ISSN 0258-7122
Bangladesh J. Agril. Res. 37(3): 377-388, September 2012

VALUE ADDITION IN VEGETABLES PRODUCTION, PROCESSING AND EXPORT FROM BANGLADESH

M. S. HOQ[1], S. K. RAHA[2] AND N. SULTANA[3]

Abstract

Bangladesh has immense prospect for exporting vegetables to the world market and it has also produced high quality exportable fresh vegetable. Although the share of export earning in vegetables increasing day by day but export is constrained by several issues**.** Thus the present study was undertaken to determine the value addition, cost and return of vegetables production and export at different levels and also suggest some policy implication for improving the present system. The study was based on both primary and secondary data. The sample included vegetables producer, suppliers, and exporters. Vegetable producers and suppliers were selected from Ulokhola of Kaligonj Upazila and exporters were selected from Dhaka city (Motijheel, Kakrail, Shantinagar, Khilgaon, and Sham Bazar).Appling conventional profitability analysis the study revealed that per hectare production cost for cowpea, snake gourd, and bitter gourd were estimated at Tk. 73838, Tk.72,029 and Tk.1,04,644 respectively and value addition for cowpea, snakegroud, and bitter gourd were calculated at Tk.86,162, Tk.1,52,611 and Tk.2,37,356 respectively by farmers. The average estimated marketing costs incurred by suppliers were Tk.2906 per ton. The value addition by suppliers were Tk.3094 per ton. The average estimated marketing cost incurred by different exporters for UK, Saudi Arabia, Kuwait, and Qatar were Tk.1,69,442, Tk.98,429, Tk.1,03,499, and Tk.85,324 per ton, respectively. The value addition by different exporters for UK, Saudi Arabia, Kuwait, and Qatar were Tk.55,778, Tk.16,661, Tk.16,902, and Tk. 23,754 per ton respectively. Among all the cost items, airfreight charge was the highest. It was revealed from the study that bitter gourd cultivation is more profitable and BCR is also highest (3.27) and UK market was more profitable for vegetables export.

Keywords: Vegetable, value addition, supplier, exporter and export.

Introduction

Bangladesh is endowed with a fertile land and favourable climate for the production of various agricultural products. Considering its potentiality, the Government has given much emphasis on the development of agricultural products and agro-based industries in the country. Vegetables, fruits, aromatic fine rice, tea and other agro products are exported regularly. Before liberation

[1] Scientific Officer, Agricultural Economics Division, Bangladesh Agricultural Research Institute (BARI), Gaziopur, [2]Professor, Dept of Agri-business & Marketing, Bangladesh Agricultural University (BAU), Mymensingh, [3]Assistant Director, Dept. of Agricultural Marketing, Khamarbari, Dhaka, Bangladesh.

vegetables were exported in a very limited scale but export has increased remarkably in the late 1980s. The Government has taken various steps to explore the opportunities related to the export of agricultural products. The government and private sector are working together to set up export villages for the production of quality fruits and vegetables in the country.

Diversification into vegetables, crops and increasing commercialization can support the development of the agricultural sector in several ways. Vegetables constitute an important share in the total agricultural exports from Bangladesh. Vegetables and crops sub-sector also share about 11.70% to the agricultural GDP (Bangladesh Economic Review-2008)**.**

