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## Impact assessment of kitchen garden in food and nutritional security of rural families

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### Abstract

Food is one of the most fundamental human requirement. A balanced food has been always high on human agenda. In the context of India, the answer unfortunately is a resounding. Vegetables are major source of vitamins, minerals, and fibers. They are very important part of our diet as they contain various nutrients for many body functions. Vegetables also provide taste, palatability, better digestibility to us and increase the appetite better digestibility to us and increase the appetite. Kitchen gardening directly provides food and nutritional security by making access to food that can be harvested instantly, prepared, and fed to family members, daily or whenever required. Kitchen gardening is the revolutionary step to increase vegetables production as well as provision of cheap vegetables to the consumers Keeping in view all the above facts, Krishi Vigyan Kendra Raebareli has conducted various trainings and demonstrations on Kitchen gardening for rural women. Health status of farm women in terms of per capita nutrient availability to rural families has also been assessed which is presented in the present paper. Purposive sampling has been used for the selection of rural households of farm women who were the part of trainings and demonstration organized by K.V.K Raebareli. Total 120 rural women of district Raebareli from the villages namely Belabhela, Belagusisi, Kodarjahanpur, Atarthariya, Purehashapurawa and Kuchariya have been selected for the study. Personal interview method has been used for data collection. On the basis of the findings of the study, it can be said that use of recommended practice in kitchen garden has significant positive impact on average yield, average per capita availability of vegetables and in fulfilling daily recommended allowances of vegetable consumption, thus on per capita availability of nutrients too.

**Keywords:** Food, vegetables, nutrients, kitchen garden, farm women

### 1. Introduction

Food is one of the most fundamental human requirement. It is not just the quantity but the quality also that determines the usefulness of a meal. A balanced food has been always high on human agenda. In the context of India, the answer unfortunately is a resounding “No”. Millions in India go hungry every day and millions, probably more than a billion, suffer from malnutrition. During the last 25 years, a large database has been accumulated on the diet and nutritional status of the rural population of different states of India. The National Nutrition Monitoring Bureau (NNMB) and the National Institute of Nutrition (NIN), Hyderabad have carried out extensive diet and nutrition surveys in 12 states of the country. These surveys indicate that the diets of the rural population are inadequate and deficient in most of the nutrients. There is widespread energy deficiency in the rural households. About 60 per cent of the preschool children are underweight and 62 per cent are stunted (long duration malnutrition). About 15 per cent of the children of 1-5 years of age suffer from short duration malnutrition (wasting). Women have also been consistently found to be more likely to invest in their children’s health and wellbeing, and the income and resources that women control wields disproportionately strong effects on health and nutrition outcomes generally, World Bank (2007) [10]. Kitchen gardening directly provides food and nutritional security by making access to food that can be harvested instantly, prepared, and fed to family members, daily or whenever required. Kitchen gardening is the revolutionary step to increase vegetables production as well as provision of cheap vegetables to the consumers. A family can take vegetables from these kitchen gardens round the year. This is especially important in rural areas where people have low purchasing power and distant markets. Vegetables are major source of vitamins, minerals, and fibers. They are very important part of our diet as they contain various nutrients for many body functions. Vegetables also provide taste, palatability, better digestibility to us and increase the appetite better digestibility to us and increase the appetite.

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Apart from having a good amount of production of vegetables at national level, the per capita availability in diet is quite low in our country (Tripathi and Selvan, 2016) [9]. The daily requirement of vegetable is around 300 gms 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. Vegetables are suitably grown in kitchen gardens as they are mostly short duration crops. The nutritional kitchen garden is generally located close to the house and is used for growing vegetables, fruits, and other food crops for the family (Jana, 2015) [4]. It not only saves our money and time but also can provide a healthy, useful and environment friendly hobby for whole family. Kitchen gardens can help us in recycling of household waste especially when a compost pit is developed. 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. From the evidence, reaching women farmers is particularly important in contexts where women are becoming more responsible for agricultural work traditionally done by men as men migrate to urban areas for other work Lastarria-Cornhiel (2008) [5]. In order to preserve health and prevent malnutrition; we should develop a kitchen garden; grow fresh and clean vegetables and make them a part of our daily diet (Nandal and Vashisth, 2009) [6].

Keeping in view all the above facts, the Krishi Vigyan Kendra Raebareli has conducted various trainings and demonstrations for rural women. After giving trainings and demonstration impact of kitchen garden on health status of farm women in terms of per capita nutrient availability to rural families has also been assessed which is presented in the present paper.

