Agricultural Trade Structure and Linkages in SAARC: An Empirical Investigation

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Abstract

Since regional associations and free trade are perceived to be welfare-enhancing, this paper has examined the structure and flow of trade among SAARC economies. The study has revealed that India alone accounts for 74 per cent of the agricultural exports from the region and 55 per cent of the agricultural imports of the region. Cotton, cereals, fish & crustaceans, and tea & beverages have emerged as the most exported commodities accounting for more than 50 per cent share of exports from SAARC countries to the world. Animal or vegetable fat, cotton and rubber are the most imported commodities by SAARC. India enjoys comparative advantage in exports of cotton, cereals, fish and tea, while Pakistan has a greater comparative advantage in export of cotton and cereals. A unidirectional causality has been observed between gross domestic product (GDP) and agricultural exports, where agricultural exports Granger cause GDP and not vice versa. A one-way causal relationship has also been observed between agricultural GDP and agricultural exports. This indicates that growth in agricultural exports has contributed to the overall and agricultural growth in India. The study has suggested that Indian trade policy environment needs to be made more favourable for attracting foreign buyers and making Indian exports competitive globally.

Key words: SAARC countries, agricultural trade, cointegration, Granger causality

JEL Classification: Q17, O57, P52

Introduction

The regional associations and free trade area are perceived to have welfare impacts and provide gains to the member countries. A strong neighbourhood bias in trade followed by regionalization and increased concentration accompanied by trade linkages and no trade diversion has clear implications of benefit enhancement to the countries in Asian region (Chand, 2006). SAARC (South Asian Association for Regional Cooperation) was formed for fostering economic and political cooperation among the member countries (Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka) and the South Asian Free Trade Area (SAFTA) agreement came into force from 1 January 2006. It required the developing countries in South Asia (India, Pakistan and Sri Lanka) to bring their duties down to 20 per cent in the first phase of two-year period ending 2007 and to zero in the final five-year phase ending 2012. Formation of a free trade area in South Asia has raised intensive debates on the welfare gains and losses from the free trade agreement among the countries (Ali and Talukder, 2009). It has also been reported that the small countries may lose and large countries may gain from a free trade area. Economic cooperation among the South Asian countries had been limited until the SAARC progressed into the second cycle of cooperation; the region had

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remained highly protected until the late-1980s due to the extended use of import-substitution policies and restrictive trade regimes followed by most of its member countries (Wadhwa, Undated). It has been reported that SAFTA has positive impacts on the socio-economic conditions of the people of South Asia (Bhatti and Taga, 2014). Regional cooperation and integration will allow the SAARC states to benefit from international investment, technology and trading opportunities (Kher, 2012).

The diverse climatic conditions in SAARC countries provide added advantage for production and trade of various agricultural commodities. South Asia's total trade has increased at a rate faster than the growth in world trade after 2005; however, trade within the South Asian bloc has increased at a rate lower than trade with rest of the world (Chand, 2012). Studies suggest that deeper economic relations between India and Pakistan would benefit not just the two countries but the entire South Asian region, leading, potentially, to a rise in economic growth and trade competitiveness in the region. Agriculture continues to be a key constituent in South Asian economies in respect of employment as also in contribution to national GDP. Trade in food and other commodities can play a significant role in achieving food security and stabilizing supply conditions and prices. Considering these, this paper aims to study trade structure among the SAARC economies and also establishes the linkages between the economic growth and agricultural trade. The study also analyses the comparative advantage in agricultural trade among the SAARC nations.

Data and Methodology

The study is based on the time series data on exports and imports of agricultural commodities in SAARC countries since 2001 to 2013 at HS 2 digit level. The Trade Map tool provides yearly trade data of 5,300 products of the Harmonized System for 220 countries and territories and at 2 or 4 digits group of the Harmonized System (HS) nomenclature. For the present study, a total of 30 groups related to the agricultural sector were selected out of the total 99 groups of 2-digit products. The analysis of structure and direction of agricultural trade from SAARC countries has been done using the descriptive analysis. The comparative advantage in trade of major

agricultural commodities has been worked out using the Balassa Index estimated as per Equation (1):

$$RCA_{ij} = (X_{ij}/X_i) / (X_{wj}/X_w) \qquad \ldots(1)$$

where, RCA_{ij} is the revealed comparative advantage of the ith country for the jth commodity, X_w is the total global exports, X_{ij} is the ith country's export of commodity j to the world, X_i is the ith country's total exports to the world and the X_{wj} is the global exports of commodity j.

Trade Linkages among SAARC Nations

India being the largest economy among SAARC nations, we have examined the linkages between economic growth and agricultural trade of India. These trade linkages not only help in devising appropriate trade policies but also have spillover effects in the neighbouring countries. The yearly data on agricultural exports, agricultural imports and value-added have been taken for the period, 1990-91 to 2013-14. The economic growth has been measured by the total GDP and GDP agriculture (Gross Value Added at Factor Cost) at current price. Kumari and Malhotra (2014) have explored the causal relationship between exports and economic growth by employing Johansen cointegration and Granger causality approach based on annual time series data on India for exports and GDP per capita from 1980 to 2012. Ramphul (2013) has empirically investigated the causality between agricultural exports and GDP agriculture in India using the Granger causality test via Vector Error-Correction Model over the period 1970–1971 to 2009–2010. Dar *et al.* (2013) have established relationship between India's export and economic growth using the methodology of wavelets based correlation and cross correlation. Shahbaz *et al.* (2011) have applied Ng-Perron unit root test, ARDL bounds testing approach to cointegration and error correction method for examining exports-led growth hypothesis in Pakistan.

Among SAARC nations, India and Pakistan are the two important nations in cotton trade. Cotton provides an interesting case as it is one of the major commodities in export and import baskets of both these countries. Even, the extent of bilateral trade in cotton is very high between these countries. Both countries have integrated themselves in creating a value chain, in which India exports raw staple cotton to Pakistan and imports value-added textiles and fabrics from it

(Chand and Saxena, 2014). To study the relationship between India and Pakistan's cotton trade, monthly data were taken from January 2011 to December 2014 from the UN Comtrade Database. All these variables were considered in natural logarithms to avoid the problems of heteroscedasticity. The specific steps followed in analysis of trade linkages are given below.

Checking the Stationarity of Data

The first step in the times series analysis, before testing for cointegration and Granger causality, is to examine the stationarity of each individual time series selected for the analysis. Augmented Dickey-Fuller (ADF) unit root test (Dickey and Fuller, 1979), Philips Perron (PP) test (Philips and Perron, 1988) and KPSS (Kwiatkowski–Phillips–Schmidt–Shin) test were considered to examine the stationarity.

Cointegration Analysis

The cointegration depicts long-term relationship between the variables. It means even if two or more series are non-stationary, they are said to be cointegrated if there exists a stationary linear combination of them. Johansen's (1988) multivariate cointegration approach was used to examine cointegration in the cotton trade between India and Pakistan. To examine India's growth-trade linkage, two-step Engle-Granger method was used.

Examining Long-term Causality

For examining long-term causality, Granger causality test was applied, which examines how one variable explains the latest value of another variable. According to it, if a variable Y is Granger caused by variable X, it means that values of variable X help in predicting the values of variable Y and vice-versa.

Estimating Error Correction Model for Short-term Relationship

The cointegration analysis reflects the long-run movement of two or more series, although in the short-run they may drift apart. Once the series are found to be cointegrated, then the next step is to find out the short-run relationship along with the speed of adjustment towards equilibrium using error correction model, represented by Equations (2) and (3):

$$\Delta \ln X_t = \alpha_0 + \sum \beta_{1i} \Delta \ln Y_{t-i} + \sum \beta_{2i} \Delta \ln X_{t-i} + \gamma ECT_{t-1} \quad \ldots(2)$$

$$\Delta \ln Y_t = \beta_0 + \sum \alpha_{1i} \Delta \ln X_{t-i} + \sum \alpha_{2i} \Delta \ln Y_{t-i} + \gamma ECT_{t-1} \quad \ldots(3)$$

where, ECT_{t-1} is the lagged error correction term; X_t and Y_t are the variables under consideration transformed through natural logarithm; and X_{t-i} and Y_{t-i} are the lagged values of variables X and Y. The parameter γ is the error correction coefficient that measures the response of the regressor in each period to departures from equilibrium. The negative and statistically significant values of γ depict the speed of adjustment in restoring equilibrium after disequilibria.

