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Impact study of nutritional intervention through Kitchen Gardening in Nutri Smart Village of Shajapur District (M. P.)

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Abstract

Malnutrition and poor health status especially in rural area is a common problem. It retards children growth, increases the risk and duration of illness, reduces work output, and slows social and mental development. Malnutrition among women of reproductive age increases the risk of mortality during labor and delivery and puts their new born children at risk of long term deficiencies. Nutrition garden has an importance role in the supply of essential nutrients at the household level. It provides a diversity of fresh foods that improve the quantity and quality of nutrients especially micronutrients available to the family with minimum effort. Vegetables are most affordable and sustainable dietary sources of vitamin and minerals. Improved production and consumption is thus the most direct, low cost method to increase micronutrients in the diet.

KVK, Shajapur gives on campus training on various aspects like Kitchen Gardening, value addition in fruits and vegetables, SHGs management, Balance Diet for various ages, Child and mother care, *etc.* Also encourage farmwomen for other income generating activities besides agriculture. Awareness on importance of nutritional garden was stated through demonstration on garden done in the year 2017-18 to 2021-22 among the rural women of Shajapur district of Nutri smart Village Rampura mewasa 10 families village each year were selected for establishment of nutrition garden. The selected families were trained by giving demonstration and talk to motivate them regarding the importance and benefits of kitchen garden. The average yield of the vegetables increased from 25-150 kg/unit in farmers practice to 45-270 kg/unit under demonstration. With the result, the average per capita consumption of vegetables increased 21%. Before plantation of kitchen garden, average per capita availability and consumption of vegetables was 39.1% of Recommended Dietary Allowances which was increased up to 45.14%. After demonstration, consumption of vegetables increased especially of green leafy vegetables. Data presented in showed that 13.17% Energy, 5.54% protein, 10.93% iron, and 16.17% calcium, of RDA were more available to individual after demonstration when compared with farmers practice and also Get benefit of extra income 1200-1500/-Rs. per month.

Keywords: Malnutrition, nutritional kitchen garden, Nutritional Security, daily diet

Introduction

Fruits and vegetables play in importance role in the balanced diet of human beings by providing vital protective nutrients. In order that the requisite quantity and kind of fresh fruits and vegetables are available every day to family, it is advisable to have nutrition garden to grow them in the harvest and the premises of the house or near the schools. Best quality of the fresh produce can be had from one's own nutrition garden as the time interval between consumptions become the least. A diet rich in fruits and vegetables has been shown to prevent cancer, neurological disorders and allergies. Nutrition garden by self can offer fresh and chemical free fruits and vegetables.

Food security and Nutritional diversity is one of the key areas that a developing country should address. For poor households, vegetables and fruits are often the only source of micronutrients in the family diet. For balance diet, an adult should have an intake of 100gm of fruits and 350gm of vegetables per day according to the dietary recommendation of nutrition specialist. But the present level of production of vegetables in our country can permit a per capita consumption of only 120g of vegetables per day. Madhya Pradesh is one of the most unsecured states of the country in terms of food and nutritional security. The concept of nutrition kitchen garden was promoted the selected families to create awareness and motivation about the micronutrients in the diet.

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 a woman 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.

Establishment of kitchen garden in rural areas is easy due to availability of space and farm families are already engaged in agriculture practices. Vegetables play a crucial role in human's diet and rural generation should get the awareness about the importance of vegetables (Simple Jain, 2017) [4]. So, kitchen gardening would be a good mean to improve household food security (Talukder *et al*., 2002) [10]. Therefore, present study was conducted to see the impact of kitchen gardening in improving the nutritional security of households in rural areas. Technical support were provided especially importance when new gardening techniques are being promoted such as growing new or increase number of varieties or year- round vegetable production. Reported that training need regarding household food security through kitchen garden is one of the major thrust area in rural and regular training are required to fill the training gap. Training and other group activities around a central demonstration garden can serve to demonstrate different varieties, hybrids or other importance garden techniques such as live fencing, composting, use of use of bio-pesticides, year round production etc. kitchen garden activities are centered on women and it can also increase the income of women, which may result in the batter use of household resources and improved caring practices and empowerment of women's.