## 2. Research Methodology

Purposive sampling has been used for the selection of rural households of farm women who were the part of trainings and demonstration organized by K.V.K Raebareli. Total 120 rural women of district Raebareli from the villages namely Belabhela, Belagusisi, Kodarjahanpur, Atarthariya, Purehashapurawa and Kuchariya have been selected for the study. Personal interview method has been used for data collection. The villagers were guided and advised about planning a kitchen garden in scientific and organic way so that all the seasonal vegetables could be grown fresh and available round the year. Individual household backyard area was taken for the establishment of nutrition kitchen garden. The study was conducted in the Kharif, Rabi and Zaid seasons. Krishi Vigyan Kendra has provided seed and seedling of improved varieties to the selected households under Front Line Demonstration program according to season. 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 (Gopalan *et al.*, 1989) [2]. Then the nutrient availability was compared with the recommended dietary allowances (ICMR, 2010) [3] for Indians. The data obtained was finally statistically analyzed using frequency and percentage for its

significance.

## 3. Results and Discussion

### 3.1 Average per unit production and availability of vegetables before and after establishing nutrition kitchen garden (Kharif season).

Table (1) depicts five years comparative data from 2016-2017 to 2020-21 on vegetable production of kitchen garden in Kharif season in terms of average yield (kg/unit area), average per capita availability (gm/day), percentage change in availability (gm/day), percentage RDA and Percentage difference in RDA for both farmer's practice and recommended practices of Krishi Vigyan Kendra. In the year 2016-17 for the 0.25 ha area of kitchen garden, average yield (kg/unit area) of kitchen garden in farmer practice was 82.26 kg compared to 121.35 kg in recommended practices. Further in farmer practice, average per capita availability was 171.37 gm/day as compared to 252.81gm/day in recommended practice. Thus percentage change in availability of vegetables was 47.52 gm/day. Except that in years 2016-17 percentage RDA for farmer practice was 57.12 as compared to 84.22 for recommended practice. Thus percentage increase of 27.15 in RDA was found in recommended practices as compared to farmers practice.

According to Table (1), In the year 2017-18 for the 0.55 ha area of kitchen garden, average yield (kg/unit area) of kitchen garden in farmer practice was 87.17kg compared to 128.87kg in recommended practices. Further in farmer practice, average per capita availability was 181.60 gm/day as compared to 268.47 gm/day in recommended practice. Thus percentage change in availability of vegetables was 47.83 gm/day. Except that in years 2016-17 percentage RDA for farmer practice was 60.53 as compared to 89.49 for recommended practice. Thus percentage increase of 28.96 in RDA was found in recommended practices as compared to farmers practice.

It is also clear from the table (1) that in year 2018-19 for 0.75 ha area of kitchen garden, Average yield in farmer practice and recommended practice were 89.23kg /unit area (F.P.), and 133.67kg /unit area (R.P.), average per capita availability in farmer practice and recommended practice were 185.89 gm/day in farmer practice and 278.48 gm/day in recommended practice.

Thus, percentage change in availability of vegetables was 49.80 gm/day. Furthermore percentage RDA in farmer practice and in recommended practice were 61.96 and 92.82, hence percentage increase of 30.86 in RDA has been observed in recommended practice.

From the table (1), it is clear that in the year 2019-20 for the 0.75 ha area of kitchen garden, average yield (kg/unit area) of kitchen garden in farmer practice was 90.16 kg compared to 133.78 kg in recommended practices. Further in farmer practice, average per capita availability was 187.83 gm/day as compared to 278.70 gm/day in recommended practice. Thus percentage change in availability of vegetables was 48.37 gm/day. Except that in years 2019-20 percentage RDA for farmer practice was 62.61 as compared to 92.90 for recommended practice. Thus percentage increase of 30.29 in RDA was found in recommended practices as compared to farmers practice.

It is also clear from the table (1) that in year 2020-21 for 0.75 ha area of kitchen garden, Average yield in farmer practice and recommended practice were 90.77 kg /unit area (F.P.), and 135.67 kg /unit area (R.P.), average per capita availability

in farmer practice and recommended practice were 189.10 gm/day in farmer practice and 282.65 gm/day in recommended practice. Thus, percentage change in availability of vegetables was 49.47 gm/day. Furthermore percentage RDA in farmer practice and in recommended practice were 63.03 and 94.22, hence percentage increase of

30.86 in RDA has been observed in recommended practice.

On the basis of the above findings it can be said that use of recommended practice in kitchen garden has significant impact on average yield, average per capita availability of vegetables and in fulfilling daily recommended allowances of vegetable consumption.

