WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 5.990
Volume 4, Issue 12, 1626-1637. Research Article ISSN 2277– 7105

EFFECTIVE NUTRITIONAL VALUE OF YEAR ROUND VEGETABLE PRODUCTION AND QUICK GROWING FRUIT TREES IN HOMESTEAD AT AGRO ECOLOGICAL ZONE ELEVEN IN BANGLADESH FOR IMPROVEMENT OF THE HEALTH OF RURAL PEOPLE.

M. A. A. Mamun[1,6], N. A. Siddquie[1], Md. Reyad-ul-ferdous[2,3]*, Abu Saleh Mohammed Sayem[4], Md. Shakhawat Hossain[5]

[1]Bangladesh Agricultural Research Institute, Regional Wheat Research Centre,Shyampur-6212 Rajshahi.

[2]Department of Pharmacy, Progati Medical Institute, Dhaka-1207, Bangladesh.

[3]Department of Pharmacy, North South University, Dhaka-1229, Bangladesh.

[4]Department of Pharmacy, University of Asia Pasific, Dhaka-1209, Bangladesh.

[5]College of Economics and Management, Northwest A&F University, Yangling, Shaanxi-712100, P. R China.

[6]College of Plant Protection, Northwest A&F University, Yangling, Shaanxi 712100, P. R China.

Article Received on
16 Oct 2015,

Revised on 06 Nov 2015,
Accepted on 26 Nov 2015

***Correspondence for Author**
Md. Reyad-ul-Ferdous
Department of Pharmacy,
North South University,
Dhaka-1229, Bangladesh.

ABSTRACT

Herbal consist of several vital constituents which plays vital rule to improve health conditions of rural people. Rural people can harvest several kinds of vegetable which also demonstrated potential biological effect against several disease conditions. Socio-economical conditions also play major role for safeguarding people health conditions. This study influence social awareness among rural people by harvesting vegetable and use of these vegetable to maintain food nutrition value of a healthy body. These also help to raise their socio-economic conditions to leads healthy life. The homestead activity was conducted in six poor and marginal farm families at MLT site, Shibpur, Rajshahi during rabi 2009-10 to utilize the labour of family members and different homestead production unit with scientific way to produce fresh and safe vegetables and fruits. Among the tested homestead, each homestead, produced 628.0 kg of vegetables and fruits, Among

the vegetables, own consumption by their family member 343.0 kg, free distributed 135.0 kg, sold 150.0 kg and average intake/person/day 233.3 kg (considering 7 family members) respectively. In this investigation, demonstrated that rural people intake lots of vital nutrients from these vegetable as well as increase their socio-economical condition. They improve natural body immunity due to intake most vital constituents from these vegetables. So, we can use this model against malnutrition and social economic development.

KEYWORDS: Natural Remedies, Vegetable and Fruit Production, Nutritional Deficiency and Household, Socio-economic Development.

INTRODUCTION

Bangladesh is a densely populated country in the world, where 50% population were below poverty level, 70% malnutrition and greater part of the total population are unemployed, besides this, every year 30,000 child became blind in their early childhood due to deficiency of Vitamin-A.[1] An earlier survey indicated that 93 percent family in Bangladesh suffering from vitamin C deficiency, 85 percent in riboflavin, 81 percent in vitamin A and calcium, 60 percent in protein & 59 percent in caloric requirement. There are about (18.20 million families in Bangladesh most of them live in rural areas having a homestead for each. In Bangladesh per capita vegetable consumptions is only 28 g against the requirement of 200g.[2] These homesteads are the most effective and common production units for supplying fresh vegetables and fruits (like as papya, banana, better mellon etc.) and other family needs and employing family labors. Various types of fruits and vegetable like as papya, banana, better mellon etc have their own biological health effect and against diseases, socio-economic effect. The fruits extract of bitter melon showed strong antioxidant and hypoglycemic activities in experimental condition both in vivo and in vitro. Recent scientific evaluation of this plant extracts also showed potential therapeutic benefit in diabetes and obesity related metabolic dysfunction in experimental animals and clinical studies. These beneficial effects are mediated probably by inducing lipid and fat metabolizing gene expression and increasing the function of AMPK and PPARs and so forth.[3] *Brassica oleracea var. capitata has* beneficial effects are mainly dependent on antioxidant and anti-inflammatory properties, also involving modulation of mitochondrial function. Resveratrol is one of the most studied phytochemical compounds and it is provided with several benefits in cardiovascular diseases as well as in other pathological conditions (such as cancer). Other relevant compounds are Brassica oleracea, curcumin and berberine and they all exert beneficial effects in several

diseases.[4] Dioscorea alata exhibit higher levels of antioxidant activity compared nonacylated compounds.[5]

