

The Macroeconomic Impacts of Trade  
Liberalization in South Asian Agriculture.

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**Abstract**

*It is often argued that a crucial impact originating from agricultural trade liberalization could be on the domestic (agricultural) terms of trade for the developing economies. This study attempts to examine the hypothesis whether the liberalization had led to changes in the terms of trade for the developing agricultures. The examination is carried out employing data pertaining to economies in the south-Asian region, viz, Bangladesh, Bhutan, India, Nepal, Pakistan and Srilanka. Our analysis involves two steps; first, we examine the degree of trade liberalization in agriculture for these economies by exploring indicators such as export share, export performance, and trade openness in agriculture, and second, we construct comparable agricultural terms of trade indices in these economies over a long period of time (1980-2006). Subsequently, we undertake a time trend analysis by employing time dummy variable to examine whether domestic terms of trade for agriculture has improved after the trade liberalization in mid 90's. We additionally carry out the econometric causality analysis to gather insights on this question. The results point out that though the agricultural terms of trade had turned favorable in India, Nepal and Srilanka, the evidence of significant causality from trade liberalization to terms of trade in agriculture is present only from India, Nepal.*

Submitted to South Asia Network of Economic Research  
Institutes (SANEI) under Collaborative Research Program.

July 2008.

## 1. Introduction and Objectives:

There is a widespread belief that liberalization of agricultural trade can contribute significantly to the growth prospects of developing economies. This presumption arises from the fact that a large number of poor populations in developing countries are dependent on agriculture and have the potential to participate in the export or import of agricultural products. A number of studies have evaluated the benefits resulting from agricultural trade liberalization on the basis of computable general equilibrium models. The benefits arise from channels like efficiency gains, terms of trade effects, technological transfer and innovation, etc. However, a fair amount of doubts have also been expressed on whether developing countries would actually gain from the multilateral trade negotiations, and further it is apprehended that the concentration of welfare benefits could vary among developing countries. For instance, according to a study by Anderson, Martin and van der Mensbrugge [2005], India would be a gainer and Bangladesh a loser from liberalizing agricultural trade under the Doha Development Agenda. Even in the case of the Indian economy, the opinion on the possible impacts of agricultural trade liberalization is not uniform (Nayyar and Sen 1994, Vyas 1994, Gulati and Pursell 1996, Gulati 1998, Parikh et al 1996, Hanumantha Rao 2006, Chand and Bathla 2005, and Pal 2007).

The south Asian region, which is traditionally known for its high protection to import substituting industries, has initiated some agricultural trade liberalization measures in the past decades. The share of agriculture in GDP is high in and it still accounts for a sizable proportion of the employment often comprising of the poor. The agricultural trade liberalization can therefore have some important implications on the poverty consequences in these economies. Now, it is important to note that since prices in developing agricultures are generally viewed as an instrument of incentives, the changes in domestic (or agricultural) terms of trade (henceforth TOT) has assumed a significant role in the agricultural policies of developing economies. To be specific, concerns with regard to productivity and marketable surplus of agriculture have been addressed in the framework of an incentive-based TOT structure. It may however be noted that the literature on agricultural price policies in developing countries has also highlighted the multiple impacts of domestic TOT on the rural economy. These include its impact on rural earning and poverty, agricultural employment, cropping pattern, and generation of investments (both public and private) in agriculture. In this background, the main objective of this study has been set to examine whether the process

of agricultural trade liberalization in the south Asian economies has led to any change in the respective agricultural TOT.

It appears that there are a few gaps in the literature that deliberates on the impacts of trade liberalization on south Asian agricultures. The caveats are apparent in respect of the following grounds; *first*, there are possibly no previous empirical analyses that examined the pattern of agricultural TOT movements between the pre- and post-liberalization periods in a comparative or regional framework. One needs to use a similar methodology and database to generate consistent and comparable set of agricultural TOT indices across different countries. *Second*, in consequent to the above, it is unlikely that any empirical exercise have attempted to examine the causal relationship between trade liberalization indicators and TOT in agriculture. With this objective, this study proceeds to examine the causal relationship between trade liberalization and TOT in agriculture by pursuing a comparative analysis across the south-Asian economies. Our empirical analysis uses data from Bangladesh, Bhutan, India, Nepal, Pakistan and Srilanka and refers to the period 1980-2006.

Thus the present study essentially involves two steps: *first*, we construct a comparable set of agricultural TOT estimates for these economies, and *second*, we verify the link between various indicators of trade liberalization and TOT in respective agricultures by undertaking statistical tests that determine the presence of significant causal relations. The plan for the rest of the study is as follows. Section 2 analyses the pattern of world trade in agriculture. The examination of the agricultural sector in respective south Asian economies is provided in section 3. We also investigate on how open are the markets in south Asian economies for agricultural trade along with the nature of tariff barriers faced by these economies in their partner countries. Thus, whether the tariffs restricting the market access of agriculture is examined in section 4. Section 5 looks at the features of agricultural trade in south Asia. Subsequently, the indicators of agricultural trade liberalization in south Asia are explored in section 6. In section 7, we estimate and analyze the agricultural TOT in south Asia. Finally, the results from the causality analysis are presented in section 8 and section 9 concludes.

## 2. Pattern and Size of World Trade in Agriculture:

The export and import share of economy groups (developed, developing and transitional economies) as well as the share of developing country groups across geographical regions (Africa, America and Asia) in the total world merchandise trade is provided in Table 1.

**Table 1: Export & Import Share of Economic Groups/Geographical Regions in World Merchandise Trade.**

<i>Export f.o.b. (%) ↓ Years →</i>	1980	1990	2000	2005	2006
World	100	100	100	100	100
Developed Economies	65	72	65	60	59
Transition Economies	5	3	2	3	4
Developing Economies	29	24	31	35	36
Developing Africa	6	3	2	2	2
Developing America	5	4	5	5	5
Developing Asia	18	17	23	27	28
East Asia	3	8	12	14	15
South Asia	1	1	1	1	1
South East Asia	3	4	6	6	6
West Asia	9	3	3	4	4
<i>Import c.i.f. (%) ↓</i>					
World	100	100	100	100	100
Developed Economies	71	73	69	65	64
Transition Economies	5	4	1	2	3
Developing Economies	23	22	28	31	32
Developing Africa	4	2	2	2	2
Developing America	5	3	5	4	4
Developing Asia	13	16	20	24	25
East Asia	4	7	11	13	13
South Asia	2	1	1	2	2
South East Asia	3	4	5	5	5
West Asia	4	2	2	3	3

*Source: Derived from UNCTAD Handbook of Statistics.*

*Note: Figures might not add to 100 due to rounding off.*

The table further analyzes the comparative position of East Asia, South Asia, South-East Asia and West Asia within the developing Asian region. It can be seen that the world merchandise trade is dominated by the developed region, followed by the developing countries and with minimal participation of the economies in transition. Thus, the developed countries as a group engaged in 59% of the world export and 64% of the world import in 2006, while the developing countries share remained at 34% of the world export and 32% of the world import during the same period. Further, the participation of developed countries in the world merchandise export and import show a decline since the 90's along with a corresponding increase in the share of the developing countries. It may also be seen that within the developing block, the Asian region takes up the largest share of merchandise trade in comparison with the developing economies of the African or American region. The share of Asian developing region in the world trade is also marked with a comparatively faster growth. In spite of this, the South Asian region holds the lowest share of world export and import as compared to other regions within the developing Asian block. In fact, the growth

rates of both export and import in south Asia remained stagnant and also seem to have lagged behind the growth rates in the East Asian, South-East Asian or West Asian economies.

The value of world agricultural exports and imports accounted for around 907, 780 and 932, 268 million US\$, respectively in 2006, which is about 10% higher in exports and 8% higher in imports from the previous year in nominal terms. This level of growth in agricultural trade amounted to about 56% rise in exports and 54% rise in imports over the export and import level of 1995. The pattern and size of world agricultural trade is examined in the following two tables, viz., while Table 2 looks at the export share by destination as well as import share by origin for the world agricultural trade, Table 3 explores the export and import share of agriculture as a product group in the world trade.

**Table 2: Export and Import Structure of World Agricultural Trade by Partner.**

	<i>Export Share by Destination (%)</i>						
	Years	World	Developed Economies	Transition Economies	Developing Economies	Asian Economies	East+South+South East Asia
All Products	1995	100	67.4	2.2	27.8	20.6	18.3
	2000	100	67.3	1.8	28.0	20.2	17.8
	2005	100	64.7	3.0	30.4	23.1	20.0
All Food Items (SITC: 0+1+22+4)	1995	100	68.4	4.9	25.4	16.5	13.1
	2000	100	66.1	3.4	26.8	16.6	12.7
	2005	100	67.9	5.0	26.3	16.6	12.6
Agricultural Raw Materials (SITC: 2-22-27-28)	1995	100	68.3	1.2	30.1	24.0	22.1
	2000	100	66.2	1.6	31.5	24.9	22.6
	2005	100	60.9	2.2	36.2	29.7	27.0
	<i>Import Share by Origin (%)</i>						
All Products	1995	100	68.9	2.5	27.5	20.2	17.9
	2000	100	61.3	2.6	32.5	24.2	20.8
	2005	100	57.8	3.7	37.3	28.4	24.2
All Food Items (SITC: 0+1+22+4)	1995	100	66.2	2.1	31.4	14.8	13.4
	2000	100	61.6	2.1	33.5	15.4	13.9
	2005	100	62.3	2.6	34.9	15.4	13.6
Agricultural Raw Materials (SITC: 2-22-27-28)	1995	100	66.0	5.6	28.1	16.9	16.3
	2000	100	63.4	5.5	28.6	16.8	16.2
	2005	100	61.5	6.9	31.4	18.5	17.7

Source: Derived from UNCTAD Handbook of Statistics.

