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IMPORT AND EXPORT PARITY PRICE ANALYSES OF SELECTED VEGETABLES AND SPICES IN BANGLADESH

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Abstract

The study was undertaken to find out the export potentialities of selected vegetables and import substitution of selected spices in Bangladesh. Seven hundred twenty vegetables and 320 spices growers, 25 suppliers, and 25 exporters were randomly selected for the study.Net margin analysis was done on both variable and total cost basis. Domestic resource cost (DRC) analysis was also done for estimating comparative advantage of the selected vegetables and spices. The study revealed that net returns were positive for all vegetables and spices producers. However, the highest net return was estimated for brinjal producers (Tk. 273799/ha) followed by bittergourd producers (Tk152145/ha). In the case of spices, the highest net return was received by ginger producers (Tk. 231399/ha) followed by onion producers (Tk. 122308/ha).Comparatively lower net returns were found for okra (Tk51830/ha) and garlic producers (Tk 99352/ha). Vegetables exporters received the highest net margin (Tk32852/ ton) from UK market which was higher than the Middle East market (Tk22869/ton).The highest benefit cost ratio (BCR) was calculated for brinjal (1.9) followed by ash gourd (1.8). For spices, BCR were 2.1and 1.8 for ginger and garlic respectively. Bangladesh had comparative advantage for producing all selected vegetables as the estimates of domestic resource cost (DRC) were less than one. The value of DRC for all selected spices were less than unity implied that the production of these spices would be highly efficient for import substitution. Therefore, the study have been undertaken to find out this issues.

Keywords: Import parity, export parity, domestic resource cost, benefit cost ratio.

1. Introduction

1.1 Vegetables situation in Bangladesh

Vegetable is one of the most essential food items for growth and maintenance the health of human beings. Bangladesh is pre-dominantly an agricultural country with rich soil and climatic condition. But it is the matter of regret that after four decades of independence, the country could not produce enough vegetables for the people. Bangladesh has potential for doubling or trebling its present production of vegetables to meet domestic demand and leave a substantial surplus for export. Currently, it can meet only 2-3% of the demand of vegetables in international markets. But this market share has all the possibilities of

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increasing fast provided proper plans are made and pursued effectively. This amount is, however, a pittance compared to the potential. Growing of vegetables for export can soon prove to be a highly rewarding activity provided supportive policies are adopted. Many educated unemployed persons are taking up vegetable growing as a form of self employment. This is, no doubt, helping to increase production. The quantity of export is not big, but sizeable enough to create market for the large ethnic population of the South Asian sub-continent residing in the UK and Gulf region. A large portion of all vegetables were exported and demand for Bangladeshi vegetables is increasing in the South Asian sub-continent and gulf region day by day. So the exporters could be able to earn more foreign exchange by exporting vegetables. The annual trend of vegetables export and their total value during 2000-2011 has been shown in Fig. 1. It was observed that the vegetables export from Bangladesh started declining from 2007 and continued up to 2009. After that period the export situation is fluctuating. This situation caused by many reasons, such as reduced outflow of migrant workers, higher air freight charge, and quality deterioration of vegetables.

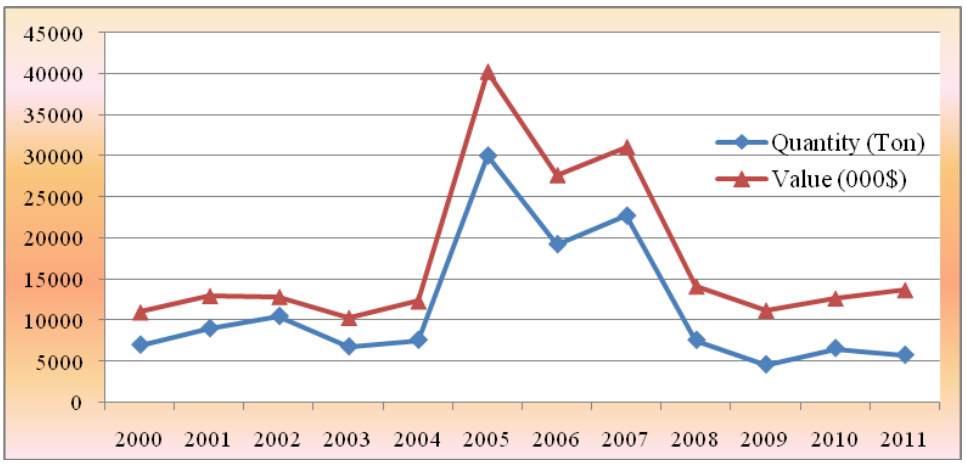

Fig. 1. Trend of vegetable exports in Bangladesh.