Results and Discussion

Socio-economic Features of SAARC Countries

South Asia is the home to about one-fifth of the world's population and the countries in the region differ considerably in terms of size of population, geographical area and economic performance (Table 1). India is the largest and fastest growing economy in the region with about 1.2 billion population and GDP of about US $ 1843 billion (in TE 2013). However, India's per capita GDP is lower than of Maldives, Sri Lanka and Bhutan. Pakistan is the second largest economy in terms of GDP (US $ 224 billion), but is 5th in terms of GDP per capita in the region. Maldives, despite being the smallest country, has the highest GDP per capita of US $ 7581.

India is also the largest agrarian economy with the highest value-added in agriculture (GDP) of about US $ 186 billion, followed by Pakistan and Bangladesh. The highest share of agricultural value-added in total GDP is found in Nepal, followed by Pakistan and Afghanistan. Maldives not only accounts for highest per capita GDP but also has highest agriculture value-added per worker (at constant 2005 US $ prices). The employment in agriculture is highest in Nepal, followed by Afghanistan and Bhutan.

Trends and Volatility in Agricultural Trade

The trade to GDP ratio has been worked out to examine the openness of different economies and their trade participation. The ratio for Afghanistan, Bhutan and Nepal could be worked out only from 2008, 2005

Table 1. Socio-economic and agricultural indicators in SAARC countries, TE 2013

| Country	Population, total (millions)	GDP (current billion US $)	GDP per capita (current US $)	Official exchange rate (Local Currency Unit per US $)
Afghanistan	30	20	656	51
Bangladesh	155	137	887	78
Bhutan	0.74	2	2439	53
India	1237	1843	1490	53
Maldives	0.34	3	7581	15
Nepal	27	19	692	84
Pakistan	179	224	1248	94
Sri Lanka	21	62	3013	122

Country	Agriculture, value-added (constant 2005 million US $)	Agriculture, value-added, 2013 (% of GDP)	Agriculture value-added per worker (constant 2005 US $)	Employment in agriculture (% of total employment)
Afghanistan	2508	24.0	391	69.6 (2004)
Bangladesh	17908	16.3	562	47.3 (2010)
Bhutan	207	17.1	629	60.2 (2011)
India	186368	18.0	676	48.9 (2011-12)
Maldives	69	4.0	3168	4.2 (2009)
Nepal	3399	35.1	266	73.9 (2008)
Pakistan	27104	25.1	1063	45.1 (2011)
Sri Lanka	4014	10.8	993	29.8 (2013)

Source: World Bank (2015) and http://www.saarcstat.org/content/saarc-figures

and 2009, respectively, due to data availability. The trade-to-GDP ratio is frequently used to measure the importance of international transactions relative to domestic transactions; this indicator is calculated for each country; this ratio is often called the trade openness ratio, although the term "openness" may be somewhat misleading, since a low ratio does not necessarily imply high (tariff or non-tariff) barriers to foreign trade, but may be due to factors such as size of the economy and geographic remoteness from potential trading partners (OECD Library, 2011). A diversion either in total trade or in GDP will affect the trade to GDP ratio. This volatility can be clearly seen in Figure 1. India, being a substantial trading partner in the world, has depicted a quite stable trend in the trade to GDP ratio. However, this ratio for India is the lowest among the SAARC nations. The ratio for Pakistan is higher than for India. The trade openness of Maldives and Sri

Lanka, though declining over time (except 2013 for Maldives), is found to be quite high.

The share of SAARC countries in total world and agricultural trade is shown in Table 2. During TE 2013, these countries together accounted for 2.6 per cent of the total world trade and 3.01 per cent of the total agricultural trade. India accounted for the highest share in world total trade as well as world agricultural trade among the SAARC nations. The share of agricultural trade in the total trade highlights the relative dominance of the sector across countries. The agricultural trade constitutes 10 per cent share in the overall trade at aggregate level. This share varied between 8 per cent (Bhutan) and 28 per cent (Maldives) among the SAARC counties. Though countries like Maldives and Sri Lanka contribute miniscule to the overall agricultural trade of SAARC nations, the agricultural sector contributes about one-fourth to the total trade from both these countries.
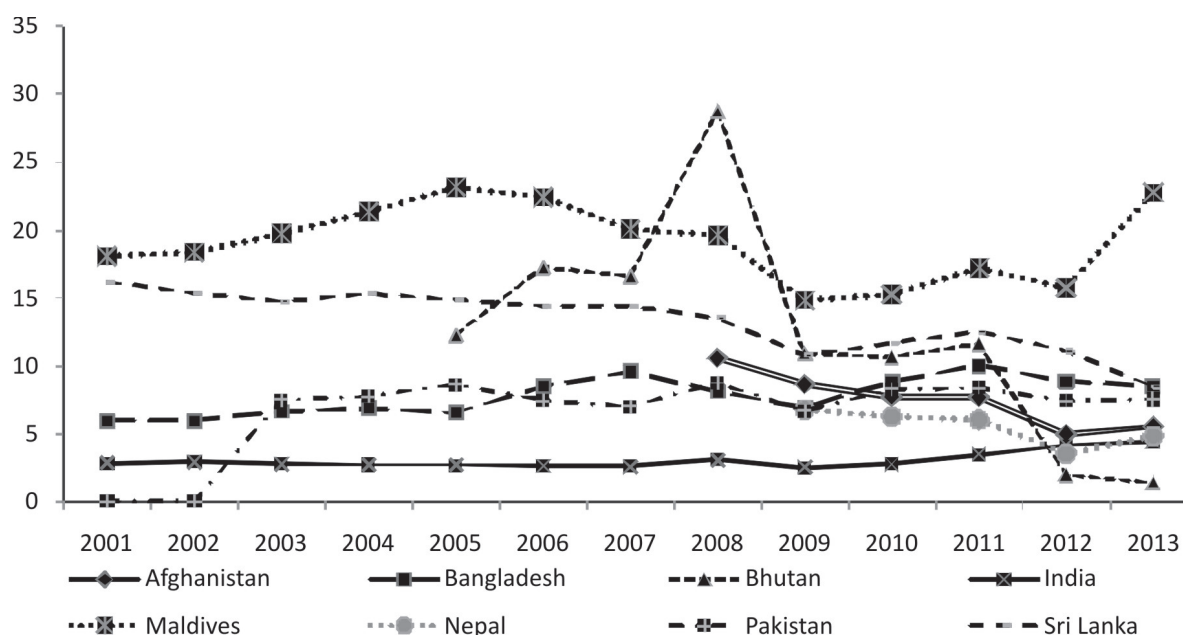
Source: Computed by authors

Figure 1. Percentage share of total agricultural trade in GDP in SAARC nations

The analysis of total and agricultural trade of SAARC nations has revealed an interesting fact that SAARC as a whole as well as all the SAARC countries are net importers as far as the total trade is concerned. However, SAARC is the net exporter in case of agricultural trade also. The three major economies of the region — India, Pakistan and Sri Lanka — have contributed to this development, as these three account for more than 95 per cent share of agricultural exports from SAARC. India is the largest economy contributing maximum to the total as well as agricultural trade in SAARC. India has 82 per cent share in the total exports and 74 per cent in agricultural exports from the region. At the same time, India has 81 per cent share in total imports and 55 per cent in agricultural imports of the region. Apart from formal trade, which is evident from the trade statistics, lot of informal trade exists among the SAARC nations due to factors like neighbourhood, similarity in demand, etc. Estimates of the composition of Indo-Nepal informal trade show that the major

Table 2. SAARC countries' percentage share in total overall and agricultural world trade, **TE 2013**

