



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating: 5.03

TPI 2020; 9(8): 145-148

© 2020 TPI

www.thepharmajournal.com

Received: 21-05-2020

Accepted: 22-06-2020

Eshu Sahu

Krishi Vigyan Kendra,
Gariyaband, IGKV, Raipur,
Chhattisgarh, India

Tushar Mishra

Krishi Vigyan Kendra,
Gariyaband, IGKV, Raipur,
Chhattisgarh, India

Ishwar Singh

Krishi Vigyan Kendra,
Gariyaband, IGKV, Raipur,
Chhattisgarh, India

Pravin Kumar Jamrey

Krishi Vigyan Kendra,
Gariyaband, IGKV, Raipur,
Chhattisgarh, India

Rahesh Bhagat

Krishi Vigyan Kendra,
Gariyaband, IGKV, Raipur,
Chhattisgarh, India

Shalu Abraham

Krishi Vigyan Kendra,
Gariyaband, IGKV, Raipur,
Chhattisgarh, India

Corresponding Author:

Eshu Sahu

Krishi Vigyan Kendra,
Gariyaband, IGKV, Raipur,
Chhattisgarh, India

Development of nutrition garden model for diet diversification and improved nutrition security: A review

Eshu Sahu, Tushar Mishra, Ishwar Singh, Pravin Kumar Jamrey, Rahesh Bhagat and Shalu Abraham

Abstract

A garden has its beauty. It exists for aesthetic purposes, like a flower garden. But when a garden like a kitchen garden or vegetable garden is put to use it becomes a source of nutritional security and useful for fulfilling human nutrition. It also becomes a source of income for the women of the families, particularly in the rural areas. This study highlights the same. A vegetable garden typically includes divided areas of land, intended to grow one or two types of plant or many varieties. It is usually located to the rear of a property in back yard of the house. It is also a mode of earning and increasing the nutritional quality of the food a family needs. During the year (2018-19) front line demonstration was conducted in Nutri Smart Village (7 villages), Gariyaband District at back yard nutritional garden for the purpose of enrichment of balance nutrient diet of the rural community and participation of rural women. The study reveals that after investing a bare minimum amount of Rs. 300 in vegetable crops production a total profit of ten times i.e. Rs. 2500 to 3000 can be obtained and can improve diet and income of farmer families of the rural areas. This would not only enhance the income of the families but would also help in getting a proper balanced diet to the family in the country where nutritional requirement lacks in our daily food.

Keywords: Nutritional garden, kitchen garden, nutritional security and physical health

Introduction

The quantity of vegetable produced per capita in India is much lower than what is recommended by the dieticians. In India per capita availability is around 135 g against the minimum requirement of about 300g for a balance diet. Even this low level of average supply does not fully reflect the consumption pattern of the rural household and those below the poverty line where per capita vegetable consumption is very low, even lower than 40g per day. It is now well conceived that by simply adding greens and other vegetables to the available food grains the diet of the average Indians can substantially be upgraded. To make this recommendation realistic adoption of kitchen garden is the best option which can supply required vegetables in daily diet to the rural families. Maximum population from the rural areas is dependent on agriculture. In agriculture work human labor plays an important role, especially the participation of women is of utmost importance in the field of farming in rural areas of the country. It will not be out of place to mention that women does most of the activities in agricultural front. In rural areas neighbor surroundings are vacant which can be utilized for installing "Kitchen Garden" which will produce fresh vegetables supplementing the vitamin deficiencies of the human population. In addition, extra produce will add to additional income by sell of the vegetables in the market, thus increasing the earnings of the family.

In Gariyaband region, there are seven locations devoted to nutritional security measures. As part of the focus of this year on nutrition security in our region. This is done to ensure nutritional security for the member families apart from promoting health initiatives such as sanitation, personal hygiene, and safe drinking water. In this process, we have disbursed Tomato, brinjal, chilli seedlings and Palak, Amaranth, spinach and Radish, other vegetable seeds from KrishiVigyan Kendra (KVK) for around 168 beneficiaries. The concept is promoted to ensure nutritious food to the member family. Before the distribution of the seeds, we organized a programme with KVK scientists. In that event, subject matter specialists attended and educated the members about the essential nutrition contained in those garden vegetables.