1.2 Spices situation in Bangladesh

Spices are popular as cash crops in Bangladesh. It has multipurpose uses. The major spices grown in the country are onion, garlic, chili, turmeric, and ginger. Onion, garlic and chili are short duration crops, whereas turmeric and ginger are long duration crops. Due to its higher demand the domestic production of spices cannot fulfill the country's demand. Therefore, a huge amount of spices has to importfrom foreign countries year after year. Different economic studies showed that the cost of production varied in a wide range among the spices produced in the country. In order to increase the domestic spices production, Bangladesh Government offers a lucrative credit facility on spice production at a lower interest rate. Unlike other agricultural crops, spices producers receive

concessional credits at the rate of 2% annual interest since it is relatively most costly to produce. The trend of annual imports of spices and their values in Bangladesh during 2003-2011 have been shown in Fig. 2. It reveals that spices imports in Bangladesh started increasing from 2005 and continued up to 2009. After that period the quantity and value of imports reduced to a great extent due to the initiatives taken by the Government.

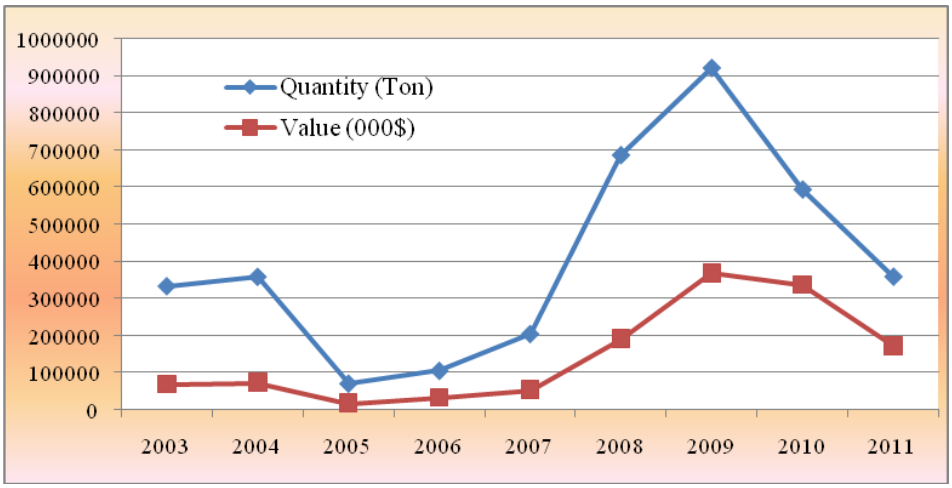

Fig. 2. Trend of spices import in Bangladesh.

1.3 Export potentialities of vegetables and import substitution of spices in Bangladesh

Export potentialities of vegetables and import substitution of spices would determine the position of the Bangladeshi cultivators in respect of production of commodities by using scarce resources. Farmers' perceptions of potentiality and constraints, public policies concerning irrigation, water control, technology and prices can influence their choice of crop growing. An evaluation of producing vegetables and spices relative to other crops for example, is required to address the issue of vegetables and spices self-sufficiency in the country both under the medium and long-term perspective. Again, the trading opportunities of the country's products depend on the comparative advantage, without subsidies or with limited subsidies that are permitted for all trading partners by the rules governing the new trading environment (Huda 2001). All these information would be of much help to the planners and policy-makers in formulating appropriate policies for optimum and efficient resource allocation within agriculture and between agriculture and non-agricultural sectors, consistent with a balanced and integrated development of Bangladesh economy. In order to formulate an appropriate policy for exporting vegetables and import substituting spices. Therefore, the present study was undertaken to highlight the economic performance of vegetables and spices.

1.4 Objectives

i) To find out the export potentialities of selected vegetables in different locations;

ii) To estimate the import substitution status of the selected spices crops and

iii) To examine the policy implications from the above.

2. Materials and Method

2.1 Selection of Sample Farmers

The vegetables and spices growing farmers, suppliers, and exporters were considered as the population for this study. Keeping in view the objectives and time constraint of the study, altogether 720 vegetables taking 40 from each vegetable and each location, and 320 spices growers taking 40 from each location, 25 suppliers, and 25 exporters were randomly selected for the present study. The study areas were purposively selected based on intensive vegetables and spices growing pockets in Bangladesh. The distribution of crops and their respective locations and sample size are shown in Table 2.1.

Table 2.1 Crops and locations wise sample size of selected vegetables and spices

Name of the crops	Study location	Sample size
Vegetables		
Bitter gourd	Jessore and Narshingdi	80
Pointed gourd	Rangpur and Narshingdi	80
Ash gourd	Comilla and Narshigdi	80
Cucumber	Comilla and Narshigdi	80
Brinjal	Jessore and Narshingdi	80
Potato	Rangpur and Munshigonj	80
Country bean	Jessore and Narshingdi	80
Okra	Comilla and Narshingdi	80
Pumpkin	Barisal and Mymensingh	80
Spices		
Onion	Rajshahi and Faridpur	80
Garlic	Natore and Nilphamari	80
Ginger	Natore and Nilphamari	80
Green chilli	Magura and Pabna	80
Total		1040

Based on the availability of data, easy road communication, and nearest to Airport, Ulokhola of Kaligonj *Upazila* of Gazipur district was selected for

selecting vegetable traders. Again, 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.