The export and import structure of world agricultural trade by partner indicates that a sizable portion of the world export of food items (68%) and agricultural raw materials (61%) were directed towards the developed countries in 2005, whereas about 26% and 36% of the

same reached to the developing countries during the same year (Table 2). The corresponding share of developing economies within the east, south and south-east Asia combined remained at 12% and 27% of the world export in food items and agricultural raw materials, respectively by the same criterion. Thus, this region is a more important destination for the world export of agricultural raw materials in comparison to food items. It can also be noted that the share of world food and raw material export has declined for the developed countries as destination after the 1995, along with a corresponding rise in the share of developing economies. Likewise, as the agricultural imports by origin are concerned, the developed countries remain a larger contributor to the import with the world as a destination. In 2005, about 62% of the food items and agricultural raw materials are sourced from the developed countries as against 35% and 31% of food items and agricultural raw materials, respectively from the developing countries. As in the case of exports, there is a trend for the developed countries share to decline since 1995 as a source of world food and raw material import along with a rise in the same for the developing countries. As the combined share of developing economies in the east, south and south-east Asia reveals, the region acts as an important origin of the world import of food items and agricultural raw materials within the developing economies. We therefore notice that even though the share of developed countries in the world agricultural export by destination criterion or the import by source of origin criterion registered a decline since 1995, yet they remain as the larger destination and the larger contributor to the world agriculture (all food items and agricultural raw materials) trade. The east, south and south-east Asian region jointly occupy an important place within the developing country's share of the world agricultural export as destination and import by origin.

If we look at the importance of agriculture as a product group for the world export in different economic and geographic regions, we find that agriculture (all food items and agricultural raw materials) constitutes about 8% of the total trade in all products in the world during 2005 (Table 3). The corresponding figures for the agricultural exports remain at 8%, 14% and 12% of all products exports in developed, developing and transitional economies, respectively. On the other hand, the share of agricultural imports as percentage of all product imports constituted about 9%, 8%, 8% and 10% in developed, developing, transitional economies and the world in 2005. The corresponding agricultural trade share of the developing economies within the east, south and south-east Asia remains at 6% of the export and 5% of the import. Further, the trend during the period from 1995 to 2005 seems to indicate that there is a decline for the importance of trade in agriculture as a product group in

comparison to the trade in all products. As a consequence, both the export and import share of agriculture dropped down during this period across economic regions and in the world.

**Table 3: Export and Import Structure of World Agricultural Trade by Product Groups.**

	<i>Export Share by Product Groups (%)</i>						
	Years	World	Developed Economies	Transition Economies	Developing Economies	Asian Economies	East+South+South-East Asian Economies
All Products	1995	100	100	100	100	100	100
	2000	100	100	100	100	100	100
	2005	100	100	100	100	100	100
All Food Items (SITC: 0+1+22+4)	1995	9.0	9.1	20.0	8.2	7.2	6.4
	2000	6.7	6.6	12.8	6.4	5.5	4.8
	2005	6.4	6.8	10.6	5.6	4.6	4.1
Agricultural Raw Materials (SITC: 2-22-27-28)	1995	2.7	2.7	1.5	2.9	3.1	3.2
	2000	1.8	1.8	1.6	2.0	2.2	2.3
	2005	1.6	1.5	1.1	1.9	2.0	2.1
	<i>Import Share by Product Groups (%)</i>						
All Products	1995	100	100	100	100	100	100
	2000	100	100	100	100	100	100
	2005	100	100	100	100	100	100
All Food Items (SITC: 0+1+22+4)	1995	9.1	8.8	7.6	10.4	6.6	6.8
	2000	6.9	7.0	5.6	7.1	4.4	4.7
	2005	6.6	7.2	4.8	6.2	3.6	3.7
Agricultural Raw Materials (SITC: 2-22-27-28)	1995	2.9	2.8	6.5	3.0	2.4	2.7
	2000	2.0	2.1	4.3	1.8	1.4	1.6
	2005	1.7	1.8	3.1	1.4	1.1	1.2

Source: Derived from UNCTAD Handbook of Statistics.

### 3. Agriculture in South Asia:

Though, the south Asia as a region has showed signs of remarkable overall economic growth since 2000 and the performance of individual economies in terms of the GDP growth has been significant, the agricultural growth performances continue to remain poor in almost all the economies in the region. To capture the compound growth rate of real agricultural and total GDP (at 1980 prices), we undertake regression analysis of each series on time in semi-log form and then take the antilog of the coefficients for time, subtract 1 from it, and multiply the difference by 100. As indicated in Table 4, countries such as Bangladesh, Bhutan and India achieved high GDP growth rates, whereas the growth rates in Nepal, Pakistan and

Srilanka drifted in the range of 4 percent. On the contrary, agricultural growth in all the south Asian economies remained low and consistently lagged behind their respective total GDP growth. Table 4 reveals that the annual average growth rate of real agricultural output remained the highest in Bangladesh followed by Pakistan and Bhutan, which remained in the range of about 4%, whereas the growth rate in India, Nepal and Srilanka remained low down at around 2-3%. Further, the structural transformation process in the south Asian region has seen a steady decline of agriculture over the study period. Agriculture in this region (excepting Bhutan and Nepal) occupied about one-third share of the GDP during early-80, which declined considerably in all the economies and constituted about one-fifth or even smaller portion of the GDP in 2006. Although, the composition of agriculture initially remained comparatively higher in both Bhutan and Nepal, its share declined in Bhutan but not in Nepal. It may however be observed that in spite of this significant decline, agriculture in recent years still accounts for a sizable portion of the GDP in some of the south-Asian economies.

**Table 4: Composition and Growth Rates of Agricultural GDP in South Asia (1980-2006).**

	Bangladesh	Bhutan	India	Nepal	Pakistan	Srilanka
<b>Share of Agriculture in GDP at 1980 Prices</b>						
Triennium ending 1982	41.4	54.7	35.1	62.6	28.9	26.3
Triennium ending 1988	37.73	48.91	30.88	59.69	24.97	22.22
Triennium ending 1994	25.44	39.81	28.32	53.68	23.41	19.07
Triennium ending 2000	23.05	34.20	23.47	47.40	24.26	17.85
Triennium ending 2006	20.19	26.59	18.29	45.71	22.14	14.77
<b>Growth Rates of Agricultural GDP at 1980 Prices</b>						
1980 to 2006	4.42 *	3.34 *	2.99 *	1.78 *	3.90 *	1.63 *
<b>Growth Rates of Total GDP at 1980 Prices</b>						
1980 to 2006	7.91 *	7.90 *	5.74 *	3.42 *	4.69 *	3.98 *

Notes:

- 1) Growth rates are derived by running a regression in semi-log form, and interpreting  $[\text{Antilog}(\beta-1)] \times 100$ ,  $\beta$  is regression coefficient.
- 2) The time trends for all countries refer to the period 1980-2006 except for Bhutan, which refers to 1980-2005.
- 3) \* indicates statistical significance at 5% level of significance.

The patterns of workforce distribution and transformation process along with the poverty incidence (both rural and urban) in south Asian economies have been examined in Table 5. The economy-wise distribution of employment across broad economic sectors suggests that the decline of agricultural employment in this region proceeded at a slow pace

during the last two decades. Leaving aside the experience of Srilanka, where the share of agricultural workforce declined significantly in 2002 as compared the level in the nineties, agriculture maintained to be the chief source of employment in the major economies of the region, viz., Bangladesh and India. It is further noted that though these economies have made some moderate progress in terms of overall poverty reduction, the incidence of rural poverty continues to remain significant in the region. Since the majority of the south Asian population is concentrated in rural areas and agriculture still continue to be the largest source of employment in rural south Asia, the achievement of higher economic growth has had limited impact on the poverty reduction in the middle of stagnant agricultural growth in the region.

**Table 5: Agricultural Employment and Poverty in South Asia.**

	Bangladesh	Bhutan	India	Maldivesl	Nepal	Srilanka
<b>EAP as % of Working Age Population</b>						
<b>1990</b>						
Female	58.2	36.4	41.1	20.5	50.4	35.0
Male	79.6	86.7	37.6	79.3	82.5	64.8
<b>Recent</b>	<b>2003</b>	<b>2005</b>	<b>2005</b>	<b>2005</b>	<b>2005</b>	<b>2006</b>
Female	26.1	48.8	22.4	49.1	52.5	35.7
Male	87.4	81.3	55.1	73.0	80.6	68.1
<b>% of Employment</b>						
<b>1990</b>						
Agriculture	64.0	-	62.0	5.0	-	47.0
Industry	15.0	-	15.0	16.0	-	15.0
Services	21.0	-	22.0	79.0	-	38.0
<b>Recent</b>	<b>2003</b>		<b>2005</b>	<b>2006</b>	<b>1999</b>	<b>2006</b>
Agriculture	62.0	-	56.0	4.0	76.0	32.0
Industry	10.0	-	19.0	17.0	6.0	19.0
Services	38.0	-	25.0	79.0	18.0	49.0
<b>Population in Poverty (%): National Poverty Line</b>						
<b>Year</b>	<b>2005</b>	<b>2003</b>	<b>2004</b>	<b>2004</b>	<b>2004</b>	<b>2002</b>
Total	40.0	31.7	27.5	21.0	30.9	22.7
Urban	28.4	4.2	25.7	-	10.0	7.9
Rural	43.8	38.3	28.3	-	35.0	24.7

*Note: Derived from Key Indicators of Developing Asian and Pacific Countries (ADB).*

#### 4. Trade Policy in South Asian Agricultures:

The south Asian region was relatively closed and did not have any outward-oriented trade policies until the early 1990s, and initiated systematic trade liberalization since then. The attempt to link economies with the global market has however proceeded in varying degrees. It can be seen from the data on import tariff duties before and after the UR-AoA that the tariffs in Bangladesh, India, Pakistan and Srilanka declined almost by 60% or more (Table 6).

