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Importance, Structural Change and Factors Affecting Production of Vegetables in Bangladesh

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Abstract: The present study was undertaken to find out the importance, structural change and factors affecting production of vegetables over a period of 1972-73 to 2003-04. The results indicated that vegetables are being an important component of crop production in Bangladesh in terms of area, production, value addition to GDP and export earnings. There was a structural change in vegetable production in the post policy reform period due to research, extension and export promotion activities. Policy reform, area and humidity variables showed statistically significant influence on different types of vegetable production. If policy reforms in terms of research and extension program and attracting foreigners investment for exporting of vegetables is continued than vegetable production may increase further. Practicing of crop rotation might increase area under these crops production. Special care should also be taken for developing disease resistant high yield potential vegetable varieties for increasing and sustaining vegetable production.

Key words: Importance, policy reforms, structural change, vegetable production

INTRODUCTION

Agriculture is the most important sector of the economy of Bangladesh contributing about 23% of the country's GDP and employing about 62% of the total labor force (BER, 2007). The structure of agriculture composed of crop, livestock, fisheries and forestry sub-sectors. The crop sub-sector dominates the structure of agricultural accounting for 57% of agricultural GDP. The main crops of the country include rice, wheat, pulses, oilseeds, sugarcane, potato, vegetables, jute and tea. Vegetable is one of the important components of crop sub sector because vegetables are usually considered as protective food and high value crops and there is therefore a natural trend to go for increased cultivation under the commercialization process, although the total cropped area under vegetable cultivation is very insignificant. One important characteristic is that income elasticity of vegetables is much higher than the major crops like rice. Mahmud (2002) showed that income elasticity of potato and vegetable was 0.89 and 0.82, respectively, which were much higher than rice (0.35). The structure of agriculture may be influenced by the increasing production of vegetables through changing cropping pattern, higher productivity and profitability, involvement of different types of farmers and government policy reform. Among these factors government policy reform is assumed as a most important factor, which may influence vegetable production positively.

In early 80s the government initiated some research and extension program on vegetable production with a view to release some new varieties with high yield potential and popularize them among the farmers through extension work. In that time government also took some export promotion activities of vegetables because of their high demand in the United Kingdom and in the Middle East. Different research centers were established for achieving this purpose. The research centers developed and released 24 vegetables, 5 spices, 12 potato, 7 root crops and 16 fruit varieties. Different projects were under taken by the Department of Agricultural Extension (DAE) to increase productivity of

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horticultural crops, to enhance the level of food security and nutrition by improving the efficiency of horticultural production system. Establishment of different research centers, adoption of different extension program and export promotion activities are termed as policy reform in this study. Government started to give emphasis on vegetable and other crop production along with rice after 1984-85. Therefore, there may be a structural change in vegetable production system due to policy reform between the period of 1972-73 to 1983-84 and 1984-85 to 2003-04. Barham *et al*. (1995), Dogliotti *et al*. (2004), Lynch (1999), Poudel *et al*. (1998) and Zaibet and Dharmapala (1999) studied factors affecting vegetable production using micro level data but Lamb (2000) studied using macro level data in different countries rather than Bangladesh. A few studies have been conducted on structural change and factors affecting vegetable production using macro level data. Considering the review of different literature the present study was undertaken to give some policy directions of vegetable production using macro level data in Bangladesh. The present study was taken to know whether the importance of vegetable production in terms of area, production, value addition to GDP and export earnings is increasing or not. It is hypothesized that adoption of research and development and export promotion activities which is usually known as policy reform may have some positive influence on vegetable production. Thus it will be interesting to know whether there is any structural change in vegetable production between pre and post periods of policy reform and the look for factors responsible for production of different types of vegetables in Bangladesh over time. The findings of the study may add some knowledge in the existing literature.