Country	Total exports	Total imports	Total trade	Ag exports	Ag imports	Total Ag trade	Share of agriculture in total trade (%)
Afghanistan	0.00	0.04	0.02	0.01	0.05	0.03	15
Bangladesh	0.15	0.20	0.17	0.11	0.56	0.34	20
Bhutan	0.00	0.00	0.00	0.00	0.00	0.00	8
India	1.69	2.58	2.12	2.60	1.40	1.99	9
Maldives	0.00	0.01	0.00	0.00	0.02	0.01	28
Nepal	0.00	0.03	0.02	0.01	0.04	0.02	13
Pakistan	0.14	0.24	0.19	0.60	0.34	0.47	25
Sri Lanka	0.05	0.10	0.08	0.19	0.17	0.18	23
SAARC	2.04	3.20	2.60	3.50	2.53	3.01	12
World (in billion US $)	18334	18500	36834	1839	1868	3707	10

Source: Computed by authors
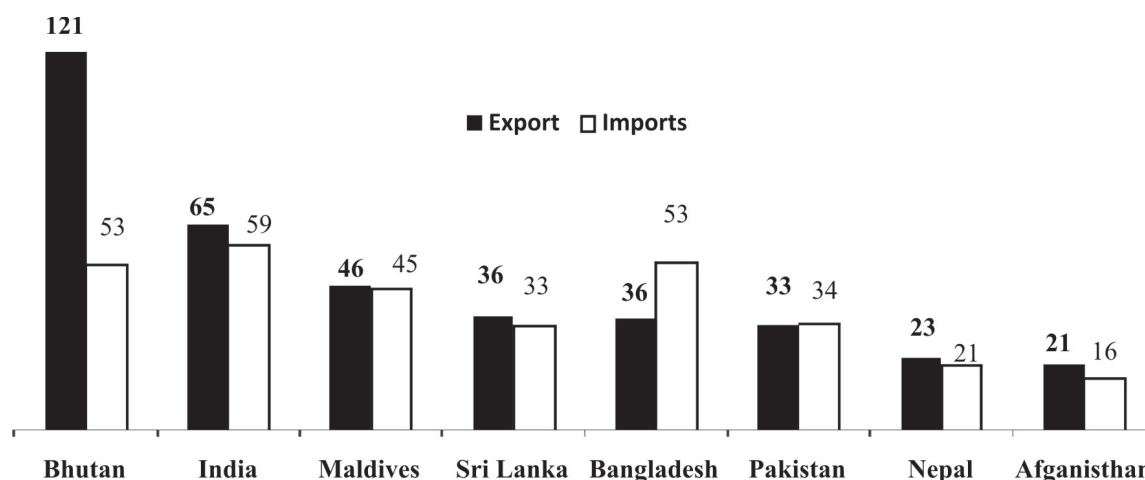
Source: Computed by authors

Figure 2. Volatility in agricultural exports and imports of SAARC countries

agricultural commodities traded informally from India to Nepal are dry fruits, live animals, processed foods, tobacco and other unprocessed foods; spices are informally traded from Sri Lanka to India (Taneja *et al.,* 2002).

A stable trade environment is important for a nation in terms of fostering effective trade linkages and earning sufficient trade revenues. The volatility in agricultural trade (in agricultural exports and agricultural imports), measured through coefficient of variation (CV) during 2001 to 2013, is presented in Figure 2. The CV for Afghanistan, Bhutan and Nepal has been computed since 2008, 2005 and 2009, respectively, due to data availability. Though India accounted for the largest share in agricultural trade, it suffers from very high volatility. Among all SAARC nations, Indian agricultural imports were most volatile, which is reflected through the CV of 59 per cent. India's agricultural exports also witnessed a great degree of volatility among other SAARC nations. Lowest volatility in agricultural trade was witnessed for Afghanistan. Agricultural exports and agricultural imports of Pakistan were also found to be quite stable. Though volatility many-a-times may arise due to uncertainties in global environment, the countries reflecting high volatility need to follow stringent measures to reduce the same by monitoring the domestic production and trade environment.

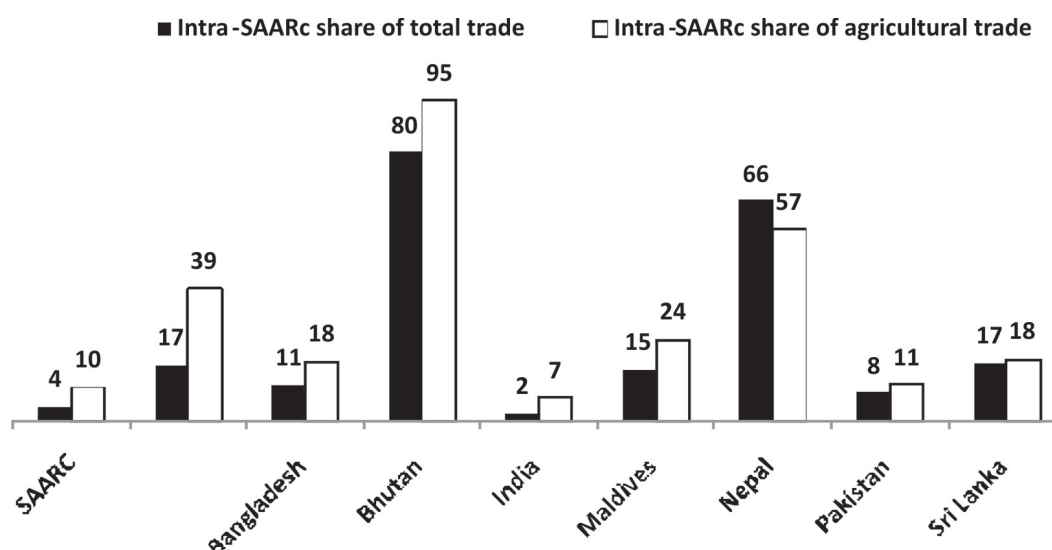**Intra-SAARC Trade Pattern**

It is important to examine how much of the total trade of South Asia is performed within the region.

Figure 3 provides the intra-SAARC share of SAARC trade in total trade as well as agricultural trade. The overall share of intra-SAARC trade in the total trade is 4.29 per cent, which ranges from as low as 2.15 per cent in India to as high as 79.81 per cent in Bhutan. The regional trade in South Asia is dismally low, at 4 per cent as compared to the regional trade of the European Union at 67 per cent, the North American Free Trade Agreement at 62 per cent, the Association of South East Asian Nations at 26 per cent, the Common Market for Eastern and Southern Africa at 22 per cent, Gulf Cooperation Council at 8 per cent, Latin America and Caribbean at 22 per cent (Kher, 2012).

During the past decade, SAARC has launched notable initiatives for greater integration through liberalization, but has achieved little in terms of intra-regional trade (ADB, 2009). The share of intra-SAARC agricultural trade is much higher for all SAARC countries (except Nepal) as compared to the proportion of intra-SAARC total trade. South Asia has become a major trade destination for agricultural trade for most of the SAARC countries due to the inherent characteristics of perishability, quality and similarities of taste and preferences of SAARC customer base. Intra-SAARC agricultural trade ranges from 7 per cent in India to 95 per cent in Bhutan.

Agricultural Trade Pattern in SAARC Countries

The composition of overall SAARC agricultural trade is presented in Table 3. The composition of SAARC trade, at HS 2-digit level, has been presented

Figure 3. Share of intra-SAARC trade in total and agricultural trade of SAARC countries

Source: Computed by authors

for two time periods, viz. TE 2005 and TE 2013. Since SAFTA came into effect since January 1, 2006; the two time periods have been selected to reflect the impact of SAFTA on agricultural trade. The agricultural exports from SAARC multiplied three times after formation of SAFTA in the region, the exports increased from 19.68 billion USD to 64.46 billion USD. The similar increase was witnessed in agricultural imports of SAARC, which increased from 15.62 billion USD to 47.31 billion USD. Cotton, Cereals, fish & crustaceans, tea and beverages were the top four exported items in both TE 2005 and TE 2013, which together account for more than 50 per cent share of exports from SAARC to the world. Animal or vegetable fat, cotton and rubber & articles were the top three imported items of SAARC from the world in both TEs.

