Scientific Journal of Impact Factor (SJIF): 5.71

e-ISSN (O): 2348-4470
p-ISSN (P): 2348-6406

International Journal of Advance Engineering and Research Development

International Conference of Trends in Information, Management, Engineering and Sciences (ICTIMES)
Volume 5, Special Issue 02, Feb.-2018 (UGC Approved)

Trends in Agricultural Product's Exports and Imports of Major SARRC Countries

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Abstract: *In this research paper an attempt is made to analyze the growth and instability of agriculture product's exports and imports of five major SAARC countries. The study is mainly based on secondary data obtained from world trade organization reports and world banks reports. The time period we consider for this study is span of 15 years from 2001 to 2015. Coefficient variation, instability index and exponential growth rate are employed along with descriptive statistics and; ANOVA and regression analysis is used for analyze the data. The result of the study reveals that the positive growth phase and significant variations have been observed across the selected countries regarding to exports and imports. India is performing as better regarding exports with highest growth rate followed by Pakistan. Nepal is most dependent country as per imports followed by India and Bangladesh. The imports of Bangladesh, India and Pakistan ranked at a higher compared to exports result in a decrease in the GDP and the exports of Nepal and Sri Lanka ranked at a higher compared to imports result in an increase in the GDP.*

Introduction

Trade will bring welfare gains, in addition trade has also been argued to have dynamic effects and potentially generate growth-accelerating as well as growth-decelerating forces (Krishna& Mitra, 1998). International trade, as a major factor of openness, has made an increasingly significant contribution to economic growth (Sun & Heshmati, 2010). The role of trade has been widely recognised as an important instrument for country's economic development process. Exports growth builds import capacity and industries engaged in exports production have the high intensity to absorb surplus of labour force of developing country like India which thereby leads to the creation of employment and increase in income which leads to rise in savings which is transferred into investment in physical and human capital, and thus in the rate of economic growth (Sharma, 2013).

The expansion of agricultural trade has helped provide greater quantity, wider variety and better quality food to increasing numbers of people at lower prices. Agricultural trade is also a generator of income and welfare for the millions of people who are directly or indirectly involved in it(FAO, 1995).

Driven towards integration by the pressure of socio-economic interests of the region, seven South Asian countries namely Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka formed the South Asian Association for Regional Co-operation(SAARC) in 1985. As a eighth member, Afghanistan joined the organization in 2005. SAARC countries are a large regional block with huge potential but achievement in regional cooperation so far is insignificant (Kiran et al, 2014).

It is argued that trade liberalization and regional economic co-operation can help a region to increase inter-regional trade by exploring the size of the markets. This may in turn yield efficiency and bring benefits not only by exploration of economies of scale but also by dynamic and upward shifts in production function. To accelerate the process of socio-economic development in member countries is one of the major objectives of formation of SAARC forum. Thereafter, trade promotion was also pursued as an area of economic Co-operation. It is in this context, the present study has been undertaken to analyze the growth and instability of agriculture product's exports and imports of five major SAARC countries during 2000-01 to 2014-15.

In four-sector economy, exports are the injections in the national income, while import act as leakages or outflows of national income. While determining national income, the difference between net exports and imports (X-M) is considered. The injections are responsible for increasing the national income while leakages or outflows result in decrease in national income. When X > M, there is net injection; therefore, there would be an increase in national income. On the other hand, in case X < M that is net leakages, the national income would decrease. For determining the national income with foreign sector in a four-sector economy, let us learn about export and import functions in next sections. In this connection the study examined trends in agriculture product's exports and imports of five major SAARC countries with time series data span of 15 years.