We also intend to conduct a sample study of families to analyze the impact created through this kitchen garden programme.

Objective of the Activity

- Reduce the expenditure on vegetable purchase by the members
- Ensure fresh vegetables without inorganic mix
- Facilitate the availability of vegetables at the doorstep
- Ensure self-consumption for their family and the neighborhood

Process followed

Need assessment in the field: As a first step towards the importance of organic vegetable consumption, an orientation was given to the staff and the people functionaries. The staff, in turn, provided orientation and awareness to the farmers on the importance of kitchen garden. Based on the need assessment, 2 SHGs member were selected and invited to the programme. After orientation and education, the seed kits were disbursed.

Training: Thirty-five associates from seven locations were provided training for promoting kitchen garden activities with knowledge on essential nutrition and health benefits of each seed in the packets. We have also imparted training on how to treat household waste water and use it in the garden as natural fertilizer and also on a safeguarding mechanism to be followed for promoting kitchen garden. The selected members were educated to monitor the mortality of the seeds, yields, consumption, and income earned from kitchen garden produce.

Follow-up visits: Our Scientific staff visited the beneficiaries for monitoring the growth of plants. Weekly follow-up visits were undertaken by the KVK staff. Awareness creation among the targeted members was done through training programmes on the importance of nutrition, positives of the kitchen garden and the health benefits of vegetable consumption. These training programmes motivated the women and their involvement to grow the plants and ensure timely follow-ups.

Nutritional Security through Kitchen Garden

Food security is a global a complex issue and remains a major challenge for developing countries. Food security is multidimensional and is presumed exists when is adequate and continuous food availability, access, and utilization in a sustainable manner. Several studies suggest that home gardens can be an option for food and nutritional security in disaster, conflict, and other post crisis situations (Galhena *et al.*, 2013) [4]. Nutrition gardening is especially important in rural areas where people have limited income-earning opportunities and poor access to markets. These gardens are also becoming an increasingly important source of food and income for poor households in peri-urban and urban areas (Christanty, 1990; Marsh, 1998; Shackleton *et al.*, 2008) [1, 19, 25]. Nutrition gardening can be a profitable proposition in a country like India which is predominantly vegetarian and, as such, a large number of nutrients are obtained from vegetables for a balanced diet. Due to inadequate consumption of vegetables, deficiency of micro-nutrients especially of iron, vitamin A and iodine are prevalent in the developing world (Hall *et al.*, 2009; Kanungsukkasem *et al.*, 2009;