Cotton is the most important exportable commodity group and second most importable commodity group of SAARC. The major export items under cotton category are: cotton yarn (not sewing thread) 85 per cent or more; cotton, not retail (HS 5205); and cotton, not carded or combed (HS 5201) covering around 65 per cent share in the cotton category. Though the cotton exports and imports have increased in absolute terms over the selected period, its composition in the export and import baskets of SAARC has changed. The major import items of SAARC are raw cotton and woven cotton fabrics. The rise in the share of agricultural commodities to world

exports and imports was highest in lac gums (4.63%) and animal and vegetable fats (3.38%), since TE 2005.

Commodity Composition of Agricultural Trade in SAARC Countries

Having highlighted the overall trade scenario of SAARC countries, this section presents the export and import composition for individual SAARC countries for various agricultural commodities. India, Pakistan, Sri Lanka and Bangladesh export 9.3 per cent, 10.0 per cent, 8.1 per cent and 12.5 per cent, respectively of their agricultural exports within SAARC, and the remaining (close to 90 %) is exported to outside region by these countries. Afghanistan and Bhutan, being the minor players, trade maximum within the region.

Table 4 depicts the major agricultural commodities exported from each country to the world and SAARC region. Fruits, lac gums and oilseeds were the top three items of exports from Afghanistan to the world accounting for more than 70 per cent share in the total exports. Fish and crustaceans were the major export items to the world and other vegetables and fibres were the major export items to SAARC region from Bangladesh. Fruits, edible vegetables and wood articles were the major export items from Bhutan to the world and SAARC region. Cotton followed by cereals were the major items of export from India and Pakistan. Fish and crustaceans were the major items of export from Maldives which accounted for more than 85 per cent

Table 3. Composition of SAARC agricultural trade, TE 2005 and TE 2013 (% share)

HS Code	Items	Exports to world		Imports from world	
		TE 2005	TE 2013	TE 2005	TE 2013
	Total agricultural exports and imports	19.68	64.46	15.62	47.31
	(in billion US $)	(100%)	(100%)	(100%)	(100%)
1	Live animals	0.07	0.05	0.08	0.13
2	Meat and meat products	2.30	5.79	0.12	0.12
3	Fish and crustaceans	10.07	7.84	0.45	0.51
4	Dairy products and bird eggs	0.85	0.81	1.79	1.82
5	Products of animal origin	0.29	0.33	0.13	0.20
6	Live trees and other plants	0.38	0.15	0.03	0.04
7	Edible vegetables	2.71	2.16	6.02	7.33
8	Fruits	4.40	3.21	4.69	5.48
9	Tea and beverages	8.39	6.88	3.09	2.48
10	Cereals	12.90	16.96	4.82	4.06
11	Products of the milling	0.79	0.94	0.36	0.30
12	Oilseeds	2.23	3.05	2.87	2.51
13	Lac, gums, etc.	1.72	6.35	0.33	0.40
14	Vegetable planting material	0.14	0.17	0.13	0.10
15	Animal or vegetable fat	2.12	1.89	26.33	29.71
16	Meat, fish and sea food	0.75	0.32	0.16	0.14
17	Sugar	1.49	3.32	4.06	3.56
19	Cereal preparations	0.53	0.80	0.65	0.59
20	Vegetable and fruit preparations	0.64	0.82	0.28	0.33
21	Misc edible preparations	0.87	0.91	0.52	0.64
22	Beverages	0.42	1.06	1.15	1.00
24	Tobacco	1.75	1.75	0.64	0.35
40	Rubber and articles	5.79	5.92	6.39	9.99
41	Raw hides and skins	5.48	3.02	2.14	1.52
44	Wood and articles of wood	0.61	0.59	6.30	6.01
47	Pulp of wood, fibrous, etc.	0.06	0.05	3.62	3.25
50	Silk	1.83	0.31	2.13	0.75
51	Wool	0.37	0.32	1.90	1.17
52	Cotton	27.72	22.50	18.07	14.54
53	Other vegetable fibres	2.32	1.76	0.79	0.98

Source: Computed by authors

trade to world and 99 per cent to SAARC countries. Tea and rubber were the top two exported items from Sri Lanka to the world and SAARC. A forecast of agricultural exports of major agricultural commodities among SAARC nations has revealed that India will enjoy optimum level in the export of cotton, sugar and rice, while Pakistan will achieve the second level and future export of Bangladesh and Sri Lanka will remain at low level in all the commodities (Iqbal *et al*., 2014).

Table 5 presents the import composition of SAARC countries. Animal or vegetable fats occupied more than one-third share in India's import basket. India imported animal or vegetable fat worth US $ 6966 million in 2013, which comprised mainly palm oil and its fraction (HS 1511), soyabean oil and its fractions (HS 1507) and safflower, sunflower/cotton-seed oil and fractions (HS 1512). Animal or vegetable fat, oilseeds and cotton occupied the major share in Pakistan's import basket from world. Pakistan mainly imports cotton and edible

**Table 4. Commodity composition of SAARC countries exports**

(% share)

HS Code	Items	Afghanistan TE 2012-13 World	Afghanistan TE 2012-13 SAARC	Bangladesh TE 2007-08 World	Bangladesh TE 2007-08 SAARC	Bhutan TE 2011-12 World	Bhutan TE 2011-12 SAARC	India TE 2013-14 World	India TE 2013-14 SAARC	Maldives TE 2013-14 World	Maldives TE 2013-14 SAARC	Nepal TE 2011-12 World	Nepal TE 2011-12 SAARC	Pakistan TE 2013-14 World	Pakistan TE 2013-14 SAARC	Sri Lanka TE 2012-13 World	Sri Lanka TE 2012-13 SAARC
	Total agricultural exports (in million US $)	242	132	1743	218	39	37	47827	4426	86	6	228	192	10951	1095	3502	283
1	Live animals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.3	0.4	0.2	0.0	0.0	0.0
2	Meat and meat products	0.1	0.3	0.0	0.0	0.0	0.0	7.4	0.2	0.0	0.0	0.8	0.0	1.8	0.0	0.1	0.3
3	Fish and crustaceans	0.0	0.0	31.4	4.5	0.0	0.0	8.0	0.9	85.5	99.9	0.0	0.0	2.7	0.5	5.4	1.1
4	Dairy products and bird eggs	0.0	0.0	0.1	0.1	0.1	0.1	0.9	1.6	0.0	0.0	0.9	1.0	0.8	0.0	0.1	0.5
5	Products of animal origin	0.4	0.5	0.2	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.1	0.9
6	Live trees and other plants	0.0	0.0	2.0	1.5	0.0	0.0	0.2	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.4	0.1
7	Edible vegetables	3.3	2.3	3.1	0.0	20.1	16.9	2.3	7.6	0.0	0.0	24.0	23.4	2.1	1.9	0.7	1.9
8	Fruits	49.6	49.2	2.0	10.5	25.6	26.9	3.1	2.5	0.0	0.0	4.0	4.8	3.3	6.2	3.2	5.2
9	Tea and beverages	10.7	14.5	1.0	5.2	13.8	14.5	6.0	5.5	0.0	0.0	20.9	23.5	0.6	0.5	46.5	29.2
10	Cereals	0.0	0.0	0.5	0.0	0.5	0.0	17.9	14.7	0.0	0.0	2.6	2.9	21.5	14.5	0.4	0.1
11	Products of the milling	0.0	0.0	0.2	0.2	2.4	2.5	0.5	0.5	0.0	0.0	1.0	0.2	2.6	0.8	3.2	0.9
12	Oilseeds	11.4	2.2	0.0	0.1	0.1	0.1	3.9	2.5	0.0	0.0	4.3	2.4	0.8	1.1	0.2	0.4
13	Lac, gums, etc.	12.1	19.2	0.0	0.0	0.0	0.0	8.3	0.4	0.0	0.0	0.0	0.0	1.2	0.1	0.1	0.5
14	Vegetable planting material	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.3	0.0	0.0	6.9	8.2	0.1	0.0	0.4	2.4
15	Animal or vegetable fat	0.1	0.2	0.1	0.4	0.8	0.8	2.1	0.1	0.0	0.0	2.0	1.6	1.7	0.0	0.4	0.8
16	Meat, fish and seafood, etc.	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	14.5	0.0	0.0	0.0	0.3	0.1	0.1	0.6
17	Sugar	0.0	0.0	0.2	0.0	0.0	0.0	3.8	8.9	0.0	0.0	0.5	0.4	2.9	2.1	0.0	0.1
19	Cereal preparations	0.0	0.0	0.5	0.0	0.0	0.0	0.9	1.7	0.0	0.0	4.4	3.9	0.5	0.0	0.5	0.7
20	Vegetable and fruit preparations	0.0	0.0	0.3	0.1	8.3	8.7	0.8	0.2	0.0	0.0	9.9	11.7	0.6	0.3	1.4	1.3
21	Misc edible preparations	0.0	0.0	0.1	0.0	1.1	1.2	1.0	0.8	0.0	0.0	1.3	1.6	0.2	0.0	1.8	1.7
22	Beverages	0.0	0.0	0.0	0.0	9.6	10.1	0.7	0.4	0.0	0.0	3.8	4.4	2.5	0.6	0.1	0.5
24	Tobacco	0.0	0.0	1.3	0.6	0.0	0.0	2.0	0.7	0.0	0.0	0.4	0.0	0.3	0.0	2.1	0.2
40	Rubber and articles	0.0	0.0	0.1	0.0	0.1	0.1	5.8	4.9	0.0	0.0	0.2	0.2	0.1	0.1	26.8	28.2
41	Raw hides and skins	5.5	5.5	14.8	2.0	0.0	0.0	2.4	0.3	0.0	0.0	4.2	2.5	4.4	2.5	0.0	0.1
44	Wood and articles of wood, etc.	0.0	0.0	0.0	0.1	16.9	17.7	0.6	0.4	0.0	0.1	1.7	1.1	0.5	0.0	1.4	6.9
47	Pulp of wood, fibrous cellulosic, etc.	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.7	8.6
50	Silk	0.0	0.0	0.0	0.1	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
51	Wool	3.5	0.5	0.0	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.1	0.8	0.0	0.0
52	Cotton	3.1	5.6	19.5	24.7	0.1	0.1	19.3	44.0	0.0	0.0	0.1	0.0	47.7	67.7	0.8	6.3
53	Other vegetable fibres	0.0	0.0	22.5	49.6	0.0	0.0	0.7	0.4	0.0	0.0	4.8	5.6	0.0	0.0	3.2	0.5