**Table 1:** Average per unit production and availability of vegetables before and after establishing nutrition kitchen garden (Kharif season)

Year	Area (ha)	Location (no)	Average yield (kg/unit area)		Average per capita availability (gm/day)		Percentage change in availability (gm /day)	Percentage RDA		Percentage difference in RDA
			FP*	RP*	FP*	RP*		FP*	RP*	
2016-2017	0.25	15	82.26	121.35	171.37	252.81	47.52	57.12	84.22	+27.15
2017-2018	0.55	15	87.17	128.87	181.60	268.47	47.83	60.53	89.49	+28.96
2018-2019	0.75	20	89.23	133.67	185.89	278.48	49.80	61.96	92.82	+30.86
2019-2020	0.75	30	90.16	133.78	187.83	278.70	48.37	62.61	92.90	+30.29
2020-2021	0.75	30	90.77	135.67	189.10	282.65	49.47	63.03	94.22	+30.92
Total	3.05	110	439.59	653.34	915.79	1361.11	242.99	305.25	453.65	+148.18

\*FP= Farmer Practice RP= Recommended Practice

### 3.2 Average per unit production and availability of vegetables before and after establishing nutrition kitchen garden (Rabi season)

Table (2) depicts five years comparative data from 2016-2017 to 2020-21 on vegetable production of kitchen garden in Rabi season in terms of average yield (kg/unit area), average per capita availability (gm/day), percentage change in availability (gm/day), percentage RDA and Percentage difference in RDA for both farmer's practice and recommended practices of Krishi Vigyan Kendra. In the year 2016-17 for the 0.25 ha area of kitchen garden, average yield (kg/unit area) of kitchen garden in farmer practice was 98.28kg compared to 138.91kg in recommended practices. Further in farmer practice, average per capita availability was 204.75 gm/day as compared to 289.40 gm/day in recommended practice. Thus percentage change in availability of vegetables was 41.34 gm/day. Except that in years 2016-17 percentage RDA for farmer practice was 68.25 as compared to 96.47 for recommended practice. Thus percentage increase of 28.22 in RDA was found in recommended practices as compared to farmers practice.

According to Table (2), In the year 2017-18 for the 0.55 ha area of kitchen garden, average yield (kg/unit area) of kitchen garden in farmer practice was 102.26kg compared to 140.22 kg in recommended practices. Further in farmer practice, average per capita availability was 213.04 gm/day as compared to 292.13 gm/day in recommended practice. Thus percentage change in availability of vegetables was 37.12 gm/day. Except that in years 2016-17 percentage RDA for farmer practice was 71.01 as compared to 97.38 for recommended practice. Thus percentage increase of 26.37 in RDA was found in recommended practices as compared to farmers practice.

It is also clear from the table (2) that in year 2018-19 for 0.75 ha area of kitchen garden, Average yield in farmer practice and recommended practice were 104.61kg /unit area (F.P.), and 141.36kg /unit area (R.P.), average per capita availability

in farmer practice and recommended practice were 217.94 gm/day in farmer practice and 294.5 gm/day in recommended practice. Thus, percentage change in availability of vegetables was 35.13 gm/day. Furthermore percentage RDA in farmer practice and in recommended practice were 72.65 and 98.17, hence percentage increase of 25.52 in RDA has been observed in recommended practice.

From the table (2), it is clear that in the year 2019-20 for the 0.75 ha area of kitchen garden, average yield (kg/unit area) of kitchen garden in farmer practice was 105.88 kg compared to 145.22 kg in recommended practices. Further in farmer practice, average per capita availability was 220.58 gm/day as compared to 302.54 gm/day in recommended practice. Thus percentage change in availability of vegetables was 37.16 gm/day. Except that in years 2019-20 percentage RDA for farmer practice was 73.53 as compared to 100.85 for recommended practice. Thus percentage increase of 27.32 in RDA was found in recommended practices as compared to farmers practice.

It is also clear from the table (2) that in year 2020-21 for 0.75 ha area of kitchen garden, Average yield in farmer practice and recommended practice were 108.21 kg /unit area (F.P.), and 148.2 kg /unit area (R.P.), average per capita availability in farmer practice and recommended practice were 225.44 gm/day in farmer practice and 308.90 gm/day in recommended practice. Thus, percentage change in availability of vegetables was 37.02 gm/day. Furthermore percentage RDA in farmer practice and in recommended practice were 75.14 and 102.97, hence percentage increase of 27.83 in RDA has been observed in recommended practice.

On the basis of the above findings it can be said that use of recommended practice in kitchen garden has significant impact on average yield, average per capita availability of vegetables and in fulfilling daily recommended allowances of vegetable consumption.