MATERIALS AND METHODS

Data on area, production, nominal price, rainfall, humidity and dollar-taka exchange rate from 1972-73 to 2003-04 was used for this study. The data were collected from different issues of agricultural yearbook of Bangladesh published by the Bureau of Statistics of Bangladesh (BBS) and ministry of finance of the government of The Peoples Republic of Bangladesh. The nominal price expressed in Bangladesh Taka (BDT) was converted into US $ using dollar-taka exchange rate of the respective year. Secondary sources of information can yield more accurate data where a government or international agency has undertaken a large-scale survey, or even a census; this is likely to yield far more accurate results. The assembly and analysis of secondary data almost invariably improves the researcher's understanding of the problem, the various lines of inquiry that could or should be followed and the alternative courses of action, which might be pursued.

Analytical Technique

Five-year moving averages, dummy variable technique for testing of structural change and a multiple regression model was used to analyse the data. Five-year moving averages were used to eliminate fluctuation in area, production and value addition.

Dummy Variable and Multiple Regression Analysis

It was assumed that effect of policy reform might influence vegetable production from 1984-85. Structural stability test (Gujarati, 2003) was performed to verify whether there was any structural change in vegetable production or not between pre (1972-73 to 1983-84) and post (1984-85 to 2003-04) policy reform period. Dummy variable technique was used to test the structural stability (Gujarati, 2003). The regression model used in the study was as follows:

$$\ln Y_i = \beta_1 + \beta_2 D_i + \beta_3 X_i + \beta_4 D_i X_i + u_i$$

where, ln = Natural logarithm, Y_i = Production of different vegetables in year i (i = 1,2, ...32), D_i = 0 when the ith observation is in the first period and D_i = 1 when the ith observation is in the second period, X_i = time (i = 1,2,..... 32 years). Here β_2 is differential intercept and β_4 is differential

slope coefficient. β_4 indicate by how much the slope coefficient of second period (post policy reform period) differs from the slope coefficient of first period (pre policy reform period). When $D_i = 1$, then $D_iX_i = X_i$ and when $D_i = 0$, then $D_iX_i = 0$. When $D_i = 1$, then $\ln Y_i = \beta_1 + \beta_2 + \beta_3X_i + \beta_4X_i = (\beta_1 + \beta_2) + (\beta_3 + \beta_4)X_i = \gamma_1 + \gamma_2X_i$, when $D_i = 0$, then $\ln Y_i = \beta_1 + \beta_3X_i$. The null hypothesis of the structural stability test was H_0: $\gamma_1 = \beta_1$ and $\gamma_2 = \beta_3$, if the first null hypothesis is accepted then it indicates that there was no change between two periods, which is originated from the intercept (due to autonomous production). If the second null hypothesis is accepted then it indicates that there was no change between the two periods, which is originated from the slope coefficient (due to policy effect). A multiple regression analysis was done to identify the factors influencing the production of different summer and winter vegetables. The regression model was specified as:

$$\ln Y_i = \delta_1 + \delta_2 \ln Area_t + \delta_3 \ln Price_{t-1} + \delta_4 \ln Rainfall_t + \delta_5 \ln humidity_t + \delta_6 Policy_i + \delta_7 Time_t$$

Where:

$\ln$ = Natural logarithm
Y_i = Production of different vegetables at time i (i = 1,2,3,.....32)
$Area_t$ = Area under the vegetable in hectare at time t
$Price_{t-1}$ = Price of vegetables expressed in US$/M.ton at time t-1
$Rainfall_t$ = Rainfall in the growing season measured in centimeter at time t
$Humidity_t$ = Humidity in the growing season measured in percentage at time t
$Policy_i$ = Dummy variable on policy ($P_i = 1$ if ith observation is in the period from 1984-85 to 2003-04 and $P_i = 0$, if ith observation is in the period from 1972-73 to 1983-84)
$Time_t$ = Time as a proxy for level of technology at time t, . δ_1 ..... δ_7 are parameters to be estimated