**Table 6: Trends in Trade Openness in South Asia (1990 -2004).**

Country	<i>Simple Mean Tariff (%)</i>		<i>Weighted Mean Tariff (%)</i>	
	1990	2004	1990	2004
India	79	28.3	56.1	28
Pakiustan	50.1	15.9	44.4	13
Bangladesh	106.5	16.5	88.4	15.9
Nepal	21.8	14.5	15.6	8.5
Srilanka	27.4	10.2	27	6.8

*Source: World Bank [2005].*

Among the south Asia economies, Srilanka made the most significant efforts in agricultural trade liberalization by binding their tariff rates, offering preferential tariffs or duty-free imports to a number of countries, and removing some of the import controls and licensing (Kelegama 2003, 2007). Pakistan acted to bind more than 90% of their agricultural tariff lines, reducing the applied tariff rates, and removing the non-tariff barriers (Khan 2003). Bangladesh undertook significant lowering of the tariff rates and also reformed the non-tariff barriers (Dowlah 2003). India had high bound tariff rates compared to the other south Asian economies and had subsequently reduced tariff duties as well as removed the non-tariff barriers on agricultural trade (Gulati 2003, Jha 2006). It is often claimed that reductions in tariff duties can signify integration of the economy with the world economy. Since the applied tariff rates in each of the economies fall below the bound rates, it appears that the south Asia has fulfilled the commitments made under the UR-AoA. A detail examination of the agricultural tariff rates in these economies follows.

The recent tariff rates (final bound and MFN applied) in south Asian economies for the agricultural and non-agricultural commodities are given separately in Table 7. The simple average of final bound and MFN applied or the trade weighted averages of applied tariffs are higher for agriculture in comparison to non-agriculture. In fact, the average bound tariff rates for the economy looks large due to high bound rates of tariff in agriculture. In some of the countries the agricultural bound tariff rates are excessively high, viz. in Bangladesh and India. As a matter of fact, the bound tariff rates for agriculture is about two to three times higher as compared to non-agriculture in India, Nepal, Pakistan and Srilanka, and five times higher in Bangladesh. The MFN applied tariff rates are however much lower than the final bound tariff rates for both agriculture and non-agriculture. Even then, the average of applied tariff rates is higher for agriculture in comparison to non-agriculture, and is kept at a comparatively high level in Bhutan and India. The gap between the averages of MFN applied

tariff rates in agriculture and non-agriculture is high in these economies and works out to be about two to three times in Bhutan, India and Srilanka. The high bound rate of tariff in agriculture is meant to provide protection for the domestic producers against cheap farm imports. However, the divergence between the trade weighted average and simple average of applied tariff in Indian agriculture would mean that the agricultural imports can go up if duty rates are reduced.

**Table 7: Tariff Rates in South Asian Economies.**

	Bangladesh	Bhutan	India	Nepal	Pakistan	Srilanka
<b><i>Simple Average Final Bound</i></b>						
Total	163.6	-	49.2	26.0	59.9	30.3
Agricultural	188.5	-	114.2	41.4	95.6	50.1
Non-Agricultural	33.8	-	34.9	23.7	54.6	19.6
<b><i>Simple Average MFN Applied</i></b>						
Total	15.2	22.1	19.2	13.9	14.3	11.2
Agricultural	17.3	41.3	37.6	14.9	16.3	23.8
Non-Agricultural	14.9	19.2	16.4	13.7	14.0	9.2
<b><i>Trade Weighted Average</i></b>						
Total	-	-	14.7	-	13.1	7.4
Agricultural	-	-	60.6	-	15.2	19.2
Non-Agricultural	-	-	12.3	-	12.8	5.9

**Source:** *WTO News and WTO website at [www.wto.or](http://www.wto.or).*

The frequency distribution of tariff lines and import values against various tariff duty ranges (both final bound and MFN applied) are illustrated separately for agriculture and non-agriculture in the south Asian economies (Table 8). If we look at the frequency distribution against MFN applied tariff rates, we find that the largest group of agricultural tariff lines fall under 25 to 50% tariff duty range in Bhutan, India and Srilanka. As par the same MFN applied rates, the largest tariff lines group belong to 15 to 25% tariff duty in Bangladesh and Pakistan and 5 to 10% tariff duty in Nepal. For most of the economies, the MFN applied tariff duty range enclosing the largest group of tariff lines in agriculture turns out to be lower than the final bound tariff duty range containing the same. In fact, the semblance between the bound and applied tariff rates in agriculture can be found only in Srilanka, where the largest group of tariff lines fall under the 25 to 50% rate according to both bound and applied duty rates. By comparing the frequency distribution of tariff duty ranges between the agricultural and non-agricultural commodities we also note that the largest tariff line for non-agricultural commodities falls under a comparatively lower applied duty rate as compared to the same for agricultural commodities in Bhutan, India, Pakistan and Srilanka.

**Table 8: Tariff Duty Ranges in South Asian Economies.**

	Duty Free	0 ≤ 5	5 ≤ 10	10 ≤ 15	15 ≤ 25	25 ≤ 50	50 ≤ 100	> 100
<b>Bangladesh</b>								
<b>Agricultural</b>								
Final Bound	0	0	0	2	0.2	4.6	0	<b>93.1</b>
MFN Applied	11.5	0	11.7	21	<b>55.2</b>	0	0	0
<b>Non-agricultural</b>								
Final Bound	0	0.2	0	0.2	0.8	1.7	0	0
MFN Applied	6.7	0	25.2	30.4	37.6	0	0	0
<b>Bhutan</b>								
<b>Agricultural</b>								
MFN Applied	0	0	3.1	0	5.5	<b>87</b>	4.1	0
<b>Non-agricultural</b>								
MFN Applied	4.1	0	34.9	2.6	26	32.2	0.1	0
<b>India</b>								
<b>Agricultural</b>								
Final Bound	0	0	1.3	0.1	2.5	6.7	<b>53</b>	36.2
MFN Applied	2.5	0	1.4	3	0.4	<b>80.5</b>	10.7	1.4
Imports	0.4	0	5.1	3.7	0	<b>48.5</b>	41.5	0.8
<b>Non-agricultural</b>								
Final Bound	3.2	0.5	0	0	15	50	0.8	0.3
MFN Applied	2.4	1.8	0.2	84.8	5.2	4.2	1.1	0.2
Imports	7.7	4.4	28.6	55.5	3.5	0.2	0.1	0
<b>Nepal</b>								
<b>Agricultural</b>								
Final Bound	0	0.7	2.4	0.4	4.8	<b>83.1</b>	7.7	0.9
MFN Applied	1.7	9.6	<b>60.5</b>	10.1	9.5	7	0.6	0.8
<b>Non-agricultural</b>								
Final Bound	3.1	1.1	2.9	5.3	47.6	39.2	0.1	0
MFN Applied	0.8	24.1	27	31.6	11.4	4.3	0.7	0
<b>Pakistan</b>								
<b>Agricultural</b>								
Final Bound	0	3.3	0	0.3	0.1	0.5	<b>90.3</b>	1.8
MFN Applied	0	<b>32.2</b>	15.4	13.6	<b>34.5</b>	1.9	2.3	0
Imports	0	<b>39</b>	28.3	1.9	6.1	24.5	0.1	0.1
<b>Non-agricultural</b>								
Final Bound	0	1.9	0	1.8	14.8	18.3	62.3	0
MFN Applied	0	40	14.5	5.2	38.1	1.5	0.6	0
Imports	0	55.1	15.8	2	18.9	5.7	2.4	0
<b>Srilanka</b>								
<b>Agricultural</b>								
Final Bound	0	0.2	0.1	0	0.5	<b>96</b>	3	0
MFN Applied	4.1	8.6	3.4	16.8	0.4	<b>65.5</b>	0.7	0.5
Imports	0.7	26.3	1.7	<b>33.1</b>	1	32.3	4.8	0
<b>Non-agricultural</b>								
Final Bound	0.2	7.5	7.1	0.1	7.2	5.4	0.7	0
MFN Applied	13.7	38.7	7.7	26	0	13.8	0	0
Imports	43.7	25.5	6.4	15.3	0	9.1	0	0

Source: WTO News and WTO website at [www.wto.org](http://www.wto.org).

Note: Tariff lines and import values are in percentage.

Interestingly, the largest tariff line in agriculture is contained under a lower MFN applied duty range as compared to that in non-agriculture for Nepal and included under the same duty range for Bangladesh. The distribution of import values categorized under various duty ranges indicates that the majority of agricultural import is carried out under lower duty rates in Pakistan and Srilanka as compared to that in India. However, while the majority of non-agricultural import is carried out under a comparatively lower tariff duty in India and Srilanka, Pakistan carries out most of its agriculture as well as non-agricultural imports under the same duty rates.