The volume of exported vegetables has been increasing day by day. So it has a great prospect to earn foreign exchange by exporting vegetables from Bangladesh. Bangladesh earned US $ 65.57 million and US $ 90.38 million from export of agricultural products in 2006-2007 and in 2007-2008 which contributes 0.72% and 0.89 % to total export earnings, respectively (Bangladesh Economic Review-2008,p-75). Bangladesh earned US $ 24.70 million from export of vegetables in 2003-2004, which contributes 0.32% to total export earnings and earned US $ 43.33 million from vegetables export in 2004-2005, which contributed 0.50% to total export earnings (EPB, 2004-2005). So the annual change of export earnings from vegetables was 75.43% (Export statistics, 2004-2005).Therefore, the vegetables sector occupies a more or less significant position in our export earning. Export of vegetables in UK market is highly profitable and also value added but it has lengthy customs procedure. So, a high amount of vegetable was exported in the Middle East countries due to its easy customs procedure and high value addition. Different types of vegetables and their main export market are shown in appendix(i). In a developing country like Bangladesh where the numbers of exportable item are not many, international trade is mainly import based and the country faces serious balance of payment problems. Fluctuations in vegetables production, variation in international prices, adjustments in exchange rates and finally the variable values of export earnings are grim concerns for developing countries of South Asia and South East Asia. The fresh vegetables and fruits exports have now been facing stiff competition from their counterparts from Pakistan, India and Kenya in middle east markets including United Arab Emirates, Qatar, Kuwait, Pakistan & Indian exporters for their close proximity are able to send their goods at cheap prices through the sea route while Bangladeshi exporters have to relay on expensive air shipment. Although several studies have been conducted earlier to highlight the profitability of vegetables cultivation and to show the socio-economic consequences of the same, problem and prospect of vegetables export but the number of studies on the area of value addition, cost and return at different levels of vegetables export is vary scanty. So, the specific objectives of the study are-

1. To determine the value addition at different levels of vegetables export;
2. To determine cost and return at different levels of vegetables export;
3. To derive policy implication from the above study.

Materials and Method

Sampling technique

Selection of study area

Considering the high intensity of vegetable production and availability of suppliers and also as closer to the Hazrat Shahjalal International Airport, Ulokhola under Kaligonj Upazila of Gazipur district was selected as a study area for the selection of exportable vegetable growers and traders. Ulokhola export villages was consisting 17 incentive exportable vegetable producing village under pubail and Nagari union. On the basis of collection of exportable items and the presence of export oriented trading firms, Motijheel, Kakrail, Shantinagar, Khilgaon, and Shambazar of Dhaka city were selected for the study**.**

Selection of samples

The vegetable growers, suppliers and exporters were considered as the population for this study. The samples of the study included vegetable producers, suppliers and exporting firms of vegetables. First a list of 80 vegetable growers, 30 suppliers were made from 17 villages under Ulokhola export village with the help BADC personnel residing the area and the list of 40 exporters were made with the help of Export Promotion Bureau by the researcher. Then a sample size of 20 vegetables producers, 12 suppliers and 12 exporters were randomly selected from the above list for the present study.

Collection of data

Data were collected from both primary and secondary sources. Primary data were collected through direct interview with the respondents. The secondary data were collected from renowned national and international organization, viz. Bangladesh Bureau of Statistics (BBS), Export Promotion Bureau of Bangladesh (EPB), Directorate of Agricultural Marketing (DAM), Food and Agricultural Organization (FAO), Statistics Department of Bangladesh Bank, The Bangladesh Journal of Agricultural Economics, The Indian Journal of Agricultural Economics, Bangladesh Economic Review, Hortex Foundation, Asian Vegetables Research Development Center (AVRDC), Newspapers and Internet Files.

Analytical technique

Value addition or costs and returns analysis were done on both variable and total cost basis. To achieve the objective of the study a simple tabular analysis was

done. The following (Π) equation is used to assess the value addition of the vegetable producers:

$$\Pi_i = P_iQ_i - TCi$$
$$= P_iQ_i - (VCi + FCi)$$

where,

Π_i = Profitability from ith vegetables production
Q_i = Quantity of the ith vegetables (kg/ha)
P_i = Average price of ith vegetables (Tk./kg)
TCi = Total cost of ith vegetables (Tk./ha)
VCi = Variable cost of ith vegetables (Tk./ha)
FCi = Fixed cost of ith vegetables (Tk./ha)
i = 1, 2, 3, ……,.... n

Per hectare profitability of growing vegetables from the view points of individual farmers was measured in terms of gross return, gross margin and value addition. Gross return was calculated by simply multiplying the total volume of output by its per unit of price in the harvesting period (Dillon and Hardakar, 1993). On the other hand, Gross margin was calculated by deducting total variable costs from gross return

Measurement of value addition

The analysis considered fixed cost (which included land rent, cost of equipment). Value addition was calculated by deducting all costs (Variable and Fixed) from gross return. Value addition of supplier and exporter is:

Value addition = Gross margin -Marketing cost
Gross margin = Sale price -Purchase price

Results and Discussion

This section is mainly concerned with the assessment of value addition of producing and exporting vegetables. Value addition activities are mainly concerned with the changes of utility. In exporting vegetables, place and possessions utility occurs. In the study areas, the farmers produced high quality vegetables by international standard that is actual colour, size, and freshness. These activities added value to the producer. For determination of value addition this section goes through the cost and returns of the production and export of vegetables.