2.2 Analytical Technique

In this study, value addition or costs and returns analyses were done on both variable and total cost basis. The following equation (Π) was developed to assess the value addition of the vegetables and spices producers.

$$\Pi_i = \sum_{i=1}^{n} P_i Q_i - TC = \sum_{i=1}^{n} P_i Q_i - (VC + FC)$$

Where,

Π_i = Profit or value addition from i^{th} vegetables and spices production

Q_i = Quantity of the i^{th} product (kg/ha)

P_i = Average price of i^{th} product (Tk/kg)

TC = Total cost (Tk/ha)

VC = Variable cost (Tk/ha)

FC = Fixed cost (Tk/ha)

i = 1, 2, 3, ……., n

Per hectare profitability of growing vegetables and spices from the view points of individual farmers was measured in terms of gross return, gross margin and value addition.

Gross return: Gross return was calculated by simply multiplying the total volume of output with it's per unit of price in the harvesting period.

Gross margin: Gross margin calculation was done to have an estimate of the difference between total return and variable costs. The argument for using the gross margin analysis is that the farmers of Bangladesh are more interested to know their return over variable costs.

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

Net margin = Gross margin -Marketing cost

Gross margin = Sale price -Purchase price

2.3 Export and Import Parity Analysis

The estimates of world price at import parity level are based on the assumption that imports compete with domestic production at the producer level. In case of exportable commodity, domestic-to-border price comparison has been made at

producer level. The border prices of selected commodities have been adjusted for marketing cost (which includes handling, transportation, storage cost) and price spent between the wholesale market to the farmers level. Border prices of commodities are used as reference or shadow prices in measuring the effects of government intervention polices. Without government intervention, the domestic producer prices are expected to be closely related to the border prices.

Export parity:The export parity price at farm gate is estimated by using the following formulae:

$$P_i = P_i^b E_0 - C_i$$

Where,

P_i = Producer price of i^{th} exportable,

P_i^b = World price at the port of entry (f.o.b) in foreign currency

E_0 = Exchange rate

C_i = All components of the marketing margin from border to farm gate level

Import parity: Import parity price at farm level is estimated using the following formulae

$$P_j = P_j^b + C_{jm} - C_{jd}$$

Where,

P_j= producer price of j^{th} importable commodity,

P_j^b=world price at port of entry (c.i.f),

C_{jm}= marketing margin from the port of entry to the wholesale market and

C_{jd}= Components of the marketing spread between the wholesale market and farm gate.

2.4 Measures of Comparative Advantage

Comparative advantage or efficiency of producing different crops in Bangladesh agriculture is analyzed here using Domestic Resource Cost (DRC) analysis. This indicator is formally defined as follows:

Domestic resource cost (DRC): The DRC is the ratio of the cost in domestic resources and non-traded inputs (valued at their shadow prices) of producing the commodity domestically to the net foreign exchange earned or saved by producing the good domestically.

Formally DRCs is defined as:

$$DRC = \frac{\text{Cost of domestic resource and non - traded inputs for producing per unit of output}}{\text{Value of tradable output - Value of tradable inputs}}$$

$$DRC = \frac{\sum f_{ij} P_j^d}{U_i - \sum a_{jk} P_k^b}$$

Where,

f_{ij} = Domestic resource and non-traded inputs j used for producing per unit commodity i

P^d_j = Price of non-traded intermediate inputs and domestic resource

U_i = Border price of output i

a_{ik}= Amount of traded intermediate inputs for unit production of i

P^b_k = Border price of traded intermediate input

If DRC < 1, the economy saves foreign exchange by producing the good domestically either for export or for imports substitution. This is because the opportunity cost of domestic resources and non-traded factors used in producing the good is less than the foreign exchange earned or saved. In contrast, if DRC > 1, domestic costs are in excess of foreign exchange costs or savings, indicating that the good should not be produced domestically and should be imported instead.

3. Results and Discussion

3.1 Cost of Production of Different Vegetables

***Variable Cost*:**The cost of production included all kinds of variable costs such as human labour, mechanical power, seed/seedling, manure, fertilizers, irrigation, pesticides, etc. used for the production of selected vegetables. Both cash expenses and imputed value of family supplied inputs were included in the variable cost. The total variable cost of selected vegetables was Tk.168527 per hectare which was 82% of total cost of production. Higher variable cost was recorded with the brinjalfarmers (Tk.217885/ha) than that of other vegetables due to higher level of input used by the brinjal farmers and lower variable cost was recorded with the pumpkin farmers. Among the different cost items, human labourwas the major cost item which accounted for about 45%of total variable cost and 37% of total cost. The second highest cost item was support (Macha/bamboo) cost which accounted for about 29% of total variable cost and 24% of total cost. Fertilizer and irrigation cost shared about 11% and 4% of total cost and ranked third and fourth cost item, respectively. There was no wide variation of different locations of the farms in the cost of selected vegetables cultivation. The uses of some inputs such as Urea, TSP and MoP were found very minimum in the study areas (Table 3.1).

***Fixed Cost*:** Rental value of land was considered as fixed cost of production. The cost of this item was Tk.37193 per hectare which was accounted for about 18% of total cost of production (Table 3.1). Rental value of land was found highestincountry bean cultivation (Tk.74800/ha) andbrinjal cultivation (Tk. 61393/ha) due more crop duration.