**Table 9: Tariffs Confronting South Asian Economies for Exports to Major Trading Partners.**

	MFN Average of Traded Tariff Lines		Duty Free Imports	
	Simple	Weighted	Tariff Lines (%)	Value (%)
<b>Bangladesh</b>				
Major Partners:				
European Community	8.0	11.6	96.8	99
US	10.6	15.0	35.7	8
Canada	9.6	17.1	100.0	100
<b>Bhutan</b>				
Major Partners:	17.2	18.2	1.0	17
India	0	0.0	100	100
Hong Kong, China	9.3	0.2	32.6	98
Mexico				
<b>India</b>				
Major Partners:				
European Community	5.9	5.3	56.5	56
US	4.3	4.7	69.5	66
China	8.9	3.4	8.5	58
<b>Nepal</b>				
Major Partners:				
India	22.2	22.4	8.7	14
European Community	7.2	10.5	97.6	94
US	8.2	9.4	30.7	37
<b>Pakistan</b>				
Major Partners:				
European Community	8.0	8.7	39.0	21
US	7.7	10.5	38.5	8
China	10.2	6.4	7.0	3
<b>Srilanka</b>				
Major Partners:				
US	7.5	14.0	46.2	15
European Community	7.6	8.3	94.6	99
India	20.6	22.8	78.2	93

Source: WTO News and WTO website at [www.wto.or](http://www.wto.or).

Finally, the tariff structures confronting the south Asian economies for exports to their major trading partners are analyzed in Table 9. The simple as well as weighted averages of traded tariffs lines are lower in most of their partner countries as compared to their domestic tariff for foreign imports. Further, the data reveals that a major portion of the south Asian exports are traded under duty free imports in their partner countries. It may be mentioned that the bound and applied tariff rates for agricultural commodities are still considered to be high in south Asia (Ingco and Kandiero 2003). It therefore appears that though the south Asian economies made significant effort in providing the market access opportunities to other nations, there is still a scope for further tariff reductions and removal of quantitative trade restrictions on imports that are still being used in Bangladesh, India and Pakistan.

### 5. Features of Agricultural Trade in South Asia:

The agricultural export in south Asian economies mainly concentrates on meat and edible meat, fish and crustaceans, edible vegetables, edible fruits and nuts, coffee-tea-spices, cereals, oil seeds fats and oils, preparations of meat/fish, sugar, tobacco and others. Whereas the import concentrates on meat and edible meat, dairy, edible vegetables, edible fruits and nuts, coffee-tea-spices, cereals, oil seeds fats and oils, sugars, beverages-spirits- vinegar, tobacco and others.

**Table 10: Size of Agricultural Trade in South Asian Economies.**

Economy	Triennium ending 1981	Triennium ending 1991	Triennium ending 2001	2003	2004
<b><i>Share in World Agricultural Export</i></b>					
Bangladesh	0.08	0.05	0.03	0.02	0.02
Bhutan	0.00	0.00	0.00	0.00	0.00
India	1.09	0.89	1.19	1.24	1.17
Nepal	0.02	0.02	0.02	0.03	0.02
Pakistan	0.41	0.37	0.26	0.24	0.21
Srilanka	0.30	0.21	0.23	0.19	0.19
World	100	100	100	100	100
<b><i>Share in World Agricultural Import</i></b>					
Bangladesh	0.20	0.21	0.39	0.33	0.31
Bhutan	0.00	0.00	0.01	0.00	0.00
India	0.55	0.28	0.82	0.89	0.81
Nepal	0.02	0.04	0.05	0.07	0.03
Pakistan	0.32	0.38	0.43	0.32	0.35
Srilanka	0.15	0.15	0.17	0.15	0.15
World	100	100	100	100	100

*Source: Derived from FAO Statistical Yearbook.*

Athukorala [1999] had earlier noted that the relative position of south Asia in the global economy and world trade has declined dramatically during the period from early-60's to mid-90. In Table 10 we examine the magnitude of agricultural trade in south Asian economies by individually exploring their agricultural export and import shares in the world export and import of agriculture. It is apparent that the percentage of agricultural exports as well as imports in the world agricultural trade is low in all the south Asian economies. The proportion of agricultural export in the world agricultural export revealed a rising trend since the 1990s for India. On the other hand, the proportion of agricultural import in the world agricultural import revealed an increase after the 1990s in Bangladesh, India and Pakistan.

**Table 11: Characteristics of Agricultural Trade in South Asian Economies.**

Economy	Triennium ending 1981	Triennium ending 1991	Triennium ending 2001	2003	2004
	<b>Share of Food in Agricultural Export</b>				
Bangladesh	3.75	11.98	11.15	13.35	20.80
Bhutan	100.00	88.43	78.48	51.06	56.15
India	40.23	38.12	58.03	61.88	63.85
Nepal	71.41	84.27	53.91	44.55	49.32
Pakistan	57.51	37.65	81.81	85.54	81.20
Srilanka	17.06	17.59	18.64	17.26	18.07
World	67.00	67.00	68.00	69.00	69.00
<b>Share of Food in Agricultural Import</b>					
Bangladesh	74.54	83.71	80.51	81.55	84.66
Bhutan	100.00	86.78	80.94	77.22	75.85
India	90.02	69.63	72.72	76.98	77.63
Nepal	93.37	57.36	66.63	72.35	72.49
Pakistan	73.67	72.48	67.53	64.01	54.16
Srilanka	92.73	88.31	82.73	83.47	84.23
World	67.00	67.00	68.00	69.00	69.00
<b>Share of Cereals in Agricultural Export</b>					
Bangladesh	0.04	0.00	0.32	0.19	0.21
Bhutan		13.72	14.78	15.36	7.08
India	11.67	10.65	17.47	24.29	28.35
Nepal	28.80	0.39	9.70	1.09	1.56
Pakistan	49.22	25.57	53.07	60.60	53.91
Srilanka	0.13	0.04	0.12	0.21	0.33
World	17.00	11.00	9.00	8.00	8.00
<b>Share of Cereals in Agricultural Import</b>					
Bangladesh	42.12	32.61	30.17	32.14	28.33
Bhutan	29.42	43.58	35.67	31.17	26.12
India	10.32	8.16	2.09	0.03	0.06
Nepal	27.16	1.60	9.83	4.69	5.74
Pakistan	22.06	22.78	10.73	2.40	1.58
Srilanka	46.33	35.22	20.53	21.53	29.30
World	17.00	11.00	9.00	8.00	8.00

Source: Derived from FAO Statistical Yearbook.

Table 11 examines the characteristics of agricultural trade in south Asian economies by looking at the share of food and cereals in the respective trade flows. It can be seen that though the share of food remains sizeable in both the export and import flow in some of the economies, it is in fact the import flow where the food items remains significant in this region. For instance, the proportions of food in the agricultural import remain substantially higher than the world average in Bangladesh, Bhutan, India and Srilanka. While the world average figure for the proportion of food in agricultural export remained more or less stable between 1991 and 2004, the share of food in agricultural export increased in Bangladesh, India and Pakistan and declined in Bhutan and Nepal during the corresponding period. In the agricultural import flow, the portion of food increased in India and Nepal and declined in Bhutan, Pakistan and Srilanka. The share of cereals in the agricultural export flow depicted a rising trend in India and Pakistan. Finally, though the data till 2004 portrayed a declining share of cereals in the agricultural import flows, the same have gone up recently for all the south Asian economies.

## 6. Indicators of Agricultural Trade Liberalization in South Asia:

The share of agricultural export in the total export has been found to decline significantly for all the south Asian economies during decade of 70's and 80's (Athukorala 1999). Recently, Chand and Bathla [2005] and Pal [2007] examined the impact of WTO trade liberalization on the south Asian agricultures for the period from 1991 to 2003, and inferred that none of the south Asian countries have benefited significantly from the trade liberalization in agriculture. The presumption in both the studies is based on the examination of absolute export, import and trade balance of agriculture in these economies before and after 1995, when the WTO agreement came into effect. To examine the extent of trade liberalization in south Asian agricultures, we have used the standard indicators trade liberalization such as the export share, export performance, net trade performance and trade openness in agriculture.<sup>1</sup>

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<sup>1</sup> The agricultural export share is calculated as the ratio of agricultural exports to total exports of the economy. The agricultural export performance is calculated as the ratio of agricultural exports to gross domestic product in agriculture. The trade openness in agriculture is calculated as the average share of agricultural exports plus imports in agricultural gross domestic product. The net trade performance in agriculture is calculated as the ratio of agricultural exports minus agricultural imports to agricultural exports plus agricultural imports. The overall trade openness in the economy is calculated as the average share of exports plus imports in the gross domestic product.