Data and Methodology

The study is mainly based on secondary data obtained from world trade organization reports and world banks reports. The time period we consider for this study is span of 15 years from 2001 to 2015. In the present we calculated mean and Standard Deviation of exports and imports along with GDP. Arithmetic average is also called as mean. It is the most common and widely used measure of central tendency or an average (Kothari, 2004). Standard Deviation of a set of scores is defined as the square root of the average of the squares of the deviation of each from the mean. Symbolically we can say that (Singh, 2006).The objective of the F- test is to find out whether the independent estimates of population variance differ significantly across the counties (Gupta, 2007). The Kruskal-Wallis test is a nonparametric (distribution free) test, and is used when the assumptions of ANOVA are not met. They both assess for significant differences on a continuous dependent variable by a grouping independent variable (Kanji, 2006). These two are employed in the study to test the statistical significance of variations across the selected counties regarding agriculture product's exports and imports. The coefficient of variation indicates the relative magnitude of the standard deviation as compared with the mean of the distribution as a percentage (Daniel et al, 2003). Instability is one of the important decision parameters in development dynamics, more so in the context of agricultural production (Krishan & Chanchal, 2014). Exponential growth is a way to measure change reliably at any time, or for any time difference (Tague et all, 1981) and calculated trend with exponential function for 15 years' time period. As the regression models are log linear, their regression coefficients (ie slope parameters) are elasticity coefficients (Gujarathi, 1988).The slope of exports and slope of GDP are considered as exports elasticity of income and income elasticity of imports.

Results and Discussions

The data on the estimated exponential growth rates of agriculture product's exports of SAARC major counties are presented in Table-1. It can be observed that the highest coefficient of variation and growth of exports from India is positive and significant at one percent level during the study period followed by Pakistan and least phase of growth has been observed in Nepal. As per data all counties have been observed significant positive growth in exports besides that Bangladesh is noticed high instability and Sri Lanka is found as stable in agriculture product's exports. As per exponential growth rates, India occupied top place and Nepal stood at last place in agriculture product's exports to rest of the world. Further, Coefficient of variation accompanied growth rate in all countries and observed that high coefficient of variation with higher level growth in exports.

The data on the estimated exponential growth rates of agriculture product's imports of SAARC major counties are presented in Table-2. It can be observed that the highest coefficient of variation and growth of imports to Nepal is positive and significant at one percent level during the study period followed by India and least phase of growth has been observed in Sri Lanka. As per data all counties have been observed significant positive growth in imports besides that Pakistan is noticed high instability and India is found as stable in agriculture product's imports. As per exponential growth, Nepal is most dependent country on rest of the world in SAARC counties for agriculture products and Sri Lanka independent country for agriculture products with least growth rate. Further, Coefficient of variation accompanied growth rates in all countries and observed that high coefficient of variation with higher level growth in imports. During the study period Sri Lanka and Pakistan are noticed low growths, it infer that the country is self-sustain with their agriculture productivity.

Table -1: Trends in Agriculture Exports of Major SAARC Counties during 2001 to 2015
(US Dollars in Million)

Country	Mean	SD	CV	Growth	Instability
Bangladesh	1057.08	497.23	47.04	0.109* (7.613)	20.122
India	21928.20	14309.94	65.26	0.155* (14.698)	15.580
Nepal	196.72	46.69	23.73	0.039* (3.858)	16.044
Pakistan	3271.26	1644.23	50.26	0.122* (11.599)	14.910
Sri Lanka	2094.00	770.28	36.79	0.087* (13.052)	9.802

Source: Appendix -1
Note: * Significant at 1% level.
Figures in parentheses denote 't' values

Table – 2: Trends in Agriculture Imports of Major SAARC Counties during 2001 to 2015
(US Dollars in Million)

Country	Mean	SD	CV	Growth	Instability
Bangladesh	6057.27	3524.33	58.18	0.140* (13.049)	15.503
India	14691.62	8739.16	59.48	0.144* (23.722)	9.021
Nepal	706.60	422.65	59.81	12.967* (16.214)	12.967
Pakistan	4962.32	2142.09	43.17	0.109* (8.362)	17.104
SriLanka	1776.34	749.20	42.18	0.096* (13.941)	10.586

Source: Appendix -2
Note: * Significant at 1% level.
Figures in parentheses denote 't' values