Cost of vegetable production

Production cost plays a vital role in the decisions of the farmers. The costs refer to the total amount of funds used in production. In this study, the total costs per

hectare were worked out irrespective of farm sizes. Hence, variable and fixed costs were calculated separately (Table 1).

Table1. Per hectare production cost of different vegetables for producer.

Cost item	Vegetables					
	Cowpea		Snakegourd		Bittergourd	
	Quantity	Total cost (Tk./ha)	Quantity	Total cost (Tk./ha)	Quantity	Total cost (Tk./ha)
A. Variable cost						
Human labour (Man-day)	200	2,0000(27.08)	214	21400(29.71)	216	21600(20.64)
Power tiller(Tk./ha)	-	4490 (6.08)	-	4490 (6.23)	-	4490 (4.29)
Seed (kg/ha)	22	4400 (5.96)	6.5	3900 (5.41)	6	36000(34.40)
Manure (kg)	3000	3000 (4.06)	4000	4000 (5.56)	4000	4000 (3.82)
Fertilizer (kg)						
Urea	90	630 (0.85)	140	980 (1.36)	145	1015 (0.97)
TSP	120	2160 (2.92)	135	2430 (3.37)	142	2556 (2.44)
MP	90	1440 (1.95)	128	2048 (2.84)	138	2208 (2.11)
Pesticides	-	6352 (8.60)	-	5916 (8.21)	-	4570 (4.36)
Irrigation (Tk./ha)	-	5987 (8.1)	-	4640 (6.44)	-	4809 (4.60)
Boundary and Macha (Tk./ha)	-	6175 (8.36)	-	6500 (9.02)	-	6325 (6.04)
Bamboo stick (Tk./ha)	-	12500 (16.93)	-	9050 (12.56)	-	9875 (9.44)
Total variable cost (Tk./ha)	-	67134 (90.92)	-	65354(90.73)	-	97448(93.12)
B. Fixed cost						
Land use cost (Tk./ha)	-	5613 (7.60)	-	5613 (7.79)	-	5613 (5.36)
Interest on operating capital (Tk.)	-	1091 (1.48)	-	1062 (1.47)	-	1583 (1.51)
Total fixed cost	-	6704 (9.08)	-	6675 (9.27)	-	7196 (6.88)
Total cost (A + B)	-	73838 (100)	-	72029(100)	-	104644(100)

Figures in the parentheses indicate percentages of total

The highest per hectare production cost was incurred for bitter gourd (Tk.104644) followed by snake gourd (Tk.72029), and cowpea (Tk.73838). Variable cost constituted more than 90% of the total cost of all the three vegetables, while fixed cost varied from 6.88% in bitter gourd to 9.08% in cowpea, and 9.27% in snake gourd.

Value addition from vegetables production

Table 2 shows per hectare gross return for cowpea, snake gourd, and bitter gourd were Tk. 160000, Tk. 2,24,640 and Tk. 3,42,000, respectively. The gross margins of cowpea, snake gourd, and bitter gourd were calculated at Tk. 9,28,66, Tk. 159286, and Tk. 2,44,552, respectively. Value addition from vegetable production was calculated by deducting total fixed cost from gross margin or total cost from gross return. It was evident from the analysis that per hectare value addition from cowpea, snake gourd, and bitter gourd were Tk. 86,162, Tk. 1,52,611, and Tk. 2,37,356, respectively. It appears from Table 2 that bitter gourd cultivation is more profitable and BCR is also highest.

Table 2. Per hectare value addition of vegetables producer.

