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Kitchen garden: An ideal approach to enhance household nutritional security in rural areas of Seoni district (M.P.)

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Abstract

The tribal women farmers, who are interested and having backyard space were chosen for backyard kitchen gardening intervention in the adopted tribal village. In 2019-2020 around 110 Kitchen Garden kits have been distributed among tribal women beneficiaries of the Setewani villages, in Kurai block under FLD programme of KVK, Seoni. Out the 40 respondents 22% were illiterate, 41% elementary education and 37% have middle class education each kitchen garden kit contains 23 different vegetable seeds which procured from ICAR, IIR Varanasi & IARI, New Delhi. The study revealed that backyard kitchen gardening in tribal areas decreases expenditure on vegetables, increase the availability of varied vegetables and green leafy vegetables in the diet, increase community connection after starting kitchen gardening activity and the production and consumption of the vegetables increased by 218.25% and 95.40% respectively which meant to additional intake of Iron viz.32.70% and Ca 110.40%.

Keywords: Backyard kitchen garden, nutritional intervention, minikits and nutritional security

Introduction

Kitchen gardening is a technology which enables us to grow fresh vegetables at home providing a good use of empty tins, old utensils and clay flower pots. This activity can not only save our money and time but also can provide a healthy, useful and environment friendly hobby for whole family (Cheema. K.J, 2011) [6].

The kitchen/home gardens have been found to play an important role in improving food security for the resource poor rural households in developing countries (Asaduzzaman, 2011) [3]. Poor people more often pay a higher price for food as they buy in expensive small quantities as well as travelling far to get to where the food costs relatively lower thereby losing that advantage on transport (Smit, 2001) [13].

The daily requirement of vegetable is around 300 g vegetables and 100 g fresh fruits/day (green leafy vegetables 50 g, other vegetables 200 g, roots and tubers 50 g) (Singh *et al.*, 2018) [12]. Pregnant women should consume 100 g leaf vegetables/day as per ICMR but the availability is very low. Many of the rural families used to grow vegetables in their backyards for their household consumption. But still they lack in adequate consumption of vitamins and minerals because of unorganized cultivation of vegetables. Keeping in view the importance of vegetables in daily diets and its low availability, the Krishi Vigyan Kendra has conducted various trainings and demonstrations under Women in Agriculture discipline.

A family can take vegetables from these kitchen gardens round the year. The nutritional home garden or kitchen garden is generally located close to the house and is used for growing vegetables, fruits, and other food crops for the family [1]. It not only saves our money and time but also can provide a healthy, useful and environment friendly hobby for whole family. Home gardens can help us in recycling of household waste especially when a compost pit is developed. One of the easiest ways of ensuring access to a healthy diet that contains adequate macro- and micronutrients is to produce many kinds of foods in the home garden.

Direct income is by sale of surplus production while the indirect income is by the savings achieved by not buying the same products from the market as well as better trade when produce is exchanged with others from the neighbours. Besides the provision of fruits and vegetables, gardening provides an aesthetic and therapeutic exercise that helps in relieving stress. The perception of good health goes beyond what we eat and encompasses the whole being. While the poor engage in manual work in their employment they do so as an obligation but in their gardens they do it because they like it.

Gardening promotes relief from acute stress (Berg, 2011) [11] which further improves the wellbeing of the participants.

Over half of the population suffer from chronic food insecurity. It has been projected that global food production will need to increase by 70% in order to meet the average daily caloric requirement of the world's population by 2050's. Now the focus is on to achieve a balanced diet, and maximization of both life expectancy and quality, by identifying food ingredients that improve the capacity to resist disease and enhance health (Agte and Tarwadi, 2012) [1].

Gardening must be done with virtually no economic resources, using locally available planting materials, green manures, "live" fencing and indigenous methods of pest control. Thus, home gardening at some level is a production system that the poor can easily enter (Marsh and Talukder., 1994) [8].

