

ECONOMIC BENEFIT FROM NUTRIGARDEN TO FARMWOMEN OF WANAPARTHY DISTRICT, TELANGANA, INDIA

ABSTRACT

Nutri-garden is an important concept that helps to combat malnutrition by producing diverse kinds of vegetables for rural families. YFA-KVK, Mahabubnagar-I demonstrated the Nutrigarden concept amongst 100 families of three mandals namely Madanapuram Kothkota and Wanaparthi of Wanaparthi district. The present study was taken-up to analyze the economic impact of the Nutrigarden along with perceived constraints faced by the farmwomen. The demonstrations on Nutrigarden improved their understanding in successful adoption of the concept. The total beneficiaries covered were 100 with an area of 1000sq.meters each, which accounts to 10 ha. as a whole. From this said area farm women as a whole were able to generate a total amount of Rs. 30592.09/- from kharif vegetables and Rs. 26604.78/- from rabi vegetables. Therefore, the total income from vegetable was Rs. 57196.87/- from an area 10 ha. Including both the seasons excluding home consumption. Besides, there are few perceived constraints in successful adoption of Nutrigarden. Overall analysis revealed that time consuming, lack of backyard and front yard space availability for Nutrigarden, Unaware of the economic advantage of Nutrigarden and lack of knowledge on pest and disease management were amongst the major constraints as perceived by farmwomen.

Keywords: Nutrigarden, Demonstration, Economic analysis, Income increase, Constraints,

INTRODUCTION

The right to adequate food is realized when every man, woman and child, alone and in community with others, has physical and economic access at all times to adequate food or means for its procurement” (CESCR General Comment No. 12, 1999). Rural India is starving hard to get proper nutritive food. Even if they spent all their

income on food, 63.3% of the rural population or more than 52 crore Indians would not be able to afford that nutritious meal (Raghunathan *et al*, 2020). Significant increase in food prices of basic kitchen items like fruits and vegetables, the poor and fixed income groups are suffering from the decreasing real incomes and purchasing power (Singh and Singh, 2017). The prices of vegetables have increased quite significantly with retail prices of almost all kinds rising from 25 per cent to 200 per cent (Business Standard, 2020). As the cost of fruits and vegetables increases, the availability of fruits and vegetables in the home decreases (Jamy, D, Ard *et al*, 2007). As a result, if we look into the statistics “Between National Family Health Survey (NFHS)-4 and NFHS-5, the percentage of underweight children went up from 26.6 to 28.9. The percentage of anemic children went up from 60.7 to 70 and at the same time women percentage suffering from anemia rose from 56.6 to 57.6 percent in Telangana (Times of India, 2021). Therefore, it is need of the hour to reduce the effect of poor diet and to meet the requirements of nutritive food with improvement in income, where should be an innovative practice in production and access of food items (vegetables and fruits), such an innovation can be a Nutri-Garden.

Nutrigarden is a method of planting and harvesting nutrient-rich crops in residential houses or in their vicinity to meet the requirements of the family all year round. It is primarily intended for continuous supply of fresh vegetables for family use, where in different types of vegetables are grown in available land. Practicing Nutrigarden can be the one most affordable and the easiest ways to ensure nutritional security besides providing additional income and reduce the food expenditure as well.

The concept of Nutrigarden has come up as an agricultural intervention in India by Indian Council of Agricultural Research (ICAR) under the Division of Agricultural Extension, New Delhi, initiated special programmes like NARI (Nutri Sensitive Agri-resources & Innovations) through Krishi Vigyan Kendras’ (KVKs) across the country which aimed to sensitize farm women and others stakeholders on various aspects of nutrition to address malnutrition by bringing change in the food systems Nutrigarden for food security and diet diversity (NARI, 2020).

The present study was carried out in the adopted villages of Youth for Action KVK, Mahabubnagar-I of Wanaparthy district, Telangana. Through various outreach

initiatives, YFA-KVK brought the idea of Nutrigarden to the communities, it was adopted between 2018 and 2021, and the program is still ongoing in the villages. During last three years, 100 demonstrations were conducted **at farm level for** proper understanding and adoption of the concept by the farmwomen. Through this paper an effort was made to study the economic benefit from Nutri-garden to farmwomen besides emphasis was laid on identifying the major constraints in adoption of recommended Nutrigarden concept.