The actual area of homesteads devoted to vegetable cultivation is very small.[6] reported that about 13% of the total homesteads area was under vegetable production. Small farmers have some crop field. Usually they are to maintain their livelihood by utilizing the homesteads and crop field. However, many small homesteads areas of Bangladesh remain unutilized, which could be brought under round the year vegetable cultivation for reducing the malnutrition problems.[7] Research findings also suggest that lack of nutritional knowledge contributes to the problem of malnutrition.[8] Homestead is an operational farm unit in which a number of crops likes, vegetables, fruits, and medicinal plants are grown along with livestock, poultry, and/or fish production mainly to satisfy the farmers' basic needs.[9] When produced in homesteads, the consumption rate is naturally increased and more family nutrition is obtained through supply of fresh fruits & vegetables round the year. As reported[6] only 13 percent homestead area was under vegetable cultivation. The fresh vegetables produced from the farmers homestead can meet up the demand of nutrition of a small land less or marginal farm family round the year. The family members can easily nurse the homestead crops that may create a chance of their employment.

The activities of the programmed one prioritized based on farmers' needs, problems, family nutrition and cash income. According to annual work plan OFRD, Shyampur, Rajshahi supplied the critical inputs like fruits and vegetable seeds/seedling/saplings, net (for fencing) etc. OFRD provided technical support like training, awareness created about different homestead production units, safe and fresh vegetable and fruit up take, nutrition, involvement of children and women in their homestead etc. In rabi season, bed preparation (open place) were done on October, 09. The crops were selected for 6-9 production units (Actually we wanted to follow Goyespur model that is 9 production unit but in most cases one or two or three production unit were absent but in every homestead minimum 6 production units were present) based on farmers choice and preference. Most of the production units were reserved before intervention of this study. A base line survey among the selected homestead farmers were done before intervention. Every homestead production cost was 2100 Tk considering, only seeds, Fencing materials, seedling/sapling. In this report 6 (six) production units and 17 (seventeen) fruits and vegetable crops were considered. Data were collected from vegetable sector mainly and some cases papaya, guava also considered from November, 09 to May

2010 that have been incorporated in this report. Now vegetable cultivation is still running in those homesteads. Data on total production, consumption,

MATERIALS AND METHODS

The experiment was conducted at Shibpur MLT site, Shibpur, Puthia, Rajshahi in 6 poor and marginal farm family selected with the help of local DAE personnel during rabi, 2009. The selected farm families were ICM club member. Different vegetable patternt were tested in different production units according to "Goyespur vegetable production model.[10] The model mentioned in table-1.

Table 1: Goyespur vegetable production model.

S/I	Spaces		Cropping patterns
1.	Open land	a	Radish *Raphanus sativus* -Stem Amaranth (*Amaranthus caudatus)* -Indian spinach (*Spinacia oleracea*)
		b	Cabbage(*Brassica oleracea var. capitata*)-Brinjal(*Solanum melongena*)-Red Amaranth*(Amaranthus caudatus)*
		c	Tomato*(Solanum lycopersicum*)-Spinach*(Spinacia oleracea*)-Okra*(Abelmoschus esculentus)*
2.	Roof	a	Bottle gourd*(Lagenaria siceraria*)-Ash gourd*(Benincasa hispida)*
3.	Trelli	a	Bottle gourd*(Lagenaria siceraria*)-sweet gourd
		b	Bitter gourd *(Momordica charantia*)-Ribbed gourd*(Luffa acutangula*)-Sponge gourd*(Luffa aegyptiaca)*
		c	Snake gourd(*Trichosanthes cucumerina)*-Potato Yam*(Dioscorea bulbifera)*
4.	Tree support	a	Country bean-Yard long bean(*Vigna unguiculata subsp. sesquipedalis)*
5.	Partial shady area	a	Elephant foot yam(*Dioscorea alata)*
		b	Leaf aroid moulavikachu)
		c	Ginger(*Zingiber officinale)*
		d	Perennial chilli
6.	Marshy land	a	Panikachu
7.	Fence	a	Bitter gourd-Yard long bean-Bitter gourd
8.	Homestead boundary	a	Papaya (3-5 plant)
		b	Guava(*Psidium guajava)* (1-2 Plant)
		c	Lemon*(Citrus limon)* (1-2 plant)
9.	Back yard/waste land	a	Laizna (1-2 tree)

Note: Distribution and sold were documented in a register day by day.