Materials and Methods

The present work was carried out by Krishi Vigyan Kendra Seoni in the villages namely Setewani of Seoni district during the year 2019 to 2020. Training programs were conducted in these villages with total female participants of 40. The objective of the training was to upgrade the knowledge of rural women regarding the importance of the kitchen gardening and the technical aspects of its establishment. Data on their basic profile was collected which included the information regarding their caste, education, income, etc. During training programs, data on the major constraints for kitchen gardening was also collected. To find out the constraints in vegetable production, Participatory Rural Appraisal (PRA) technique was used. Preferential ranking technique was utilized to identify the constraints faced by the rural women in kitchen gardening. For individual household, an area of 250m² was taken for the establishment of nutrition kitchen garden.

The study was conducted in both the kharif and Rabi seasons. Krishi Vigyan Kendra has provided seed and planting material of improved varieties to the selected households. For kharif season, the vegetables selected for kitchen garden included amaranths, okra, bottle gourd, sponge gourd, bitter gourd, brinjal, tomato, cow pea, spinach, and radish whereas in rabi season, they were provided seeds/planting material of coriander, fenugreek, spinach, radish, carrot, beet root, cauliflower, cabbage, tomato, brinjal, chilli and green pea. To assess the impact of establishing nutrition kitchen garden in the rural households, average yield per unit was obtained. A dietary survey was done in the selected households in order to assess their food consumption pattern before and after establishment of kitchen garden using 24 hour dietary recall method. The nutrient availability to every individual member of the household was calculated using the food composition tables given by Gopalan, *et al.*, (2020) [7]. Then the nutrient availability was compared with the recommended dietary allowances given by ICMR (2019) for Indians.

The new demonstrated model can fit in tribal households where limited space is available for growing varied vegetables. The vegetable crop sequences are selected in such a way that the garden remains occupied throughout the year. The kitchen garden kit having varied vegetables scientifically selected for their rich nutrient contents and least pest and disease problems, thus minimizing the use of pesticides. Spacing requirement of vegetables recommended for the garden is given in Table 2. The model produces about 300 kg of vegetables annually, enough to meet dietary allowance of

an average sized family consisting of two adults and two children.

Results and Discussion

Education status of women: The education status of the women in the present study was analysed in three categories. 22 percent of the women were illiterate, 41 percent were having elementary education and 37 percent women having middle school education. As the sample consisted of all categories of women, a non-formal approach of nutrition education and intervention may be more suitable.

Occupation: All were engaged in agriculture and allied occupation, which fell under the category of moderate work.

Monthly family income: The selected participants were from low income group. Variations were observed among subjects in their monthly earnings *viz.*, 32 percent of the respondents were earning monthly income between Rs.4, 500-5, 500/-, 20 percent of families were earning monthly income between Rs.5, 500 to 8, 000/- Majority of the families *i.e.*, 48 percent of the families were earning below Rs. 5, 000/-. Another observation on family type was that the joint families tend to be better off socio-economically due to more number of economic supporters compared to nuclear families.

Nutrition knowledge of the women: Nutrition education through intervention programmes were given to women, programmes consisted of regular contacts with the beneficiaries, lectures, group discussions, method demonstrations etc., to encourage categories.

The availability of vegetables and fruits in a kitchen garden would increase consumption and hence mitigate malnutrition. The availability of the food would spur consumption as observed by a study of urban community gardeners in USA (Alaimo, 2008) [2]. Beyond the obvious hunger resulting from insufficient food, we have hidden hunger of micronutrients deficiency that leads to vulnerability to infectious diseases physical and mental impairment that leads to low productivity in addition to reduced life expectancy (Turner, 2012) [14].

It was found that majority of the families (65%) were from medium sized families followed by small size (30%) and big size (5%). Before demonstration respondents cultivated 8 different vegetables such as bottle gourd, green chilli, brinjal, ridge gourd, okra, tomato, carrot and radish. But after intervention they had grown 23 items of vegetables like that bottle gourd, bitter gourd, green chilli, brinjal, summer squash, tomato, cucumber, ridge gourd, okra, cluster bean, cow pea, spinach, coriander, cauliflower, onion, cabbage, carrot, pea, fenugreek and radish in Kharif, Jayad and Rabi seasons as depicted in table no. 4. Area of the kitchen garden among the 40 participants was classified as per Table 1. It is evident from Table 3 that kitchen gardening demonstration resulted in increase in homestead vegetable production, consumption and distribution of excess vegetables to neighbours and relatives. Before intervention, respondents were practicing traditional practices; they used to grow only one or two seasonal vegetable. To fulfil the requirement, they had to purchase vegetables from market for consumption.

