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The study on effect of nutrition garden for nutritional security of tribal families

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Abstract
This study was designed to evaluate the effect of nutrigarden on socioeconomic status of tribal families and especially for total consumption of vegetables and total income generated through the implementation of nutrigarden in tribal families (n = 20). Malnutrition is the common problem in tribal families due to their lack of knowledge about food intake, lack of food supply, family economic background, family size, socioeconomic status, low income and family problems. We have implemented nutrigarden programme to cultivate vegetables to increase their family income and consumption of food. The income was increased drastically along with vegetable consumption ranged from Rs 770 to 12000, from 33.0 ± 2.26 to 88.0 ± 2.08 after the nutrigarden implementation as per month. Awareness have been increased about nutrition among the tribal families. The impact of nutrigarden on socioeconomic status of tribal families was clearly observed. An education and family income are the major reasons for socioeconomic status of tribal families.

Keywords: Nutrigarden, tribal families, malnutrition, nutritional security

1. Introduction
Anaemia and malnutrition are major problems identified in tribal women & children. Due to lack of knowledge low cost iron rich nutritious food about 56% of women in reproductive age and suffering from anaemia. Introduction of nutrition education through package form on various nutritional health issues and overcome precautions. Introduction of nutrition education will educate the women and predicts nutritional anaemia.

Heart failure is associated with malnutrition when the sickness has a long elaboration or is in its progressive stages. The research studies investigated whether malnutrition is frequent and related to long-term prognosis. A situation that exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life (Vijayalakshmi *et al*., 2020) [6].

Agriculture is the primary livelihood of a majority of the population in South Asia. The region also houses a large population of undernourished people. The nutrition garden envisages developing and demonstrating a sustainable framework to improve nutritional outcomes that can be used for up scaling and wider adoption in rural population. India ranks 102 out of 117 countries in the 2019 Global Hunger Index, and suffers from a serious level of hunger with a score of 30.3 (Bhavana *et al*., 2021) [1].

The mal nutrition leads to the number of health problems such as blindness, disability, increased maternal and infant mortality rates, depressed functioning of the immune system or low levels of energy (WHO, 2020) [2].

Mal nutrition is the common problem in tribal families due to their lack of knowledge about food intake, lack of food supply, family economic background, family size, socioeconomic status, low income and family problems. Nutri gardens are using to overcome these problems especially in low income families such as farm families and village agricultural families, low annual income and economic background. Now a days the proteins from plant sources such as from cereals, pulses and fruits and vegetables and oil seeds have vital and crucial applications in food processing industries. The pure proteins can be extracted from plants using wet processing methods such as water extraction and salt extraction, alkaline extraction and acid extraction (Penchalaraju & John Don Bosco, 2022) [4].

In light of the aforementioned facts, this study was undertaken to
- To promote nutrition education
- To create awareness on nutritional health

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2. Materials and Methods
2.1 Study area
A Front line Demonstration (FLD) experiment was conducted by Krishi Vigyan Kendra, Rastakutumbai, Andhra Pradesh, Acharya N.G.Ranga Agricultural University (ANGRAU) in small households of its adopted villages Durbili village, suryanagaram village, shanthinar village, Vanjarapuguda villages of Vizianagaram district, Andhra Pradesh (AP). Twenty households were randomly selected for evaluation of benefits of homestead nutrigardens based on willingness to participate in the experiment to that triabal families distributed vegetable and green leafy vegetable seeds (Rs 550/-) (Table-2), 0.02 hectare area was used for vegetable plantation and given experts suggestions to tribal families to control insects and pests using organic fertilizers like Neem oil, different kinds of kasayams (Garlic, Ginger, Green chilli Solutions) etc., Six months monthly follow-up visits were done to obtain parametrical data.

2.2 Survey Design and Data collection
Data obtained from the survey contained the following:
1. Details of household head (gender and educational level) and socioeconomic profiles (average age, family size, income and location).
2. Vegetable plantation (i.e. area, species, labour input and expenditure cost).
3. Contributions of Vegetable plantation (i.e. the proportion of vegetable diet coming from homestead plantation.
4. Vegetable yield.
5. Vegetable consumption.
6. Cost of the vegetables.