Satheannopkako *et al.*, 2009; Leenders *et al.*, 2013; NCCDPHP, 2013) [7, 13, 15, 22]. The challenge of increasing vegetables consumption is a major concern for health professionals. An estimated 6.7 million deaths worldwide were attributed to inadequate fruit and vegetable consumption in 2010 (Lim *et al.*, 2012) [16]. Further, the vegetables reaching the market contain high amount of pesticide residues, it is of special interest to the consumers to grow their own vegetables for domestic consumption. Application of pesticides for insect-pest and disease management is discouraged in the nutrition gardens. Vegetables help combat malnutrition and diversify diets. Dietary diversification balances the diet by enhancing the supply of essential micro-nutrients leading to improved health, such as improving functions of the whole body, disease prevention, and delayed disease progression, enhanced thinking ability and increased efficiency. Examples include improvement in micro-vascular reactivity (Macready *et al.*, 2014) [17], better cognitive performance (Nyaradi *et al.*, 2014) [23], decreased risk of colorectal cancer, reduce the risk of overweight (Howarth *et al.*, 2001) [10], coronary heart disease (Dauchet *et al.*, 2006; He *et al.*, 2007; Hartley *et al.*, 2013) [2, 9, 8], and reduced risk of kidney disease (Goraya *et al.*, 2013) [6]. Melina (2012) [20] suggested that "a menu filled with seasonal fruits and vegetables could provide a big nutritional boost", and vegetables were packed with fiber and water, and were low in fat, they decreased the calorie density of diet, while boosting overall nutrition. It was evident from the literature that home gardens are a part of agriculture and food production systems in many developing countries and are widely used as a remedy to alleviate hunger and malnutrition in the face of a global food crisis (Johnson *et al.*, 2000) [12]. Mitchell and Hanstad (2004) [21] reported that home garden provided multiple social benefits such as enhancing food and nutritional security, empowering women, promoting social justice and equity, and preserving indigenous knowledge and culture and so on. One of the primary objectives of this study is to develop nutrition garden model especially for urban and peri-urban households which ensure healthy diet that contains adequate quantities of vitamins and macro and micro-nutrients by producing diverse kinds of vegetables. Households with gardens typically obtain from them more than 50 percent of their supply of vegetables. Talukder *et al.* (2000) asserted that children in households with garden consumed vitamin A-rich foods, such as green leafy vegetables and yellow fruits, more frequently than did children in households without a garden or with a traditional garden. Very small mixed vegetable gardens can provide a significant percentage of the recommended dietary allowance for protein (10-20 %), iron (20 %), calcium (20 %), vitamin A (80 %) and vitamin C (100 %) (Marsh and Talukder, 1994) [18]. Though, all the nutritive daily requirements for an adult cannot be met with this suggested nutrition garden model but this model supplements major share of the daily requirements. Average daily nutrient requirement of an adult is; 10-20 mg iron, 3000-10,000 IU vitamin A, 1.5 mg riboflavin, 600 mg calcium and 50 mg vitamin C (Indian Council of Medical Research, 2010). This nutrition garden provides 6387 IU vitamin A, 11.62 mg iron, 315 mg calcium and 105 mg vitamin C per day to each adult in the family. This showed that availability of vitamin A, iron and vitamin C is at par or higher than the daily requirement. Thus this model is able to meet daily requirement of vitamin A, iron, and vitamin C of family. Although, there is daily availability of 315 mg calcium per adult but its requirement of 600 mg can be met

with the consumption of milk and milk products as these are the richest source of calcium. Though vegetables are recognized as the most important source of these micronutrients, yet the per capita vegetable consumption in India (86 g/day) is far below the FAO's recommended (200 g/day). The limited supply of vegetables, especially during the off-season, higher market price and lower appreciation or awareness regarding their consumption are key factors that limit the vegetable consumption rate in the developing world. One way to achieve this goal is to increase the nutritional status and income of people through research, development, training and extension of school, home and market garden technologies. According to Indian Council of Medical Research, New Delhi, an adult requires 125 g green leafy vegetables, 75 g other vegetables and 100 g roots and tubers per day while, this garden provides 120 g green leafy vegetables, 125 g other vegetables and 28 g root vegetables to each adult. As potato and sweet potato which constitute important tuber crops are not included in the model, an adult completes its vegetable requirement by consuming these tubers. Tubers are group of crops where freshness is not as important and can be stored for longer periods.

Tabinda Qaiser, Hassnain Shah, SajidaTaj and Murad Ali (2013) ^[26] Kitchen gardens are indigenous livelihood practices, especially among women; scientific approach in provision and promotion of these livelihoods through training sessions aims to make these livelihoods sustainable. Most of the beneficiaries valued livelihood assistance. The results were especially visible in the poor households. Kitchen gardening training has benefited the target community to practice alternative livelihoods. Still, a follow up plan is needed to ensure that such techniques are practiced on a large scale with market links to assist ecological and economical development in the project area.

Dr. Rashmi Shukla (2018) ^[3] It has been found after results of demonstration that women who are landless may also produce kitchen garden products around their house available and increase nutritional standard plus economical growth for their family. They have no knowledge about season and methods of cultivation of vegetables. Unavailability of quality seeds and planting materials of vegetables and fruits was the most important problem faced by the women. They have no knowledge of planned way/methods and use of insecticides.