Particulars	Vegetables		
	Cowpea	Snake gourd	Bitter gourd
Yield (kg/ha)	10000	17280	22800
Per unit Price (Tk./kg)	16	13	15
A. Gross Return (Tk./ha)	160000	224640	342000
B. Variable cost (Tk./ha)	67134	65354	97448
C. Gross margin (A –B) (Tk./ha)	92866	159286	244552
D. Fixed cost (Tk./ha)	6704	6675	7196
E. Total cost(B+D) (Tk./ha)	73838	72029	104644
F. Value addition (C-D) (Tk./ha)	86162	152611	237356
G. Undiscounted BCR	2.17	3.12	3.27

Marketing costs of vegetables supplier

A supplier was the part time or full time agent of the different exporters in the production area. Therefore, marketing cost was only calculated for supplier in the study area. The marketing costs of some selected vegetables for the study areas are shown in Table 3.The estimated average marketing costs per ton vegetables incurred by the suppliers were Tk.2,906.

Table 3. marketing cost of vegetables incurred by suppliers.

Cost item	Tk. per ton	Percent of total cost
Transportation	1500	51.63
Loading and unloading	300	10.33
Grading	200	6.89
Wastage/loss of weight	376	12.93
Market toll	250	8.60
Tips and donation	80	2.75
House rent	50	1.72
Personal expenses	150	5.36
Total	2906	100.00

Value addition by suppliers of exporters

Suppliers performed the function of purchasing exportable vegetables and supplying them to different types of exporters. Value addition of supplier is shown in the Table 4.

Table 4. Value addition by suppliers.

Particulars	Amount in Tk/ton
A. Average purchase price	15000
B. Average sale price	21000
C. Gross margin (B-A)	6000
D. Marketing cost	2906
E. Value addition (C-D)	3094

The average purchase price of suppliers was Tk. 15,000 per ton and average sale price was Tk. 21,000 per ton. Thus the gross margin was Tk. 6000.00 per ton. The total marketing cost of suppliers was Tk. 2906 per ton. So, the value addition of suppliers was Tk. 3094 per ton of vegetables.

Marketing cost of vegetable exporters

Of the total costs, highest cost was shared by the airfreight charge followed by packet/carton, technical and handling charges, carrying from exporter's godown to airport, clearing and forwarding, per unit cost of many items were fixed irrespective of importing countries(Table 5).The exporters incurred highest cost for exporting vegetables to UK followed by Kuwait, Saudi Arabia, and Qatar.

Table 5. Marketing cost of vegetable exporters (Tk./ton).

Cost items	United kingdom (UK)	Middle East Countries		
		Saudi Arabia	Kuwait	Qatar
Packet/ Carton	4000 (2.36)	4000 (4.06)	4000(3.86)	4000 (4.69)
Packaging materials e.g. rope, cost tape, thin paper etc.	350 (0.20)	300 (0.30)	300 (0.29)	300 (1.35)
Carrying from exporters godown to airport	1500 (0.86)	1500 (1.52)	1500(1.45)	1500 (1.76)
Clearing and forwarding (C &F)	1500 (0.86)	1500 (1.52)	1500 (1.45)	1500 (1.76)
Terminal and handling charge (THC)	3450 (2.04)	3450 (3.50)	3450(3.33)	3450 (4.04)
Bank services	70 (0.04)	70 (0.07)	70 (0.07)	70 (0.08)

Table 5. Cont'd.

Airway bill charge	552 (0.33)	179 (0.18)	420 (0.40)	195 (0.22)
GSP certificate charge	350(0.20)	-	-	-
Airfreight charge	153180(90.40)	83490 (84.82)	88320 (85.33)	70380(82.49)
EXP (Export perform)	300 (0.18)	300 (0.30)	300 (1.29)	300 (0.35)
Salary and wages	1000 (0.59)	1000 (1.02)	1000(0.97)	1000 (1.17)
Office, godown rent and taxes	1400 (0.83)	1200 (1.22)	1200 (1.16)	1200 (1.41)
Telephone, fax, telex	800 (0.47)	500 (0.51)	500 (0.48)	500 (0.59)
Loading of unloading	300 (0.18)	300 (0.30)	300 (0.29)	300 (0.35)
Quarantine	500 (0.29)	500 (0.51)	500 (0.48)	500 (0.59)
Entertainment	120 (0.07)	90 (0.09)	90 (0.09)	90(0.11)
Miscellaneous	70 (0.04)	50 (0.05)	50 (0.05)	40 (0.05)
Total	169442(100)	98429 (100)	103500 (100)	85325 (100)

Figures in the parentheses indicate percentages of total

Value addition by the exporters

Value addition by exporters consisted of the net margin (Profit) from the export of vegetables. Exporters performed the function of purchasing exportable vegetables from supplier /selected agents and supply these to different foreign buyers of the world. The value addition of exporters is depicted in Table 6. It is revealed from the following table that value addition is very high in the UK market followed by Qatar, Kuwait, and Saudi Arabia.