MATERIALS AND METHODS

Investigation for the study was carried-out in 10 villages of three mandals (Madanapuram, Kothakota and Wanaparthy) of Wanaparthy district, which were purposely selected based on demonstrations conducted by KVK for the last three years i.e., 2018-2019, 2019-20 and 2020-21. The total number of beneficiaries were 100 farmwomen. Different outreach programmes including awareness programmes, focused group discussion and demonstrations were conducted focusing on health and nutrition with the beneficiaries in the villages.

Table 1. Selection of respondents

S.No	Mandals	Villages	Beneficiaries	Area required (Sq. meters/ Ha.)
1	Madanapuram	Madanapuram	10	10,000
		Kothapally	10	10,000
		Nelvidi	10	10,000
		Thirumalaipally	10	10,000
		Shankarampet	10	10,000
		Total	50	50000 (5 ha.)
2	Kothakota	Nervein	10	10,000
		Ranipet Thanda	10	10,000
		Total	20	20000 (2 ha.)
3	Wanaparthy	Metpally	10	10,000
		Metpally Thanda	10	10,000

		Nagamma Thanda	10	10,000
		Total	30	30000 (3 ha.)
		Grand total	100	100000 (10 ha.)

A cross sectional design was inculcated and based on the availability of the area, water, nutritional requirements of the families, willingness of farm women to maintain the garden and availability of space with an area of 1000 sq. meters at the least for kitchen garden was identified and based on which the beneficiaries were selected for the demonstrations.

These beneficiaries were distributed with vegetable seed kits for both the Kharif and Rabi from YFA-KVK. The kits comprised of vegetable seeds of three category i.e., Vegetables viz., tomato, brinjal, okra, chilies, beans and cucurbits viz., bitter guard, ridge guard and bottle guard and leafy vegetables coriander, gogu, methi, spinach, amaranthus, ambhaticukka and tuber crops viz., carrot and radish.

Among, 100 farmwomen selected, In kharif season, 50 farmwomen were selected from Madanapuram Mandal whereas from other 50 farmwomen were selected from Kothakota (n=20) and Wanaparthy(n=30) mandal for rabi season.

A keen monitoring during the cultivation of nutria-garden was under taken. During the harvesting of each season yield procured, consumption pattern and income generated was tabulated for economic analysis. follow up activities and field day program was conducted in the respective villages and identified the major constraints faced by the farmwomen during were listed and categorized as input constraints technical, socio-cultural and general constraints and rank ordered them according to their preferences. statistical analysis included percentage, frequency and ranking was used to analyze the data collected

RESULTS AND DISCUSSION

The average yield and expenses were analyzed by calculating the economics of the respondents obtained through Nutrigarden cultivation for both kharif and rabi.

These data was in line with Bhavana A, 2021 where in the Nutri garden was implemented all-round the year and yield of vegetables which were consisted of green leafy vegetables, roots and tubers and other vegetables (okra beet root carrot, bootle guard beans chilli tomato brinjal onion ridge guard raddish cabbage spinach amaranthus fenugreek leaves) was obtained in all the three seasons (Kharif and Rabi).

The data of average cumulative yields from kharif were presented in Table 2. It is clear from the data that from an area of 1000 sq. meter each selected 50 farmwomen, the obtained cumulative average yield in kharif was 2139.31 kg from 14 different vegetables sown.

These results showed that the economic and nutritional security was attained with increased availability of vegetables at their own kitchen garden with low maintenance. The results are in line with Thakor et al, 2020, wherein he revealed that with Gangama mandal Nutri-garden model, farmers could produce average annual economic benefit of Rs. 23,745/- with average production 564 kg by the growing of 32 crops.