Garcia MT *et al.* (2018) ^[5] To examine the impacts on food and nutrition-related outcomes resulting from participation in urban gardens, especially on healthy food practices, healthy food access, and healthy food beliefs, knowledge and attitudes. Participants in a home-based urban gardening program reported a wide range of perceived health-related benefits. All participants reported that the gardens led to healthier eating for both adults and children, which they attributed to the greater affordability, accessibility, freshness, flavor, and convenience of their garden produce; motivation for healthy eating fostered by pride in their gardens; and/or greater nutritional knowledge. Multigenerational improvements in physical activity and the ability to cope with stress and trauma through gardening reported by participants were also highly salient. In addition, some reported direct improvements in weight management and adherence to diabetes-healthy diets. These findings suggest that an urban gardening model that integrates home gardening with culturally appropriate nutrition and gardening education has the potential to improve a range of health behaviors that are critical to preventing and managing chronic disease,

especially among low-income, urban/ peri urban households. Kartikapalar *et al.* (2019) ^[14] This study suggests that supported home gardening integrated with nutrition education in a community-based, culturally appropriate program setting is acceptable to participants, who perceive it to benefit their nutrition and health in a myriad of ways. Key program elements perceived to be beneficial by participants include the educational component provided in tandem with garden support, the culturally appropriate garden produce and curriculum, and the promotion of organic gardening. Although promising, a formal program evaluation is needed to assess whether supported home gardening is an effective vehicle for health improvement for low-income populations with high cardio metabolic risk in urban settings. If effective, urban home gardening programs should be understood as a complement to (rather than a replacement for) community gardens, which together may promote a more resilient, trauma-informed local food system.

Conclusion

Vegetables help combat malnutrition and diversify diets. Dietary diversification balances the diet by enhancing supply of essential micro-nutrients leading to improved health, enhanced thinking ability and increased efficiency. Improved vegetable nutrition garden is better than traditional homestead vegetable garden. The improved model involves many crops that can be repeatedly harvested to meet a family's vegetable needs throughout the year. The crops and their varieties are scientifically selected to be highly nutritious with few pest and disease problems. The suggested model can produce 300 kg of vegetables annually, sufficient to meet vitamins and minerals requirement of a family comprising four members.

References

1. Christanty L. Home gardens in tropical Asia, with special reference to Indonesia, In: Landauer K., and Brazil M., ed. Tropical home gardens, 9-20, Tokyo, Japan: United Nations University Press, 1990.
2. Dauchet L, Amouyel P, Hercberg S, Dallongeville J. Fruit and vegetable consumption and risk of coronary heart disease: a metaanalysis of cohort studies, *J Nutr.* 2006; 136(10):2588-2593.
3. Dr. Rashmi Shukla. Kitchen garden for nutritional security in nutri smart village. *International Journal of chemical studies.* 2018; 6(3): 1015-1017.
4. Galhena DH, Freed R, Maredia KM. Home gardens: a promising approach to enhance household food security and wellbeing, *Agric Food Security.* 2013; 2:8. <https://doi.org/10.1186/2048-7010-2-8>
5. Garcia MT, Ribeiro SM, Germani ACCG, Bógus CM. The impact of urban gardens on adequate and healthy food: a systematic review. *Public Health Nutr.* 2018; 21(2):416-425.
6. Goraya N, Simoni J, Jo CH, Wesson DE. A comparison of treating metabolic acidosis in CKD stage 4 hypertensive kidney disease with fruits and vegetables or sodium bicarbonate, *Clin. J Am. Soc. Nephrol.* 2013; 8:371-381.
7. Hall JN, Moore S, Harper SB, Lynch JW. Global variability in fruit and vegetable consumption, *Am. J Prev. Med.* 2009; 36:402-409.
8. Hartley L, Igbinedion E, Holmes J *et al.* Increased consumption of fruit and vegetables for the primary prevention of cardiovascular diseases, *Cochrane Database*