Trends in Gross Domestic Product (GDP) of five countries are presented in the Table-3.As shown in the Table the maximum growth rate(exponential) in GDP witnessed by Sri Lanka i.e., 13.3 per cent followed by India 11.1 per cent and Nepal 10.5 per cent while the minimum growth rate is witnessed by Bangladesh i.e., 9.4 per cent during the study period. The trend in GDP increased from 2001 to 2015 in all counties positively and it is significant. As per instability index, the GDP growth in Bangladesh is observer stable compared to other SAARC nations. There is considerable growth is observed in all selected counties during the time period ranged from 13.3 per cent in Sri Lanka to 9.4 per cent in Bangladesh. Coefficient of variation accompanied with GDP growth rate in all countries and observed that high coefficient of variation have higher level growth.

Table -3: Trends in GDP of Major SAARC Counties during 2001 to 2015
(US Dollars in Million)

Country	Mean	SD	CV	Growth	Instability
Bangladesh	102946.21	44783.97	43.50	0.094* (31.052)	4.960
India	1277510.62	572483.88	44.81	0.111* (18.396)	8.620
Nepal	12868.15	5714.31	44.41	0.105* (20.015)	7.819
Pakistan	161681.92	65579.35	40.56	0.099* (18.986)	7.588
SriLanka	44450.37	24500.47	55.12	0.133* (26.867)	7.395

Source: Appendix -3
Note: * Significant at 1% level.
Figures in parentheses denote 't' values

To test the statistical significance of variations across the selected counties regarding agriculture product's exports and imports, we applied F-test and Kruskal-Wallis Test. Panel A and Panel B of Table - 4 provides the results pertaining from these tests. Panel A presents the results of F-test with the null hypothesis that the estimated mean exports and imports across the counties are same. According to test results, the null hypothesis is rejected and concluded that there is significant difference regarding exports and imports across the countries. Panel - B provides the results pertaining from Kruskal-Wallis Test. The null hypothesis that the distribution of exports and imports among the selected nations are not different is rejected as calculated test statistic is significant statically with p-value < 0.05. Hence, the study concludes that the distribution of exports and imports among the nations is different in the study period.

Table – 4 Hypothesis Testing-
Agriculture product's Exports and Imports Differences across the Selected Counties

	Exports	**Imports**
Panel A: ANOVA Test		
$H_{0:}$ *mean of exports and imports is not different across the SAARC major counties*		
F-statistics	30.071*	24.270*
p-value	0.000	0.000
Inference	**Rejected H_0**	**Rejected H_0**
Panel B: Kruskal-Wallis Test		
H_0: *The distribution of exports and imports is not different across the SAARC major counties*		
Test statistics	63.745	56. 413
p-value	0.000	0.000
Inference	**Rejected H_0**	**Rejected H_0**

Source: Appendix -1 & Appendix -2.
Note:*Significant at 1 per cent level.

The growth of any economy and distribution of income and wealth in a country are directly associated with exports. Exports play a crucial role in internal trade and economic stability of a country. Moreover, it helps in increasing foreign

exchange reserves in a country. The exports of a country are dependent on various factors. Some of these factors are as follows:The prices of domestic goods as compared to prices of goods in importing countries and Income elasticity for import goods in importing countries.

Below Table-5 that the exports elasticity of national income of Bangladesh is 0.687 which means that a one per cent increases in country's exports causes 0.687 per cent increase in GDP. As the 't' values of exports elasticity of national income is significant at one per cent level, exports significantly influence the level of national income. It is found that of exports elasticity of national income is positive. A positive exports elasticity of national income contributes the economic growth of the country. Same kind of results has been observed in all selected counties and exports are positively influencing the national income at significant level in all counties. According to regression results, one per cent increases in agriculture exports causes 0.691 per cent increase in GDP for India, 1.536 per increase in GDP for Nepal, 0.765 per cent in GDP for Pakistan and 1.457 per cent in GDP of Sri Lanka.

Table - 5: Results of Log linear regression models revealing agriculture products exports elasticity of national income.