RESULTS AND DISCUSSIONS

Vegetable production per homestead during November, 2009 to May, 2010

From the table-3 total vegetable production was found 628 kg/homestead from seven months (Nov. to May). Table-3 also showed that the highest production was found in April (209.8 kg) followed by May (181.5 kg) and lowest (27.1 kg) in November. Individual vegetable production from the season was bitter gourd : 27.0; Cabbage : 27.5; Spinach; 17.0; Radish: 19.5; Brinjal: 9.3; Indian Spinach: 67.4; Okera: 33.7; Katuadata: 56.9; Bottle gourd: 90.9; Papaya: 69.0; Sweet gourd: 54.0; Country bean: 36.0; Tomato: 35.8; PaniKachu: 10.5; Taro : 10.0; Jujubee: 10.5 and Muringa: 52 kg/season respectively. Bottle gourd produced the highest 90.9 kg followed by papaya 69.0 kg and taro produced lowest (10.0 kg) yield. Considering, the month of vegetable production per homestead, November: 27.1; December: 45.6; January: 54.6; Febuary: 54.2; March: 55.5; April: 209.8 and May: 181.5 kg vegetable respectively.

Vegetable consumption per family during November, 2009 to May, 2010

From the table-4 the maximum consumption of vegetable per month was obtained April (74.8 kg) followed in the month of May (71.5 kg) and minimum consumption in November (27.1 kg considering individual vegetable, highest consumption vegetable was bottle gourd 55.9 kg, this may be due to its higher production 90.9 kg (Table-3) and lowest in taro (5.0 kg). From December to March monthly consumption was more or less equal (39-45 kg/month) and it was medium uptake. On the other hand, April and May highest up take (71-75 kg per month) respectively.

Vegetable tree distribution by a homestead during November, 2009 to May, 2010

From the table-5 there was no distributed vegetable in the month of November due to lower production. The highest free distributed vegetable in April (50 kg) followed by the month of May (45 kg). Individually highest distributed vegetable was bottle gourd (20.0 kg).

Vegetable sold per family during November, 2009 to May, 2010

Maximum vegetable sold on April (85.0 kg) followed in the month of May (65.0 kg). From November to March did not sell any vegetable due to comparative lower production. Among the different vegetable, Indian Spinach: 25.0; Okra: 10; Katuadata: 30.0; bottle gourd: 15; Papaya: 25; Sweed gourd: 25 and Muvinga 20.0 kg per season produced respectively.

From table-7 and Fig.1 it was revealed the 55% (343.0 kg) produced vegetable was consumptioned, 21% (135.0 kg) was free distributed and 24% (150 kg) was sold per homestead from November to May during 2009-10.

From the economic view, (Table-8) total veriable cost per homestead was 2100 Tk and total gross return from 17 vegetable was obtain 6092.6 Tk. Net return per homestead was obtain 3992.6 Tk. Individualymuringa produced highest (780.0 Tk) gross margin followed sweed gourd (648.0 Tk).

Farmers reactions

Farmers opined that homestead vegetable production is very helpful for fulfillment their daily vegetable requirement for establishing relationship with the neighbor and some extra income. But seed is main problem for the program continuation, because its different niches required very small amount of seed with different species.

Table 2: Utilization of different homestead spaces in different cropping seasons at Shibpur MLT site, Rajshahi during 2006-2008.

Space	**Before intervention**	**After intervention**			
		Bed	**Rabi**	**Kharif-1**	**Kharif-2**
Open sunny place	Fallow	Bed-1	Radish	Katuadata	Red amaranth
		Bed-2	Cabbage	Brinjal	Indian Spinach
		Bed-3	Tomato	Spinach	Katuadata
Fence crop	Never used	6 pit	Bitter gourd		
Homestead boundary	Never used	Guava, Jujubee, Muringa, Banana, Papaya, bottle gourd			
Trellis	Traditional management	Country bean, bottle gourd, Sweet gourd			
Marshy place	Never used	Panikachu			
Semishade	Never used	Taro			

Table 3: Vegetable production per homestead during November, 2009 to May, 10 from different production units at MLT site, Shibpur, Puthia, Rajshahi.