**Table 2:** Average per unit production and availability of vegetables before and after establishing nutrition kitchen garden (Rabi season)

Year	Area (ha)	Location (no)	Average yield (kg/unit area)		Average per capita availability (gm/day)		Percentage change in availability (gm /day)	Percentage RDA		Percentage difference in RDA
			FP	RP	FP	RP		FP	RP	
2016-7	0.25	15	98.28	138.91	204.75	289.40	41.34	68.25	96.47	+28.22
2017-2018	0.55	15	102.26	140.22	213.04	292.13	37.12	71.01	97.38	+26.37
2018-2019	0.75	20	104.61	141.36	217.94	294.5	35.13	72.65	98.17	+25.52
2020-2021	0.75	30	105.88	145.22	220.58	302.54	37.16	73.53	100.85	+27.32
2021-2022	0.75	30	108.21	148.27	225.44	308.90	37.02	75.14	102.97	+27.83
Total	3.05	110	519.24	713.98	1,081.75	1,487.47	187.98	360.58	495.84	+135.26

\*FP= Farmer Practice RP= Recommended Practice

### 3.3 Availability of vegetables in terms of nutrient before and after establishment of kitchen garden in Kharif and Rabi Season

Average per capita availability of nutrients before and after establishing nutritional kitchen garden in Kharif and Rabi is presented in Table 3. It is obvious from the table that per capita availability of nutrients/day increased after kitchen garden intervention. In farmer's practice of kitchen gardening per capita availability of nutrients/day like Protein, Iron, Calcium Beta carotene and vitamin C were 3.22 gm, 2.53 mg, 88.56 mcg and 97.67 mg in Kharif season and 3.78 gm, 3.45 mg, 78.56 mg, 1654.32 mcg and 106.76 mg in Rabi Season. In Recommended practice of kitchen gardening per capita availability of nutrients/day like Protein, Iron, Calcium Beta carotene and vitamin C were 3.22 gm, 2.53 mg, 88.56 mcg and 97.67 mg in Kharif season and 3.78 gm, 3.45 mg, 78.56 mg, 1654.32 mcg and 106.76 mg in Rabi Season. Vitamin C was the only nutrient which the individuals were having in adequate amount in both kharif and rabi season in Farmer as well recommended practice. Rest of the nutrients like protein, calcium, iron and beta – carotene were very less in their diets through vegetables in farmer practice. Table (3) also revealed

that 7.76% and 9.26% protein, 9.66% and 10.57% iron, 12.51% and 13.32% calcium, 58.57% and 78.79% beta-carotene, 101.85% and 97.50% vitamin C of RDA were more available to individual in recommended practice when compared with farmers practice in both the kharif and rabi season respectively Borthakur *et al.* (2021) <sup>[1]</sup> in a study conducted at 20 households of Golaghat and Sivasagar district of Assam also found that demonstration of nutrition garden resulted in increased homestead vegetable production and consumption of excess vegetables. According to them, demonstration had positive effect on making availability of more nutrients (such as 2.37% protein, 34.29% iron, 19.57% calcium, 34.28% beta-carotene, 177.50% vitamin C and 16.53% folic acid of RDA) to individuals. Similar findings were also reported by Borthakur *et al.* (2021) <sup>[1]</sup>. They revealed that the production and consumption of the vegetables increased by 218.25% and 95.40% respectively which resulted in additional intake of iron (32.70%) and calcium (110.40%) when kitchen garden was established at Setewani village of Seoni district in M.P under frontline demonstration.

**Table 3:** Average per capita availability of nutrients before and after establishing nutritional kitchen garden in Kharif and Rabi Season

Season	Nutrients	Per capita availability of nutrients/ day		% RDA		% Difference
		Before	After	Before	After	
Kharif	Protein (g)	3.22	7.34	5.58	13.34	+7.76
	Iron (mg)	2.53	4.56	12.05	21.71	+9.66
	Calcium (mg)	88.56	162.67	14.76	27.11	+12.51
	Beta carotene (mcg)	1456.78	4267.87	30.34	88.91	+58.57
	Vitamin C(mg)	97.67	138.64	244.75	346.6	+101.85
Rabi	Protein (g)	3.78	8.87	6.87	16.13	+9.26
	Iron (mg)	3.45	5.67	16.43	27.00	+10.57
	Calcium (mg)	78.56	158.43	13.09	26.41	+13.32
	Beta carotene (mcg)	1654.32	5436.33	34.47	113.26	+78.79
	Vitamin C(mg)	106.76	145.76	266.9	364.4	+97.5

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