Table 3.1. Per hectare production cost of different vegetables for producer

Cost item	Bitter gourd	Pointed gourd	Ash gourd	Cucumber	Brinjal	Potato	Country bean	Okra	Pumpkin	All vegetables
A. Variable cost (Tk/ha)										
Human labour (man-days)	61500	64400	56024	53000	125200	74600	126494	76000	40074	75255
Mechanical power (Tk/ha)	7426	7161	7993	8284	8234	9282	8483	6503	5331	7633
Seed cost	8196	4649	7553	2787	16894	54750	5364	4100	4706	12111
Ash (Tk/ha)	578		578	-	555					570
Cowdung (Tk/ha)	3488	6170	3109	3794	4645	4877	5339	1960	3991	4153
Fertilizer (Kg/ha):										
Urea	8670	7323	9688	5163	7763	5063	1597	3760	4940	5996
TSP	18400	9458	8222	5103	5913	2943	2495	4131	3024	6632
MoP	5928	3363	4250	2338	3196	3417	1085	1309	1445	2926
DAP		739		-	1760			448	-	982
Zipsum	1077	4393	660		880	772	287		-	1345
Zinc sulphate	4738	6845		216		975			-	3194
Boron	1200		145						-	673
Pesticides (Tk/ha)	14143	6845	2519	1824	19235	11530	11227	4629	4215	8463
Irrigation (Tk/ha)	17472	13604	8829	6362	11601	4734	6483	5987	4917	8888

Cost item	Bitter gourd	Pointed gourd	Ash gourd	Cucumber	Brinjal	Potato	Country bean	Okra	Pumpkin	All vegetables
Macha cost	52106	50832	55008	59537	-		29065	-	-	49310
Int. on operating capital	5806	5009	7066	6326	12010	5765	8324	3083	2058	6161
Total variable cost	210728	181799	176639	158133	217885	178706	206243	111910	74701	168527
B. Fixed cost (Tk/ha)										
Land use cost	23703	28734	23955	28734	61393	24921	74800	49920	18580	37193
Total fixed cost	23703	28734	23955	28734	61393	24921	74800	49920	18580	37193
Total cost (A+B)	234430	210533	200594	186867	279278	203627	281043	161830	93281	205720

Source: Field survey, 2012-13 to 2014-15

***Total Cost*:** Total cost of production included variable costs and fixed costs incurred for selected vegetables cultivation. On an average, the total cost of production for selected vegetables cultivation was Tk.205720 per hectare where 18% were fixed costs and 82%were variable cost (Table 3.1). The highest total cost of production was incurred for country bean (Tk.281043/ha) followed by brinjal(Tk.279278/ha) and the lowest total cost of production was for pumpkin cultivation (Tk. 93281/ha).

3.2 Cost of Production of Different Spices

***Variable cost*:** The averagetotal variable cost of spices cultivation was Tk.139840 per hectare which was 83% of total cost of production. Thehighest variable cost was recorded with the farmers of ginger (Tk. 173110/ha) than that of other spices due to use higher level of inputs. Among different cost items, human labour was the major cost item which accounted for about 40% of total variable cost and 33% of total cost (Table 3.2). The second highest cost item was seed which accounted for about 25% of total variable cost and 21% of total cost. Fertilizerand irrigation cost accounted for about 13% and 5% of total cost and ranked third and fourth cost item, respectively. The uses of some inputs such as Urea, TSP and MoP were found very minimum in the study areas for producing selected spices.

Table 3.2. Per hectare production cost of different spices for producer

Cost item	Onion	Garlic	Ginger	Chilli	All spices
A. Variable cost (Tk/ha)					
Human labour	57200	52600	51600	62600	56000
Mechanical power	6737	5838	9731	9402	7927
Seed cost	38959	9772	90388	2700	35455
Ash	555				555
Cowdung	5039	4877		6506	5474
Fertilizer					
Urea	6630	3060	3888	5900	4870
TSP	5188	5125	3767	5265	4836
MoP	4384	3216	2678	3179	3364
DAP	4995			4288	4642
Zipsum	552	804	132	560	512
Zinc sulphate	1005	938	244	1200	847
Boron	1350	3600		1160	2037
Pesticides	11916	2882	520	3909	4807
Irrigation	17941	4749	3105	8981	8694
Machha cost	-			-	
Int. on operating capital	4688	2761	7057	3277	4446
Total variable cost (Tk/ha)	167137	100221	173110	118927	139849
B. Fixed cost (Tk/ha)					
Land use cost	26393	31851	37303	17465	28253
Total fixed cost (Tk/ha)	26393	31851	37303	17465	28253
Total cost (A+B)	193529	132072	210413	136392	168102

Source: Field survey, 2012-13 to 2014-15.