RESULTS

Significance of Vegetables Production

Five year moving average was calculated to show the trend of area, production and value addition to GDP for different types of winter and summer vegetables. Area, production and value addition to GDP of different types of winter vegetables except eggplant showed an increasing trend from 1974-75 to 2003-04 (Fig. 1). Area, production and value addition to GDP of different types of summer vegetables except wax gourd also showed an increasing trend (Fig. 2) indicated their growing importance in the agriculture sector of Bangladesh. Winter vegetables and summer vegetables cover only 1.00 and 0.77% of total cropped area respectively during the year 2003-2004 in compared with 0.60 and 0.37%, respectively in 1973-77. Considering value of agricultural product it is seen that winter vegetables cover 1.96% of agricultural value addition in 2003-04 compared with 0.68% in 1973-77 (Table 1). Summer vegetables cover 1.45% of agricultural value addition in 2003-2004 compared with 0.33% in 1973-77. There was an increasing trend of value addition of vegetable production indicated its emerging importance in the agriculture sector. Export earnings showed decreasing trend in agricultural export, which was US$101.69 million in 2003-04 compared with US$113.42 in 1973-77. But vegetable export earnings showed an increasing trend, which was US$11.98 million compared with US$0.01 million in 1973-77. Vegetables are becoming an important component of agriculture sector in terms of area, production, value addition to GDP and export earnings.

Structural Change of Vegetable Production

Structural stability test through dummy variable technique showed that differential intercept and differential slope coefficient of eggplant, pumpkin, bitter gourd, cucumber, yard long bean and snake gourd production was statistically significant indicating that there was a positive structural change in