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Table 2 Average yield obtained from Nutrigarden in Kharif (Area: 1000 sq.meters)

Beneficiaries	Kharif vegetables production in Kg														
	Tomato	Brinjal	Chilli	Bottle guard	Bitter guard	Ridge guard	Okra	Spinach	Amaranthus	Coriander	Methi	Gogu	Ambhati Chukka	Beans	Cumulative yield (Kg.)
Madanapuram mandal (n=50)															
1	307.2	576.6	302.4	288	40	288	168	60	30	30	30	30	30	108	2288.2
2	289	507.7	290	278	30	250	120	51	28	21	25	15	18	102	2024.7
3	300	540	260	268	28	240	120	52	26	24	26	16	18	100	2018
4	256	560	265	255	25	260	123	50	25	25	27	18	15	97	2001
5	233	500	240	248	30	230	124	54	23	21	26	17	18	98	1862
6	275	510	250	250	35	254	140	48	24	23	28	15	15	95	1962
7	305	520	230	200	34	255	143	47	21	24	24	21	16	90	2500
8	300	540	220	210	30	265	148	49	20	25	25	20	15	100	2537
9	265	530	230	220	28	276	156	50	18	26	26	22	21	91	2559
10	256	550	240	240	34	278	123	51	19	26	24	23	22	92	2666
11	270	560	250	250	35	284	150	52	20	28	25	24	23	93	2862
12	288	490	260	200	38	285	154	53	19	23	26	24	24	94	2776
13	267	500	270	210	32	265	156	56	26	25	24	25	20	95	2868
14	244	510	300	211	34	265	154	57	28	26	28	26	21	96	2678
15	250.4	515	280	230	29	267	160	54	26	21	24	21	19	97	2979.4
16	266.7	520	265	220	32	260	161	54	28	27	25	21	23	98	2000.7
17	266	540	270	236	34	254	162	53	25	23	26	20	24	99	2032
18	280.4	518	260	276	33	240	167	48	27	24	24	21	21	100	2039.4
19	275.3	512	269	230	28	281	154	48	29	23	25	24	23	102	2023.3
20	278	500	245	240	35	274	155	47	23	23	26	25	24	90	1985
21	209	528	256	250	34	272	156	45	22	24	24	26	24	91	1961
22	290	540	260	230	33	271	157	44	21	23	25	23	23	91	2031
23	300	530	270	239	32	275	154	43	24	25	26	24	22	92	2056

24	304	517	300	240	31	276	150	45	23	26	27	25	21	99	2084
25	278	515	260	230	30	277	154	46	22	27	23	26	23	89	2000
26	287	520	270	210	30	287	160	47	21	28	24	26	23	90	2023
27	298	510	260	200	25	267	160	48	25	21	25	27	24	91	1981
28	300	511	290	210	26	276	161	49	24	24	26	21	25	90	2033
29	267	513	300	200	28	245	162	50	21	25	24	23	27	91	1976
30	240	543	245	219	27	250	163	51	25	21	27	23	21	90	1945
31	250	550	265	229	31	265	164	52	26	28	28	24	23	91	2026
32	256	545	267	230	32	267	165	54	27	29	28	27	24	90	2041
33	279	529	250	254	30	276	166	48	26	27	21	21	25	91	2043
34	289	515	240	276	27	261	167	48	21	28	24	23	21	92	2032
35	280.4	529	260	280	25	250	140	46	23	21	25	24	20	93	2016.4
36	257.3	520	270	210	28	246	143	47	24	18	26	21	23	94	1927.3
37	266.3	530	289	211	31	254	143	43	24	19	27	23	24	95	1979.3
38	278.3	540	290	230	32	245	142	43	25	17	23	29	25	100	2019.3
39	287	560	300	220	33	234	145	43	26	18	24	21	26	99	2036
40	243	540	270	210	32	243	146	44	27	21	25	22	27	98	1948
41	289	550	240	230	33	254	164	45	23	23	27	20	21	99	2018
42	234.3	570	260	240	32	251	155	46	24	24	24	24	23	100	2007.3
43	250.4	540	260	250	34	278	154	47	25	25	25	25	24	100	2037.4
44	270	504	270	240	32	267	165	48	26	25	27	26	20	89	2009
45	240	515	260	260	28	276	161	49	27	26	23	23	17	88	1993
46	230	520	300	240	27	266	163	50	23	27	24	23	18	90	2001
47	244	540	280	250	28	256	166	51	18	26	26	24	28	91	2028
48	259	550	270	260	28	255	154	52	18	28	23	25	25	98	2045
49	260	567	265	270	31	276	145	53	21	28	21	27	23	88	2075
50	230	540	270	210	32	243	151	56	23	25	18	21	24	89	1932
Total	13438	26480.3	13283.4	11788	1546	13130	7614	2467	1190	1215	1254	1145	1104	4726	106965.7
Avg.	268.76	529.606	265.668	235.76	30.92	262.6	152.28	49.34	23.8	24.3	25.08	22.9	22.08	94.52	2139.314