**Table 12: Trade Indicators of South Asian Agriculture.**

Years	Agricultural Export Share						
	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Srilanka
Triennium ending 1982	31.4	32.0	33.8	59.0	72.3	40.9	62.7
Triennium ending 1985	33.0	38.5	33.4	53.3	64.5	30.3	61.7
Triennium ending 1988	27.0	19.8	30.5	65.3	43.9	30.1	48.4
Triennium ending 1991	20.9	21.3	25.2	72.2	28.0	23.8	40.2
Triennium ending 1994	14.5	23.8	21.0	77.4	14.7	15.6	23.4
Triennium ending 1997	12.1	17.4	20.2	78.7	10.1	14.4	22.8
Triennium ending 2000	8.8	15.8	16.3	63.5	13.6	14.4	22.9
Triennium ending 2003	7.2	n.a	13.4	62.3	21.7	12.4	22.7
Triennium ending 2006	6.9	n.a	10.6	73.0	22.2	12.8	23.6
Years	Agricultural Export Performance						
	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Srilanka
Triennium ending 1982	3.5	9.1	4.5	-	5.7	10.7	59.3
Triennium ending 1985	4.0	9.7	4.5	-	5.9	8.7	62.1
Triennium ending 1988	3.8	9.9	4.4	-	4.9	11.1	49.5
Triennium ending 1991	3.4	14.8	5.1	-	3.6	10.3	46.5
Triennium ending 1994	3.9	18.0	5.7	-	3.7	7.3	32.8
Triennium ending 1997	4.1	17.9	6.8	-	2.2	6.6	38.2
Triennium ending 2000	3.7	14.6	5.9	-	3.8	6.7	41.7
Triennium ending 2003	3.7	n.a	6.8	-	6.7	7.2	43.7
Triennium ending 2006	4.4	n.a	7.7	-	5.9	7.6	47.0
Years	Agricultural Net Trade Performance						
	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Srilanka
Triennium ending 1982	-0.4	0.0	0.3	-0.1	0.1	0.2	0.5
Triennium ending 1985	-0.4	0.0	0.1	0.2	0.1	-0.1	0.4
Triennium ending 1988	-0.4	0.0	0.1	0.2	-0.2	0.0	0.2
Triennium ending 1991	-0.4	0.1	0.2	-0.1	-0.4	-0.1	0.1
Triennium ending 1994	-0.4	0.0	0.2	-0.1	-0.6	-0.3	0.0
Triennium ending 1997	-0.5	-0.1	0.4	-0.3	-0.7	-0.3	0.0
Triennium ending 2000	-0.6	-0.1	0.2	-0.4	-0.5	-0.3	0.1
Triennium ending 2003	-0.7	n.a	0.1	-0.3	-0.4	-0.2	0.1
Triennium ending 2006	-0.6	n.a	0.2	-0.2	-0.4	-0.3	0.1

Source:

Derived by using the UNCTAD trade data and sectoral GDP data provided in various issues of Key Indicators of Developing Asian and Pacific Countries (Asian Development Bank).

Notes:

1) Agriculture is the sum of all food items and agricultural raw materials. The data on all food items refer to the sum of food, beverages, tobacco, oilseeds and oleaginous fruits, animal and vegetable oils and fats. It includes the sum of SITC section 0, section 1, section 4 and division 22. The data on agricultural raw materials excludes synthetics and includes the SITC section 2 (less division 22, 27, 28, and groups 233, 244, 266 and 267).

2)

$$\text{Agricultural export share} = \left( \frac{\text{Export}_{\text{Agriculture}}}{\text{Export}_{\text{Total}}} \right),$$

$$\text{Agricultural export performance} = \left( \frac{\text{Export}_{\text{Agriculture}}}{\text{GDP}_{\text{Agriculture}}} \right),$$

$$\text{Net trade performance in Agriculture} = \left( \frac{\text{Export}_{\text{Agriculture}} - \text{Im port}_{\text{Agriculture}}}{\text{Export}_{\text{Agriculture}} + \text{Im port}_{\text{Agriculture}}} \right).$$

The trade indicators provided in Table 12 point out that agriculture's export share in south Asia declined for almost all the economies excepting for Maldives in recent years as compared to the level in early 80's. If we seek out for the indication of improvements in agriculture's export share after the inception of WTO, we note that only Nepal and Srilanka experienced ascending export share in agriculture since the mid 90's. The estimates of export performance indicate that agriculture in Srilanka possess the highest degree of export performance, which is almost 50% as compared to the level of 10% recorded in other south Asia economies. Further, the export performance in all these economies seems to be improving particularly since the mid 90's. On the other hand, the net trade performance figures reveal that only India and Srilanka are the net exporter of agriculture in this region, while other economies, viz., Bangladesh, Bhutan, Nepal and Pakistan remain as net importers in agricultural trade and their state of affairs have continued to stay unchanged even after the mid 90's.

**Table 13: Agricultural Trade Openness vis-à-vis the Economy in South Asia.**

Years	Agricultural Trade Openness						
	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Srilanka
Triennium ending 1982	11.9	19.3	7.0	160.7	10.4	18.6	79.5
Triennium ending 1985	13.8	18.7	8.2	114.6	10.9	20.4	91.6
Triennium ending 1988	12.9	19.5	8.3	156.3	12.2	23.0	82.3
Triennium ending 1991	12.4	27.5	8.4	268.6	13.0	23.3	84.6
Triennium ending 1994	13.8	36.2	9.4	186.3	16.6	19.8	67.0
Triennium ending 1997	16.4	40.8	10.0	292.1	12.5	19.7	75.7
Triennium ending 2000	18.3	33.3	10.2	301.3	15.8	18.3	76.7
Triennium ending 2003	23.2	n.a	11.9	290.7	23.0	17.7	80.1
Triennium ending 2006	25.2	n.a	13.3	402.3	19.1	21.1	84.7
	Economy Trade Openness						
Triennium ending 1982	14.5	55.2	12.1	66.2	21.8	21.7	64.4
Triennium ending 1985	14.3	54.7	10.9	72.9	23.6	21.5	53.8
Triennium ending 1988	14.0	63.8	10.2	68.9	24.5	21.2	51.4
Triennium ending 1991	16.2	59.1	12.6	86.9	26.3	23.5	54.5
Triennium ending 1994	18.7	96.9	15.7	74.6	35.7	23.9	62.3
Triennium ending 1997	22.6	72.2	18.3	80.8	40.6	25.4	66.7
Triennium ending 2000	25.6	69.1	19.1	77.6	39.2	24.1	65.6
Triennium ending 2003	28.2	67.6	22.0	78.0	39.3	26.1	62.6
Triennium ending 2006	32.3	62.4	31.0	113.8	35.7	30.4	61.9

Source:

Derived by using the UNCTAD trade data and sectora/total GDP data provided in Key Indicators of Developing Asian and Pacific Countries (Asian Development Bank).

Notes:

1) Agriculture consists of all food items and agricultural raw materials, as given in Table 11.

2)

$$\text{Agricultural trade openness} = \left( \frac{\text{Export}_{\text{Agriculture}} + \text{Im port}_{\text{Agriculture}}}{\text{GDP}_{\text{Agriculture}}} \right).$$

Table 13 compares the trade openness in agriculture vis-à-vis the respective economy, which informs that the overall economy is more open to trade than the relevant agricultural sectors in all the sample economies of south Asia, excepting Srilanka. In fact, Srilanka possess the highest agricultural trade openness in the region and other economies are more open in their manufacturing and services trade. Further, the divergence between the agricultural and economic trade openness is rather sharp in India and Nepal, where the overall trade openness is twice the size of the agricultural trade openness. Although, the trade openness in agriculture showed an improvement for each of the economies after the mid 90's, the progress remains sharp in Bangladesh and Srilanka and moderate in India and Pakistan.

## 7. Agricultural Terms of Trade in South Asia:

### 7.1. Methodology:

The domestic terms of trade (TOT) for agriculture is mostly analyzed by referring to the net barter TOT, which is defined by:

$$NBTOT = \frac{P_{Agriculture}}{P_{Non-agriculture}},$$

where,  $P_{Agriculture}$  and  $P_{Non-agriculture}$  refer to composite price indices of agricultural and non-agricultural sectors, respectively. In this study we would work out the estimates of agricultural TOT by defining the ratio of implicit price deflator for agriculture to that of the whole economy. That is,

$$\text{Agricultural TOT} = \frac{P_{va,j}}{P_{va}}$$

where:

$P_{va,j}$  = implicit price deflator for the j-th sector, i.e.,  $P_{va,j} = X_{va,j} / X'_{va,j}$

$P_{va}$  = implicit price deflator for the economy, i.e,  $P_{va} = \sum_j X_{va,j} / \sum_j X'_{va,j}$

$X_{va,j}$  = sectoral gdp of the j-th sector at current prices

$X'_{va,j}$  = sectoral gdp of the j-th sector at constant prices, and, j = agriculture.

### 7.2. Data Source

The basic data on total GDP and agricultural sector (both at current and constant prices) has been collected from various issues of *Key Indicators (ADB)*. There is a problem in obtaining the estimates of agricultural and total GDP at constant prices over a longer period of time due to the revisions in the base year from time to time. The revision of base years in the national accounts data often provided constant price estimates which are not comparable with the

earlier series. We have therefore arrived at the long GDP series referring to the time period 1980-2006 by splicing the two or three shorter series with different base years. Further, the constant price estimates of GDP in south Asian economies refer to different base years. Thus, the basic GDP data in all the economies have been pre-adjusted by undertaking a base-shifting so as to have a common base year which is 1980. Our data in general refers to the period 1980 to 2006 except for Bhutan, which is available only till 2000.