Table 3.3. Per hectare net return from different vegetables production

Particulars	Bitter gourd	Pointed gourd	Ash gourd	Cucum-ber	Brinjal	Potato	Country bean	Okra	Pump kin	All vegetable
Yield (kg/ha)	27613	26621	29167	26121	35675	29265	21100	14244	18200	25334
Per unit price (Tk/kg)	14	13	12	13	16	9	18	15	8	13
A. Gross return (Tk/ha)	386575	346073	349998	326841	553075	263385	379800	213660	145600	329445
B. Variable cost (Tk/ha)	210728	183943	176639	158133	217884	178706	206243	111910	74701	168765
C. Gross margin (A-B)	175848	162130	173359	168709	335192	84679	173557	101750	70899	160680
D. Net return (Tk/ha)	152145	133396	149405	139975	273799	59758	98757	51830	52319	123487
E. Fixed cost (Tk/ha)	23703	28734	23955	28734	61393	24921	74800	49920	18580	37193
F. Total cost (B+E)	234430	212677	200594	186867	279276	203627	281043	161830	93281	205958
G. BCR (Cash cost basis)	1.83	1.88	1.98	2.07	2.54	1.47	1.84	1.91	1.95	1.95
H. BCR(Full cost basis)	1.60	1.70	1.80	1.70	1.90	1.30	1.35	1.32	1.56	1.58

Source: Field survey, 2012-13 to 2014-15**.**

***Fixed cost*:** The average rental value of land of selected spices was Tk. 28253 per hectare which incurred 17% of the total cost of production (Table 3.2). Rental value of land was found highestinginger cultivation (Tk. 37303/ha) compared to other selected spices cultivation.

***Total cost*:** On an average, the total cost of production of selected spices was Tk.168102 per hectare, where 17% was fixed costs and 83% was variable cost (Table 3.2). The highest total cost of production was incurred for ginger (Tk.210413/ha) followed by onion (Tk.193529/ha).

3.3 Net Returns of Different Vegetables Cultivation

The average gross return of different vegetables was estimated at Tk.329445/ha (Table 3.3). Thehighest gross return was obtained from brinjal cultivation (Tk.553075/ha) compared to bitter gourd cultivation (Tk. 386575/ha). The highest gross return from brinjalcultivation was attributed to the highest yield and higher market price. Average gross margin was Tk.160680 per hectare which varied from Tk.335192/ha to Tk.70899/ha. Net return was also followed similar trend. It was evident that the average net returnofselected vegetables production wasestimated at Tk.123487 per hectare which was very high compared to other vegetables. As the production cost was also very high, the resource poor farmers could not afford such high cost. The average benefit cost ratio (BCR) was 1.6 on full cost basis, the highest being with the brinjal growers (1.9). Although the brinjal growers obtained the highest gross margin, BCR was also highest compared to others vegetable.

Table 3.4. Per hectare net return from different spices production

Particulars	Onion	Garlic	Ginger	Chilli	All
Yield (kg/ha)	17547	6172	8350	7180	9812
Per unit price (Tk/kg)	18	38	52	33	35
A. Gross return (Tk/ha)	315837	231424	429973	236940	303544
B. Variable cost (Tk/ha)	167137	100221	181271	118927	141889
C. Gross margin (A-B)	148701	131203	248702	118013	161655
D. Net return (Tk/ha)	122308	99352	231399	100548	138402
E. Fixed cost (Tk/ha)	26393	31851	17303	17465	23253
F. Total cost (B+E)	193529	132072	198574	136392	165142
G.BCR (Cash cost basis)	1.89	2.31	2.37	1.99	2.14
H. BCR(Full cost basis)	1.60	1.80	2.10	1.73	1.81

Source: Field survey, 2012-13 to 2014-15

3.4 Net Returns of Different Spices Production

The average gross return from selected spicesproduction was estimated at Tk.303544 per hectare (Table 3.4). The highest gross return was obtained by the

ginger growers (Tk.429973/ha) than that of onion growers (Tk.315837/ha). The highest gross return from gingerproduction was attributed tothe highest yield and higher market price. Average gross margin was found to be Tk.161655 per hectare which varied from Tk. 248702/ha to Tk. 118013/ha. Similar trend was found in calculating net returns. The average net return from selected spicesproduction was Tk.138402 per hectare. The average benefit cost ratio (BCR) was 1.81 on full cost basis.

3.5 Marketing Cost and Margin 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 areas. The marketing costs of selected vegetables are shown in Table 3.5. The estimated average marketing costs per ton of vegetables incurred by suppliers were Tk. 3730.

Table 3.5. Marketing cost of vegetables incurred by supplier

Cost item	Cost (Tk/ton)	Percent of total cost
Transportation	2000	53.62
Loading and unloading	400	10.72
Grading	250	6.70
Wastage/loss of weight	425	11.39
Market toll	275	7.37
Tips and donation	100	2.68
House rent	80	2.14
Personal expenses	200	5.36
Total	3730	100

Field survey, 2014

The net margin of supplier is shown in the Table 3.6. The average purchase price of suppliers was Tk. 13,111 per ton and the average sale price was Tk. 19,333 per ton. Thus the gross margin of suppliers was Tk. 6,111 per ton. The total marketing cost of suppliers was Tk. 3730 per ton. So, the net margin of suppliers was Tk. 2381 per ton of vegetables.