Mon.	Vegetable Production (kg/homestead)																	
	Bi. Gourd	Cabb.	Spi.	Rad.	Brin.	I. Spin	Okera	Katua	B. gourd	Papaya	S. gourd	C. bean	Toma.	P. Kachu	Taro	Juju.	Muri.	Total
Nov.	-	10.5	-	6.2	-	-	-	-	-	-	-	-	10.4	-	-	-	-	27.1
Dec.	-	12.5	-	8.2	-	-	-	-	6.3	-	-	4.2	14.4	-	-	-	-	45.6
Jan.	-	4.5	6.5	5.1	-	-	-	-	10.0	-	-	17.5	11.0	-	-	-	-	54.6
Feb.	-	-	10.5	-	3.5	-	-	-	15.4	-	-	14.3	-	-	-	10.5	-	54.2
Mar.	-	-	-	-	2.5	12.5	-	-	20.5	20.0	-	-	-	-	-	-	-	55.5
April	19.5	-	-	-	4.3	30.7	16.2	20.4	20.2	31.5	32.5	-	-	-	-	-	34.5	209.8
May	7.5	-	-	-	-	24.5	17.5	36.5	18.5	17.5	21.5	-	-	10.5	10.0	-	17.5	181.5
Total	27.0	27.5	17.0	19.5	10.3	67.7	33.7	56.9	90.9	69.0	54.0	36.0	35.8	10.5	10.0	10.5	52.0	628.0

Note: Bi. Gourd = Bitter gourd; Cabb = Cabbage; Spi = Spinak; Rad. = Raddish; Brin = Brinjal; I. Spi = Indian Spinak; B. gourd = Bottle gourd; S. gourd = Sweet gourd; C. Bean = Country bean; Toma = Tomato; P. Kachu = Pani Kachu; Juju = Jujube; Muri = Muringa**.**

Table 4: Vegetable consumption per homestead during November, 2009 to May, 10 from different production units at MLT site, Shibpur, Puthia, Rajshahi.

Mon.	Vegetable Production (kg/homestead)																	
	Bi. Gourd	Cabb.	Spi.	Rad.	Brin.	I. Spin	Okera	Katua	B. gourd	Papaya	S. gourd	C. bean	Toma.	P. Kachu	Taro	Juju.	Muri.	Total
Nov.	-	10.5	-	6.2	-	-	-	-	-	-	-	-	10.4	-	-	-	-	27.1
Dec.	-	12.5	-	8.2	-	-	-	-	6.3	-	-	4.2	10.4	-	-	-	-	41.6
Jan.	-	4.5	6.5	5.1	-	-	-	-	10.0	-	-	7.5	6.0	-	-	-	-	39.6
Feb.	-	-	10.5	-	3.5	-	-	-	10.4	-	-	10.3	-	-	-	10.5	-	45.2
Mar.	-	-	-	0	2.5	10.5	-	-	15.5	15.0	-	-	-	-	-	-	-	43.5
April	9.5	-	-	-	4.3	10.7	6.2	10.4	5.2	6.5	7.5	-	-	-	-	-	14.5	74.8
May	7.5	-	-	-	-	4.5	7.5	6.5	8.5	7.5	11.5	-	-	5.5	5.0	-	7.5	71.5
Total	17.0	27.5	17.0	19.5	10.3	25.7	13.7	16.9	55.9	29.0	19.0	22.0	26.8	5.5	5.0	10.5	22.0	343.0

Note: Bi. Gourd = Bitter gourd; Cabb = Cabbage; Spi = Spinak; Rad. = Raddish; Brin = Brinjal; I. Spi = Indian Spinak; B. gourd = Bottle gourd; S. gourd = Sweet gourd; C. Bean = Country bean; Toma = Tomato; P. Kachu = Pani Kachu; Juju = Jujube; Muri = Muringa**.**

Table 5: Vegetable distribution per homestead during November, 2009 to May, 10 from different production units at MLT site, Shibpur, Puthia, Rajshahi.