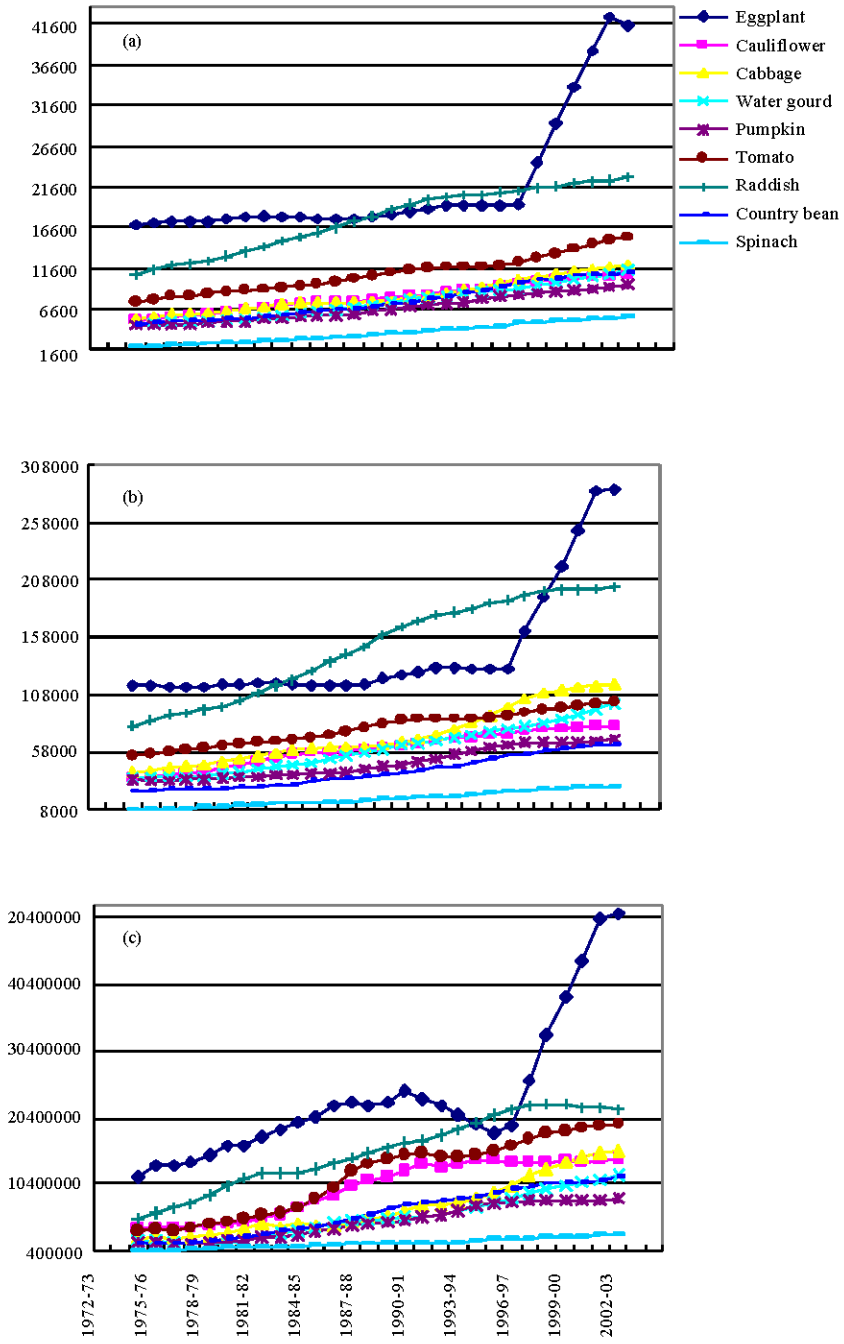

Fig. 1:Moving average trend of area (a), production (b) and value addition to GDP (c) of winter vegetables

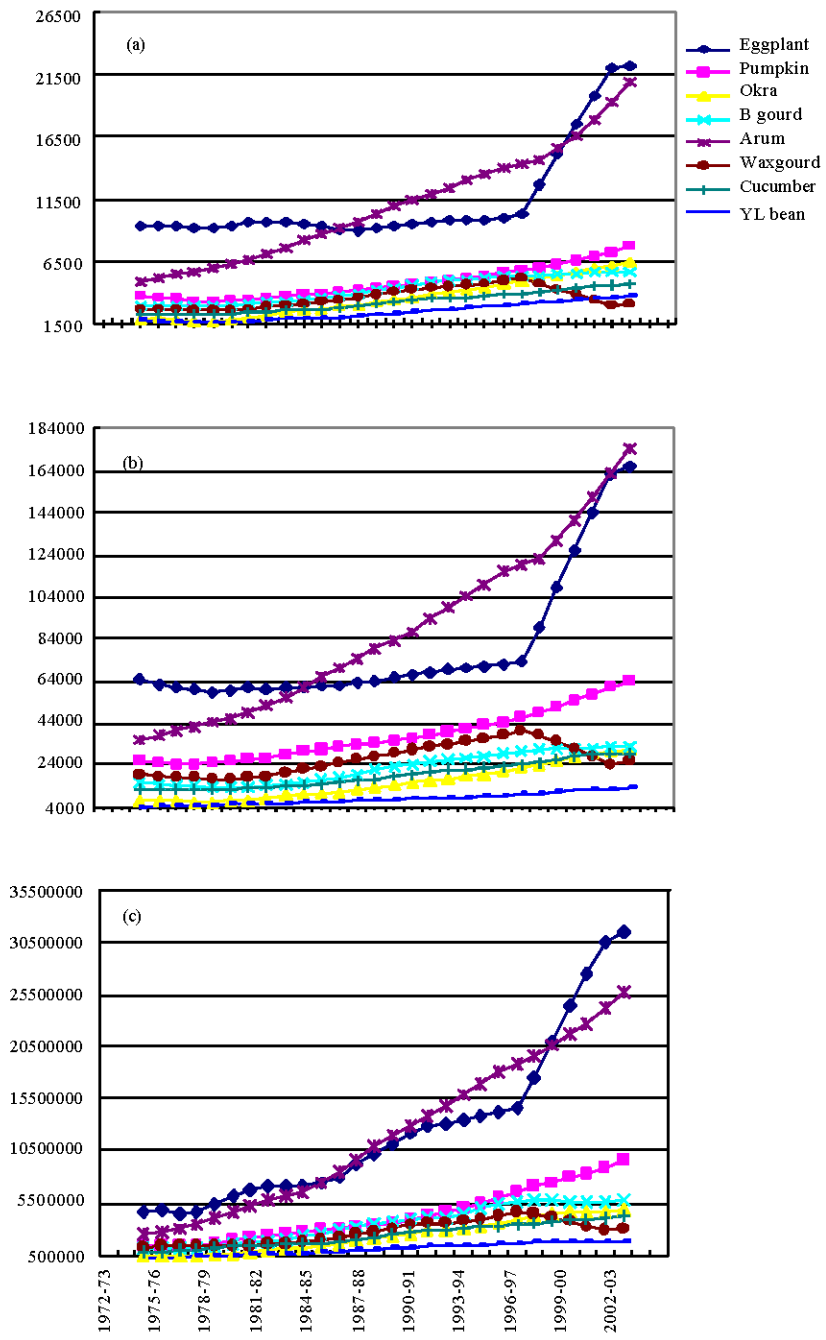

Fig. 2:Moving average trend of area (a), production (b) and value addition to GDP (c) of summer vegetables vegetables

