

## Chapter 12

# International Trade, Regional Integration and Food Security in South Asia

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### 12.1 Introduction

South Asia is home to more than 23 per cent of the global population but it accounts for less than 3 per cent of global output (GDP). All countries in South Asia are classified in the low-income or low-middle-income categories. Poverty and hunger are the most serious problems faced by the region. About 43 per cent of the poor and 36 per cent of the undernourished population of the world is concentrated in South Asia. Despite rapid growth of some of the economies in the region, the incidence of poverty, hunger and malnutrition has not seen perceptible decline. All these countries, except India, have been net importers of food, as their own production has not been sufficient to meet domestic requirements.

Historically, South Asian countries have followed inward-looking trade policies both in terms of trade within the region and in terms of trade with rest of the world. Though these countries sometimes faced the situation of availability of cheap food in the international market, trade was not considered a reliable source to meet the main food needs of the domestic population. There have been apprehensions about the effect of trade liberalisation on domestic agriculture and long-term sustainability of food security. Moreover, unlike other regions such as South East Asia, the EU, and North America, regional integration in South Asia has remained shallow, and strong barriers exist for trade between the neighbouring countries. Apart from the Sri Lanka–India free trade agreement (FTA), other trade pacts in the region have not succeeded in promoting the free movement of goods between these geographically contiguous nations. Thus, both intra-regional and inter-regional trade have remained below their potential.

Some countries in South Asia import food from distant countries when their neighbouring country export the same food to outside the region. Deeper regional integration resulting in greater intra-regional trade would be very beneficial for consumers (lower prices) and for producers (lower transaction costs). This would also result in reducing inefficiencies in production by promoting competition and by harnessing complementarities and comparative advantage.

Quite often when one South Asian country faces short supply of a food commodity, another country in the region has surplus production. This offers tremendous scope for stabilising supply and prices through trade. South Asia is experiencing high growth in population in the region of 1.5 per cent per annum. Demand for agri-food commodities in the region is projected to rise at a much higher rate than population

growth, as there is a large consumption deficit. Per capita consumption of most of the food items is much lower than what is required for a healthy diet and healthy living. Moreover, with rising per capita income, and changes in tastes and preferences, demand patterns in South Asian countries are diversifying. Demand for a variety of new products and attributes is on the rise. Demand for processed food products is rising much more rapidly than demand for raw products. These trends and shifts in demand patterns and preferences cannot be addressed through local production and processing and they open new avenues for trade in agri-food commodities and investments in agri-food processing.

Realisation has been growing about the benefits of increasing trade and regional integration among South Asian countries and of improving food and nutrition security through the free movement of agriculture and food commodities. In order to actualise such benefits there is a need to identify (i) country-level and regional-level production and utilisation and the surplus and deficit of agri-food commodities, and (ii) inter-dependence of agricultural markets. Against this backdrop, the present chapter intends to do the following:

- Examine regional surpluses and regional deficits in food and other agricultural commodities and outline the importance of regional integration and co-operation in the context of food security in the region.
- Undertake country-level analysis in terms of surpluses and deficits in the identified agricultural commodities, including food, and estimate the potential for regional trade.
- Estimate the extent of co-movement in prices of the identified agricultural commodities in South Asian countries, and its impact on formal and informal trade in agricultural commodities.
- Examine the extent and importance of liberalisation in food processing industries.
- Assess the potential for FDI in food processing industries in LDCs of the region.
- Examine the constraints (economic, political and social) to trade and investments in agricultural commodities in South Asia, with special focus on LDCs
- Suggest ways forward and possible steps for regional integration and co-operation in agriculture in the context of food security.

The chapter begins by presenting socio- and agro-economic characteristics of South Asian countries and then proceeds to address the above-mentioned aspects of trade, regional integration and food security.