Source: Authors' calculations

Table 5. Commodity composition in intra-SAARC imports

(% share)

HS Code	Items	Afghanistan TE 2012-13		Bangladesh TE 2007-08		Bhutan TE 2011-12		India TE 2013-14		Maldives TE 2013-14		Nepal TE 2011-12		Pakistan TE 2013-14		Sri Lanka TE 2012-13	
		World	SAARC	World	SAARC	World	SAARC	World	SAARC	World	SAARC	World	SAARC	World	SAARC	World	SAARC
	Total agricultural imports (in million US $)	873	307	4342	860	133	127	26078	744	393	110	775	381	6395	793	3085	924
1	Live animals	0.4	0.9	0.2	0.0	0.1	0.1	0.0	0.0	0.0	0.1	1.5	2.1	0.3	0.0	0.1	0.0
2	Meat and meat products	4.5	1.1	0.0	0.0	6.8	7.2	0.0	0.0	9.9	4.1	0.1	0.0	0.1	0.4	0.1	0.0
3	Fish and crustaceans	0.0	0.0	0.1	0.1	2.2	2.3	0.3	6.5	4.0	6.1	0.4	0.8	0.1	0.0	3.1	3.1
4	Dairy products and bird eggs	3.3	6.4	2.5	2.0	9.5	10.0	0.4	0.2	10.9	8.3	1.7	2.8	1.8	0.8	9.9	0.1
5	Products of animal origin	0.0	0.0	0.2	0.1	0.0	0.0	0.2	0.2	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0
6	Live trees and other plants	0.0	0.0	0.0	0.0	1.3	0.0	0.1	0.0	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0
7	Edible vegetables	1.2	0.0	5.3	5.6	3.4	3.6	8.2	0.6	8.7	15.2	8.0	11.1	8.6	24.3	8.9	11.0
8	Fruits	0.3	0.7	1.0	0.8	0.7	0.7	7.8	20.4	8.3	10.4	7.5	2.4	2.0	1.1	1.0	0.5
9	Tea and beverages	7.4	1.0	1.2	1.7	1.1	1.1	1.8	15.4	1.9	3.1	2.9	3.4	6.7	7.8	3.6	9.1
10	Cereals	2.5	6.4	15.9	30.8	15.8	16.6	0.1	0.1	4.2	13.5	8.5	15.3	2.2	0.9	12.7	7.5
11	Products of the milling	23.9	13.9	0.3	0.1	1.8	1.9	0.2	0.2	2.9	7.3	1.0	1.2	0.4	0.0	0.7	0.8
12	Oilseeds	0.1	0.0	2.8	0.6	0.9	1.0	0.9	1.9	0.2	0.1	8.5	11.9	9.3	6.0	0.6	1.0
13	Lac, gums, etc.	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.3	0.0	0.0	0.1	0.1	0.2	0.3	0.1	0.1
14	Vegetable planting material	0.0	0.0	0.0	0.0	1.2	1.2	0.0	0.5	0.1	0.1	0.1	0.2	0.3	2.1	0.2	0.7
15	Animal or vegetable fat	31.5	54.4	24.2	0.7	8.5	8.8	38.4	1.9	2.6	0.3	23.0	1.2	35.9	0.3	4.7	0.1
16	Meat, fish and seafood, etc.	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.2	2.3	0.8	0.1	0.0	0.1	0.0	1.5	0.0
17	Sugar	4.3	4.8	6.5	7.6	4.4	4.7	1.6	0.7	3.4	9.4	3.4	5.0	0.9	2.2	12.3	20.9
19	Cereal preparations	0.0	0.0	0.6	1.2	6.3	6.2	0.1	0.6	4.9	3.6	3.4	6.0	1.3	0.3	1.5	1.4
20	Vegetable and fruit preparations	0.0	0.0	0.1	0.2	2.6	2.6	0.3	0.5	5.0	2.6	1.1	1.5	0.5	0.0	0.4	0.1
21	Misc edible preparations	0.0	0.0	0.5	0.6	0.8	0.7	0.4	0.3	4.5	4.4	4.4	3.7	0.8	0.1	1.3	0.8
22	Beverages	3.8	4.3	0.1	0.0	7.9	7.2	1.3	7.1	7.5	6.2	2.6	2.0	0.1	0.0	1.8	1.7
24	Tobacco	6.4	1.9	0.4	0.5	0.0	0.0	0.2	0.0	3.3	0.7	3.2	6.4	0.3	0.4	1.7	0.2
40	Rubber and articles	4.6	1.1	1.9	3.3	7.1	6.1	13.9	5.8	2.0	0.9	4.1	5.6	7.6	6.5	8.7	5.7
41	Raw hides and skins	0.0	0.0	0.5	0.4	0.0	0.0	2.0	3.0	0.0	0.0	0.0	0.1	1.6	0.2	0.5	0.9
44	Wood and articles of wood, etc.	5.2	1.1	1.2	0.1	15.2	15.8	9.8	2.8	12.2	1.6	1.1	1.3	1.8	0.8	2.2	0.9
47	Pulp of wood, etc.	0.0	0.0	1.3	0.0	0.0	0.0	5.1	3.5	0.0	0.0	0.2	0.0	1.5	0.1	0.1	0.0
50	Silk	0.0	0.0	0.2	0.0	0.3	0.3	1.2	0.1	0.0	0.0	0.6	0.0	0.5	0.0	0.2	0.0
51	Wool	0.0	0.0	0.6	0.1	0.2	0.2	1.5	1.3	0.0	0.0	3.7	0.4	0.2	0.1	0.5	0.2
52	Cotton	0.3	0.8	32.3	43.5	1.4	1.5	2.6	9.2	0.6	0.6	5.2	8.8	13.8	38.2	20.6	32.3
53	Other vegetable fibres	0.6	1.1	0.1	0.0	0.0	0.0	1.0	16.9	0.1	0.1	3.3	6.7	0.9	7.0	0.8	0.5