### 7.3. Terms of Trade Results

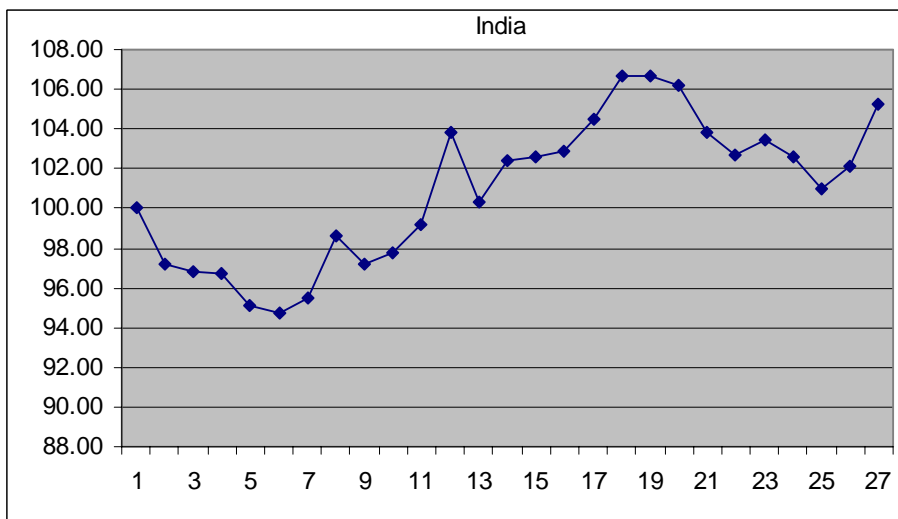
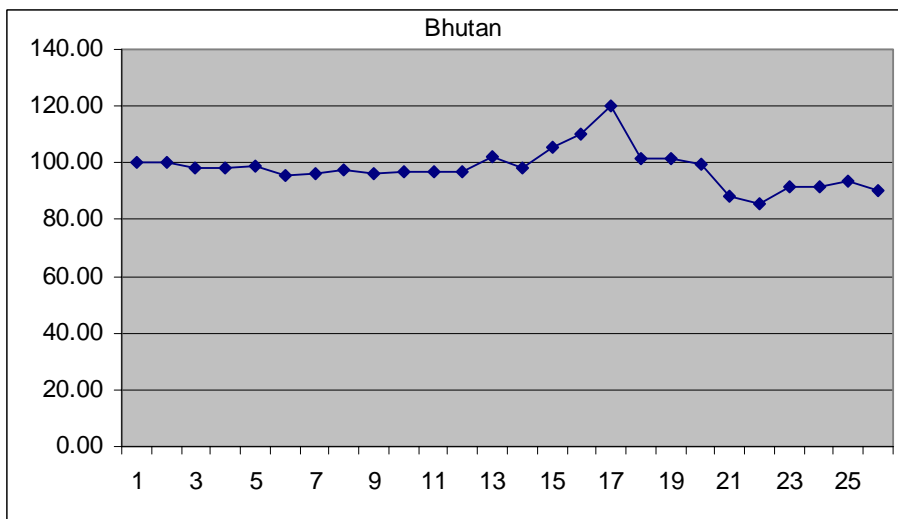
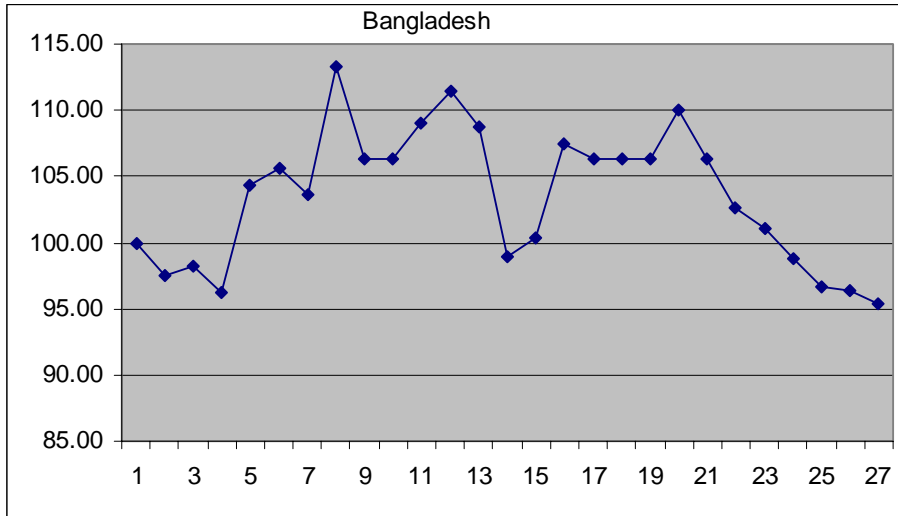
Results of agricultural TOT indices (base: 1980 = 100) for six south Asian economies during specific years in 80's, 90's and the recent decade have been provided in Table 14. The estimates are presented in the form of three-year averages to reduce the inter-year fluctuations. The agricultural TOT in recent years can be found to have remained favorable only in India and Srilanka, with Srilanka experiencing domestic TOT movements quite favorable to agriculture. On the other hand, Bangladesh, Bhutan, Nepal and Pakistan experienced unfavorable agricultural TOT movements in the recent period. Figure 1 contains a plot of individual agricultural TOT series for the whole sample period. It is observed that though the agricultural TOT visibly improved in all the economies during the mid-90's, it went down markedly in almost all the economies around 2000, which thereafter showed signs of improvement only in India, Srilanka and Nepal.

**Table 14: Agricultural Terms of Trade Indices in South Asia (Base: 1980 = 100).**

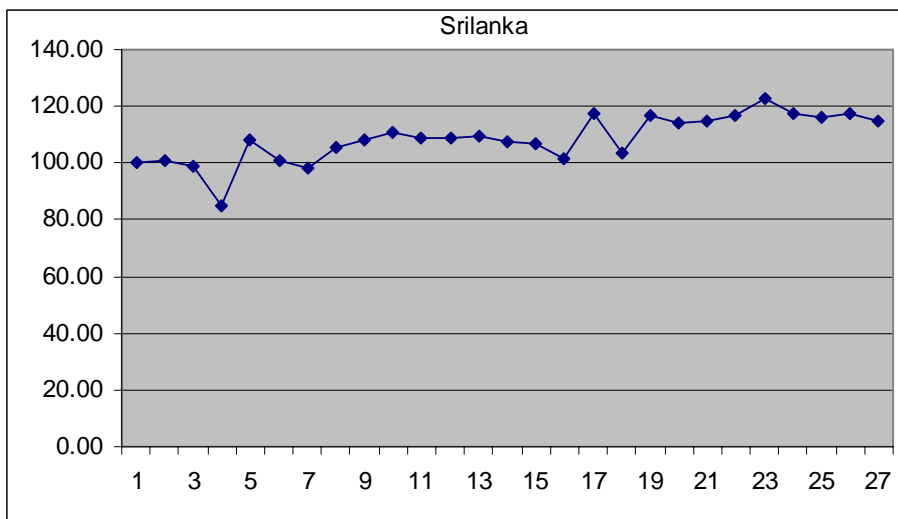
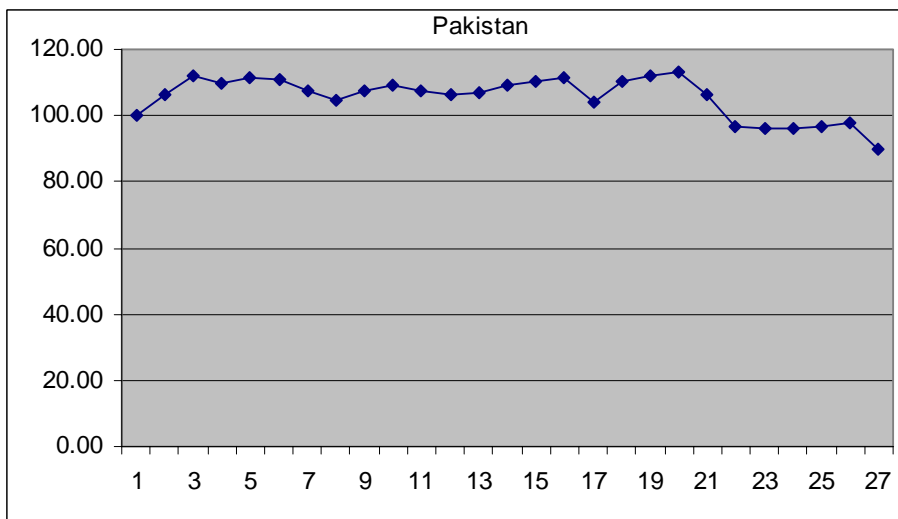
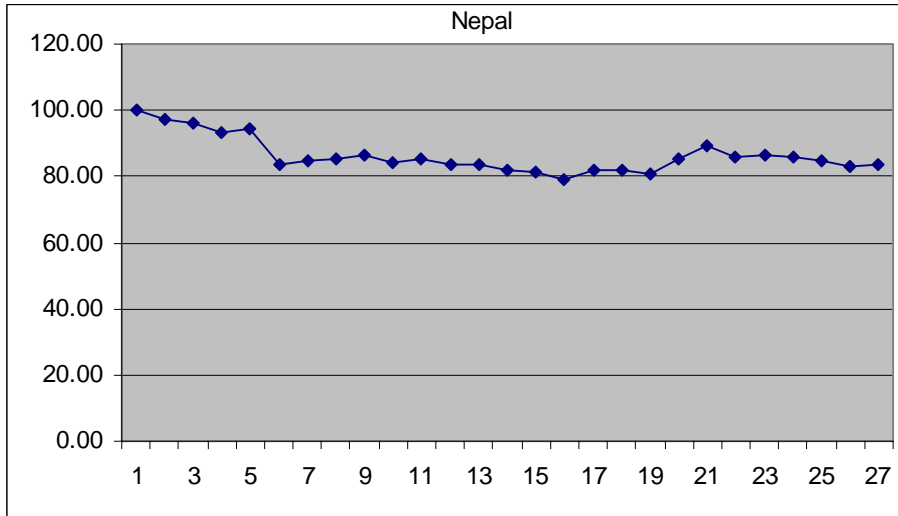
Years	Bangladesh	Bhutan	India	Nepal	Pakistan	Srilanka
Triennium ending 1982	98.59	99.43	98.01	97.75	106.06	100.08
Triennium ending 1985	102.04	97.50	95.51	90.44	110.70	98.07
Triennium ending 1988	107.77	96.83	97.07	85.49	106.65	103.88
Triennium ending 1991	108.92	96.79	100.26	84.51	107.62	109.40
Triennium ending 1994	102.67	102.06	101.77	82.14	108.76	108.12
Triennium ending 1997	106.67	110.59	104.69	81.07	108.62	107.69
Triennium ending 2000	107.55	96.58	105.57	85.14	110.32	115.17
Triennium ending 2003	100.83	89.65	102.92	85.91	96.36	119.14
Triennium ending 2006	96.13	92.03	102.77	83.80	94.87	116.37