## 12.2 South Asia in a global setting

South Asia is the most populous region in the world. With a total population of 1.57 billion (in 2011), it accounts for 23 per cent of the global population. The share of the region in land and water resources is much lower than its share in population. The arable land per capita in South Asia is lower than the world average, despite

**Table 12.1 South Asia in a global setting**

Variable	Year	South Asia	World	Share (%)
Gross national product (US\$ billion)	2009	1,735	59,163	2.93
Population (million)	2009	1,568	6,775	23.14
Land area (sq. km)	2009	4,771,220	129,710,719	3.68
Arable land (% of land area)	2009	41	11	
Arable land derived (sq. km)	2009	1,973,940	13,859,525	14.24
Poverty (people living on less than US\$1.25 a day) (million)	2005	596	1,374	43.38
Prevalence of under nutrition (%)	2005–09	22	14	
Prevalence of under nutrition derived (million)	2009	345	949	36.37
Total merchandise export (US\$ million)	2009	2,047,60	12,492,190	1.64
Total merchandise import (US\$ million)	2009	323,199	12,595,548	2.57

**Source:** World Development Indicators (2011)

the fact that 41 per cent of the land in the region is arable as compared with 11 per cent for the world as a whole. There is a stark contrast between the share of South Asia in global population and economic output. South Asia generates only 2.9 per cent of global national product, which is less than one-seventh of South Asia's share in population. Low per capita income in the region is associated with a very high incidence of poverty and hunger. Some basic facts relating to population, per capita income, land resources, poverty and under nutrition, and trade are presented in Tables 12.1 and 12.2.

More than 43 per cent of the world's poor, based on a per capita daily income of less than US\$1.25, live in Asia. Similarly, more than 36 per cent of total undernourished persons in the world are inhabitants of South Asia. Trade ratios for South Asia are quite low. The region constitutes 1.64 per cent of global merchandise export and 2.98 per cent of global merchandise import. These shares are smaller than its share in global output, implying that South Asia trades a lesser share of its production compared with the world average.

### 12.2.1 Socio and agro-economic profile of South Asian countries

Agriculture is the mainstay of economies of South Asian countries. About 18–34 per cent of national output and 33–66 per cent employment are contributed by this sector in various countries in the region. Among the five major countries in the region, per capita income is highest in Sri Lanka (Table 12.2) followed by India with a per capita income of US\$1,220. Nepal comes last with a per capita income of US\$440. Bangladesh is a notch above Nepal with a per capita income of US\$580. Even the country with highest per capita income in the region is ranked at 151. This shows that South Asia has a very low level of income compared with most other countries.

**Table 12.2 Salient features of economy of South Asian countries**

Particular	Reference year(s)	Bangladesh	India	Nepal	Pakistan	Sri Lanka
Per capita income (US\$)	2009	580	1,220	440	1,000	1,990
Arable land (hectare per capita)	2008	0.05	0.14	0.08	0.12	0.06
Poverty, people living on less than US\$1.25 a day (%)	2004–07	49.6	41.6	55.1	22.6	7.0
Share of agriculture in GDP (%)	2009	19	18	34	22	13
Workforce in agriculture	2006–10	48.1	56.1	65.7	45.1	32.5
Agriculture value added/worker (US\$ constant 2000 prices)	2009	435	468	238	903	926

**Note:** Workforce data taken from Key Indicators, Asian Development Bank (2011).

**Source:** World Development Indicators (2011)

Per capita arable land varies from 0.06 hectare in Sri Lanka to 0.14 hectare in India. More than one-third of total national output in Nepal is contributed by the agriculture sector. Agriculture contributes around one-fifth of national output in Pakistan, Bangladesh and India. In all the countries, the share of agriculture in employment is much higher than its share in output. In Nepal, two-thirds of the workforce is engaged in agriculture, which is more than double the employment share of agriculture in Sri Lanka.

Agriculture value added per worker is meagre in Nepal, where two-thirds of the workforce is employed in the agriculture sector. Sri Lanka, which has the lowest share of employment in agriculture, is at the top in agriculture value added per worker. Agriculture value added per worker in Sri Lanka and Pakistan is far higher than Bangladesh and India (Table 12.2).

