Int.J.Curr.Microbiol.App.Sci (2018) *7*(2): 468-474

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 7 Number 02 (2018)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2018.702.058

Household Food Security through Kitchen Gardening in Rural Areas of Western Uttar Pradesh, India

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Keywords

Nutrition, Kitchen Garden, Food security, Average production, Farm families

Article Info

Accepted:
08 January 2018
Available Online:
10 February 2018

A B S T R A C T

Malnutrition and poor health status especially in rural areas 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 newly born children at risk of long-term deficiencies. Improving nutritional status, including micronutrient status, can lead to increased productivity, increased child survival and growth, and reduced maternal morbidity and mortality. To overcome this problem, Kitchen Garden is considered to be the best possible solution. The present study was conducted in 4 districts (Muzaffarnagar, Baghpat, Bulandshahr, Gautam Budh Nagar,) of Western Uttar Pradesh. Kitchen Gardens were established in 4 villages of each district making the involvement of 160 farm families. Average production of vegetables in kitchen garden was found to be 403.4 kg in the year 2011-12& 2012-13 Average saving procured was Rs 9870.25. Through kitchen garden farm families get fresh and organic vegetables year round and their nutritional needs are fulfilled. Through kitchen garden empowerment of women also addresses a priority area of poverty alleviation and provides important socio-economic returns through lower health and welfare costs, lower fertility, and lower maternal and infant mortality rates. Thus, the simultaneous impact of home gardening programs in terms of giving women a voice and promoting their full participation in domestic life can make an important contribution to the overall development of communities.

Introduction

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 sources of micronutrients in the family diet. Establishment of Kitchen Garden in rural areas is easy due to availability of space and farm families are already engaged in agriculture practices. Kitchen gardening is one of the world's most ancient food production practices and is practiced throughout the world (Landauer and Brazil, 1985).Homestead production of fruits and vegetables provides the households with direct access to important

nutrients that may not be readily available or within their economic reach. Vegetables play a crucial role in human's diet and rural generation should get the awareness about the importance of vegetables (Simple Jain, 2017). So, kitchen gardening would be a good mean to improve household food security (Talukder *et al*., 2002). 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 important when new gardening techniques are being promoted such as growing new or increased number of varieties or year-round vegetable production. Kirtimani *et al.,* (2016) reported that training need regarding household food security through kitchen garden is one of the major thrust areas in rural Bulandshahr and regular trainings 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 important garden techniques such as live fencing, composting, use of bio- pesticides, year round production etc. Kitchen gardening activities are centered on women and it can also increase the income of women, which may result in the better use of household resources and improved caring practices and empowerment of women's. This empowerment of women also addresses a priority area of poverty alleviation and provides important socio-economic returns through lower health and welfare costs, lower fertility, and lower maternal and infant mortality rates. Thus, the simultaneous impact of home gardening programs in terms of giving women a voice and promoting their full participation in domestic life can make an important contribution to the overall development of communities.

Materials and Methods

This research was undertaken in rural area of Western Uttar Pradesh in district Muzaffarnagar, Baghpat, Bulandshahr and Gautam Budh Nagar, to investigate the role of kitchen gardens in addressing food security. The research used both qualitative and quantitative approach to collect data from households and stakeholders. Stratified sample was used to pick household respondents. The research was conducted in four villages of each district during year 2011 and 2013 in Kharif–Rabi and Zaid season. Villages adopted for the study were Haidernagar, Mukandpur, Ladwa and Saidpura in District Muzaffarnagar, Sankraud, Mavikala, Firojpur and Sunheda in Baghpat, Gijhauri, Chawli, Machkauli and Vehlimpura from Bulandshahr and Nanglanainsukh, Veerpura, Duryai and Chholuski Maraiiya from Gautam Budh Nagar. Ten families from each village were selected randomly making total of 160 participants. Different capacity building activities including organic vegetables production techniques, exposure visits and farmer's scientist's interaction on various aspects including vegetable grown in kitchen garden, vegetable utilization, average vegetable consumption, nutrient contribution from garden vegetables were planned and undertaken.