3.6 Marketing Cost and Margin of Vegetables Exporters

Of the total costs, the highest cost was incurred by the airfreight charge followed by packet/carton, terminal and handling charge, carrying from exporters go-down to airport, clearing and forwarding. The per unit cost of many items were fixed irrespective of importing countries. The exporters incurred higher cost for exporting vegetables to UK followed by Middle East (Table 3.7).

Table 3.6. Net margin of different vegetables suppliers

Particulars	Amount in Taka per ton									
	Bitter gourd	Pointed gourd	Ash gourd	Cucumber	Brinjal	Potato	Country bean	Okra	Pumpkin	All vegetable
A. Average purchase price (Tk/ton)	14000	13000	12000	13000	16000	9000	18000	15000	8000	13111
B. Average sale price (Tk/ton)	21000	21000	19000	18000	22000	14000	24000	22000	13000	19333
C. Gross margin (B-A)	7000	7000	7000	5000	6000	5000	6000	7000	5000	6111
D. Marketing cost (Tk//ton)	3730	3730	3730	3730	3730	3730	3730	3730	3730	3730
E. Net margin (C-D)	3270	3270	3270	1270	2270	1270	2270	3270	1270	2381

Source: Field survey, 2012-13 to 2014-15.

Table 3.7. Marketing cost (Tk/ton)of exporters for different vegetables export

Cost items	United kingdom	Middle East
Packet/Carton	4000	4000
Packaging materials e.g. rope, cost tape, thin paper etc.	350	300
Carrying from exporters godown to airport	1500	1500
Clearing and forwarding (C&F)	1500	1500
Terminal and handling charge (THC)	3450	3450
Bank services	70	70
Airway bill charge	552	216
GSP certificate charge	350	-
Airfreight charge	153000	101000
EXP (Export perform)	300	300
Salary and wages	1000	1000
Office, godown rent and taxes	1400	1200
Telephone, fax, telex	800	500
Loading and unloading charge	300	300
Quarantine	500	500
Phyto-sanitary certificate	200	-
Metropolitan chamber of commerce office charge	500	500
Dhaka chamber of commerce office charge	1500	1500
Commission agent	500	500
Entertainment	120	90
Miscellaneous	70	50
Total cost	171962	118476

Source: Vegetable exporters and different airlines from airport 2014.

Net margin by exporters consisted of the profit from the export of vegetables. Exporters performed the function of purchasing exportable vegetables from supplier/selected agents and supply them to different foreign buyers of the world. The average net margin of the exporters is depicted in Table 3.8. It is revealed that net marginwas very high in the UK market (Tk. 32852/ton) followed by Middle East (Tk. 22869/ton).

Table 3.8. Net margin (Tk/ton) of vegetables exporters

Particulars	United Kingdom	Middle East
A. Average selling price in abroad (Tk/ton)	224147	160678
B. Average purchase price (Tk/ton)	19333	19333
C. Gross margin (A-B)	204814	141345
D. Marketing cost (Tk/ton)	171962	118476
E. Net margin (C-D)	32852	22869

Source: Field survey, 2012-13 to 2014-15.

Table 3.9. Domestic resource cost (DRC) of selected vegetables at export parity level

Items	Bitter gourd	Pointed gourd	Ash gourd	Cucumber	Brinjal	Potato	Country bean	Okra	Pumpkin
A. Traded input (Tk/MT)	1970	1254	1105	704	685	576	415	1020	824
B. Non-Traded inputs and domestic resources (Tk/MT)	7020	7040	5919	6533	7281	6508	11683	10684	4608
Human labour	2227	2419	1921	2029	3509	2549	5995	5336	2202
Mechanical power	269	269	274	317	231	317	402	457	293
Seed	297	175	259	107	474	1871	254	288	259
Ash	-	-	20	-	16	-	-	-	-
Manure	126	232	107	145	130	167	253	138	219
Pesticides	512	257	86	70	539	394	532	325	232
Irrigation	633	511	303	244	325	162	307	420	270
Macha	1887	1909	1886	2279	-	-	-	-	-
Int. on operating capital	210	188	242	242	337	197	395	216	113
Land rent	858	1079	821	1100	1721	852	3545	3505	1021
C. Output price (Tk/MT)	37010	34125	33080	34987	40573	34150	36610	40615	41877
D. Value added (Tradable) (Tk/MT) (C-A)	35040	32871	31975	34283	39888	33574	36195	39595	41035
E. **DRC** (B/D)	**0.200**	**0.214**	**0.185**	**0.191**	**0.183**	**0.194**	**0.322**	**0.270**	**0.112**

Source: Authors' calculation.

3.7 Comparative Advantages of Vegetables and Spices Production

DRC indicates whether the domestic economy has a comparative advantage in vegetables and spices crops production relative to other countries. If the DRC is greater than one, it implies that the economy loses foreign exchange through domestic production of the vegetables and spices (in the sense that it uses more domestic resources than it generates net value added to tradable goods and services), while DRC is less than one implies that the production is efficient and make positive contribution to domestic value addition. The estimates of DRCs for selected vegetables and spices during the period from 2012-13 to 2014-15 are presented in Table 3.9 & 3.10. The DRCs for selected vegetables and spices were observed to be less than unity implying that Bangladesh had comparative advantage in vegetables production for export promotion and spices production for import substitution. The study results supported in the earlier study by Rashid *et al.,* 2010.