Materials and Methods

Study was conducted in Nutri Smart Village (Rampura mewasa), in Shajapur, district of Madhya Pradesh for the purpose of demonstration, "Nutritional security and Self-employment of village women by Kitchen Garden". The research used both qualitative and quantitative approach to collect data from households and stakeholders. Women of the above villages actively participated in this demonstration. It has been studied and found that women around their houses have vacant lands which are not being utilized. Therefore, it was suggested to use extra land for kitchen garden. Many of them are not utilizing this vacant land in a planned way. Krishi Vigyan Kendra Shajapur planned to demonstrate Kitchen Garden model and methods. Nutritional garden was stated through demonstration on garden done in the year 2017-18 to 2021-22 among the rural women of Shajapur district of Nutri smart Village Rampura mewasa 10 families village each year were selected for establishment of nutrition garden. In these village total 50 demonstrations were arranged, where women's are anemic and children are also malnourished. One of the on campus training on Kitchen Gardening was carried out for farm women and ICDS workers during 2016-17.

KVK also conducted 50 kitchen garden kit demonstrations under Home science discipline. Gave them seeds of 6-7 vegetables and seedling of Tomato, Brinjal, Chilly as a FLD input. Different capacity building activities including organic vegetables production techniques, exposure visits and farmers scientist interaction on various aspects including vegetables were planned and undertaken.

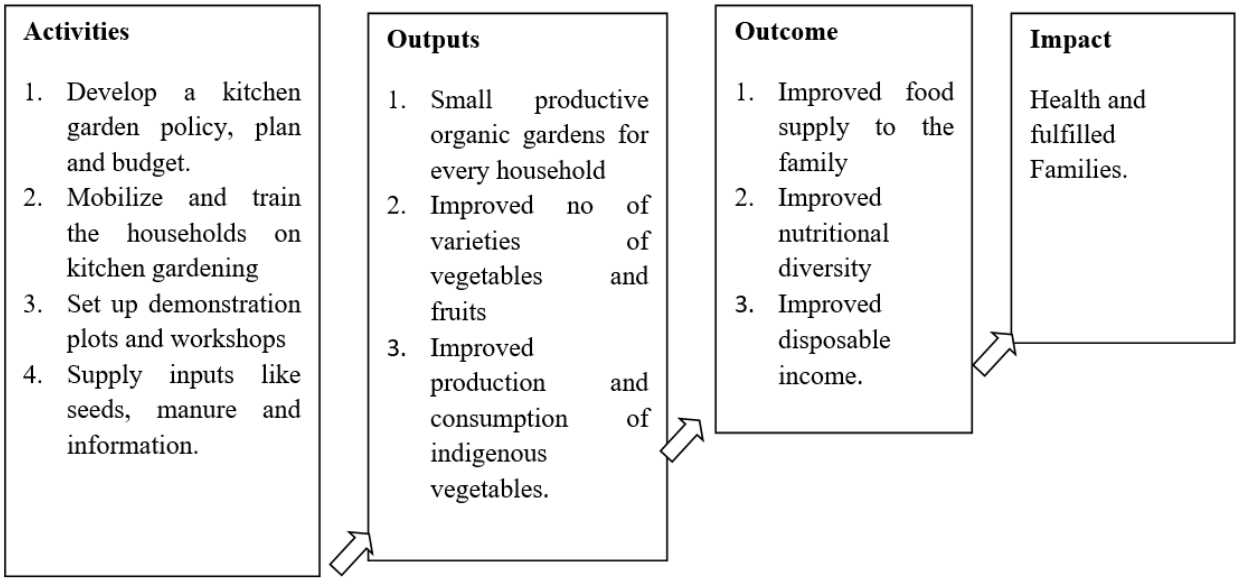
The village were guided and advised about planning a kitchen garden in scientific and organic way that all the seasonal vegetables could be grown fresh and thus available round the year. Use of high yielded varieties of different vegetables and few plants of nutritious fruits like one plant of Guava, one plant of Lemon, two plants of papaya, one plant of curry leaf, one plant of Drum steak were also planted in kitchen garden. The size of the garden was designed to be big enough to produce sufficient vegetables for the family, (100sq mt).

These participants were trained and shown the area/field. Results were analyzed prior and after demonstration and comparative study were done with vegetables produced and used. In addition the income from kitchen garden as extra income was studied and valued, along with this; the nutrition status was estimated by estimating the amount and daily consumption of vegetables in the daily diet of family members.

KVK Intervantion

The study was conducted in Shajapur district of Madhya. In all 50 model nutritional garden set up in two purposively selected families. Different capacity building activities including training, exposure visit and farmer's scientist's interaction on various aspects including vegetable grown in Homestead, homestead vegetable utilization, average vegetable consumption, and nutrient contribution from homestead vegetable gardening were planned and undertaken. Pre-survey was conducted to obtain information regarding profile and respondent's dietary food habits and nutritional deficiency diseases were also pre-surveyed. After one year of establishment of nutritional garden, a post-survey was done to analyze the impact of kitchen gardens on nutritional status of selected families.

Conceptual Framework



Result and Discussion

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.