Table 6. Value addition of vegetable by exporters (Tk./ton).

Particulars	UK	Middle East Countries		
		Saudi Arabia	Kuwait	Qatar
A. Average unit sale of selected vegetables	246720	133240	139902	126578
B. Average unit Purchase of Selected vegetables	21500	18150	19500	17500
C. Marketing margin (A-B)	225220	115090	120402	109078
D. Marketing cost	169442	98429	103500	85325
E. Value addition (C-D)	55778	16661	16902	23754

Note: In United Kingdom (UK) market average unit sale price of selected vegetables is 2£/kg (1£= 123.36 Tk. in 2006)

In Middle East countries market average unit sale price of selected vegetable is 2 $/kg ($ =66.62 Tk in 2006).

Conclusion

This is a clear indication of the above study that Bangladesh seemed to have high prospects for export of vegetables for its high demand to the foreign ethnic market. The export of fresh vegetables is more profitable due to high value addition. Bangladeshi vegetables were still not well known to the foreign consumers. To familiarize Bangladeshi vegetables to the foreigners and foreign super markets, quality of those vegetables has to be improved by different value addition activities like upgrading the packaging, Processing, handling, grading and transportation system. These kind of activities added value among to the vegetable producers, suppliers and exporters. Export expansion and demand from super market is constrained by poor quality of produces and imposition of different sanitary and phyto-sanitary criteria by the importing countries. So vegetables export should be promoted by implementing the following recommendation covering the above constraints.

Recommendation

The Government and concern authority should take the following policy measures for exploring the export market of vegetables:

1. To establish some "Export village" in and around some selected vegetable growing areas. For this location studies should be undertaken to identify exportable vegetables farming areas in terms of both high productivity and efficient distribution. The exploration and expansion of the market for vegetables needed supervised production, procurement, and cultivation processes conforming to the demand of the importers. A direct link has established between exporters and the farmers by co-ordinating production planning.
2. Bangladeshi exporters have now been facing stiff competition from their counterparts from Pakistan, India and Kenya in Middle East markets to send their vegetables at cheap prices through the sea route for their close proximity while Bangladeshi exporters have to relay on expensive air shipment. This is a disadvantage for Bangladeshi exporters. It is therefore, crucial to look for alternatives which would help reduce the transportation cost.
3. Exporters had to pay a high rate of air freight charge for the space in the aeroplanes because Bangladesh has no cargo planes. Cargo space depends largely on number of passengers in aircrafts. So Biman Bangladesh Airlines should buy separate cargo plane. Private Airlines should be allowed to arrange cargo flights for reducing air freight charge which will be helpful for more value addition to the exporters.

4. Government should explore markets in Western Europe, Middle East, and Japan for export of fresh vegetables.
5. It should ensure availability of international standard packaging materials and it will be helpful for maintaining quality and freshness of exportable vegetable**.** Therefore, quality assurance would be must and it required continuous market research for improving the demand of Bangladeshi fresh vegetables in the international markets.
6. To survive and sustain in the export market in this context and to ensure and enhance market access and export competitiveness, the combined efforts of the concerned parties are necessary at the level of policy formulation, planning and implementation of programs.

The above measure, should be implemented for expanding vegetable trade in the foreign markets.

References

Acharya, S.S. and N. L. Agarwal. 1999. *Agricultural Marketing in India*, *3rd edition,* Oxford and IBH publishing Co. Pvt. Ltd., New Delhi.

Azgar, S. M. S. 2000. A Study on Fruits and Vegetables Export from Bangladesh, Unpublished M. S. Thesis, Department of Co-operation and Marketing, Bangladesh Agricultural University, Mymensingh

Bangladesh Agricultural Development Corporation. 2006. Export Report, BADC Vegetables and Fish Cold Storage, Zia International Airport, Dhaka.