Table 3.10. Domestic resource cost (DRC) of selected spices

Items	Onion	Garlic	Ginger	Chilli
	Import Parity	Import Parity	Import Parity	Export parity
A. Traded input (Tk/MT)	2001	3099	1838	3190
B. Non-Traded inputs and domestic resources (Tk/MT)	9624	18686	22499	15994
Human labour	3260	8522	6180	8719
Mechanical power	384	946	1165	1309
Seed	2220	1583	10825	376
Ash	-	-	-	-
Manure	287	790	-	906
Pesticides	679	467	62	544
Irrigation	1022	769	372	1251
Macha			-	-
Int. on operating capital	267	447	1823	456
Land rent	1504	5161	2072	2432
C. Output price (Tk/MT)	30694	125251	58849	57325
D. Value added (Tradable) (Tk/MT) (C-A)	28693	122152	57011	54135
E. DRC (B/D)	0.335	0.200	0.395	0.295

Source: Authors' calculation.

3.14 Supply Chains for Vegetables Export

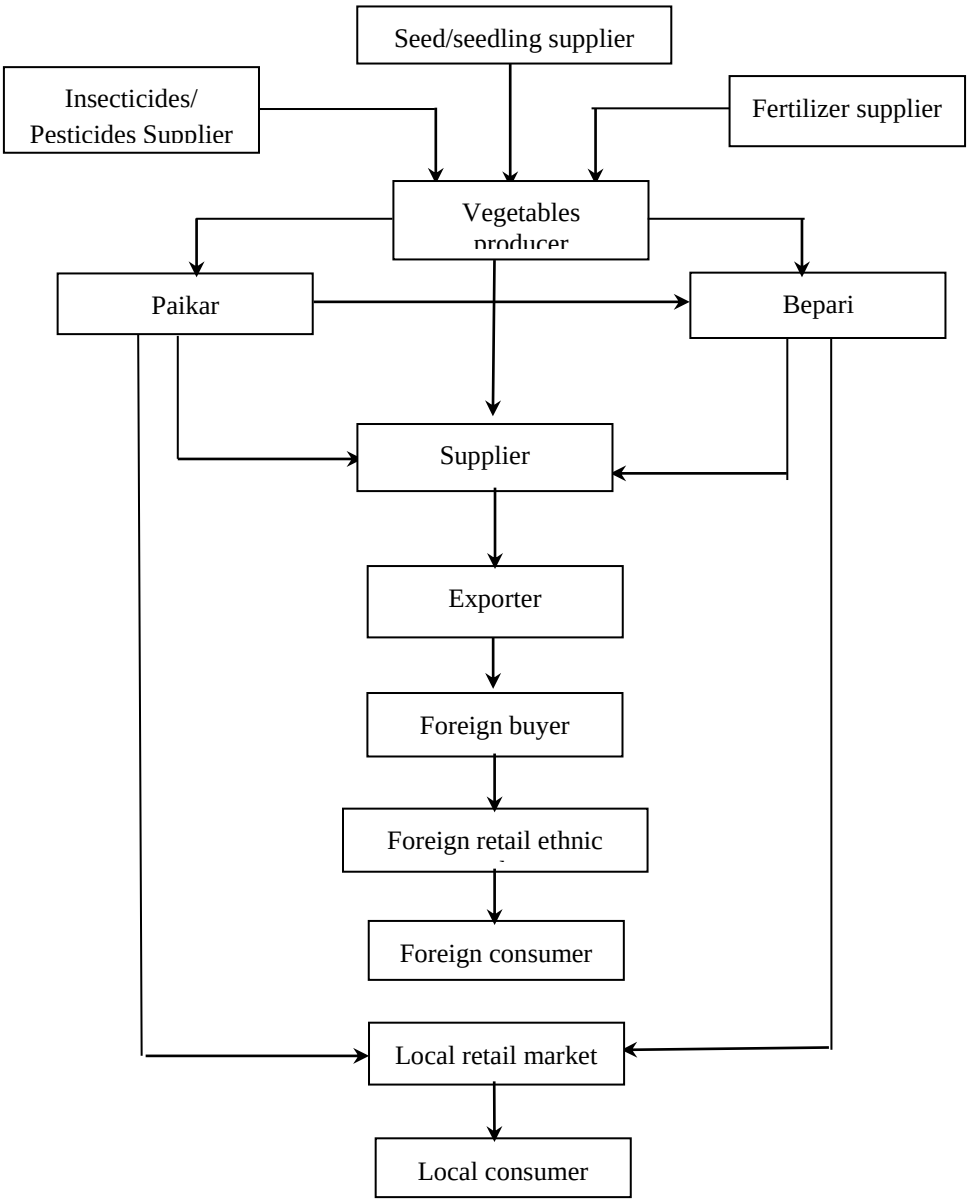

Fig. 2. Supply chains for vegetables export.