Table 1: Pre and post training knowledge of farm women regarding establishment of nutritional kitchen garden.

S.N.	Particulars	Knowledge of farm women (N=50)			
		Before training		After training	
		n	%	n	%
1	Land preparation and layout	17	34	40	80
2	Improved varieties	8	16	36	72
3	Appropriate sowing time of various vegetables and their seed rates	18	36	44	88
4	Nutrient management through organic and inorganic inputs	11	22	43	86

Data presented in [Table-1] showed that the knowledge of the participant women was assessed through collection of data through an interview schedule before and after training programs. Data obtained is presented in showed an increase in the knowledge of participants after their participation in training on various aspects of kitchen gardening. Least (16%) rural women had knowledge on improved varieties whereas highest knowledge was observed on land preparation aspect (34%) before the training. After training, their knowledge has been increased in all the aspects of vegetable production through kitchen gardening.

Table 2: Major constraints perceived in the establishment of nutrition kitchen garden.

S. N.	Particulars	Participants (N=50)	
		n	%
1	Unavailability of quality planting material and seeds of HYV vegetables	35.5	71
2	Low availability of water for irrigation	39.5	79
3	Lack of technical knowledge related to establishment of nutritional kitchen garden, like improved varieties, seed rate, sowing time, major insect pest diseases and their management, fertilizer and manure application, irrigation etc.	34	68
4	Lack of interest in kitchen gardening	23.5	47
5	Adoption of traditional practices for growing vegetable	29	58

Data presented in [Table-2] showed that availability of water for irrigation is the major constraint for production of vegetables in these areas. Unavailability of quality seed material and lack of technical knowledge ranked second and third constraint in this regard. Other constraints found included lack of interest in cultivation, traditional practices of vegetable production, not giving much priority to kitchen gardening etc. Several other studies were also conducted to find out these constraints in establishing a kitchen garden in rural areas.

Table 3: Impact Of nutrition kitchen garden on production and consumption of vegetables.

Technology	Average Yield (kg/unit area)	Average Per capita consumption (gm/ day)	% change in consumption (gm/ day)	% RDA
Farmer's Practice	25-150	137.0	21%	39.1
Recommended Practice	45-270	158.0		45.14

Data presented in [Table-3] showed that showed that the average yield of the vegetables increased from 25-150 kg/unit in farmers practice to 45-270 kg/unit under demonstration. With the result, the average per capita consumption of vegetables increased 21%. Before plantation of kitchen garden, average per capita availability and consumption of vegetables was 39.1% of Recommended Dietary Allowances which was increased up to 45.14%. After demonstration, consumption of vegetables increased especially of green leafy vegetables.

Table 4: Per capita availability of nutrients before and after establishing nutritional kitchen garden

Nutrients	Per capita availability of nutrients/day		% RDA		Difference (%)	RDA
	Before	After	Before	After		
Energy (kcal)	1048	1324	43. 21	56.38	+ 13.17	2425
Protein(g)	4.42	7.74	7.36	12.9	+ 5.54	60
Iron (mg)	8.72	11.78	31.14	42.07	+ 10.93	28
Calcium (mg)	120.6	185.3	30.15	46. 32	+ 16.17	400

Data presented in [Table-4] showed that 13.17% Energy, 5.54% protein, 10.93% iron, and 16.17% calcium, of RDA were more available to individual after demonstration when compared with farmers practice.

Table 5: Source of nutrients in daily diet

Source of nutrients(gm/day)	Daily need for men (In grams)		Daily need for women (In grams)	
	Vegetarian	Non-vegetarian	Vegetarian	Non-vegetarian
Cereals	420	420	420	420
Pulses	80	65	60	50
Leafy vegetables	125	125	125	125
Other vegetables	125	125	125	125
Root vegetables	100	100	100	100
Fruit	100	100	85	85
Milk	600	400	600	400

Data presented in [Table-5] showed that it indicates that in daily need of vitamins from food per head Root vegetables - 100 gm. And other vegetables -125 gm. In addition to above other vegetables (total 350gm) should also be included in daily diet.

Table 6: Availability of Nutritional elements and deficiency produces disease in vegetables.

Nutritional elements	Disease produced by deficiency	Nutritional elements available in vegetables
Vitamin 'A'	Night Blindness, Caritomalasia	Carrot, Tomato, Radish
Vitamin 'C'	Scurvy, Indigestion, Pain in gums	Chilli, Cauliflower
Vitamin 'D'	Rickets, weakness in bones	Potato
Vitamin 'E'	Infertility	Leafy vegetables
Vitamin 'K'	Blood clotting, Heart Disease	Tomato, Cabbage
Calcium	Improper growth of bones	Palak, Chilli, Radish leafs
Iron	Anemia	Palak, Cabbage, radish leafs
Iodine	Thyroid gland disease	Leafy and root vegetables

Data presented in [Table-6] showed that availability of vitamins in different vegetables has been shown, and if insufficient quantity of vitamins is being taken then disease will be produced in the body of the humans. The above knowledge was given to women participants.