Country	α	β	R^2	F-value
Bangladesh	4.817* (4.998)	0.687* (6.392)	0.759	40.856*
India	4.984* (10.697)	0.691* (15.193)	0.947	230.825*
Nepal	-2.660 (-0.887)	1.536* (4.245)	0.581	18.022*
Pakistan	3.939* (7.492)	0.765* (14.587)	0.942	212.788*
Sri Lanka	-2.956 (-4.208)	1.457* (19.274)	0.966	371.505*

Source: Appendix -1 & Appendix -3
Note: * Significant at 1% level.
Figures in parentheses denote 't' values of coefficients

Imports also play an important function in the growth of an economy. It helps in strengthening the global presence of a country. The imports of a country are dependent on various factors. Some of them are as follows: Import prices in relation to domestic prices, Income elasticity of imports, Income levels.

According to Results of Log linear regression models revealing agriculture products income elasticity of imports, the income elasticity of imports of Bangladesh is 1.460 which means that a one per cent increases in country's national income causes 1.46 per cent increase in imports. As the 't' values of income elasticity of imports is significant at one per cent level, imports of agriculture products significantly depend on the level of national income. It is found that of income elasticity of imports is positive. A positive income elasticity of imports contributes the increase in imports of the country. Same kind of results has been observed in all selected counties and income level of the country is positively influencing imports at significant level in all counties. According to regression results, one per cent increases in income causes 1.272 per cent increase in imports for India, 1.267 per increase in GDP for Nepal, 1.135 per cent in GDP for Pakistan and 0.725 per cent in GDP of Sri Lanka.

Table - 6: Table - 5: Results of Log linear regression models revealing agriculture products income elasticity of imports

Country	α	β	R^2	F-value
Bangladesh	-6.317* (-4.371)	1.460* (11.086)	0.904	122.896*
India	-5.249* (-7.6.3)	1.272* (22.218)	0.974	493.644*
Nepal	-3.979 (-4.106)	1.267 (13.161)	0.930	173.208*
Pakistan	-3.029* (-3.063)	1.135* (12.822)	0.927	164.391*
Sri Lanka	1.543 (3.821)	0.725 (18.992)	0.965	360.692*

Source: Appendix -2 & Appendix -3
Note: * Significant at 1% level.
Figures in parentheses denote 't' values of coefficients

Further, a comparison has made between the exports and imports with help of their elasticity's. This is evident from the analysis that the imports of Bangladesh ranked at a higher compared to exports result in a decrease in the GDP. Same kind of state has been observed in India and Pakistan. While the exports of Nepal and Sri Lanka ranked at a higher compared to imports result in an increase in the GDP.

Table – 7: Elasticity of Agriculture Product's Exports and Imports of SAARC Countries

Country	**Exports Elasticity of Income (X)**	**Income elasticity of imports (M)**	**(X>M) or (X<M)**	**Effect on GDP**
Bangladesh	0.687	1.460	X<M	Decreasing
India	0.691	1.272	X<M	Decreasing
Nepal	1.536	1.267	X>M	Increasing
Pakistan	0.765	1.135	X<M	Decreasing
Sri Lanka	1.457	0.724	X>M	Increasing
Source: Table-5 & Table-6				

Conclusion

The result of the study reveals that the positive phase of growth and significant variations have been observed across the selected countries regarding to exports and imports. India is performing better regarding exports with highest growth rate per annum followed by Pakistan. Nepal is most dependent country as per imports with highest growth per annum followed by India and Bangladesh. Export elasticity of national income is significant at one per cent level; exports significantly influence the level of national income in all counties. It is found that the exports elasticity of income is positive. A positive exports elasticity of national income contributes the economic growth of the country. Same kind of results has been observed in all selected counties and exports are positively influencing the national income at significant level in all counties. Income elasticity of imports is significant at one per cent level, imports of agriculture products significantly depend on the level of national income. It is found that of income elasticity of imports is positive. A positive income elasticity of imports contributes the increase in imports of the country. Same kind of results has been observed in all selected counties and income level of the country is positively influencing imports at significant level in all counties. The imports of Bangladesh, India and

Pakistan ranked at a higher compared to exports result in a decrease in the GDP and the exports of Nepal and Sri Lanka ranked at a higher compared to imports result in an increase in the GDP.