*Source: Derived by using sectoral and total GDP data provided in various issues of the publication Key Indicators of Developing Asian and Pacific Countries (Asian Development Bank).*

**Figure 1: Pattern of Agricultural Terms of Trade Movements in South Asia.**



**Figure 1: Pattern of Agricultural Terms of Trade Movements in South Asia.**



To capture the statistical trend in agricultural TOT movements, we carry out regression of TOT series in each economy on time in semi-log form. The coefficients of time which denote the sustained trend of TOT can also be converted to the compound rate of growth in TOT by taking the antilog, subtracting 1 from it, and multiplying the difference by 100. The statistical growth rate of agricultural TOT in each of the economies of South Asia during the period 1980 to 2006 is provided in Table 15. It can be seen that the coefficient of time is statistically significant in India, Nepal, Pakistan and Srilanka and insignificant in Bangladesh and Bhutan. We also notice that agricultural TOT movements have registered a significant (statistically) improvement in India and Srilanka, and statistically significant deterioration in Nepal and Pakistan during the sample period.

**Table 15: Growth Rates of Agricultural Terms of Trade in South Asia (1980-2006).**

Bangladesh	Bhutan	India	Nepal	Pakistan	Srilanka
-0.08	0.21	0.34 *	-0.45 *	-0.43 *	0.77 *

*Notes:*

- 1) *Growth rates are derived by running a regression in semi-log form, and interpreting  $[\text{Antilog}(\beta-1)] \times 100$ ,  $\beta$  is regression coefficient.*
- 2) *The time trends for all countries refer to the period 1980-2006 except for Bhutan, which refers to 1980-2000*
- 3) *\* indicates statistical significance at 5% level of significance.*

#### **7.4. Trend in Terms of Trade:**

We have found that the agricultural TOT among the south Asian economies registered statistically significant sustained upward movements in India and Srilanka, and downward movements in Nepal and Pakistan during the overall sample period 1980-2006. Subsequently, we examine the pattern of TOT movements over time in more detail by introducing a dummy variable to particularly examine the nature of TOT shifts after the inception of the WTO in 1995. It must be noted that the identification of break date in a time series is not always precise and further the break date in this case may be different across the TOT series for various economies. We have therefore used the insights derived from the graphical plot of the specific agricultural TOT series on this aspect. It may be recalled that the plot of agricultural TOT in Figure 1 revealed a general improvements beginning 1995 in most of the economies. We have therefore examined the time trend of agricultural TOT in south Asian economies

during the overall period 1980-2006 by introducing a time dummy variable (D) which takes a value of 1 for observations beginning from 1995 and 0 otherwise.<sup>2</sup>

**Table 16: Time Trend of Agricultural Terms of Trade in South Asia (1980-2006).**

Country ↓	Dependent Variable: Agricultural Terms of Trade		
Dependent Variable →	Constant	Time	Time Dummy
Bangladesh	104.70 (51.14)*	-0.08 (-0.69)	
	104.69 (42.48)*	-0.08 (-0.33)	-0.03 (-0.00)
Bhutan	97.35 (34.73)*	0.23 (1.06)	
	99.73 (31.12)*	-0.15 (-0.43)	6.64 (1.41)**
India	96.04 (99.82)*	0.35 (5.81)*	
	96.96 (87.63)*	0.19 (1.69)**	2.83 (1.56)**
Nepal	91.95 (53.27)*	-0.41 (-3.77)*	
	93.52 (47.75)*	-0.70 (-3.45)*	5.44 (1.70)**
Pakistan	111.66 (53.52)*	-0.44 (-3.35)*	
	111.25 (44.88)*	-0.53 (-2.06)*	1.83 (0.45)
Srilanka	97.01 (47.74)*	0.83 (6.56)	
	96.32 (39.61)*	0.94 (3.34)*	-2.12 (-0.53)

Notes:

- 1) Time dummy is defined as: Dummy = 1 for observations 1996-2006, and = 0, otherwise.
- 2) The trend regressions for countries refer to the period 1980-2006 except for Bhutan, which refers to 1980-2000.
- 3) \*and \*\* indicates statistical significance at 5% and 10% level of significance, respectively.

The results are reported in Table 16, where we find that the coefficients for both the time trend and time dummy variable are insignificant in Bangladesh but not in Bhutan. The agricultural TOT improved significantly after the WTO inception in 1995 for Bhutan. Similar to our previous results on growth rates, the coefficient of time trend variable showing overall improvement in agricultural TOT for India and Srilanka continues to remain statistically

<sup>2</sup> By looking at the TOT plots, we have experimented by considering different break dates for the TOT series in these economies. However, the formulation of alternate time trend regression models with time dummy effective from different break dates did not produce any different results.

significant. However, the coefficient for the time dummy variable capturing any time trend since 1995 remains significant for India but insignificant for Srilanka.. On the other hand, while the overall time trend variable showing worsening agricultural TOT in Nepal and Pakistan remains statistically significant as before, the coefficient for the time dummy variable turns out to be insignificant in Pakistan but significant in Nepal. Though the coefficient for the time dummy variable bears a positive sign in Bhutan, India, Nepal and Pakistan, it is only for Bhutan, India and Nepal that the coefficient remains significant statistically. Thus, the hypothesis of agricultural TOT improving after the WTO inception in 1995 can be confirmed only by the evidence from Bhutan, India and Nepal. However, while the agricultural TOT seem to have remained favorable for India during the whole sample period, a favorable turnaround of the same in Bhutan and Nepal appear to have taken place only since 1995.

### 8. Causality Analysis:

The direction of agricultural TOT movements and the pattern of trade liberalization process across economies raise an important question, namely, whether the TOT the changes bear an impact on the respective trade liberalization process, or the TOT are a reflection of changes in trade liberalization. We attempt to examine this relationship for the agricultural sector in each of our sample economies. As a preliminary analysis, we classify the information on pattern of changes in TOT and various trade liberalization indicators such as export share, export performance and trade openness in agriculture. The classification is based on the statistically significant trend of agricultural TOT in each of the economies. Thus, Table 17 reveals that the increasing trade liberalization in agriculture could be associated with the agricultural TOT improvements in India and Srilanka or deterioration for the same in Nepal and Pakistan.

**Table 17: Pattern of Agricultural TOT & Trade Liberalization in South Asia.**

	Bangladesh	Bhutan	India	Nepal	Pakistan	Srilanka
Agricultural TOT	Not significant	Improving	Favorable	Improving	Unfavorable	Favorable
Agricultural Export Share	Declining	Declining	Declining	Improving	Declining	Improving
Agricultural Export Performance	Improving	Improving	Improving	Improving	Improving	Improving
Agricultural Trade Openness	Improving	-	Improving	Improving	Improving	Improving

*Source: Derived from Tables 11, 12 and 14.*

## 8.1. Methodology

Subsequently, we perform pair-wise Granger causality tests to discern the cause and effect of fluctuations in TOT and trade liberalization in agriculture for each of our sample economies. The hypothesis that an explanatory variable (x) does not cause the dependent variable (y) is tested by estimating the following regressions:

$$y_t = \alpha + \sum_i \beta_i y_{t-i} \quad \text{:Restricted Form}$$

$$y_t = \alpha + \sum_i \beta_i y_{t-i} + \sum_i \delta_i x_{t-i} \quad \text{:Unrestricted Form}$$

and then performing a F-test to test the null hypothesis that  $H_0: \beta_i = 0$ , against the alternative that  $H_1: \beta_i \neq 0$ . Further, to confirm that a reverse causality does not exist, we repeat the process in the opposite direction. This test verifies whether the causation is bi-directional.<sup>3</sup>

## 8.2. Causality Results

The Granger causality test results involving trade liberalization and TOT in south Asian agricultures for the sample 1980-2006 are provided in Table 18. It may be noted that there could be several other important variables from the domestic front causing an impact on the respective economy's domestic TOT. However, since our focus here is to investigate the existence of a causal link between trade liberalization and domestic TOT in agriculture, and not to examine the determinants of the domestic TOT, we have limited our exercise to examine only the bi-directional causal relations between the two. We have alternatively used three different proxies of trade liberalization, viz., export share, export performance and trade openness in agriculture in the examination of causal relations. Finally, since the causality results are known to be sensitive to the choice of lag lengths, the selection of lag length in each regression has been carefully determined. For deciding the optimal lag structure in our regressions with a sample size of 27 observations, we start with a lag length of 3 and then pare down the model by using information from the usual t-test. That is, we initially estimate the test regression with a 3 period lag, and then reduce the number of lags until the last lag included is still significant with the standard t-test. These test results are provided in Table 18.