Table 1: Contribution of vegetables to cropped area, agricultural value addition and export earnings during 1972-73 to 2003-2004

	Winter vegetables (%)		Summer vegetables (%)		Agricultural export	Vegetable export
Year	Cropped area	Agricultural value	Cropped area	Agricultural value	(mil. US $)	(mil. US $)
1973-1977	0.60	0.68	0.37	0.33	113.42	0.01
1978-1982	0.62	0.76	0.34	0.42	173.41	0.32
1983-1987	0.66	0.96	0.44	0.54	193.21	5.38
1988-1992	0.74	1.18	0.46	0.73	156.97	10.59
1993-1997	0.84	1.20	0.54	0.89	122.82	5.67
1998-2002	1.02	1.64	0.67	1.18	125.32	12.64
2003-2004	1.00	1.96	0.77	1.45	101.69	11.98

Table 2: Results of structural stability test through dummy variable technique between before and after policy effect of different types of winter and summer vegetable production

Variable	β_1 (t-value)	β_2 (t-value)	β_3 (t-value)	β_4 (t-value)	R^2 (F-value)	$\gamma_1 = (\beta_1 + \beta_2)$	$\gamma_2 = (\beta_3 + \beta_4)$	$H_0: \gamma_1 = \beta_1$	$H_0: \gamma_2 = \beta_3$
Winter vegetables									
Eggplant	11.65	-0.950***	0.0023	0.0546***	0.78	10.70	0.0569	Rejected	Rejected
	(110.67)	(5.09)	(0.16)	(3.46)	(33.06)				
Cauliflower	10.28	0.4080***	0.0539*	-0.0327***	0.99	10.69	0.0212	Rejected	Rejected
	(459.28)	(10.28)	(17.02)	(9.75)	(720.20)				
Cabbage	10.46	-0.1010	0.0444*	0.0030	0.99	10.36	0.0474	Accepted	Accepted
	(277.09)	(1.51)	(8.66)	(0.05)	(395.26)				
Watergourd	10.37	-0.0763	0.0285*	0.0121***	0.99	10.29	0.0406	Accepted	Rejected
	(409.31)	(1.70)	(8.27)	(3.18)	(860.96)				
Pumpkin	10.38	-0.251***	0.0125**	0.0232***	0.98	10.13	0.0357	Rejected	Rejected
	(257.75)	(3.52)	(2.28)	(3.84)	(196.75)				
Tomato	10.84	0.125**	0.0263*	-0.0075	0.98	10.97	0.0188	Rejected	Accepted
	(388.34)	(2.53)	(6.93)	(1.79)	(287.85)				
Radish	11.11	0.464***	0.0499*	-0.0273***	0.98	11.57	0.0226	Rejected	Rejected
	(268.76)	(6.34)	(8.89)	(4.41)	(284.70)				
Country bean	9.96	-0.0706	0.0286*	0.0116**	0.98	9.89	0.0402	Accepted	Rejected
	(303.13)	(1.21)	(6.41)	(2.36)	(509.35)				
Spinach	8.88	0.122**	0.0542*	-0.0121***	0.99	9.00	0.0421	Rejected	Rejected
	(303.54)	(2.36)	(13.65)	(2.77)	(806.24)				
Summer vegetables									
Eggplant	11.09	-1.079***	-0.0094	0.0709***	0.82	10.01	0.0615	Rejected	Rejected
	(107.27)	(5.89)	(0.67)	(4.58)	(41.66)				
Pumpkin	10.12	-0.372***	0.0093	0.0342***	0.95	9.75	0.0435	Rejected	Rejected
	(209.88)	(4.36)	(1.41)	(4.72)	(190.16)				
Pointed gourd	9.57	-0.293	0.0501	0.0083	0.92	9.28	0.0584	Accepted	Accepted
	(110.31)	(1.90)	(4.25)	(0.64)	(104.82)				
Okra	8.72	-0.257	0.0246	0.0396***	0.95	8.46	0.0642	Accepted	Rejected
	(99.53)	(1.66)	(2.07)	(3.01)	(176.38)				
Bitter gourd	9.66	-0.228**	-0.0122	0.0466***	0.95	9.43	0.0344	Rejected	Rejected
	(190.79)	(2.54)	(1.78)	(6.15)	(184.46)				
Arum	10.34	0.0425	0.0531	0.0021	0.99	10.38	0.0552	Accepted	Accepted
	(373.29)	(0.87)	(14.10)	(0.51)	(1488.58)				
Wax gourd	9.86	0.46**	-0.0019	0.0023	0.64	10.32	0.0004	Rejected	Accepted
	(85.29)	(2.25)	(0.12)	(0.13)	(16.41)				
Cucumber	9.44	-0.299***	0.0051	0.0346***	0.98	9.14	0.0397	Rejected	Rejected
	(279.17)	(5.00)	(1.12)	(6.84)	(378.99)				
Yard long	8.29	-0.111**	0.0343	0.0089**	0.99	8.18	0.0432	Rejected	Rejected
Bean	(339.08)	(2.56)	(10.32)	(2.44)	(942.63)				
Snake gourd	9.28	-0.441***	-0.0120	0.0460***	0.97	8.84	0.034	Rejected	Rejected
	(319.00)	(8.56)	(3.04)	(10.56)	(298.74)				