Mon.	Vegetable Production (kg/homestead)																	
	Bi. gourd	Cabb.	Spi.	Rad.	Brin.	I. Spin	Okera	Katua	B. gourd	Papaya	S. gourd	C. bean	Toma.	P. Kachu	Taro	Juju.	Muri.	Total
Nov.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dec.	-	-	-	-	-	-	-	-	-	-	-	-	4.0	-	-	-	-	4.0
Jan.	-	-	-	-	-	-	-	-	-	-	-	10.0	5.0	-	-	-	-	15.0
Feb.	-	-	-	-	-	-	-	-	5.0	-	-	4.0	-	-	-	-	-	9.0
Mar.	-	-	-	-	-	2.0	-	-	5.0	5.0	-	-	-	-	-	-	-	12.0
April	10.0	-	-	-	-	10.0	5.0	5.0	5.0	5.0	5.0	-	-	-	-	-	5.0	50.0
May	-	-	-	-	-	5.0	5.0	5.0	5.0	5.0	5.0	-	-	5.0	5.0	-	5.0	45.0
Total	10.0	-	-	-	-	17.0	10.0	10.0	20.0	15.0	10.0	14.0	9.0	5.0	5.0	-	10.0	135.0

Note: Bi. Gourd = Bitter gourd; Cabb = Cabbage; Spi = Spinak; Rad. = Raddish; Brin = Brinjal; I. Spi = Indian Spinak; B. gourd = Bottle gourd; S. gourd = Sweet gourd; C. Bean = Country bean; Toma = Tomato; P. Kachu = Pani Kachu; Juju = Jujube; Muri = Muringa**.**

Table 6: Vegetable sold per homestead during November, 2009 to May, 10 from different production units at MLT site, Shibpur, Puthia, Rajshahi.

Mon.	Vegetable Production (kg/homestead)																	
	Bi. gourd	Cabb.	Spi.	Rad.	Brin.	I. Spin	Okera	Katua	B. gourd	Papaya	S. gourd	C. bean	Toma.	P. Kachu	Taro	Juju.	Muri.	Total
Nov.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dec.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jan.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Feb.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mar.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
April	-	-	-	-	-	**10.0**	**5.0**	**5.0**	**10.0**	**20.0**	**20.0**	-	-	-	-	-	**15.0**	**85.0**
May	-	-	-	-	-	**15.0**	**5.0**	**25.0**	**5.0**	**5.0**	**5.0**	-	-	-	-	-	**5.0**	**65.0**
Total	-	-	-	-	-	**25.0**	**10.0**	**30.0**	**15.0**	**25.0**	**25.0**	-	-	-	-	-	**20.0**	**150.0**

Note: Bi. Gourd = Bitter gourd; Cabb = Cabbage; Spi = Spinak; Rad. = Raddish; Brin = Brinjal; I. Spi = Indian Spinak; B. gourd = Bottle gourd; S. gourd = Sweet gourd; C. Bean = Country bean; Toma = Tomato; P. Kachu = Pani Kachu; Juju =Jujube; Muri = Muringa**.**

Table 7: Average vegetable production distribution sold per family during November to May 2009-10 at MLT site, Shibpur, Puthia, Rajshahi.

Location	Total vegetable production (kg/family)	Total own consumption (kg/family)	Own consumption (g/head/day*	Free distribution (kg/family)	Sold (kg/family)
Shibpur MLT site, Puthia, Rajshahi	628.0	343.0	233.3*	135.0	15.0

Note: Seven (7) members in a family was considered.

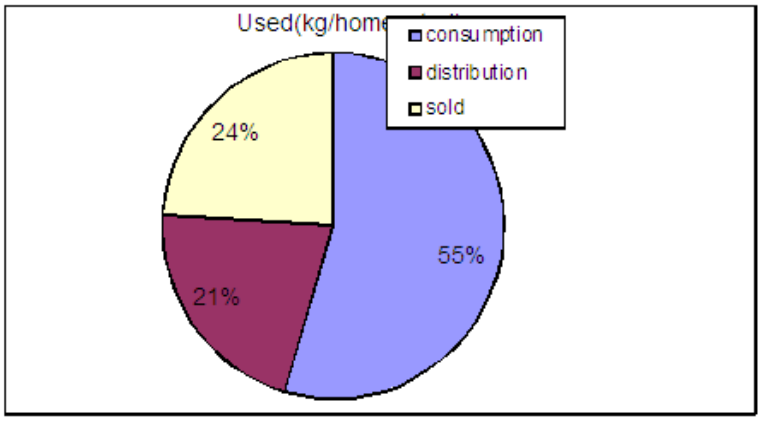

Figure 1: Pie chart showed the average percentage of vegetable consumption, free distribution and sold per homestead from November to May 2009-2010.

Table 8: Cost and return per homestead from November, 2009 to May 2010.

