesthetic security with analytical discussion to achieve it.

Key words: Aesthetic, Food-Nutritional, Horticulture, Human welfare, Sustainable.

Introduction: Rapid development of industries followed by urbanization and geometric progress in population with escalated demand of food grains and increase in price of the same is the major challenge before us. Predominant rice-based production system in this country is being affected by decreased availability of land and deteriorating production environment which can hamper initiative for food security by Indian government. On the other hand, only enhancement of productivity of food grain is not sufficient to get rid of serious problem of malnourishment in the population of our country and it demands nutritional security. India is blessed with various agro climatic conditions and has lot of potential resources to grow wide range of horticultural crops round the year. In fact, in our country horticulture crops are grown from sea level to snowline. Diversified horticultural crop production can play unique role for food, nutritional and aesthetic security. There is urgent need to develop strategies for increasing horticulture production with acceptable quality. Hence, enhanced production of various horticultural crops enriched with diverse kind nutrients to meet the minimum dietary requirements should be emphasized.

Crop diversification: Maximum diversification in horticultural crops is found in Asia. India, among Asian countries is the second largest producer of fruits and vegetables next to China. Fruits, vegetables, flowers, spice, plantation crops, medicinal and aromatic plants are the potential resources in horticultural crop diversification which is a play vital role for nutritional, aesthetic and economic development in India. Collection and maintenance of elite germplasm apart from preservation of existing germplasm is necessary for development of high-yielding varieties of various horticultural crops having traits of economic importance which includes improved nutritional qualities, shelf-life and tolerance to biotic and abiotic stresses.

Importance of horticulture crops on food and nutritional security Fruits: Fruit production is recognized as one of the important sub-sectors of food and nutritional security.In many countries fruits rank third in consumption after cereals and vegetables. Fruits are low in calories, fat, and rich in sugars, fiber, and vitamins, which are essential for optimizing our health.Many fruits contain adequate amount of anti-oxidants like poly-phenols, flavonoids and anthocyanins.Primary aim of these compounds is to protect our body from oxidant stress and diseases and secondary aim is boosting our immunity level.

As per recommendations of the Indian Council of Medical Research (ICMR) the per capita consumption of fruits should be 120g /person /day, but present availability is low i.e., 80g/person/day which may be due to less availabitlity and increased price in the retail market**.** During 2011-12 India produced 76.424 million metric tonnes of fruits with an area of 6.704 million hectares (NHB data-2013). The challenge is to double the present production of fruits to meet the rising demand.

Vegetables: Vegetables contain valuable food ingredients for the maintenance of health and

prevention of diseases. They are valued for their high carbohydrate, vitamin, mineral and fibre contents. Vegetables make up a significant proportion of the diet of most of the people and the production of vegetables is a significant factor in ensuring that people have an adequate intake of many essential vitamins, minerals and carbohydrates. Among vegetables tuber crops are the primary food source for most of the African counties. Leafy vegetables root and tuber crops are an excellent source of vitamins and micronutrients. Increasing vegetable consumption can alleviate the problem like malnutrition present in the poor people especially lying below poverty line. Cultivation of vegetables generates employment and income, and contributes to gender equity and better livelihoods. Many vegetables, indigenous vegetables in particular, have high levels of micronutrients and can significantly contribute in this regard if included in the daily diet.

As per recommendations of the Indian Council of Medical Research (ICMR) the per capita consumption of vegetables should be 300g/person /day against the present level of consumption i.e.,180g/person/day. During 2011-12 India produced 156.33 Million metric tons of vegetables (NHB data-2013). The area under cultivation of vegetables was 8.99 Million hectares and it is necessary to increase production in upcoming years (IIHR-vision-2050).

Flowers and Ornamental Landscaping: The role of landscape gardening in human health and welfare cannot be over looked. Even in under developed countries, people do not live by bread alone, and they also need some finer things of life. They need to relax, find peace of mind and breathe the fresh air after a day's hard work. The visible landscape contributes significant benefits on human beings. Landscape gardening regarding public health directly affects the health of individuals and community. Exposure to 'green space' or 'landscape garden' has several positive effects on mind including aesthetic appreciation, meditation, contemplation, restoration, reduced levels of stress and even in reduction of blood pressure and heart rate, improvement of recovery from surgery healing. Landscape gardening and gardening in public places, schools, colleges, hospitals, industrial area is essential for human welfare. In the context of landscape architecture human welfare means the stewardship of natural environments and of human communities in order to enhance social, economic, psychological, cultural and physical functioning, now and in the future (Randhwa and Mukhopadhyay,2007).

Nutraceuiticals: Nutraceutical can be defined as "A food or part of food or nutrient that provides health benefits including the prevention and treatment of a disease."(Stephen De Felice).

Horticulture crops are hidden sources for different functional components and plays exceptional role in prevention of different types of diseases and disorders of human body.

Spice,Plantation, Medicinal and Aromatic Crops: Spices valued for more than just taste and appearance. These are hidden sources for nutritional and medicinal merits. Sometimes these are better known as home remedies than proven treatments in medicine. Plantation crops providing economic and livelihood security to wide range of population. Medicinal and aromatic plants have immense potential to prevent diseases and disorders due to presence of great medicinal properties.

cultivation.

Strategies To Achieve Food And Nutritional Security:

1. Government of India (GOI) has implemented food security bill 2013 to provide subsidized food grains to approximately two thirds of Indian population (1.2 billion) to alleviate hunger and malnutrition. Horticulture crops are the hidden sources to provide food and nutrition and reduce the burden on cereals.

2. Nutrition hot spots: Identification of malnourished geographical areas and implementation of ideal nutrient rich cropping pattern has to be drawn based on the specific location for correction of malnutrition.