*** and **, stands for significant at 1 and 5%, respectively

post policy reform period in the production of these summer vegetables (Table 2). The structural change was not only due to policy effect but also due to autonomous production. Differential intercept and differential slope coefficient of pointed gourd and arum production was statistically insignificant

indicating that there was no structural change in the production of these summer vegetables. Differential intercept and differential slope coefficient of eggplant, cauliflower, pumpkin, radish and spinach was statistically significant indicating that there was a structural change in the production of these winter vegetables (Table 2). This change was due to both policy and autonomous effect. There was no structural change on the production of cabbage because both the coefficient was statistically insignificant. Differential slope coefficient of water gourd and country bean was statistically significant and differential intercept of these two vegetables was statistically insignificant. The result indicated that there was a structural change in the production of these two vegetables, which is originated from policy effect only.

Factors Affecting Production of Vegetables

Multicolinearity among different explanatory variable was tested while running the multiple regression of identifying factors affecting production of different types winter and summer vegetables. There was a multicolinearity between area and previous years price variable of different types of vegetables except winter and summer eggplant, wax gourd and pointed gourd. Previous years price variable was dropped while running the regression due to its multicolinearity effect with area variable. Policy variable played a significant positive role in the production of most of the summer and winter vegetables. Policy variable was statistically significant for the production of summer eggplant, okra, bitter gourd, wax gourd, snake gourd, pointed gourd, cauliflower, tomato, radish, country bean (Table 3, 4). Area variable was statistically significant for all types of summer and winter vegetables production. Previous years price variable was statistically significant for summer eggplant and wax gourd production. Time trend, which is used as a proxy for level of technology was positive and statistically significant for arum, wax gourd, yard long bean, summer pumpkin, winter eggplant and spinach production. But it was negative for cauliflower production. Among the climatic variables humidity showed positive and statistically significant role for the production of bitter gourd, arum, wax gourd, cucumber, winter eggplant, winter pumpkin and country bean production but it showed negative

Table 3: Regression results of identifying factors affecting production of different summer vegetables in Bangladesh over a period of 1972-73 to 2003-04