The villages 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 yielding varieties of different vegetables and few plants of nutritious fruits like two plant of Guava, one plant of Lemon, four plants of Papaya 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). The basic functions of food and nutrition education were taken in consideration while planning the kitchen garden. Total amount of vegetable and fruit were recorded of four family and average were calculated each village at district level of both year production of vegetables in each

garden are shown in Table 3, 4 and 5. Savings (Rs) and satisfaction quotient were also recorded with pre structured questionnaire.

Results and Discussion

Socio-economic profile

The findings showed in table 1 that the kitchen gardens in rural area are small organic gardens which were started about few years ago. The study also depicted that counseling to change feeding/eating behaviors is generally an important component of food-based strategies. The human capital in the form of traditional knowledge (51percent had kitchen gardens before but very few vegetables were being grown) played a big role. The management decision to reinforce this innovation and regular technical advised by KVK scientists helped to bring a positive change to food security and nutritional diversity of the villagers. Some farm women revealed that they do not buy vegetables after establishing kitchen gardens as compared to half of the women who bought very few vegetables. About 99 percent of the respondents think that the kitchen garden has improved their nutritional diversity.

Compared to the monoculture of the few gardens that existed before the formal gardens, more than 18 different varieties of vegetable and fruits were recorded in different households during the study indicating that a wide diversity had been achieved. Maximum have replicated the garden in their rural homes, and they have learnt a new skill indicating that the kitchen garden seems to be positively addressing food security and nutritional diversity and further demonstrating the central role of agriculture in meeting household needs.

Socio-economic characteristics of respondents were analyzed and are presented in Table 1. The table indicates that majority (60%) of respondent's belonged to joint family and followed by (40 %) nuclear family. It was found that majority of the families (55.63%) were from medium sized families followed by small size (35%) and big size (9.37%). Results on family income showed that majority (47.5 %) of respondents belonged to income group of 50000 to Rs. 1.0 lakh. While looking at their educational status, results revealed that 62.5 per cent heads of the family were literate to middle level educated. Results on land holding depicts that majority (58.12%) had small scale land followed by small(30%) scale land and only (11.88%) had large scale land holding

Intervention and evaluation of kitchen garden

Table 2 revealed that before demonstration respondents cultivated 3-4 different vegetables such as bottle gourd, brinjal, ridge gourd, okra, and radish. But after intervention they had grown 18 types of vegetables like bottle gourd, bitter gourd, green chilli, brinjal, tomato, ridge gourd, okra, Lobia, spinach, coriander, cauliflower, onion, cabbage, carrot, pea, fenugreek and radish in *Kharif*, *Zaid* and *Rabi* seasons. It is evident from Table 2 that kitchen gardening demonstration resulted in increase in kitchen garden vegetable production, consumption and distribution of excess vegetables to neighborhood and relatives. Before intervention, respondents were practicing traditional methods; they used to grow only one or two seasonal vegetable. To fulfill the requirement, they had to purchase vegetables from market for consumption. It is obvious from Table 2 that production of vegetables at beneficiaries increased 412 per cent which resulted in increased consumption (175 %), distribution (100 %) and purchase of vegetables was decreased by 40%. Similar results were reported by (Nandal and Vashisth, 2009) (Fig. 1).

Table.1 Socio personal characteristics of respondents (no -160)

Variables	Category	Number	Percent
Type of Family	Joint Family	96	60.00
	Nuclear Family	64	40.00
Size of the Family	Small size(1-4 member)	56	35.00
	Medium size(5-7members)	89	55.63
	Big size(>7 members)	15	9.37
Annual Income(Rs)	<50000	55	34.37
	50000-100000	76	47.5
	>100000	29	18.12
Education	Illiterate	07	2.50
	Primary	16	10.00
	Middle	101	62.5
	Graduation	36	22.5
Land Holding	Small	48	30.00
	Medium	93	58.12
	Large	19	11.88

Table.2 Changes occurred by intervention of kitchen garden

Particulars	Production(kg)	Purchase(kg)	Distribution/Sale	Consumption(kg)
Before Intervention	50	325	00	205
After Intervention	256	195	50	565
Change	+206	-130	+50	+360
Percent Change	412	40	100	175

Figure.1 Graphical representation of changes occurred by intervention of Kitchen Garden