Source: Authors' calculations
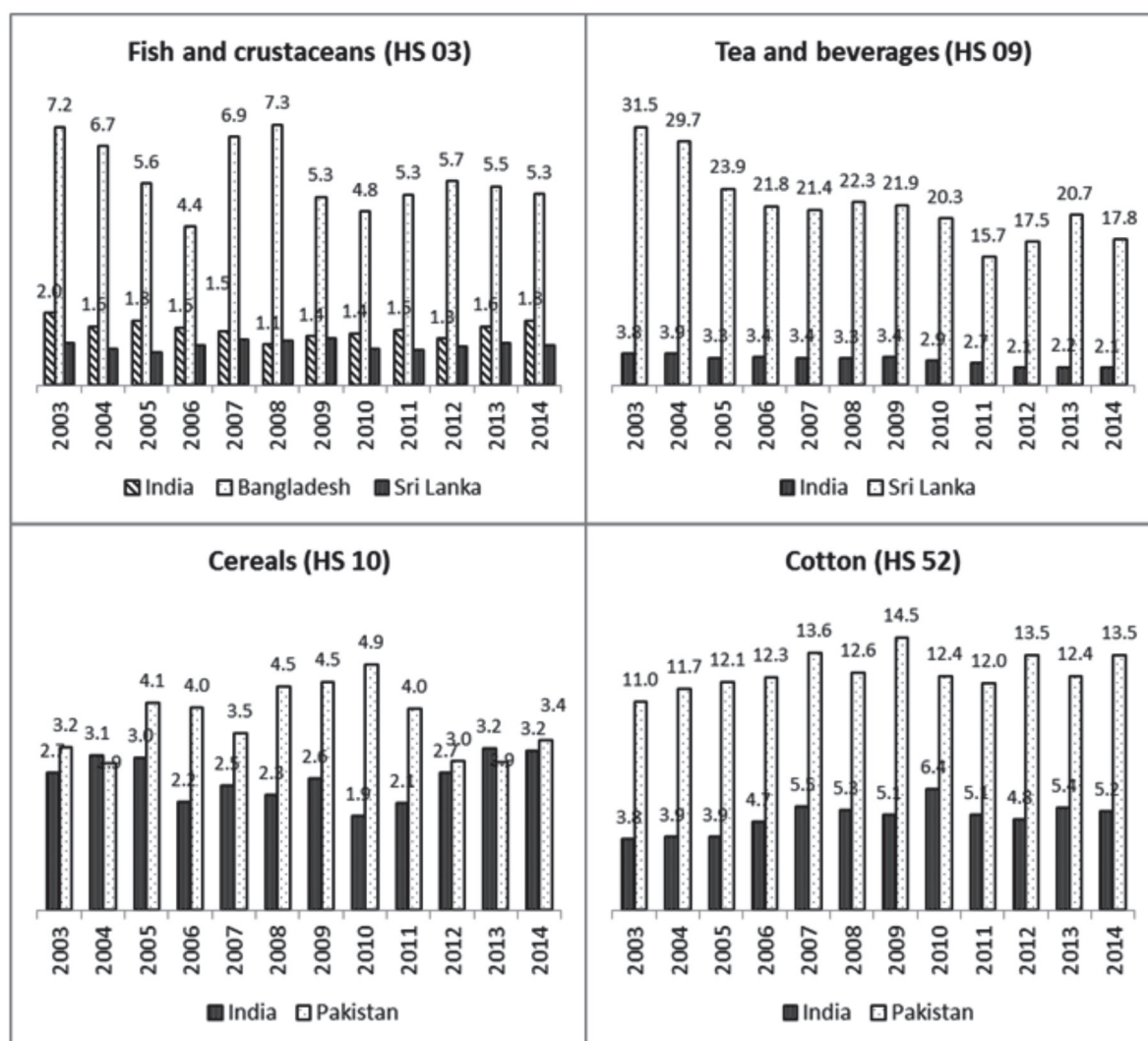
Source: Computed by authors

Figure 4. Comparative advantages in agricultural trade

vegetables from SAARC. Animal or vegetable fat (31%) and products of the milling were the major imported items to Afghanistan from world and SAARC region. Cotton was the major item imported by Bangladesh and Sri Lanka from the world as well as SAARC. Cereals were the major item imported from the world as well as SAARC region by Bhutan. The edible oils were the major items imported from SAARC region by Maldives.

Comparative Advantage in Trade

The revealed comparative advantage (RCA) indicates the relative advantage or disadvantage of a country in major exportable commodities. It depicts the position of a country with respect to global trade

levels and indicates how other competing countries are integrating themselves with global trade. Figure 4 shows the RCA for major exportable items of SAARC countries. It reveals that India enjoys comparative advantage in exports of cotton, cereals, fish and tea. However, Pakistan has greater comparative advantage in export of cotton and cereals from SAARC countries. The greatest comparative advantage of Pakistan lies in the exports of cotton textiles and woven fabrics to India, both countries have integrated themselves in creating a value chain, in which India exports raw staple cotton to Pakistan and imports value-added textiles and fabrics from it (Chand and Saxena, 2014). The comparative advantage in exports of fish and crustaceans is found highest for Bangladesh, though it

Table 6. SAARC country-wise top five markets for major commodities, 2012

Products	Major suppliers in SAARC countries	Value of export (in million US $)	Major destinations
HS 3: Fish and crustaceans	India	3282	United States of America (19.5), Vietnam (14.6), Japan (10.3), China (5.2), Belgium (4.2)
	Bangladesh	636*	Belgium (19.5), United Kingdom (17), United States of America (10.4), Netherlands (9.6), India (8.8)
	Pakistan	292	Vietnam (26.1), United Arab Emirates (9.8), Thailand (10.4), China (14.2), Saudi Arabia (7.8)
	Sri Lanka	205	United States of America (19.5), Japan (20.6), United Kingdom (8.7), Italy (7.1), Netherlands (8.6)
HS 8: Fruits	India	1390	United States of America (19.4), United Arab Emirates (14.7), Netherlands (9.2), Saudi Arabia (8.2), United Kingdom (4.4)
	Pakistan	348	Afghanistan (32.5), India (19.3), United Arab Emirates (7.7), Russian Federation (10.4), Germany (5.6)
	Sri Lanka	99	India (6.2), United Arab Emirates (10.3), Pakistan (10.5), Saudi Arabia (10.1), United States of America (7.3)
	Afghanistan	98	Area Nes (56.3), Pakistan (23.1), India (18), Iran (Islamic Republic of) (1.8) Germany (0.4)
HS 9: Tea and beverages	India	2694	United States of America (9.3), Italy (8), Vietnam (4.6), United Arab Emirates (6.1), Germany (4.7)
	Pakistan	2061	Kenya (7.6), United Arab Emirates (9.2), Afghanistan (8.3), China (12.5), Saudi Arabia (4.8)
	Sri Lanka	1646	Russian Federation (13.6), Iran (Islamic Republic of) (11.3), Turkey (5.5), India (3.8), Syrian Arab Republic (3.3)
HS 10: Cereals	India	8729	Iran (Islamic Republic of) (10.4), Saudi Arabia (8.3), Bangladesh (5.2), United Arab Emirates (7), Benin (2.2)
	Pakistan	2061	Kenya (7.6), United Arab Emirates (9.2), Afghanistan (8.3), China (12.5), Saudi Arabia (4.8)
HS 52: Cotton	India	8569	China (42.2), Bangladesh (16.2), Pakistan (2.9), Vietnam (1.8), Sri Lanka (2.5)
	Pakistan	5226	China (35.1), Bangladesh (11.1), Hong Kong, China (4.4), Italy (2.9), Turkey (3.6)
	Bangladesh	124*	Area Nes (61.6), India (7.6), China (7.3), Turkey (6.4), Hong Kong, China (2.2)

Note: The figures within the parentheses are the percentage share of respective country in the total commodity exports.
*Data pertain to the year 2011

has been declining with time. Sri Lanka enjoys a very high comparative advantage in exports of tea and beverages. However, computation of RCA at more disaggregated levels (HS 4 and 6 digits level) will provide much more insights.