Table 7: Impact Of nutrition kitchen garden before and After KVK intervention.

S. No.	Particulars	Before KVK intervention	After KVK intervention
1	Kitchen Gardening	Grown only 3-4 vine or cucurbits outs type vegetables like Cowpea, Indian bean, Bottle gourd and sponge gourd	▪ She well establish kitchen garden with 6-7 types of vegetables including leafy vegetables in her kitchen garden like Brinjal, Okra, Chilly, Tomato, Spinach, fenugreek, French bean, Cabbage *etc*. with vine vegetables. ▪ She planted drumstick, papaya, guava, lemon, curry leaves, Giloy and lemongrass fruit plants and other meditational plants. ▪ Also prepared compost pit for organic fertilizer for her kitchen garden.
2.	Income (Rs./ Month)	-	▪ Get benefit of extra income 1200-1500/-Rs. per month

Layout Plan of a Nutritional Garden
Model 1 (100 square meter)
Total Area 100 square meter (4 x 25 m)

Total number of beds for vegetable growing=10
Area of one bed = 10 square meter (2 x 5 m)

2 M		2 M
4.5M	1	6
	0.5 M	
	2	7
	3	8
	4	9
	5	10

Fruit plants on bunds



Table 8: Plot *Kharif* Rabi Summer

Plot	*Kharif*	Rabi	Summer
1	Tomato	Cauliflower	Brinjal
2	Brinjal	Cabbage	Tomato
3	Okra	Carrot	Pumpkin /Bottle Gourd
4	Chilly	French Bean	Pumpkin /Bottle Gourd
6	Pumpkin /Bottle Gourd	Pea	Okra
7	Cauliflower (Early)	Tomato	Onion
8	Cowpea	Spinach	Chilly
9	Leafy vegetables	Onion	Cowpea
10	Pumpkin /Bottle Gourd	Pea	Okra
Size of each plot 10 m^2			

Table 9: Vegetable Crops for the kitchen garden

Vegetables	Seed Rate (per 10sq Meter)	Line to line distance (cm)	Plant to Plant distance (cm)	Harvesting time	Production (kg) (per 10sq Meter)
Okra	20g	60	30	July-September & March-June	10
French bean	30g	60	15	February To April	22
Cowpea	30 g	60	15	August-Sept	15
Pea	30g	20	5	December to February	15
Cabbage	3g	45	45	November to March	20
Carrot	5g	45	30	October to Feb	15
Cauliflower	2g	60	45	October to February	20
Brinjal	2 g	90	60	October & February	30
Onion	15g	45	5-0	April & October	22
Chilly	2g	60	30	July – December	15
Pumpkin	5 g	150	50	March & October	20
Radish	10 g	30	2-5&3-5	November& February	15
Spinach/ leafy vegetables	30 g	30	5&10	October & January	17
Tomato	2 g	60	30	October & February	32

Table 10: Fruits Plants for the kitchen garden

Plant	Spacing	No of plants
Acid Lime	6x6 ft	01
Guava	6x6 ft	01
Curry leave	6x6 ft	01
Drumstick	6x6 ft	01
Papaya	6x6 ft	02

In above model diagram has been showing how they get the fruits and vegetables throughout the year season wise and earned additional income.

Conclusion

This study highlights that how kitchen gardens can help in improving the Nutritional Security and rural revenue all over India and also acts as a major source for women empowerment. The practicing farm women will be able to raise vegetables and fruits in backyard in a systematic manner. This way around the year the family requirements of vegetables and fruits is full-filled. By using different types of vegetables and fruits they would grow through kitchen garden they would also get essential micro nutrients and macro nutrients in their diet. If surplus any, they can sell it in the market for additional income. Despite having good amount of vegetable production at national level, the per capita availability of vegetables is still less from the recommended dietary allowances. Kitchen garden can be established at household or community level in order to ensure the daily supply of fresh vegetables in the diets.

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.

Suggestions and Recommendations

Following suggestions and recommendation were made to promote kitchen gardening as hobby.

1. Longer-term interventions required to support livelihoods in target area.
2. Explore joint agency collaboration at the community level.
3. Strategies with communities to improve access to products and services.
4. Provide gender specific tool kits at community level to improve food
5. Sustainability.
6. Establish improved seed sale point in community.
7. to conduct different more productive training and seminars to encourage the Community.

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