More than half of the total population in Nepal and Bangladesh suffers from poverty based on the World Bank definition of less than USD \$1.25 per person in daily income. Similarly, more than 40 per cent of people in India live in poverty. Poverty in Pakistan based on this definition was 22.6 per cent. Sri Lanka shows the lowest incidence of poverty in South Asia. High dependence on agriculture for livelihood and slow growth in employment opportunities in the non-agriculture sector are the salient features of South Asian countries and these are largely responsible for widespread poverty and under nutrition in the region.

### 12.3 Hunger and nutrition

Hunger is generally estimated from dietary energy intake. A person having dietary energy intake below a threshold level is classified as hungry. Such persons are also termed as undernourished. Country-wise information on dietary energy intake, the incidence of under-nutrition and the number of persons undernourished during 1990–92 and 2006–08 is presented in Table 12.3. The table also provides estimates of hunger and nutrition for developing countries and the world as a whole in order to make comparison with South Asia.

As can be seen from Table 12.3, dietary energy intake in all South Asian countries has remained lower than not only the world average but also the average of developing countries. Further, this gap in dietary intake of energy has increased from 1990–92 to 2006–08, for India, Bangladesh, Nepal and Pakistan. Though all South Asian countries have experienced some improvement in per capita energy intake the increase has been very small, in the range of 3 to 16 per cent over a period of 16 years.

Prevalence of under nutrition during 2006–08 varies from 17 per cent (in Nepal) to 26 per cent (in Bangladesh). Dietary energy intake among the South Asian countries show a very narrow variation, 2270–2370 kcal/person/day. Despite small improvements in per capita calorie intake, the prevalence of undernourishment shows large improvements in Bangladesh and Sri Lanka. The latest data provided by the Food and Agriculture Organization (FAO) show that prevalence of under-nutrition based on dietary energy intake remains highest in Bangladesh, despite tremendous progress made by the country in the improvement of under-nutrition. The percentage of the population facing under-nutrition in Bangladesh has declined from 38 per cent during 1990–92 to 26 per cent during 2006–08. There has been little progress in reducing prevalence of under-nutrition in India, Sri Lanka and Nepal. Despite a decline in the percentage

**Table 12.3 Incidence of hunger and under nutrition in South Asian countries and world**

Country	Dietary energy consumption (kcal/person/day)		Prevalence of undernourishment in total population (%)		Number of undernourished persons (million)	
	1990–92	2006–08	1990–92	2006–08	1990–92	2006–08
Bangladesh	1,960	2,270	38	26	44.4	41.4
India	2,290	2,360	20	19	177.0	224.6
Nepal	2,190	2,340	21	17	4.2	4.7
Pakistan	2,210	2,280	25	25	29.5	42.8
Sri Lanka	2,170	2,370	28	20	4.8	3.9
South Asia	2,270	2,360	22	20	267.5	330.1
Developing countries	2,440	2,640	20	15	833.2	839.4
Total world	2,610	2,790	16	13	848.4	850.0

**Source:** State of Food Insecurity, FAO

of the population facing under nutrition, the number of undernourished persons has increased over time in all countries except Sri Lanka and Bangladesh. The number of undernourished persons in India has increased from 177 million 1990–92 to 225 million in the late 2000s.

## 12.4 Production, consumption and surplus at regional level

Agricultural production in South Asia as a whole shows sharp year-to-year fluctuations. These fluctuations are much stronger at country level than at regional level. Because of this, a single-year estimate does not capture the correct situation for agriculture and food and trade in the region or a country. Therefore, in order to have credible information on surplus or deficit of different food items, this chapter uses three-year averages of production, trade and stock. Surpluses and deficits have been computed from data available on production and consumption and related aspects reported by the FAO in a food balance sheet for individual countries. The regional data was arrived at by summing up country-level production, consumption, trade, stock, etc. The estimates of surplus for South Asia for major food commodities are presented in Table 12.4.