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Appendix

Appendix -1 : Agriculture Product's Exports of SAARC Countries during 2001-2015

(in US dollars)

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
2001	380226882	6328735628	140083307	1159709660	1059517302
2002	426009301	6911414631	140760082	1208816646	1060283322
2003	430563811	7205020331	141436857	1470168648	1123451047
2004	615268525	8799250972	142113632	1569599545	1252050455
2005	740676493	10273710651	176959909	2155000000	1495656977
2006	885563841	12452317389	173515507	2210007964	1695490672
2007	1267381357	16300759639	192628079	2327125283	2014502894
2008	1562935072	21251041997	294000000	3900537810	2326568014
2009	718942761	16383589827	248156160	3208975831	2108199873
2010	1012521670	23106277573	211008013	3939500368	2561325939
2011	1364852772	34491358396	198420892	5549601942	2979994973
2012	1309770213	41890150326	237587983	4978907867	2732369638
2013	1625898345	44685097711	203038993	5570965838	2913653953
2014	1698034627	43466524129	252956516	5155357107	3207578101
2015	1817579309	35377704595	198081421	4664619426	2879429327

Source: World Trade Organization data bank

Appendix -1 : Agriculture Product's Imports of SAARC Countries during 2001-2015
(in US dollars)

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
2001	1916687538	4512838958	210000000	1682106645	836594015
2002	1907733163	4954279337	302187814	1853873913	921304432
2003	2659697652	6166845538	394375628	2115699064	948394820
2004	2692637520	6822133729	314762875	2886028770	1041501592
2005	2683219993	7520129583	300811861	3655800682	1131155637
2006	3719772805	7975739637	428502314	4130920028	1337215724
2007	5322206468	10658998294	519879724	4518372879	1508350297
2008	6822418442	12005306333	565200000	7102859370	2021684211
2009	5096697286	14224008383	621518846	4925155949	1594759386
2010	5991601715	17863568499	791185268	6736671503	2062752246
2011	11047158375	22550681815	969540939	7352644171	2847977882
2012	9158188272	25668258000	1093628369	6523951457	2278385269
2013	9938587013	24417552000	1312110711	6332280445	2365439873
2014	11327460939	27315616000	1474542582	7434758201	2844900668
2015	10575046138	27718290000	1300809320	7183626478	2904656650

Source: World Trade Organization data bank

Appendix -1 : Gross Domestic Product (GDP) of SAARC Countries during 2001-2015
(in US dollars)

2001	53991289844.33	493954161367.56	6007061224.49	72309738921.33	15746229581.56
2002	54724081490.51	523968381476.72	6050875806.66	72306820396.23	16536535647.08
2003	60158929188.26	618356467437.03	6330473096.54	83244801092.71	18881765437.22
2004	65108544250.04	721584805204.78	7273938314.72	97977766197.67	20662525941.30
2005	69442943089.43	834214699568.14	8130258041.47	109502102510.88	24406252456.51
2006	71819083683.74	949116769619.55	9043715355.89	137264061106.04	28279814924.59
2007	79611888213.15	1201071960529.75	10325618017.38	152385716311.92	32350248410.82
2008	91631278239.32	1186913419021.34	12545438605.40	170077814106.31	40713812309.73
2009	102477791472.39	1323896417147.06	12854985464.08	168152775283.03	42066217871.53
2010	115279077465.23	1656562168648.57	16002656434.47	177406854514.89	56725745039.34
2011	128637938711.39	1822989507290.05	18850169891.67	213587413184.00	65292741296.54
2012	133355749482.48	1828985283085.00	19206631648.97	224383620829.57	68434399083.41
2013	149990451022.29	1863208343557.81	19393541020.22	231218567178.98	74317806754.53
2014	172885454931.45	2042438591343.98	19811974851.55	244360888750.81	80025305461.58
2015	195078665827.57	2095398349095.54	21194888047.83	271049886672.73	82316172384.33