It is obvious from Table 3 that production of vegetables at beneficiaries increased 218.25 percent which resulted in increased consumption (95.40%) and money saving. Similar results were reported by (Nandal and Vashisth, 2009) [9]. Different essential nutrients contribution from vegetables is

presented in Table 5. Nutritional value of different vegetables was calculated Gopalan (2020) [7] and Rana (2020) [11]. Table 5&7 indicates that there was significant increase in consumption of protein, fat, carbohydrates, dietary fibre and minerals (*viz.* Iron 32.70 mg and calcium 110.4 mg) percentage these findings are supported by Yusuf *et al.*

(2008). It was also found that intake of energy, protein and iron increased after intervention of kitchen gardening intervention. Similar results were also reported by Rahman *et al.* (2008) [10], Nandal and Vashisth (2009) [9] and Biswas and Masanta (2009) [5].

Table 1: Distribution of respondents on the basis of availability of area for kitchen garden

Area for kitchen garden		No. of respondents	Percentage
i	Court yard	22	55.00
ii	Useless land near the house	03	07.50
iii	Cultivated areas near the house	13	32.50
iv	Cultivated area near the tube well	02	05.00
Total		40	100.00

Table 2: Distribution of respondents on the basis of awareness regarding selected scientific technology before intervention

S. No.	Selected scientific technology	Awareness level		
		No knowledge	Low	Medium
1.	Sowing time	20 (50.00)	16 (40.00)	4 (10.00)
2.	Improved varieties	32 (80.00)	6 (15.00)	2 (5.00)
3.	Seed rate	40 (100.00)	00	00
4.	Transplanting distance	31 (77.50)	7 (17.50)	2 (5.00)
5.	IPM	35 (87.50)	3 (7.50)	2 (5.00)
6.	Stages of irrigation	33 (82.50)	7 (17.50)	00
7.	Seed Treatment	39 (97.50)	1 (2.50)	00
8.	Manure and fertilizer	37 (92.50)	2 (5.00)	1 (2.50)
9.	Nutritious food and vegetables	21 (52.00)	16 (40.00)	3 (7.50)
10.	Requirements of vegetables in daily diet	28 (70.00)	10 (25.00)	2 (5.00)

Table 3: Impact of kitchen gardening on rural communities

S. No.	Impact	Before intervention	After intervention
1.	Practice of Kitchen Gardening	07	110
2.	Type of vegetable grow	Only some leafy and fruits vegetables	All types of vegetables
3.	Grow vegetables in all season	Some people only Kharif and Rabi season	All families throughout year
4.	Time allocation for Kitchen Gardening/day	0.5	2.5
5.	Impact on livelihood	Buy costly vegetables and poor health	Saving money, improvement in physical health (fitness)
6.	Knowledge about daily intake vegetables in diet	Not aware	Have aware and used 285-300 gm/person /Day
7.	Production (Kg/unit) 25*10 m ²	157.00	499.65
8.	Purchase (Kg)	90.00	-
9.	Distribution (Kg)	10.00	17.00
10.	Consumption (Kg)	247.00	482.65

Table 4: Production of vegetables in nutritional kitchen garden in rural areas

S. No.	Name of vegetables	Average production (Kg)	Rate (Rs./Kg)	Total income (Rs.)
1	Bottle gourd	50.44	20	1008.8
2	Pumpkin	54.11	20	1082.2
3	Sponge Gourd	42.00	20	840
4	Cucumber	14.45	15	216.75
5	Bitter gourd	20.80	30	624
6	Lobia	26.01	25	650.25
7	Okra	37.25	30	1117.5
8	Sem	30.26	30	907.8
9	Radish	22.70	15	340.5
10	Gwar	12.50	20	250
11	Snake Gourd	10.35	25	258.75
12	Tomato	22.80	30	684
13	Brinjal	29.60	22	651.2
14	Cauliflower	09.80	20	196
15	Cabbage	11.00	15	165
16	Chilli	6.25	60	375
17	Palak	26.40	30	792
18	Menthi	10.60	25	265
19	Coriander	7.69	45	346.05