The chapter covers cereals (total, rice and wheat), pulses, vegetable oil, sugar, vegetables, fruits, eggs, meat and milk. This list leaves a very small fraction of total agriculture which consists of several small items. Cereals, mainly rice and wheat, are the staple food for all countries in South Asia. Average production of cereals in the region during 2007–09 was 286 million tonne (mt). South Asia as a whole consumed 238 mt of cereal as food. Consumption of cereal for other uses such as seed, feed processing was 34.2 mt. Total utilisation of cereal per year in South Asia during 2007–09 was estimated at 272.6 mt. Based on these estimates South Asia was found to have a surplus of 13.4 mt of cereals, which is 4.7 per cent of cereal production in the region.

Rice and wheat account for 84 per cent of total cereal production in South Asia (rice 47.5 per cent and wheat 36.1 per cent). Total annual absorption (consumption in all uses) of rice in the region during 2007–09 was 126 mt comprising 115 mt of food and 11 mt of other uses. Total utilisation of wheat was 103 mt comprising 94 mt of food consumption and 9 mt of other uses. South Asia was found to have 10.3 mt rice surplus, while it had a small deficit in wheat of 0.5 per cent of production.

Pulses (dried leguminous vegetables) are a regular part of the South Asian diet and also a major source of protein. Pulses are consumed both by vegetarian as well as non-vegetarian populations in various forms. Over time, pulse production in South Asia has remained either stagnant or experienced very slow growth. Green revolution technology rendered pulse production relatively much less remunerative than cereals. Thus, production of pulses has shifted in a large amount towards production of cereals; in some places pulses have been pushed to less fertile or marginal lands. As a result, production of pulses in the region could not keep pace with growth in population, and per capita production and consumption of pulses has witnessed sharp decline over time. This, in turn, has had an adverse effect on protein intake in the region.

**Table 12.4 Production and utilisation of major food products in South Asia during 2007–09, million tonne**

Item	Production	Food consumption	Other consumption	Total utilisation	Surplus or deficit	Surplus or deficit as % of production
Cereals – excluding beer	286.14	238.51	34.21	272.73	13.41	4.69
Rice (milled equivalent)	136.17	114.96	10.96	125.92	10.26	7.53
Wheat	103.40	94.92	9.03	103.95	-0.55	-0.53
Pulses	15.98	16.58	3.10	19.68	-3.70	-23.13
Vegetable oils	8.72	11.07	4.29	15.36	-6.64	-76.22
Sugar (raw equivalent)	29.57	26.19	0.03	26.22	3.35	11.32
Vegetables	100.39	92.55	6.58	99.13	1.27	1.26
Fruits – excluding wine	78.66	68.17	10.52	78.69	-0.03	-0.04
Eggs	3.93	3.33	0.50	3.84	0.09	2.37
Meat	8.75	8.14	0.01	8.15	0.61	6.95
Milk – excluding butter	145.59	116.49	29.18	145.67	-0.08	-0.05

**Source:** FAO Food Balance Sheet and FAOSTAT 2007.

During 2007–09, average production of pulses in the region was close to 16 mt. Total utilisation of pulses was close to 20 mt, which leaves a gap of about 4 mt between regional production and utilisation. The level of deficit of pulses is 23 per cent of the total production.

The quantity of vegetable oil consumed as a food was 27 per cent more than production in the region. Then there was consumption of edible oil in other uses of 4.29 mt. The total utilisation of vegetable oil in the region was 15.4 mt, which is 76 per cent more than the regional production. This leaves a deficit of 6.6 mt of vegetable oil in the region. The deficit in terms of oilseed is much higher and is given by the deficit of vegetable oil divided by extraction rate of oil to oilseeds. A crude estimate shows that South Asia need to raise oilseed production by about 19 mt to match the deficit in production and consumption of vegetable oil in the region.