Bhairagi, S. K. 2004. An Economic Study on Contract Broiler Farming with Reference to Supply Chain Management, Unpublished M.S. Thesis, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

Bangladesh Bureau of Statistics. 2004. *Statistical Year Book of Bangladesh*, Statistics Division, Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka.

Bangladesh Economic Review. 2008. Economic Advisor's Wing, Finance Division, Ministry of Finance Government of the Peoples Republic of Bangladesh.

Bansal, R. N. 1994. Export of Fruits and Vegetables; Problems and Prospects, *Indian Journal of Agricultural Economics* Vol. 37, No. 3.

Dillon, J.L and J.B. Hardaker. 1993. *Farm Management Research for Small Farmer Development*, Food and Agriculture Organization, Rome, Italy.

Hasan, M. R. 2005. An Economic Analysis of Contract Farming for Production and Export of High Value Vegetables in Bangladesh,Unpublished M. S. Thesis, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

Hortex Foundation. 2006. A Quarterly Publication of the Horticulture Export Development Foundation, Dhaka. Vol. 5, No. 2. April- June.

Kohls, R. L. and J. N. Uhl. 2005. *Marketing of Agricultural Products, (9th edition*), Macmillan Publishing Co. Inc., New York.

Nahar, Khairun. 2005. Export of Fresh Vegetables from Bangladesh. Problems and Prospects, Unpublished M.S.Thesis, Department of Cooperation and Marketing, Bangladesh Agricultural University, Mymensingh.

Quasem, M. A. 2004. Exports of Fresh Horticultural Corps from Bangladesh: Problems and Prospects. A Paper Presented at a Seminar, Organized by BRAC,75, Mohakhali, Dhaka.

Sabur, S. A. 1992. Vegetable Marketing System in Bangladesh. *Journal of Business Administration* Vol.18, No. (3 and 4), pp.141-155.

Sabur, S. A., M.S. Palash and K.Nahar. 2004. Profitability and Problems of Exporting Fresh Vegetables from Bangladesh. *The Bangladesh Journal of Agricultural Economics* Vol. XXVII, No. 2, pp. 96-108.

Appendix 1. Different types of vegetables and their main export market.

Sl. No.	Name of vegetables	Main export market
1	Bitter gourd	Middle East, UK
2	Cow pea/yard long bean	Middle East, UK Canada, Italy, Netherlands, Belgium and France
3	Corm of arum or taro (panikachu)	Middle East, Canada, Italy
4	Palwal	Middle East, Canada, Italy
5	Ridge gourd	Middle East, Canada, Italy
6	Teasle gourd	Middle East, Canada, Italy
7	Snake gourd	Middle East, UK
8	White gourd	Middle East, UK
9	Stolon of taro (Kachurtati)	Middle East, UK
10	Green chili	Middle East, UK, Canada, Italy, Netherlands, Belgium, France and other countries
11	Green papaya	Middle East, UK
12	Green banana	Middle East, UK
13	Stem amaranth	UK
14	Indian spinach	Middle East, UK, Canada, Italy, Australia
15	Bottle gourd	Middle East, UK
16	French bean	Middle East, UK, Canada, Italy, Netherlands, Germany
17	Eggplants	Middle East, UK
18	Radish	Middle East, UK

Appendix 1. Cont'd.

19	Okra/Lady's finger	Netherlands, Belgium, France and others
20	Sweet gourd	Middle East, UK
21	Pea	Middle East, UK
22	Cucumber	Middle East, UK
23	Red amaranth	UK
24	Coriander	Middle East, UK
25	Amaranth leaves	UK
26	Potato	Dubai
27	Banana flower	UK
28	Bean seeds	Middle East, UK
29	Lemon	Middle East, UK
30	Tamarind (Green)	Middle East, UK
31	Hog plum/Green apple	Middle East, UK
32	Wax gourd	Middle East, UK
33	Jute leaf	UK
34	Jackfruits seed	Middle East, UK
35	Mango (Green)	Middle East, UK
36	Sweet potato	UK
37	Betel leafs a) Deshi b) Khasia	UK, Pakistan UK, Pakistan

Source: Data on Horticultural products (vegetables) compiled by the researcher from various national-international Journals, Hortex Foundation, EPB and personal contacts with different categories of vegetables exporters in Bangladesh.