Vegetable items	Total vegetable production per homestead	Individual vegetable price (Tk/kg)	Gross regurn (Tk/vegetable)	Total cost	Net return
Bitter gourd	27.0	24.0	648	2100	3992.6
Cabbage	27.5	7.0	192.5		
Spinach	17.0	7.0	119		
Radish	19.5	3.0	58.5		
Brinjal	9.3	22.0	204.6		
Indian Spinach	67.7	8.0	541.6		
Okra	33.7	10.0	337.0		
Katuadata	56.9	6.0	341.4		
Bottle gourd	90.9	5.0	454.5		
Papaya	69.0	4.0	276.0		
Sweet gourd	54.0	12.0	648.0		
Country bean	36.0	14.0	504.0	-	-
Tomato	35.8	10.0	358.0		
PaniKachu	10.5	12.0	126.0		
Taro	10.0	10.0	100.0		
Jujubee	10.5	35.0	367.5		
Muringa	52.0	15.0	780.0		
Total	**628**	-	**6092.6**	**2100**	**3992.6**

N B: Cost consider seed (without labour), fencing material, seedling/sapling and some cases inorganic fertilizer pea homestead.

CONCLUSION

Six homestead activities are going on round the year. According to "Goyespur Model" Here we considered only six production units only. From these production unit per homestead produced 628.0 kg, Own consumption 343.0 kg, free distributed 135 kg and sold 150 kg of vegetable. Average every family (family member 7) member uptake vegetable per day per person was 233.3 g. According to this model average vegetable requirement is sufficient up to 11 family members. In this investigation, demonstrated that rural people intake lots of vital nutrients from these vegetable as well as increase their socio-economical condition. They improve natural body immunity due to intake most vital constituents from these vegetables. So, we can use this model against malnutrition and social economic development in under developing and developing countries.

CONFLICT OF INTEREST

All author affirmed no conflict of interest.

ACKNOWLEDGEMENT

Authors are highly grateful to DANIDA (ICM-AEC) for their funding and also give thanks CSO, OFRD, BARI Gazipur to approve the program.

REFERENCES

1. BARC (Bangladesh Agricultural Research Council). 1990. Farming Systems Agribusiness Newsletter Vol. 1 No.2. Bangladesh Agricultural Research Council, Farmgate, Dhaka.
2. Chadha ML, Shanmugassundram S, Hossain AKMA and Hossain SMM. 1994. Vegetable research and development in Bangladesh. AVRDC, BARI, Gazipur.
3. Alam MA[1], Uddin R[2], Subhan N[3], Rahman MM[1], Jain P[1], Reza HM[1]. Beneficial role of bitter melon supplementation in obesity and related complications in metabolic syndrome. J Lipids. 2015; 2015: 496169. doi: 10.1155/2015/496169. Epub 2015 Jan 12.
4. Pagliaro B, Santolamazza C, Simonelli F, Rubattu S. Phytochemical Compounds and Protection from Cardiovascular Diseases: A State of the Art. Biomed Res Int., 2015; 2015: 918069. doi: 10.1155/2015/918069. Epub 2015 Oct 4.

5. Moriya C, Hosoya T, Agawa S, Sugiyama Y, Kozone I, Shin-Ya K, Terahara N, Kumazawa S. Biosci Biotechnol Biochem., 2015; 79(9): 1484-92. doi: 10.1080/09168451.2015.1027652. Epub 2015 Apr 7.
6. Hussain MS, Abedin MZ, Quddus MA and Ahmed D. 1988. Women's contribution in homestead agriculture production systems in Bangladesh. Bangladesh Academy for Rural Development, Comilla, 344.
7. OFRD (On-Farm Research Division). 1993. Homestead vegetable production: Training Manual. Published by OFRD of Bangladesh Agricultural Research Institute, Gazipur.
8. Bhuyan MA, Haque MA, Al-Mahmud S, Rahman MM, Rahman MK and Shaheen N. Nutrition education exposure and nutritional status of selected household members in three agro-ecological locations of Bangladesh. Bangladesh J of Nutrition, 2001; 14: 31-40.
9. Tejwani KG. 1994. Agroforestry in India. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
10. Ali MA, Momin MA, Alam MR, Mollah MSH, Ivy FI and Hossain MA. 2006. Goyespur vegetable production model (a Bengali booklet), On-Farm Research Division, Bangladesh Agricultural Research Institute, Pabna.