	Brinjal		Okra		Bitter gourd		Arum		Wax gourd	
Variable	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Intercept	1.02***	3.40	0.45	1.42	-0.62	1.34	1.23**	2.37	0.82***	4.10
$LnArea_t$	1.02***	21.28	1.08***	18.07	1.06***	6.61	0.73***	6.68	1.02***	46.44
$Lnprice_{t-1}$	-0.08**	2.55	Dropped		Dropped		Dropped		-0.17***	7.42
$lnrainfall_t$	0.01	1.22	-0.05**	2.43	-0.06**	2.32	-0.009	0.51	0.04**	2.61
$lnhumidity_t$	-0.05	0.37	0.003	0.02	0.66***	5.28	0.32***	3.12	0.16**	2.31
Policy	0.07***	3.81	0.01	0.70	0.05***	3.32	0.009	1.04	0.03***	4.30
Time	0.002	1.04	0.002	1.15	0.00	0.22	0.008***	3.64	0.007***	9.09
R^2	0.91		0.85		0.79		0.81		0.90	
F-value	437.52***		1273.97***		393.34***		3050.26***		1028.54***	
	Cucumber		Yard long bean		Snake gourd		Pointed gourd		Pumpkin	
Variable	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Intercept	-0.23	0.68	6.84***	13.35	-0.37	0.86	0.23	0.85	1.59*	6.35
$LnArea_t$	1.18*	8.86	0.33***	4.26	1.19***	14.99	1.10***	24.05	0.84*	11.37
$Lnprice_{t-1}$	Dropped		Dropped		Dropped		0.06**	2.30	Dropped	
$lnrainfall_t$	0.005	0.33	0.01	0.77	0.03**	2.09	0.005	0.29	-0.003	0.34
$lnhumidity_t$	0.18*	1.80	-0.24**	2.24	0.07	0.99	0.05	0.61	-0.10	0.63
Policy	-0.009	0.91	-0.02	0.99	0.08***	4.65	0.03**	2.32	0.001	0.08
Time	0.001	0.62	0.03***	11.43	0.004**	2.31	-0.002	1.54	0.005***	3.83
R^2	0.92		0.91		0.87		0.85		0.81	
F-value	691.59***		757.55***		733.01***		1283.78***		528.42***	

***, ** and * stands for significant at 1, 5 and 10%, respectively

Table 4: Regression results of identifying factors affecting production of different winter vegetables in Bangladesh over a period of 1972-73 to 2003-04

	Eggplant		Cauliflower		Cabbage		Water gourd		Pumpkin	
Variable	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Intercept	0.30	1.68	-1.87***	3.13	-0.63	0.82	0.25	0.48	-0.58	1.01
$LnArea_t$	0.92***	33.65	1.75*	11.85	1.39***	6.98	1.14***	7.28	1.30***	7.26
$Lnprice_{t-1}$	-0.006	0.38	Dropped		Dropped		Dropped		Dropped	
$lnrainfall_t$	0.001	0.12	-0.003	0.48	-0.02	1.01	-0.01	0.92	-0.001	0.05
$lnhumidity_t$	0.51***	5.05	-0.03	0.58	0.04	0.54	0.08	1.33	0.21*	1.91
Policy	-0.02**	2.07	0.05***	6.27	0.01	1.04	0.003	0.52	-0.02	1.34
Time	0.002***	3.05	-0.01***	4.87	0.00	0.12	0.001	0.49	-0.002	0.80
R^2	0.91		0.75		0.85		0.86		0.90	
F-value	1069.85***		956.52***		839.50***		1807.71***		339.06***	

	Tomato		Radish		Country bean		Spinach	
Variable	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio	Coefficient	t-ratio
Intercept	1.55**	2.15	0.02	0.06	-0.89	1.44	0.96***	2.88
$LnArea_t$	0.89***	4.82	1.19***	14.74	1.30***	9.02	0.95***	10.27
$Lnprice_{t-1}$	Dropped		Dropped		Dropped		Dropped	
$lnrainfall_t$	0.03	1.42	0.004	0.29	0.002	0.09	0.001	0.14
$lnhumidity_t$	-0.16	1.45	0.03	0.55	0.28**	2.23	-0.10	1.53
Policy	0.03***	3.20	0.02***	1.97	0.02**	1.99	-0.02**	2.45
Time	-0.002	0.92	0.00	0.28	-0.003	1.18	0.004**	2.34
R^2	0.92		0.91		0.82		0.84	
F-value	235.11***		1101.49***		1027.09***		1906.88*	

***, ** and * stands for significant at 1, 5 and 10%, respectively

and statistically significant role in the production of yard long bean. Rainfall did not show any significant role in the production of summer and winter vegetables except okra, bitter gourd, wax gourd and snake gourd production, which are summer vegetables.