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<sup>3</sup> See Granger [1969] for details.

**Table 18: Granger Causality Tests Involving Trade Liberalization and Terms of Trade in South Asian Agricultures (sample: 1980-2006).**

<b>Bangladesh: Null Hypothesis</b>	<b>Lag</b>	<b>F-Statistics</b>
Agricultural Export Share does not cause Terms of Trade in Agriculture	1	4.66*
Agricultural Terms of Trade does not cause Export Share in Agriculture	2	3.23**
Agricultural Export Performance does not cause Terms of Trade in Agriculture	1	1.09
<i>Agricultural Terms of Trade does not cause Export Performance in Agriculture</i>	2	2.72**
<i>Agricultural Trade Openness does not cause Terms of Trade in Agriculture</i>	3	5.57 *
Agricultural Terms of Trade does not cause Trade Openness in Agriculture	2	1.22
<b>Bhutan: Null Hypothesis</b> * *		
Agricultural Export Share does not cause Terms of Trade in Agriculture	1	0.05
Agricultural Terms of Trade does not cause Export Share in Agriculture	1	0.62
Agricultural Export Performance does not cause Terms of Trade in Agriculture	1	2.79 **
Agricultural Terms of Trade does not cause Export Performance in Agriculture	1	3.02**
Agricultural Trade Openness does not cause Terms of Trade in Agriculture	1	3.15 **
Agricultural Terms of Trade does not cause Trade Openness in Agriculture	1	3.46*
<b>India: Null Hypothesis</b>		
Agricultural Export Share does not cause Terms of Trade in Agriculture	3	1.35
Agricultural Terms of Trade does not cause Export Share in Agriculture	1	1.45
<i>Agricultural Export Performance does not cause Terms of Trade in Agriculture</i>	1	2.85 **
Agricultural Terms of Trade does not cause Export Performance in Agriculture	2	1.15
Agricultural Trade Openness does not cause Terms of Trade in Agriculture	1	1.63
Agricultural Terms of Trade does not cause Trade Openness in Agriculture	3	0.50
<b>Nepal: Null Hypothesis</b>		
<i>Agricultural Export Share does not cause Terms of Trade in Agriculture</i>	3	6.07 *
Agricultural Terms of Trade does not cause Export Share in Agriculture	3	1.28
Agricultural Export Performance does not cause Terms of Trade in Agriculture	2	1.05
Agricultural Terms of Trade does not cause Export Performance in Agriculture	1	1.80
Agricultural Trade Openness does not cause Terms of Trade in Agriculture	2	0.42
Agricultural Terms of Trade does not cause Trade Openness in Agriculture	1	0.01
<b>Pakistan: Null Hypothesis</b>		
Agricultural Export Share does not cause Terms of Trade in Agriculture	1	0.56
Agricultural Terms of Trade does not cause Export Share in Agriculture	3	0.22
Agricultural Export Performance does not cause Terms of Trade in Agriculture	2	0.63
Agricultural Terms of Trade does not cause Export Performance in Agriculture	3	0.36
Agricultural Trade Openness does not cause Terms of Trade in Agriculture	2	1.78
Agricultural Terms of Trade does not cause Trade Openness in Agriculture	3	0.44
<b>Srilanka: Null Hypothesis</b>		
Agricultural Export Share does not cause Terms of Trade in Agriculture	3	0.92
Agricultural Terms of Trade does not cause Export Share in Agriculture	1	0.64
Agricultural Export Performance does not cause Terms of Trade in Agriculture	3	1.22
Agricultural Terms of Trade does not cause Export Performance in Agriculture	1	2.05
Agricultural Trade Openness does not cause Terms of Trade in Agriculture	3	0.48
Agricultural Terms of Trade does not cause Trade Openness in Agriculture	1	0.80

Note: \*, \*\* implies significance at 5% & 10% level respectively. Results for Bhutan refer to 1980-2000.

The results indicate that the possibility of statistically significant causation is present only in the economies of Bangladesh, Bhutan, India and Nepal, whereas no significant causation can be present in Pakistan and Srilanka. It may be observed that even when a significant causality was detected, ever so often the results indicated bi-directional causality in certain cases. For instance, the causation between export share and TOT in agriculture for Bangladesh or the causation between export performance and TOT in agriculture and between trade openness and TOT in agriculture for Bhutan suggested bi-directional relations. The evidence of statistically significant one-way causal relation from trade liberalization to TOT in agriculture is present only for Bangladesh, India and Nepal. On the other hand, there is also some scanty evidence from Bangladesh that TOT causes trade liberalization in agriculture. The TOT has been found to have improved for agriculture in a statistically significant way only in India and Nepal and not in Bangladesh. Thus, the hypothesis - agricultural trade liberalization impacting on the domestic TOT and causing significant improvements favoring agriculture - can be supported only by the data evidence from India and Nepal. It would therefore appear that trade liberalization in agriculture is a weak indicator of domestic TOT in these economies and there may be other domestic supply and demand-side factors that are at work to influence the agricultural TOT in south Asian economies.

## 9. Conclusions:

1. The growth rates of both export and import in the South Asian economies remained stagnant and also seem to have lagged behind the growth rates in the East Asian, South-East Asian or West Asian economies. It therefore appears that in terms of integrating the economy with the world market, the south Asian region - despite several trade liberalizing policies - still remains the least integrated of all the regions.
2. Though the shares of world agricultural export by destination criterion and the import by source of origin criterion has declined over time for the developed countries along with an increase in developing economies, the developed region still remains as the larger destination as well as the larger source of world trade in agriculture (all food items and agricultural raw materials). Within the developing block, economies in the east, south and south-east Asian region acts as the important destination and origin of the world trade in agriculture.

3. The trend during the period from 1995 to 2005 seems to indicate that there is a decline for the importance of trade in agriculture as a product group in comparison to the trade in all products. As a consequence, both the export and import share of agriculture dropped down during this period across economic regions and in the world.

4. The annual average growth rate of real agricultural output (1980 prices) remained the highest in Bangladesh followed by Pakistan and Bhutan, which remained in the range of about 4%, whereas the growth rate in India, Nepal and Srilanka remained low down at around 2-3%. Due to the poor growth of agriculture the sectoral output composition in the region also reflects a significant transformation away from agriculture over the past two decades, i.e., the real sectoral share of agriculture that was about 30-40% in major economies of the region during early-80s has gone down to 20% or even lesser in 2006.

5. Not only is the majority of the poor in south Asian economies are concentrated in the rural segment and dependent on agriculture, but they also use labor as a source of their livelihood earning.

6. The bound tariff rates for agriculture is about two to three times higher as compared to non-agriculture in India, Nepal, Pakistan and Srilanka, and five times higher in Bangladesh. Similarly, the average of applied tariff rates is higher for agriculture in comparison to non-agriculture, and is kept at a comparatively high level in Bhutan and India. The divergence between final bound and applied tariff rates is substantial in agriculture. These facts suggest that there is a scope for further liberalizing the agricultural trade by tariff duty reduction in south Asian economies.

7. The frequency distribution of tariff lines against MFN applied tariff rates indicate that the largest group of agricultural tariff lines fall under 25 to 50% tariff duty range in Bhutan, India and Srilanka, 15 to 25% tariff duty in Bangladesh and Pakistan and 5 to 10% tariff duty in Nepal.

8. Analysis on the characteristics of agricultural trade in south Asian economies signifies that the proportions of food in the agricultural import remain substantially higher than the world average in Bangladesh, Bhutan, India and Srilanka.

9. Almost all the south Asian economies pursued a followed a closed-economy import-substitution policy for a long period and it is found that the pattern of low agricultural trade openness in these economies is the result of such policies. The export share of agriculture in south Asia declined for almost all the economies excepting for Maldives in recent years as

compared to the level in early 80's. However there seems to be a slow improvement of the agricultural export performance in these economies, particularly since the mid 90's. On the other hand, the net trade performance figures reveal that only India and Srilanka are the net exporter of agriculture in this region, while other economies, viz., Bangladesh, Bhutan, Nepal and Pakistan remain as net importers in agricultural trade. Finally, a comparison of the the trade openness in agriculture vis-à-vis the respective economy informs that the overall economy is more open to trade than the relevant agricultural sectors in all the sample economies of south Asia, excepting Srilanka.

10. The analysis of agricultural TOT reveals that the general improvements observed during the mid-90 (beginning 1996) were short-lived for most of the economies. Thus, while the uptrend in TOT could not be sustained in Bangladesh, Bhutan and Pakistan, some recovery in this regard is observed for India, Srilanka and Nepal after a lag. The statistical analysis of growth rates suggests that agricultural TOT movements registered significant (statistically) improvement in India and Srilanka, and deterioration in Nepal and Pakistan during the sample period.

11. The hypothesis of agricultural TOT improving after the WTO inception in 1995 can be confirmed only by the evidence from Bhutan, India and Nepal. However, while the agricultural TOT seem to have remained favorable for India during the whole sample period, a favorable turnaround of the same in Bhutan and Nepal appear to have taken place only since 1995.

12. Overall, the causality results seem to suggest that the trade liberalization process have caused the variations in TOT rather than the converse in the south-Asian economies. This pattern seemed to have occurred in the economies of India and Nepal.

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