4. Conclusions and Recommendations

4.1 Conclusions

The study revealed that net margins were positive for all vegetables and spices producers. However, the highest net return was estimated for brinjal producers

followed by bitter gourd producers. In the case of spices, the highest net return was received by ginger producers followed by onion producers. Comparatively low net returns were found for okra and garlic producers. Vegetables exporters received the highest net margin from UK market which was higher than the Middle East market.The highest benefit cost ratio (BCR) was calculated for brinjal followed by ash gourd. For spices, it the estimated BCR were 2.1 and 1.8 for ginger and garlic respectively. Bangladesh had comparative advantage of producing all selected vegetables and spices as the estimates of domestic resource cost (DRC) were less than one. This is a clear indication that although not yet a major supply source, Bangladesh seemed to have a high potential for export development of horticultural crops, particularly, in vegetables and spices. The country has got some natural advantages like fertile soil, favorable climatic condition, and abundant supply of inexpensive labour force. The export of fresh vegetables is more profitable due to high value addition. Raw materials are not to be imported for vegetables export. Bangladeshi vegetables are still not well known to the foreign consumers. Export expansion and demand from super market was constrained by poor quality of produces and imposition of different sanitary and phyto-sanitary criteria by the importing countries. To familiarize Bangladeshi vegetables to the foreigners and foreign super markets, quality of those vegetables has to be improved by upgrading the packaging, handling, gradingand transportation system. Therefore, quality assurance would be must and it required continuous market research for improving the demand of Bangladeshi fresh vegetables in the international markets.

4.2 Recommendations

Selected vegetables production could be expanded for export promotion by using more improved technology as the country's demand. So emphasis should also be given on local production of selected vegetables as the export parity is favorable for the country.

Domistic resource cost for all spices crops were also less than unity implying that production of these spices would be highly efficient for import substitution.

To survive and sustain in the export market in this context and to ensure and enhance market excess and export competitiveness, the combined efforts of the concerned parties are necessary at the level of policy formulation, planning and implementation of programs.

References

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Appendix 1. Total export quantity of vegetables

Year	Quantity (Ton)	Value (000$)	Unit value ($/Ton)
2000	7000	11000	1571
2001	9000	13000	1444
2002	10484	12888	1229
2003	6779	10323	1523
2004	7592	12333	1624
2005	30070	40242	1338
2006	19263	27672	1437
2007	22744	31071	1366
2008	7574	14132	1866
2009	4589	11236	2453
2010	6577	12689	1929
2011	5753	13704	2382

Source: www.faostat.org

Appendix 2. Total import quantity of onion, garlic and ginger

Year	Onion		Garlic		Ginger	
	Quantity (Ton)	Value (000$)	Quantity (Ton)	Value (000$)	Quantity (Ton)	Value (000$)
2003	334521	69003	--	N/A	N/A	N/A
2004	359589	73732	--	N/A	N/A	N/A
2005	72391	17338	N/A	N/A	N/A	N/A
2006	106975	32880	N/A	N/A	N/A	N/A
2007	96446	30809	109443	22248	N/A	N/A
2008	686756	190873	N/A	N/A	N/A	N/A
2009	767548	262244	103884	70699	49496	35595
2010	505886	207150	50898	86622	37585	43065
2011	268109	89611	44072	44231	47939	38061

Source: www.faostat.org

Appendix 3. Import parity border prices of spices 2012-13 to 2014-15

Items	Onion	Garlic	Ginger
A. CIF PRICE (US$ /mt)	409	1702	794
B. CIF price (Tk/mt)	29039	120842	56374
C. Marketing margin from the port of entry to wholesale market	2039	4793	2859
Import handling cost	871	3625	1691
Transportation cost	1016	1016	1016
Domestic trading cost	152	152	152
D. Border price at Wholesale level (B+C)	31078	125635	59233
E. Components of the marketing spread between the wholesale market to the produce level	384	384	384
F. Border price of farm produce at farm gate (D-E)	30694	125251	58849

Source: Authors calculation**.**

Appendix 4. Export parity border prices of vegetables for 2012-13 to 2014-15

Items	Bitter gourd	Pointed gourd	Ash gourd	Cucumber	Brinjal	Potato	Country bean	Okra	Pumpkin	Chilli
A. F.O.B price at airport (Tk/mt)	41000	38000	37000	39000	45000	38000	41000	45000	46000	63000
B. Costs from border toproducers level	3990	3875	3920	4013	4427	3850	4390	4385	4123	5675
Export handling cost	1230	1140	1110	1170	1350	1140	1330	1350	1380	1890
Transportationcost	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016
Domestictrading cost	152	152	152	152	152	152	152	152	152	152
Costsfrom farm gate toWholesale	1242	1242	1242	1242	1242	1242	1242	1242	1242	1242
Interest rate	350	325	400	433	667	300	750	625	333	1375
F. Border price atproducer level(A-B)	37010	34125	33080	34987	40573	34150	36610	40615	41877	57325

Source: Authors' calculation.