2.3 Statistical analysis
The values are expressed as mean ± standard deviation. All the data were statistically evaluated by one-way analysis of variance (ANOVA) and the significance of differences between means were determined by Duncan's multiple comparison test at a 5% significance level ($p < .05$) by using IBM SPSS statistics software, version 20.0 (IBM, SPSS, Inc., Chicago, IL, USA).

3. Results and Discussion
3.1 Profiles of participating tribal families
The socio-demographic variables selected for the research study were age, educational qualifications, the family's income, family size, occupation, and marital status. The data is presented in table 1.

Table 1: Profiles of participating tribal families

S. No.	Variable name	Number (%)	S. No.	Variable name	Number (%)
01.	Age (years)		04.	Educational Qualification	
	28 -35	4 (20%)		Below 5th	10 (50%)
	35-45	12 (60%)		Primary	4 (20%)
	50-60	4 (20%)		Secondary	6 (30%)
	Total	20 (100%)		total	20 (100%)
02.	Income (Monthly)		05.	Occupation	Number (%)
	Below 5000	6 (30%)		House wives	04 (20%)
	8000-10000	12 (60%)		Agricultural workers	10 (50%)
	10000-15000	2 (10%)		Farmers	06 (30%)
	Total	20 (100%)		total	20 (100%)
03.	Marital status		06.	Family members	
	Married	18 (90%)		2 to 3	15 (75%)
	Widow	02 (10%)		Above 4	5 (25%)
	Total	20 (100%)		total	20 (100%)

Table 1 represent that the lack of knowledge, lack of education, very low income and its clearly understood that the lack of sources, lack of self-confidence for all age group of the selected participants. These tribal families are having lack of opportunities. Similar data Ws presented by (Pandey *et al*., 2016) [3]. This status of tribal family is affected by number of factors including their socioeconomic status, family problems, lack of income and properties (Vijayalakshmi *et al*., 2020) [6].

Table 2: Yield of vegetables after establishment of nutrigarden

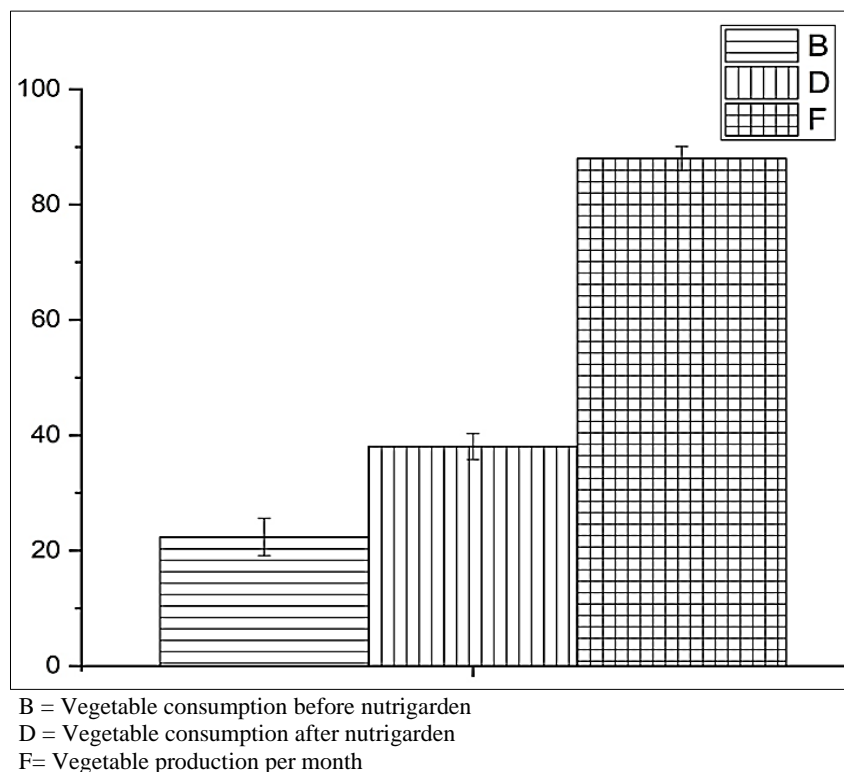| Total investment (Initial level)	Parameters	For month (Kg)	Cost	For six months
Rs 500.00	House hold consumption	40	1200	7200
	Selled vegetables (@30/-	50	1500	9000
	Total yield of vegetables	90 Kg	2700	16200
	For one year total yield	1080	32,400.00	

Table 2 depicted that the total yield of vegetables for one year was around 1080 kg and total cost of rupees 32400.00. our study results were more consistent with (Bhavana *et al*., 2021) [1].