South Asia produced 29.6 mt of sugar (raw equivalent) against a total utilisation in the region of 26 mt. During 2007–09 the region, on average, had 3.4 mt of surplus sugar.

Vegetable production in South Asia was estimated to be 100 mt and total utilisation was reported to be 99.13 mt. About 93 per cent of the total utilisation of vegetables is for food. The region has a surplus of 1.27 mt vegetables. Fruit production is estimated at 78.7 mt and total consumption is also the same. About 86 per cent of fruit production is utilised as food and the remaining 14 per cent for other uses. At the 2007–09 level of production and consumption, South Asia has a small deficit (30,000 tonnes) of fruits (30,000 tonnes).

Among livestock products, milk is the largest item of production and consumption in the region. Total production of milk per year is 145.6 mt and total utilisation is estimated to be 146 mt. About 80 per cent of total milk utilisation is used as food. This production and consumption balance leaves 80,000 tonnes of milk deficit in the region. The deficit was 0.05 per cent of the total production. Total egg production in South Asia during 2007–09 was 3.93 mt. The amount of egg used as food was 3.33 mt and 500,000 tonnes of eggs were consumed in other forms. This makes total utilisation of egg to be 3.84 mt. South Asia shows surplus in egg production of the order of 90,000 tonnes. Ratio of surplus to total production is 2.37 per cent. Meat production in the region was close to 9 mt and total utilisation was 8.15 mt. South Asia shows a surplus of 0.61 mt of meat.

From the regional food balance it is concluded that South Asia has a large surplus of rice, sugar and meat and a small surplus of eggs and vegetables at the 2007–09 level of consumption. The region shows a large deficit of vegetable oils and pulses.

## 12.5 Country-wise production, domestic use and surplus/deficit

Country-wise production, utilisation and surplus or deficit for various food items are presented in Tables 12.5–12.14.

**Table 12.5 Production, utilisation and surplus of rice in South Asian countries during 2007–09, million tonnes**

	Production	Domestic use	Surplus or deficit	Surplus or deficit as % of production
India	94.29	87.96	6.32	6.71
Bangladesh	30.36	29.18	1.18	3.88
Pakistan	6.42	3.25	3.18	49.46
Sri Lanka	2.35	2.39	-0.04	-1.68
Maldives	0.00	0.01	-0.01	-
Nepal	2.76	3.13	-0.37	-13.56

**Source:** FAO Food Balance Sheet and FAOSTAT (2007)

**Table 12.6 Production, utilisation and surplus of wheat in South Asian countries during 2007–09, million tonne**

	Production	Domestic use	Surplus or deficit	Surplus or deficit as % of production
India	78.35	78.66	-0.31	-0.39
Bangladesh	0.81	2.72	-1.91	-235.55
Pakistan	22.76	20.18	2.58	11.32
Sri Lanka	0.00	0.89	-0.89	-
Maldives	0.00	0.02	-0.02	-
Nepal	1.48	1.48	0.00	0.00

**Source:** FAO Food Balance Sheet and FAOSTAT (2007)

**Table 12.7 Production, utilisation and surplus of pulses in South Asian countries during 2007–09, million tonne**

	Production	Domestic use	Surplus or deficit	Surplus or deficit as % of production
India	14.44	17.09	-2.66	-18.41
Bangladesh	0.22	0.67	-0.45	-199.62
Pakistan	1.06	1.48	-0.43	-40.21
Sri Lanka	0.02	0.18	-0.16	-765.00
Maldives	0.00	0.00	0.00	-
Nepal	0.24	0.25	-0.01	-2.38

**Source:** FAO Food Balance Sheet and FAOSTAT (2007)

### 12.5.1 Foodgrains

India is the largest producer of rice and wheat in the region. It produced 94 mt of rice and 78.4 mt of wheat per year during 2007–09. The second largest producer is Bangladesh for rice and Pakistan for wheat. During the three-year period from