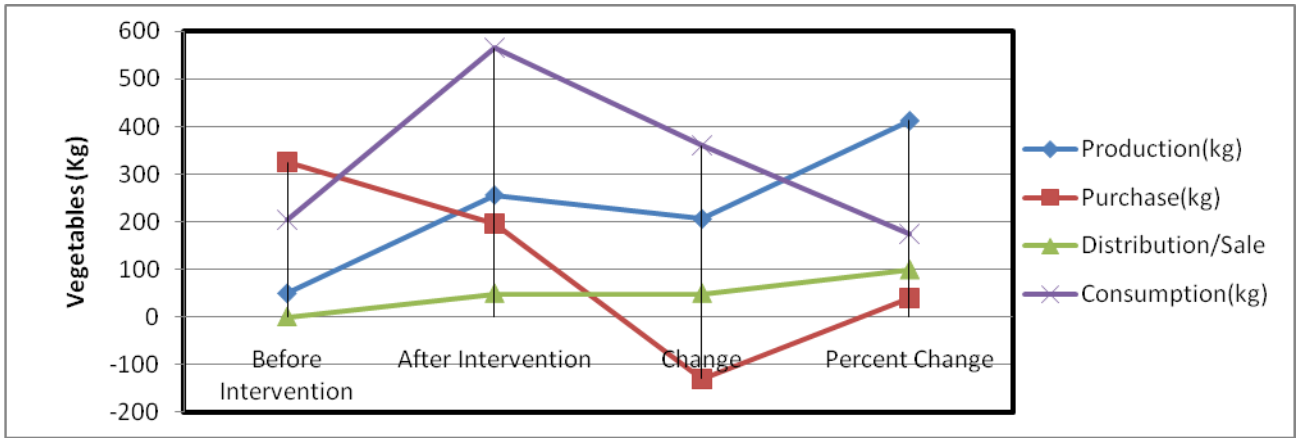

Table.3 Average production of vegetables of four districts

Name of vegetables	Vegetables Production during 2011-12(Kg)					Average Rate (Rs.)	Average Income (Rs.)
	Muzaffar nagar	Baghpat	Bulandshahr	Gautam Budh Nagar	Average production (kg)		
Methi	4.00	6.00	8.50	7.4	6.47	24.00	96.00
Spinach	22.50	20.00	23.50	20.5	21.62	25.00	562.50
Radish	37.50	42.00	40.00	38.5	39.5	12.00	450.00
Turnip	21.50	20.00	32.00	20	23.37	15.00	322.50
Coriander leaves	04.00	6.00	7.50	5.5	5.75	60.00	240.00
Carrot	17.00	22.00	20.00	20	19.75	15.00	255.00
Tomato	74.50	60.00	48.00	56	59.62	20.00	1490.00
Green Chillie	12.50	10.50	9.50	9.3	10.45	110	1375.00
Cauliflower	35.50	32.00	31.00	26	31.12	20.00	710.00
Cabbage	41.00	40.00	46.00	28	38.75	20.00	820.00
Pea	3.50	5.00	4.50	4.2	4.3	15.00	52.50
Brinjal	32.00	30.00	25.50	38	31.37	15.00	480.00
Onion	35.00	40.00	40.50	12	31.87	15.00	525.00
Lobia	05.50	5.00	6.50	7.5	6.12	30.00	165.00
French Bean	11.00	8.00	5.50	13.5	9.5	40.00	40.00
Bottle gourd	22.50	25.00	20.00	25	23.12	10.00	225.00
Ridge gourd	22.00	20.00	23.00	20.4	21.35	20.00	440.00
Bitter gourd	15.00	15.00	18.00	18.5	16.62	20.00	300.00
Total	416.5	406.5	409.5	370.3	400.7		8549.50