3. Village adaptation: The government of India had initiated programme in 2011 of 60,000 pulses villages to improve pulse production (http://agricoop.nic.in/idpvra29311.pdf). Similar initiative through adaptation of villages can be undertaken to improve production of vegetables and fruits which can increase the consumption at the grass-root level apart from other benefits of their

4.Implementation of Nutra-farming system: Strategies should be determined towards implementation of ideal and nutritionally superior farming patterns for specific-agro climatic zones

5. Think globally - act locally: ''Home is the ideal place for operation". Kitchen garden is an ideal not only for food and nutritional security but also outcome from this garden is safe and free from residues of agro-chemicals. Planning and implementation of ideal kitchen garden with incorporation of nutritionally superior vegetable and fruits can be taken into consideration.

6. Quality is the question mark? The food which lacks quality won't be full fill the object of food and nutritional security of the nation. Though, quality is a complex term which must be maintained. Impurities and inferior quality of raw material contaminated with residues of agro chemicals can induce secondary health problems. Indiscriminate use of fertilizers and

pesticides by Indian farmers is a matter of concern both for domestic and export markets.

7. Think different to escalate production: 'Grow more fruits and vegetables''- take these words as a 21 century slogan. This object can be fullfilled by adoption and implementation of new and advanced farming systems like integrated farming, precession farming, sky farming, terrace farming, hydroponics, aero-ponics at macro level and development of kitchen garden by individuals at micro level.

8.Wild/underutilized/non-utilized/neglected crops: India is the country having vast diversity of horticulture crops and lots of nutritionally superior crops. Unfortunately many of these are still undiscovered, under-utilized, non-utilized, threatened and some have disappeared. There is urgent need to take steps towards identification, conservation and cultivation of these crops.

9. Post-harvest management: In India post-harvest losses in horticulture crops estimated about 30%. Most of these crops perish during harvest, storage, grading, transport, packaging and distribution. Only 2% of these crops are processed into value-added products. Hence, there is a need for maximum commercial utilization of horticultural crops into post harvest and processed products and to adapt marketing strategies to the requirements of the world market. Scientific research and development of suitable technology for maintenance of nutritive value of the processed food products is also important for future food and nutritional security.

10. Bio-fortification: Bio-fortification is the process of generating genetically improved food crops that are rich in bio-available micronutrients, either through conventional breeding or genetic modification. Bio-fortified crops have been evaluated across the world which will help to improve the specific nutrient deficiency. Bio-fortification works has been successfully carried out in cassava, tomato, banana, and other pulses, broccoli crops. Countries like Africa developed Vitamin-A rich sweet potato and tapioca, iron rich beans, all these are witness to treat against malnourishment. Progress of Bio-fortified crops in India is very slow. Since, the role of Research institutes and organizations is not only implementation of advanced technologies in research and development, the outcome from these with horticultural plants, tools and methods can raise the production and add more colures in lives of institutions should have acceptability in the public domain. In this sense, Research organizations should take the responsibility to create awareness in the society about advance technologies which will impart hopeful results.

11. Economic and social justice: Availability, affordability and acceptance of food are good in high class people in the society. Hunger and malnutrition hits to the vulnerable population of low affordability, particularly who are under below poverty line (BPL) and people who are far away from geographical distribution points. The government should take steps to reduction of economic and social imbalance in the society.

Strategies To Achieve Aesthetic Security: 'Health of the country indicates wealth of the nation' the ultimate aim of food and nutritional security is to provide good health. In the same way the aim of aesthetic security is to improve psychological health to the masses. Changing life style, increased work pressure, physical and mental stress are the obstacles to good health.

Rapid urbanization, increasing population density, decreasing per capita availability of land in cities all these are hurdles to secure ideal place for gardening in cities. Children are the worst sufferer in the cities and towns where the play grounds are too small in terms of number and area. They are suffering from life-style diseases apart from mental aggressiveness and anxiety. There is urgent need to develop adequate number of public parks and gardens in cities and also in small towns for people's recreation. Intervention by Government and NGOs is necessary for identification of land for development of gardens, playgrounds and allied infrastructures. General awareness about the nature and learning to love and live amidst the Nature is not only essential for conversation of biodiversity but also for making the surroundings beautiful for peace and tranquillity which is only possible through various horticultural activities.

Conclusion:

Obviously horticulture is the best answer for present day burning issue like malnourishment. Rainbow revolution added colures to overall horticulture development and our strategies and necessary initiative

Indian people to achieve food- nutritional and aesthetic security.

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Table 1.Example of functional components present in horticultural crops and their role in human

Sl.no	Compound name	source	Role
1.	**Fatty acids**	Vegetable oils	Improve body composition, reduce cancers
2.	**Poly phenols**		
	Anthocyanidine	Fruits	Neutralises free radicals, reduce risk of cancer
	Catechins	Tea, babul pods	
	Flavonone	Citrus	
	Flavones	Fruits, vegetables, soya bean	
	Proanthocyanidine	Cocoa, chocolate,tea	Reduce Cardio Vesicular disease (CVD)
3.	**Saponins**	chick pea	Lower cholesterol, anti cancer
4.	**Probiotics /Prebiotics/Synbiotics**		
	Fructo - oligosaccharides	Onions, combination of Pro & Prebiotics	Improve GI health
	Daidzein , Zenistein	subabul fodder	Reduce menopause symptoms, improve bone health
6.	**Caroteinoids**		
	β- caroteine	Carrots, vegetabels,fruits	Nutralises free radicals
	Luteine	vegetables	Healthy vision
	Zeoxanthine	citrus,corn	
	Lycopene	Tomatoes	Reduce prostate cancer
7.	**Dietary fiber**		
	Insoluble fiber	Apple,orange,cucumber	Reduce breast, colon cancer
	β-glucan	Oats,mushrooms	Reduce CVD

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