DISCUSSION

Vegetables cultivation are getting importance from 1984-85 because it has immense scope of earning foreign currency through export. That's why there was a positive structural change in the production of different types of vegetables. Another reason may be the effect of cropping intensity. Cropping intensity rises at 179.20% in 2003-04 from 139.34% in 1972-73. Policy variable played a significant influence on vegetable production. Policy variable have two wings, in one hand government not only initiate horticulture research and extension program but also took initiatives for export and in the other hand government already started to give some incentive in cash to the vegetable exporters. The other steps include subsidy on the airfreight fare of agro-products, increasing cargo space, establishing cold storage and documentation counter in the Biman's cargo complex. The exporters create new markets besides strengthening existing ones. The target buyers are mostly the ethnic population. The marketing approach is being followed is market-to-market approach rather than production to market approach (Hossain, 2004). The government already took a Taka 2000 million project to develop export-oriented vegetable gardens to increase vegetable export after proper quality assurance and packaging. These are the possible causes of increasing export of vegetable as well as its production. This increasing trend of vegetable export should not only be continued but it should get further acceleration. The export prospects of Bangladeshi vegetables are huge, as there is an annual market of $2,000 billion worth of fresh and processed vegetables in the world. Different multinational company may be engaged in vegetable export providing money and technical assistance to the vegetable exporters. For instance, developed country like Japan import green tea from China, Vietnam and Thailand but they export technology and material to those countries for producing tea. For developing export of vegetables from Bangladesh, the importers can supply seed and technical assistance to

Bangladeshi suppliers under Buy-Back arrangements. This may accelerate the trend of vegetable export from Bangladesh. Area variable showed significant positive impact on vegetable production, which means that farmers are interested to brought more area under its production because of its high prices and profitability. Practicing of crop rotation may be one way to increase area under vegetable production. Another way may be proper utilization of homestead land for vegetable production. Humidity played a significant role for the production of bitter gourd, arum, wax gourd, cucumber, winter eggplant and winter pumpkin. For keeping adequate humidity in the land, organic manures, compost and vegetable residue may be applied. Technological advancement was seen for okra, arum, wax gourd, yard long bean, pumpkin, winter eggplant and spinach production because virus resistant okra, high yield potential arum, wax gourd, yard long bean, pumpkin, winter eggplant and spinach was developed through research and development process. But adequate improved technology was not available for other vegetables, because research centers yet to be giving emphasis on developing high yield potential varieties and improvement management technique. Therefore, for increasing and sustaining vegetable production special care should be taken to developed and disseminate disease resistant high yield potential vegetable varieties.

CONCLUSION

There was an increasing trend of area, production and value addition to GDP for different types of winter and summer vegetables. Aggregate data on winter and summer vegetables also showed that there was an increasing trend of area and value addition to total cropped area and agricultural value addition. Vegetable export also increases at an increasing rate over the period though the agricultural export declines. Vegetables are being an important component of agricultural production of Bangladesh in terms of area, production, value addition to GDP and export earnings. Structural stability test through dummy variable technique showed that except pointed gourd, arum and cabbage production all summer and winter vegetable production registered a positive structural change in the post policy reform period. Research and extension program may be one cause of increasing vegetable production in the latter period. The other cause may be export promotion activities by the government. Among the factors affecting production of vegetables policy variable showed statistically significant role for most of the vegetables production. If government takes some necessary measures to activate buy-back mechanism and ensures quality of these products then Bangladesh may take the significance share of $2000 billion vegetable export market. Policy reform in terms, of research and extension program, export promotion in terms of attracting foreign investment through buy back mechanism may accelerate vegetable production in a further extent.

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