Table 3 Average yield obtained from Nutrigarden from Rabi season (Area: 1000sq.meters)

Beneficiaries	Rabi vegetables production in Kg														
	Tomato	Brinjal	Chilli	Bottle guard	Bitter guard	Ridge guard	Okra	Spinach	Amaranthus	Coriander	Methi	Gogu	Ambati Chukka	Beans	Cumulative yield (Kg.)
Wanaparthy (n=30)															
51	278.9	534.5	274	231	28	231	144	42	30	28	29	33	31	74	1988.4
52	254.3	456.7	235	165	26	165	132	41	32	32	32	32	32	75	1710
53	223	342.5	245	187	21	187	122	44	32	32	32	32	32	72	1603.5
54	184.5	523.6	162	198	22	198	121	45	30	30	30	30	30	73	1677.1
55	192.5	445.7	163	187	23	187	112	44	29	29	29	29	29	75	1574.2
56	187.5	523.5	234	187	21	187	120	41	27	28	31	28	29	70	1719
57	210	324	265	167	18	167	128	42	23	21	24	31	27	69	1539
58	225.5	345	264	195	19	195	119	42	24	25	28	29	30	66	1618
59	243	423	231	221	16	221	132	38	31	31	31	31	31	67	1747
60	221	453	256	214	21	214	131	39	30	30	30	30	30	68	1767
61	192.2	432	221	210	23	210	132	38	30	30	30	30	30	63	1671.2
62	211	412	198	200	24	200	120	36	29	29	29	29	29	64	1610
63	265	389	187	221	27	221	124	36	28	28	28	28	28	62	1672
64	235	394	174	198	20	199	123	35	27	27	27	27	27	61	1556.6
65	272	387	187	198	18	198	123	38	30	30	30	30	30	60	1631
66	186	389	245	174	17	174	125	38	31	31	31	31	31	59	1562.9
67	194	386.6	234	167	20	167	118	36	28	28	28	28	28	74	1540.4
68	205	376.6	254	178	18	178	120	37	25	25	25	25	25	75	1565.9
69	223	345	268.6	170	21	160	123	37	26	26	26	26	26	72	1568.7
70	215.5	354	231.3	178	23	170	132	32	27	27	27	27	27	73	1593.2
71	234.7	367	231.7	198	21	187	131	36	27	27	27	27	27	75	1606.6

72	218	378	245	185	24	185	128	36	21	21	21	21	21	70	1574.3
73	194.5	369	187.5	174	21	174	123	26	22	22	22	22	22	71	1460.9
74	233	345	187	165	23	165	124	25	21	21	21	21	21	74	1456.6
75	242	344	194.5	171	24	171	126	33	30	30	30	30	30	73	1533.4
76	254	445	185.6	195	24	195	129	32	30	30	30	30	30	72	1688.6
77	264	423	187.9	203	21	203	132	38	30	30	30	30	30	70	1691.8
78	255.6	412	195	207	23	207	131	38	21	21	21	21	21	71	1644.6
79	247.5	417	234.5	209	20	209	130	39	30	30	30	30	30	75	1731

Kothakota mandal (n=20)

Beneficiaries	Tomato	Brinjal	Chilli	Bottle guard	Bitter guard	Ridge guard	Okra	Spinach	Amaranthus	Coriander	Methi	Gogu	Ambati Chukka	Beans	Cumulative yield (Kg.)
80	267.9	342	233.5	221	21	221	128	38	19	19	19	19	19	66	1633.4
81	244	367	245.6	203	19	203	114	32	21	21	21	21	21	67	1599.6
82	221.4	358	234.1	200	18	200	115	33	22	22	22	22	22	68	1557.5
83	234.5	398	212.7	198	17	143	118	33	24	24	24	24	24	63	1522.6
84	222.3	432	245.6	189	16	163	117	34	23	23	23	23	23	64	1643.5
85	215	456	212	154	17	197	113	36	25	25	25	25	25	62	1631
86	234	421	210	201	18	201	122	39	26	26	26	26	26	61	1637
87	239.6	324	203.3	214	18	214	125	40	27	27	27	27	27	60	1572.9
88	265	345	235	216	17	216	124	44	28	28	28	28	28	59	1661
89	243	367.7	236	208	21	208	120	41	29	29	29	29	29	74	1661.4
90	227.6	345.6	198	209	20	209	121	42	30	30	30	30	30	73	1594.7
91	235.4	345.8	174.3	212	19	212	112	41	30	30	30	30	30	72	1573
92	197	512	189.6	214	21	214	132	42	31	31	19	21	29	70	1744.1
93	193.5	498.8	198.8	231	22	231	122	41	26	30	20	29	31	71	1760.1
94	186.4	345.7	208.9	222	20	222	121	4	22	27	21	22	32	75	1559
95	210.5	511.2	210	221	23	221	112	41	23	30	30	30	30	63	1762.7
96	215	434	211	212	27	212	120	41	21	21	21	21	21	64	1641
97	235	411	205	210	21	210	128	40	20	20	20	20	20	62	1622