20	Sarson Saag	8.25	35	288.75
21	Carrot	13.46	40	538.4
22	Pea	15.43	30	462.9
23	Chaolai	17.50	25	437.5
Total Production		499.65		12498.35

Table 5: Nutritional information of kitchen gardening vegetables

S. No.	Vegetable	Energy (kcal)	Moisture (%) (wb)	Protein (%)	Fat (%)	Total CHO's (%)	Dietary Fibre (%)	Minerals (%)
1	Tomato	18.67	93.62	0.9	0.47	2.71	1.77	0.52
2	Brinjal	22.88	90	1.48	0.32	3.52	3.98	0.7
3	Ridge Guard	11.78	94.99	0.91	0.14	1.72	1.81	0.44
4	Cluster bean	37.17	84.65	3.55	0.37	4.91	4.83	1.68
5	Lady's finger	24.78	89.06	2.08	0.22	3.62	4.02	0.94
6	Bottle guard	10.01	95.17	0.53	0.13	1.68	2.12	0.36
7	Field bean	31.64	85.57	3.71	0.6	2.85	6.19	1.08
8	Green chilies	14.86	93.89	1.11	0.34	1.84	2.06	0.76
9	Amaranth leaves	28.13	86.85	3.29	0.65	2.28	4.41	2.52
10	Gogu leaves	33.49	87.42	1.86	1.09	4.06	4.59	0.98
11	Spinach	22.52	90.31	2.14	0.64	2.05	2.38	2.47
12	Fenugreek leaves	30.87	86.73	3.68	0.83	2.17	4.9	1.69
14	Drumstick leaves	62.88	75.65	6.41	1.64	5.62	8.21	2.46

Source: Longvah *et al.*, (2017)

Table 6: Sowing/transplanting of vegetables

Vegetables	Row to row spacing (cm.)	Plant to plant spacing (cm.)	Depth of sowing/transplanting (cm)	Seed rate (10 M ²)
Okra	60	30	2.0-3.0	15 g.
French Bean	60	15	2.5-3.5	40 g.
Cowpea	45	15	2.5-3.5	30 g.
Pea	20	5	2.0-3.0	150 g.
Cabbage	45	45	Transplanting	0.4 g.
Carrot	45	30	1-2	4 g.
Cauliflower	60	45	Transplanting	0.4 g.
Cucumber	150	50	1-2	2 g.
Brinjal	90	60	Transplanting	0.4 g.
Onion	45	5-0	Transplanting	8 g.
Chili	60	30	Transplanting	0.8 g.
Pumpkin	150	50	3-4	4 g.
Radish	30	2.5 - 3.5	1-2	8 g.
Spinach	30	5-10	1-2	20 g.
Tomato	60	30	Transplanting	0.4 g.

Table 7: Per unit production and availability of vegetables before and after establishing nutrition kitchen garden year rabi 2019-20

Detail of technology	Name of product/enterprise	Per capita consumption gm/day	Nutrient intake (Unit)			
			Energy (kcal)	Protein (gm)	Iron (mg)	Calcium (mg)
T ₁ (Farmers Practices)	Potato, Tomato and Chili	150	2170	38.25	29.80	59.85
T ₂ (Recommended Practices)	Spinach, Amaranth, Fenugreek, Brinjal, Cauliflower Tomato, Carrot, Radish	220.75	2400	51.60	32.70	110.4

Conclusion

From the present investigation it may be concluded that establishment of kitchen gardens had immense role in tackling the problem of malnutrition and micronutrients deficiencies in rural areas. Women are the main care-takers of the garden, and kitchen garden empowers them, ensures better utilization of the income for food and increases family welfare.

Kitchen gardening that it decreases expenditure for vegetables, increase supply variety of vegetables, increase crop diversity area of kitchen gardening, improved self-esteem and motivation, increase community connection after starting kitchen gardening activity and Improved social environment.

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