- Syst. Rev. 2013; 6:CD009874.
<https://doi.org/10.1002/14651858.CD009874.pub2>
9. He FJ, Nowson CA, Lucas M, MacGregor GA. Increased consumption of fruit and vegetables is related to a reduced risk of coronary heart disease: meta-analysis of cohort studies, *J. Hum. Hypertens.* 2007; 21(9):717-728.
 10. Howarth NC, Saltzman E, Roberts SB. Dietary fiber and weight regulation, *Nutr. Rev.* 2001; 59(5):129-139.
 11. Indian Council of Medical Research, Nutrient requirements and recommended dietary allowances for Indians, A report of the expert group of the Indian council of medical research, 2010, 1-334.
 12. Johnson WC, Alemu B, Msaki TP *et al.*, Improving household food security: institutions, gender and integrated approaches, Davis CA, USA: Paper prepared for the broadening access and strengthening input market systems (BASIS) collaborative research support project (CRSP), 2000.
 13. Kanungsukkasem U, NG N, Minh HV *et al.* Fruit and vegetable consumption in rural adults population in INDEPTH HDSS sites in Asia, *Glob Health Action.* 2009; 2:35-43.
 14. Kartikapalar, Emiliano Lemus Hufstedler, Karen Hernandez, Annie Chang, Laura Ferguson, Raul Lozano *et al.* *Journal of Nutrition Education and Behaviour.* 2019; 51(9):1037-1046.
 15. Leenders M, Sluijs I, Ros MM *et al.* Fruit and vegetable consumption and mortality: European prospective investigation into cancer and nutrition, *Am. J Epidemiol.* 2013; 178:590-602.
 16. Lim SS, Vos T, Flaxman AD *et al.* A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010, *Lancet.* 2012; 380:2224-2260.
[https://doi.org/10.1016/S0140-6736\(12\)61766-8](https://doi.org/10.1016/S0140-6736(12)61766-8)
 17. Macready AL, George TW, Chong MF *et al.* Flavonoid-rich fruit and vegetables improve microvascular reactivity and inflammatory status in men at risk of cardiovascular disease FLAVURS: a randomized controlled trial, *Am. J Clin. Nutr.* 2014; 99:479-489.
<https://doi.org/10.3945/ajcn.113.074237>
 18. Marsh R, Talukder A. Production and consumption effects of the introduction of home gardening on target, interaction and control groups: a case study from Bangladesh, In *Proceedings of the International Symposium on Systems-Oriented Research*, Montpellier, France, Montpellier, France, Association for Farming Systems Research/Extension (AFSR/E), 1994.
 19. Marsh R. Building on traditional gardening to improve household food security, *Food Nutr. Agric.* 1998; 22:4-14.
 20. Melina. Realistic and livable tips for a healthy lifestyle, Accessed April 19, 2012, 2012.
 21. Mitchell R, Hanstad T. Small home garden plots and sustainable livelihoods for the poor, Rome, Italy: LSP Working Paper 11, 2004.
 22. NCCDPHP. National Center for Chronic Disease Prevention and Health Promotion, State Indicator Report on Fruits and Vegetables, Atlanta, GA: Centers for Disease Control and Prevention, US Dept of Health and Human Services, 2013.
 23. Nyaradi A, Foster JK, Hickling S *et al.* Prospective associations between dietary patterns and cognitive performance during adolescence. *J Child Psychol. Psychiatry.* 2014; 55:1017-1024.
<https://doi.org/10.1111/jcpp.12209>
 24. Satheanoppakao W, Aekplakorn W, Pradipasen M. Fruit and vegetable consumption and its recommended intake associated with sociodemographic factors: Thailand National Health Examination Survey III, *Public Health Nutr.* 2009; 12:2192-2198.
<https://doi.org/10.1017/S1368980009005837>
 25. Shackleton CM, Paumgarten F, Cocks ML. Household attributes promote diversity of tree holdings in rural areas, South Africa, *Agrofor. Syst.* 2008; 72:221-230.
<https://doi.org/10.1007/s10457-007-9066-5>
 26. Tabinda Qaiser, Hassnain Shah, SajidaTaj, Murad Ali. Impact Assessment of Kitchen Gardening Training under Watershed Programme. *Journal of Social Sciences, COES&RJ-JSS.* 2013; 2(2):108-116.