Table.4 Average vegetable production of four districts

Name of vegetables	Vegetables Production during 2012-13(Kg)					Average Rate (Rs.)	Average Income (Rs.)
	Muzaffarnagar	Baghpat	Bulandshahr	Gautam Budh Nagar	Average production (kg)		
Methi	5.00	7.00	7.50	8.5	7	25.00	125.00
Spinach	21.50	23.00	29.00	22.5	24	25.00	537.50
Radish	38.00	34.00	35.00	40	36.75	17.50	285.00
Turnip	20.50	18.00	24.00	22	21.12	15.00	307.50
Coriander leaves	5.00	6.5	8.00	6	6.37	70.00	350.00
Carrot	16.00	18	21.00	22.6	19.4	15.00	240.00
Tomato	75.50	62	42.00	55	58.62	20.00	1510.00
Green Chillie	10.50	9.00	12.50	10	10.5	110.00	1155.00
Cauliflower	34.50	30.00	26.00	32	30.62	20.00	690.00
Cabbage	43.00	45.00	48.00	26	40.5	20.00	860.00
Pea	3.50	4.00	5.50	6.5	4.87	15.00	52.50
Brinjal	28.00	20.00	24.50	40	28.12	15.00	420.00
Onion	35.00	38.00	23.50	14	27.62	17.50	612.50
Lobia	5.50	5.00	4.50	6	5.25	30.00	165.00
French Bean	13.00	12.00	10.00	13	12	40.00	520.00
Bottlegourd	23.50	22.00	18.50	24	22	10.00	235.00
Ridge gourd	28.00	25.00	24.00	18	23.75	20.00	560.00
Bitter gourd	15.00	12.00	20.00	16	15.75	22.50	337.50
Papaya	10.00	20.00	18.00	-	12	25.00	250.00
Total	431.00	410.5	401.50	382.1	406.27		8057.50

Table.5 Consolidated data of year 2011-12 & 2012-13

Name of vegetables	Vegetables Production 2011-12 (kg)	Vegetables Production 2012-13 (kg)	Average production (kg)	Average Rate (Rs.)	Average Total Income (Rs.)
Methi	6.47	7	6.735	24.50	110.25
Spinach	21.62	24	22.81	25.00	550.00
Radish	39.5	36.75	38.125	10.00	380.00
Turnip	23.37	21.12	22.245	15.00	315.00
Coriander leaves	5.75	6.37	6.06	70.00	315.00
Carrot	19.75	19.4	19.575	20.00	330.00
Tomato	59.62	58.62	59.12	20.00	1500.00
Green Chillie	10.45	10.5	10.475	100.00	1150.00
Cauliflower	31.12	30.62	30.87	20.00	700.00
Cabbage	38.75	40.5	39.625	25.00	1050.00
Pea	4.3	4.87	4.585	20.00	70.00
Brinjal	31.37	28.12	29.745	10.00	300.00
Onion	31.87	27.62	29.745	20.00	700.00
Lobia	6.12	5.25	5.685	40.00	200.00
French Bean	9.5	12	10.75	40.00	480.00
Bottle gourd	23.12	22	22.56	10.00	220.00
Ridge gourd	21.35	23.75	22.55	15.00	375.00
Bitter gourd	16.62	15.75	16.185	20.00	300.00
Papaya	-	12	6	25.00	125.00
Total	400.7	406.27	403.4		9870.25

Data in Table 3 depicts that average production of vegetables in four districts was…400.7…..kg in all three season Kharif, Zaid and Rabi during 2011-2012. Economically benefit of rupees 8549.50 was observed. Table 4 shows that in year 2012-13 average production of all vegetables in all four districts is 406.27 kg which saves Rs 8057.50 of each farm family.

In conclusion, success and acceptability of any technique largely depend on involvement and participation of the community having two-way channels for information exchange is instrumental for achieving sustainable, improved gardening practices. Involving workers in producing part of their own food helps to develop effective relationship, necessary for harmonious growth. Food security and nutritional diversity is so basic and is a strong foundation for a productive society. The kitchen garden could be an effective motivational tool that could mitigate the problem of malnutrition and militate against workers turnover by giving the workers a sense of belonging. This research showed that there is a lot of potential in the knowledge accumulated in societies over time and only require the right trigger to unlock it for the benefit of the same societies and the nation at large. The process of extension of awareness about kitchen garden is continuous, taking thumb rule of household food security.

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How to cite this article:

Savita Arya, Satya Prakash, Sarita Joshi, Kirti M. Tripathi and Vinita Singh. 2018. Household Food Security through Kitchen Gardening in Rural Areas of Western Uttar Pradesh, India. *Int.J.Curr.Microbiol.App.Sci.* 7(02): 468-474. doi: https://doi.org/10.20546/ijcmas.2018.702.058