Direction of SAARC Agricultural Trade

We have identified cotton, cereals, fish & crustaceans and tea & beverages as the major commodities exported from the SAARC region. In this section, we identify the major destinations to which these commodities were exported by different countries of SAARC (Table 6). In 2012, the major trading partners in importing of fish and crustaceans from SAARC countries were USA, Vietnam, Japan, Belgium and United Kingdom. Fish is usually exported outside of the SAARC region. Interestingly, India is the major importer of fruits which are exported by other SAARC

countries. China, Bangladesh, Vietnam, Pakistan and Turkey are the major importers of SAARC cotton. China is the biggest importer of SAARC cotton, meeting most of its requirement from India and Pakistan. Before 2006, China was meeting most of its cotton requirement from Pakistan (from SAARC region); however, the exports of cotton have gone exceptionally high and have grown at CAGR of 30.38 per cent per year during 2006-2013. The United States of America is India's major trading partner for fish & crustaceans, fruits and tea & beverages. The SAARC countries further need to strengthen their partnership with their major buyers to further boost agricultural trade from the region.

Trade Linkages: Economic Growth and Agricultural Trade of India

The KPSS test was applied to test the stationarity of GDP (total as well as agricultural & allied), agricultural exports and agricultural imports of India. The KPSS test is based on the null hypothesis that the series is stationary. Table 7 provides the results of KPSS test. The series have been found non-stationary at the level as the null hypothesis is rejected at 5 per cent level of significance (Table 7). After the first differencing, the series became stationary at 5 per cent level of significance. Thus, all the series are non-stationary at the level and can be used for cointegration analysis.

Cointegration Analysis

To check for cointegration between the variables (GDP, GDP Ag & allied, agricultural exports and imports), two-step Engle-Granger method was used. The cointegration equation was estimated using OLS (ordinary least square) and the residuals from the estimation were examined. The variables would be considered cointegrated if the residuals generated from

Table 7. Testing stationarity of log series through KPSS

Variable	Level series	Ist differenced series
Agricultural exports	0.706	0.164
Agricultural imports	0.700	0.231
GDP	0.711	0.116
GDP Ag & allied	0.707	0.135

Note: 5 per cent critical value for KPSS test is 0.463

the equations are found to be stationary. The following long-run equations were estimated:

$$\ln GDP \quad = \alpha + \beta \ln Agr\_Ex + \varepsilon$$
$$\ln Agr\_Ex = \alpha + \beta \, GDP + \varepsilon$$
$$\ln GDPag \ = \alpha + \beta \ln Agr\_Ex + \varepsilon$$
$$\ln Agr\_Ex = \alpha + \beta \, GDPag + \varepsilon$$
$$\ln GDP \quad = \alpha + \beta \ln Agr\_Im + \varepsilon$$
$$\ln Agr\_Im = \alpha + \beta \, GDP + \varepsilon$$
$$\ln GDPag \ = \alpha + \beta \ln Agr\_Im + \varepsilon$$
$$\ln Agr\_Im = \alpha + \beta \, GDPag + \varepsilon$$

where, lnGDP is log value of GDP; lnAgr_Ex is log value of agricultural exports; lnGDPag is log value of GDPag; lnAgr_Im is log value of agricultural imports

The residuals from the above equations were checked for stationarity using KPSS test and these were found to be stationary at level. Thus, the variables were found to be cointegrated. Ramphul (2013) has also established that there is a positive and stable long-run equilibrium relationship between India's agricultural exports and GDP agriculture.

Causality between Economic Growth and Agricultural Trade

The results of pair-wise Granger causality test are presented in Table 8. Here, an attempt has been made to determine the causal relationships between India's growth and India's agricultural trade. According to results, there is unidirectional causality between GDP and agricultural exports, where agricultural exports Granger cause GDP, but GDP does not Granger cause agricultural exports. Also, one-way causal relationship between GDPag and agricultural exports has been observed, where causality runs from agricultural exports towards GDPag, but not vice-versa. Ramphul (2013) has also found unidirectional causal link running from farm exports to gross domestic product of agriculture, which indicates that export of agricultural products Granger causes the growth in GDP of agriculture in India, which supports the export-led growth hypothesis. This indicates that the growth in agricultural exports has led to the overall and agricultural growth of Indian economy.

Many studies have been conducted to establish the export-led growth hypothesis with respect to India's

Table 8. Granger-causality Wald test

Null hypothesis	lag	F-Statistic	Probability
GDP does not Granger cause Ag_export	3	2.13	0.5461
Ag_export does not Granger cause GDP	3	18.57	0.0003
GDPag does not Granger cause Ag_export	3	3.88	0.275
Ag_export does not Granger cause GDPag	3	31.2	<.0001
GDP does not Granger cause Ag_import	3	12.81	0.0051
Ag_import does not Granger cause GDP	3	10.74	0.0132
GDPag does not Granger cause Ag_import	3	5.24	0.1552
Ag_import does not Granger cause GDPag	3	17.84	0.0005

total trade. Some have been in favour of this hypothesis (Mishra, 2011; Ray, 2012) and some have rejected this hypothesis. Kumari and Malhotra (2014) have concluded bidirectional causality running from exports to GDP per capita and GDP per capita to exports. Shahbaz *et al.* (2011) have also indicated that exports are positively correlated with economic growth confirming the validity of exports-led growth hypothesis in Pakistan. Dar *et al.* (2013) have shown that the relationship between export growth and output growth is not only positive in India but this relationship grows stronger as time horizons increases; their results based on wavelet cross-correlation have shown that causal relationship is bi-directional at higher time scales. We could not find many studies on the causality between economic growth and agricultural trade. Here, the optimum lag length was selected based on minimum Schwarz Bayesian Criteria (SBC) value.

The GDP and agricultural imports share bidirectional causality as GDP does Granger cause agricultural imports and vice-versa. Among GDPag and agricultural imports, there is unidirectional causality; the causality runs from agricultural imports towards GDPag but not vice-versa.

Estimating Error Correction Model

The following ECM equations measure the short-term relationship among GDP, GDPag, agricultural exports and agricultural imports. Only those equations are being presented here, where causality has been established earlier.

$$\Delta \ln GDP_t = -0.034 ECT_{t-1} + 0.016 \Delta \ln Agr\_Ex_{t-1} + 0.661 \Delta \ln GDP_{t-1}$$

$$\Delta \ln GDPagr_t = -0.033 ECT_{t-1} + 0.122 \Delta \ln Agr\_Ex_{t-1} + 0.138 \Delta \ln GDPagr_{t-1}$$

$$\Delta \ln Agr\_Im_t = -0.802 ECT_{t-1} - 0.642 \Delta \ln GDP_{t-1} - 0.154 \Delta \ln Agr\_Im_{t-1}$$

$$\Delta \ln GDP_t = -0.063 ECT_{t-1} + 0.028 \Delta \ln Agr\_Im_{t-1} + 0.453 \Delta \ln GDP_{t-1}$$

$$\Delta \ln GDPagr_t = -0.191 ECT_{t-1} + 0.037 \Delta \ln Agr\_Im_{t-1} - 0.122 \Delta \ln GDPagr_{t-1}$$

where, lnGDP = log value of GDP ; lnAg_Ex = log value of agricultural exports; lnGDPag = log value of GDPagriculture; lnAg_Im = log value of agricultural imports

The coefficient of error correction term denotes the speed of adjustment; the higher the speed of adjustment, the higher is the chance of correction of any disequilibrium caused due to change in any phenomenon. The speed of adjustment is found to be highest (80 %) when the agricultural imports are affected by the GDP. Surprisingly, the speed of adjustment is very low (close to 3 %), when the agricultural exports-led growth is observed.

Examining Trade Linkages: Cotton Trade of India and Pakistan

The ADF and PP tests were applied to check the stationarity of cotton exports and cotton imports of both India and Pakistan. The tests indicated that all the series were non-stationary at level and became stationary after first differencing (at 1% level of significance). Thus, the series are suitable for cointegration analysis.