98	185.8	378.8	200	225	24	225	132	44	21	21	21	21	21	61	1580.6
99	274	431	210	227	25	217	131	43	22	22	22	22	17	62	1725
100	245.9	512	234.6	225	26	187	130	42	18	21	20	20	21	66	1768
Total	11355	20273.3	10885.6	9965	1057	9851	6212	1875	1309	1326	1307	1328	1340	3406	81753
Average	227.1	405.466	217.712	199.3	21.14	197.02	124.24	37.5	26.18	26.52	26.14	26.56	26.8	68.12	1629.80

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Similarly, the data of average cumulative yields from rabi were presented in Table 3. It is clear from the data that from an area of 1000 sq. meter each selected 50 farmwomen, the obtained cumulative average yield in rabi was 1629.80 kg from 14 different vegetables sown from both the kothakota and Wanaparthy mandal. The study results were more consistent with Thakor R.F, 2020

Besides, from the Table 4, the expenses spent on the Nutrigarden cultivation for kharif and rabi were Rs. 27334/- and Rs. 20089/- were drawn, respectively. Therefore, the net income earned after deducting the expenses were Rs. 30592.09/- from kharif vegetables and Rs. 26604.78/- from rabi vegetables. Hence, the total income earned from vegetables for both the season was Rs. 57,196/- from an area of 1000 sq. meters each of 100 beneficiaries.

The results are in line Vijayalaxmi et al, 2020 where in the average income of the selected households was 9380 ± 4208.03 rupees/month without any homestead vegetable plantation. After the experiment the average income of the households was increased (10694 ± 4194.70 rupees/month). The average income generated from vegetable garden was about 1314 ± 31.04 rupees/month) (Table 3). There was a significant difference ($p < 0.001$) in an income of the households with the impact of homestead vegetable garden

Table 4 Economic analysis of vegetable production under Nutrigarden for Kharif & Rabi seasons

Kharif	Crops	Average Yield	Market price per Kg	Average Gross Income	Expenses	Net income
1	Tomato	268.76	30	8062.8	3967	4095.8
2	Brinjal	529.606	25	13240.15	5340	7900.15
3	Chilli	265.668	30	7970.04	3562	4408.04
4	Bottleguard	235.76	20	4715.2	2370	2345.2
5	Bitterguard	30.92	60	1855.2	1023	832.2
6	Ridgeguard	262.6	25	6565	2578	3987
7	Okra	152.28	20	3045.6	2691	354.6

8	Spinach	49.34	30	1480.2	1058	422.2
9	Amaranthus	23.8	30	714	200	514
10	Coriander	24.3	30	729	110	619
11	Methi	25.08	30	752.4	150	602.4
12	Gogu	22.9	25	572.5	150	422.5
13	AmabhatiChukka	22.08	30	662.4	150	512.4
14	Beans	94.52	80	7561.6	3985	3576.6
Total				57926.09	27334	30592.09
Aveg.				1158.5218	546.68	611.8418
Rabi	Crops	Average Yield	Market price per Kg	Average Gross Income	Expenses	Net income
1	Tomato	227.1	30	6813	2890	3923
2	Brinjal	405.466	25	10136.65	3980	6156.65
3	Chilli	217.712	30	6531.36	2897	3634.36
4	Bottleguard	199.768	20	3995.36	1129	2866.36
5	Bitterguard	21.074	60	1264.44	789	475.44
6	Ridgeguard	198.808	25	4970.2	1897	3073.2
7	Okra	124.24	20	2484.8	2001	483.8
8	Spinach	38.322	30	1149.66	897	252.66
9	Amaranthus	26.868	30	806.04	200	606.04
10	Coriander	26.888	30	806.64	110	696.64
11	Methi	26.888	30	806.64	150	656.64
12	Gogu	26.958	25	673.95	150	523.95
13	AmabhatiChukka	26.848	30	805.44	150	655.44
14	Beans	68.12	80	5449.6	2849	2600.6
Total				46693.78	20089	26604.78
Aveg.				933.8756	401.78	532.0956