Table 3: Income and vegetable consumption before and after nutrigarden

No. of families	Vegetable consumption before nutrigarden (Kg)	Vegetable consumption after nutrigarden	Total vegetables Yield	Average cost kg@30/-	Income before nutrigarden	Income after nutrigarden
1	20	40	90	2700	5000	7700
2	18	41	91	2730	5000	7730
3	20	38	88	2640	8000	10640
4	20	40	90	2700	8000	10700
5	14	40	90	2700	10000	12700
6	24	40	90	2700	10000	12700
7	22	40	90	2700	8000	10700
8	20	40	90	2700	8000	10700
9	21	40	90	2700	10000	12700
10	24	38	88	2640	10000	12640
11	22	39	88	2640	10000	12640
12	24	38	88	2640	10000	12640
13	24	35	85	2550	8000	10550
14	24	36	86	2580	5000	7580
15	28	34	86	2580	8000	10580
16	24	35	86	2580	10000	12580
17	22	36	86	2580	5000	7580
18	24	34	86	2580	10000	12580
19	28	38	88	2640	8000	10640
20	24	39	84	2520	5000	7520
mean	22.35	38.05	88	2640	8050	10690
SD	3.23	2.26	2.08	62.32	2012.46	2023.60

Values are expressed as mean ± SD

B = Vegetable consumption before nutrigarden
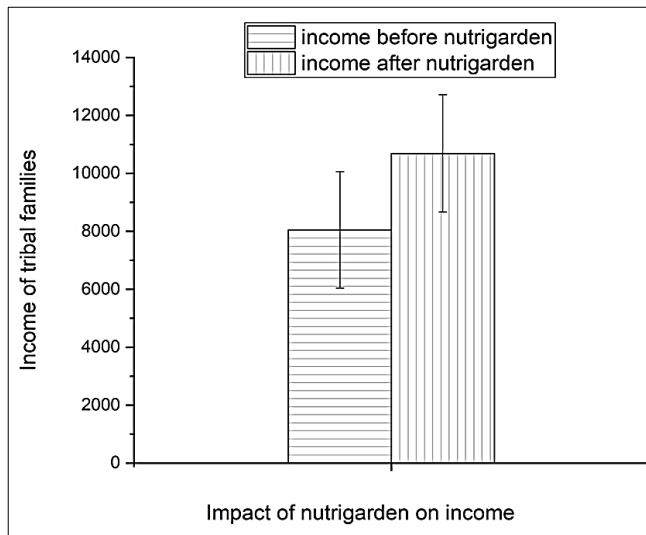D = Vegetable consumption after nutrigarden
F= Vegetable production per month

Fig 1: Vegetable consumption before and after nutrigarden

Vegetable consumption was drastically increased after nutrigarden implementation in tribal families. Vegetables are rich sources of minerals, vitamins and enzymes, and other nutrients. The possibility of chances is more to prevent malnutrition and its implications in tribal families and socioeconomic status can be increased. Health immunity power will be increased to overcome the typical health hazards.

Fig 2: Income of tribal families before and after nutrigarden

Fig 2 shows that the income of the tribal families has been increased due to the establishment of nutrigarden in tribal areas. The income of the tribal families ranged from 5000 to 10000 as per month before the establishment of nutrigarden. The income of the tribal families ranged from 7700 to 12000.

Conclusion
- The impact of nutrigarden on socioeconomic status of tribal families was clearly observed.
- The income of the tribal families ranged from 7000 rupees to 12700 rupees when compared to normal income due to nutrigarden.
- The vegetable consumption was increased after nutrigarden was ranged from 88.0 ± 2.02
- The socioeconomic status was increased.

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