Cointegration in Cotton Export and Import of India and Pakistan

The results of Johansen cointegration method, used to check cointegration between the variables, are presented in Table 9. According to Likelihood Ratio

Table 9. Cointegration and speed of adjustment among Indian and Pakistan's cotton exports and imports

H0: Rank=r	H1: Rank>r	Eigen value	Likelihood ratio	Speed of adjustment	
			India's exports and Pakistan's exports		
				India's exports	Pakistan's exports
0	0	0.238	20.084	32.95	46.06
1	1	0.152	7.581		
			India's imports and Pakistan's imports		
				India's imports	Pakistan's imports
0	0	0.308	21.986	33.40	33.05
1	1	0.104	5.047		
			India's exports and India's imports		
				India's exports	India's imports
0	0	0.243	12.793	31.63	35.39
1	1	0.000	0.004		
			Pakistan's exports and Pakistan's imports		
				Pakistan's exports	Pakistan's imports
0	0	0.237	12.727	58.13	38.77
1	1	0.006	0.264		

Note: The 1 per cent critical value of likelihood ratio at rank 1 is 12.97 and at rank 0 is 24.6

Table 10. Results of Granger-causality test

Null hypothesis	Lag	F-Statistic	Probability
INDIA_IM does not Granger cause INDIA_EX	2	2.728	0.077
INDIA_EX does not Granger cause INDIA_IM	2	3.428	0.042
PAK_IM does not Granger cause PAK_EX	2	1.185	0.315
PAK_EX does not Granger cause PAK_IM	2	1.467	0.242
PAK_EX does not Granger cause INDIA_EX	2	1.203	0.310
INDIA_EX does not Granger cause PAK_EX	2	0.454	0.638
PAK_IM does not Granger cause INDIA_IM	2	3.933	0.027
INDIA_IM does not Granger cause PAK_IM	2	0.985	0.381

(LR) test, there is at least 1 cointegration vector that exists between Indian and Pakistan export and import. The first null hypothesis (r=0) is rejected at 5 per cent level of significance. The results detected at least one cointegrating relationship between the variables. The acceptance of cointegration between the series implies that there exists a long-run relationship between them and this means that an error-correction model (ECM) exists which combines the long-run relationship with the short-run dynamics of the model.

Causality among India and Pakistan's Cotton Export and Import

The results of pair-wise Granger causality test are presented in Table 10. There is unidirectional relationship between cotton imports of India and Pakistan and also Indian exports and imports of cotton. There is no causal relationship between India's cotton export and Pakistan's cotton export. Further, no causal relationship has been observed between Pakistan's export and import of cotton.

Table 11. Doing business indicators related to trading across borders of SAARC nations, 2015

Country	Ease of Doing Business rank	Export environment			Import environment		
		Documents to export (No.)	Time to export (days)	Cost to export (US $/ container)	Documents to import (No.)	Time to import (days)	Cost to import (US $/ container)
Afghanistan	183	10	86.0	5045	10	91.0	5680
Bangladesh	173	6	28.3	1281	9	33.6	1515
Bhutan	125	9	38.0	2230	11	37.0	2330
India	142	7	17.1	1332	10	21.1	1462
Maldives	116	7	21.0	1625	9	22.0	1610
Nepal	108	11	40.0	2545	11	39.0	2650
Pakistan	128	8	20.7	765	8	18.4	1005
Sri Lanka	99	7	16.0	560	7	13.0	690

Source: World Bank, 2015

Error Correction Model for India and Pakistan's Cotton Export and Import

The following ECM equations measure the short-term relationship between cotton imports of India and Pakistan and also between Indian exports and imports of cotton:

$$\Delta lnInd\_IM_t = -0.353\ ECT_{t-1} - 0.270\Delta lnInd\_EX_{t-1} + 0.197\ \Delta lnInd\_IM_{t-1}$$

$$\Delta lnInd\_IM_t = -0.334 ECT_{t-1} -0.221\ \Delta lnPak\_IM_{t-1} + 0.214\ \Delta lnInd\_IM_{t-1}$$

where, lnInd_IM is log value of India import; Ind_Ex is log value of India exports; and lnPak_IM is log value of Pakistan imports

The results have shown the speed of adjustment ranges from 33 per cent to 35 per cent, when Indian imports are affected by the Indian exports and Pakistan's imports of cotton. This relationship between imports of both India and Pakistan may be due to the climatic factors which affect cotton production in both the countries.

Harnessing Trade Opportunities

World Bank every year conducts a survey on doing business environment of different economies of the world which affect domestic small and medium size enterprises across ten areas. It indicates relative performance and improvements over time to facilitate overall business environment of the country. It becomes important to understand the trading environment of different nations to explore the possibilities of trade. The information for SAARC nations has been extracted from the Doing Business data of 2015 and is presented in Table 11. The ease of doing business rank indicates that Sri Lanka is the most favourable destination in terms of ease of doing business. The same is evident from the export and import environment of the country, as the country requires least documentation to export, requires minimum time to export and import and has lowest export and import cost per container. Afghanistan emerges as the least preferred destination in terms of ease of doing business. The country takes more than 5-times of Sri Lanka's time to export and 7-times of Sri Lanka's time to import. The time and cost involved in both export and import of the country is much higher as compared to other SAARC countries.

As far as export environment of India is concerned, the country requires 17 days to export and 21 days for imports. The cost involved in export and imports are higher than of Sri Lanka and Pakistan, even Bangladesh has lower export cost compared to India. The Indian trade policy environment needs to be made more favourable for attracting foreign buyers and making the exports competitive globally.

Conclusions

The structure of trade among the SAARC economies has been studied based on time series data on exports and imports of agricultural commodities in these countries. The linkages have been examined between economic growth of India and its agricultural

trade, and also the trade linkages in exports and imports of cotton from India and Pakistan.

The study has revealed that SAARC countries together account for 2.6 per cent of total world trade and 3.01 per cent of total agricultural trade. Among the SAARC nations, India accounted for the highest share in world total trade as well as world agricultural trade. The agricultural trade constitutes 10 per cent share in the overall trade at the aggregate level. The analysis of total and agricultural trade of SAARC nations has revealed that SAARC as a whole as well as all the SAARC countries individually are net importers as far as the total trade is concerned. However, SAARC is the net exporter in case of agricultural trade. The three major economies of the region, viz. India, Pakistan and Sri Lanka, have contributed to this development, as these three have accounted for more than 95 per cent share of agricultural exports from SAARC. India alone has 82 per cent share in total exports and 74 per cent share in the agricultural exports from the region. At the same time, India has 81 per cent share in total imports and 55 per cent share in the agricultural imports of the region. Though India accounts for a largest share in agricultural trade, it suffers from very high volatility. Among all SAARC nations, Indian agricultural imports have been found most volatile, as reflected through the CV of 59 per cent. The overall share of intra-SAARC trade in total trade is 4.29 per cent which ranges from as low as 2.15 per cent in India to as high as 79.81 per cent in Bhutan. The share of intra-SAARC agricultural trade is much higher for all SAARC countries (except Nepal) as compared to the proportion of intra-SAARC total trade.

The agricultural exports from SAARC has multiplied three-times after the formation of SAFTA in the region, the exports have increased from US $ 19.68 billion to US $ 64.46 billion. A similar increase has been witnessed in agricultural imports of SAARC, which has increased from US$ 15.62 billion to US $ 47.31 billion. Cotton, cereals, fish & crustaceans, and tea & beverages have been the top four items exported in both TE 2005 and TE 2013, which together could account for more than 50 per cent share of exports from SAARC to the world. The animal or vegetable fat, cotton and rubber & articles have been the top three items imported by SAARC countries from the world during both these TEs. Pakistan has depicted comparative advantage in export of cotton from SAARC. Sri Lanka has depicted high comparative advantage in exports of tea and beverages.

The study has revealed a unidirectional causality between GDP and agricultural exports, where agricultural exports Granger cause GDP, but GDP does not Granger cause agricultural exports. Also, one-way causal relationship between GDPag and agricultural exports has been observed, where causality runs from agricultural exports towards GDPag, but not vice-versa. However, GDP and agricultural imports share bidirectional causality as GDP does Granger cause agricultural imports and vice-versa. A unidirectional relationship has been observed between cotton imports of India and Pakistan and also between Indian exports and imports of cotton. There is no causal relationship between India's cotton export and Pakistan's cotton export. Further, no causal relationship has been observed between Pakistan's export and import of cotton.

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