During cultivation of vegetables under Nutrigarden, respondents faced few constraints. As mentioned before, the constraints were further divided in to four categories. The data was presented in Table 5. From the first category “Input constraints”, lack of backyard or front yard space availability was ranked as major

constraint (78.00 %) as perceived by the respondents followed by lack of availability of good quality soil (60.00 %). Under technical constraints, lack of knowledge on pests and diseases management (74.00%) followed by lack of knowledge on post-harvest management (63.00%) were ranked as 1st and 2nd major, constraints respectively. Further, from Table 5, it was depicted that time consuming was identified as a major constraint among the socio-cultural constraints (81.00 %) studied. Most of the farmwomen and the family members saw Nutrigarden as burdensome and after perceived that it consumes lot of time, hence they lack interest to look after the Nutrigarden or to maintain (73.00%), hence, this is been the next major constraint perceived by the respondents. In the category of general constraints, 78 percent of the respondents were unaware of the economic advantage of Nutrigarden followed by 60 percent of the respondents expressed the negligence towards the nutritional benefit from vegetables.

Table 5 Perceived constraints faced by the respondents in the adoption of Nutrigarden

S.No.	Constraints	Frequency and percentage	Rank
I	Input constraints		
1	Lack of water availability for irrigation	35(35.00%)	6
2	Lack of backyard and front yard space availability for Nutrigarden	78(78.00%)	1
3	Lack of manure availability in small packets	36 (36.00%)	5
4	Lack of pesticide availability in small packets	48 (48.00%)	3
5	Lack of availability of good quality soil	60 (60.00%)	2
6	Lack of availability of quality seed	40 (40.00%)	4
II	Technical Constraints		
1	Lack of knowledge on pest and disease management	74 (74.00%)	1
2	Lack of knowledge on time of sowing	48 (48.00%)	4
3	Lack of knowledge on seed rate and spacing	52 (52.00%)	3

4	Lack of knowledge on manure/FYM preparation	40 (40.00%)	5
5	Lack of knowledge on identification and selection of good quality soil	34 (34.00%)	6
6	Lack of knowledge on post-harvest management	63 (63.00%)	2
III	Socio-Cultural Constraints		
1	Lack of interest of family members in management Nutrigarden	73 (73.00%)	2
2	Animal threat and Human theft	46 (46.00%)	3
3	Time consuming	81 (81.00%)	1
IV	General Constraints		
1	Neglecting the nutritional benefit from vegetables.	60 (60.00%)	2
2	Unaware of the economic advantage of Nutrigarden	78 (78.00%)	1

CONCLUSION

Economic returns from the analysis revealed that Nutrigarden can be a wonderful solution to the vulnerable households in providing economic benefit besides nutritional security. However, there are certain constraints in successful adoption of Nutrigarden. It can be concluded that socio-cultural followed by input, general constraints were at par followed by technical constraints. It is revealed that constraints like Nutrigarden is perceived as a **time-consuming** activity followed by lack of space for taking up the gardening, Unaware of the economic advantage of Nutrigarden and lack of awareness in management of pest and diseases were major blockages in successful adoption of Nutrigarden.

Therefore, if we look into the positive impact of Nutrigarden, it not only provides the healthy lifestyle with diversity of vegetable in diet but also provide additional income for the households. Hence, Nutrigarden can be the best way in improving economic standards of farm families and helps in reducing financial burden by waiving the expenses spent on vegetables. In addition to this, garden maintenance will keep women healthy and active. Hence keeping in view all this above advantages people should adopt the Nutrigarden for its immense benefits.

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