**Table 12.8 Production, utilisation and surplus of milk in South Asian countries during 2007–09, million tonne**

	Production	Domestic use	Surplus or deficit	Surplus or deficit as % of production
India	107.59	106.56	1.03	0.96
Bangladesh	3.06	3.43	-0.37	-11.94
Pakistan	33.28	33.40	-0.12	-0.36
Sri Lanka	0.19	0.77	-0.58	-313.64
Maldives	0.00	0.02	-0.02	-
Nepal	1.48	1.50	-0.02	-1.40

Source: FAO Food Balance Sheet and FAOSTAT (2007)

**Table 12.9 Production, utilisation and surplus of meat in South Asian countries during 2007–09, million tonne**

	Production	Domestic use	Surplus or deficit	Surplus or deficit as % of production
India	5.31	4.70	0.62	11.63
Bangladesh	0.59	0.59	0.00	0.00
Pakistan	2.43	2.43	0.00	0.13
Sri Lanka	0.13	0.14	0.00	-3.82
Maldives	0.00	0.01	-0.01	-
Nepal	0.28	0.28	0.00	-0.36

Source: FAO Food Balance Sheet and FAOSTAT (2007)

**Table 12.10 Production, utilisation and surplus of eggs in South Asian countries during 2007–09, million tonne**

	Production	Domestic use	Surplus or deficit	Surplus or deficit as % of production
India	3.082	2.983	0.099	3.20
Bangladesh	0.247	0.248	-0.001	-0.39
Pakistan	0.511	0.512	-0.001	-0.21
Sri Lanka	0.059	0.060	-0.001	-1.92
Maldives	0.000	0.002	-0.002	-
Nepal	0.032	0.032	0.000	0.00

Source: FAO Food Balance Sheet and FAOSTAT (2007)

2007–09 average absorption of rice in India was 87.96 mt, which left the country with a surplus of 6.32 mt of rice. Bangladesh and Pakistan also used less rice than they produced resulting in a surplus of 1.18 and 3.2 mt, respectively. Sri Lanka and Nepal had a small deficit of rice.

**Table 12.11 Production, utilisation and surplus of fruits in South Asian countries during 2007–09, million tonne**

	Production	Domestic use	Surplus or deficit	Surplus or deficit as % of production
India	66.702	66.557	0.144	0.22
Bangladesh	3.559	3.680	-0.121	-3.41
Pakistan	6.518	6.448	0.071	1.08
Sri Lanka	0.722	0.737	-0.015	-2.06
Maldives	0.013	0.031	-0.018	-
Nepal	1.142	1.235	-0.093	-8.14

**Source:** FAO Food Balance Sheet and FAOSTAT (2007)

**Table 12.12 Production, utilisation and surplus of vegetables in South Asian countries during 2007–09, million tonne**

	Production	Domestic use	Surplus or deficit	Surplus or deficit as % of production
India	88.393	86.446	1.946	2.20
Bangladesh	3.364	3.557	-0.194	-5.76
Pakistan	5.301	5.539	-0.238	-4.49
Sri Lanka	0.729	0.903	-0.174	-23.84
Maldives	0.011	0.019	-0.008	-
Nepal	2.596	2.663	-0.067	-2.57

**Source:** FAO Food Balance Sheet and FAOSTAT (2007)

**Table 12.13 Production, utilisation and surplus of sugar in South Asian countries during 2007–09, million tonnes**

	Production	Domestic use	Surplus or deficit	Surplus or deficit as % of production
India	25.500	20.523	4.977	19.52
Bangladesh	0.147	0.693	-0.546	-371.35
Pakistan	3.780	4.328	-0.548	-14.50
Sri Lanka	0.034	0.543	-0.509	-1,496.88
Maldives	0.000	0.007	-0.007	-
Nepal	0.107	0.126	-0.019	-17.48

**Source:** FAO Food Balance Sheet and FAOSTAT (2007)

During the three-year period selected for the study, India's production and domestic use of wheat were closely balanced with a deficit of only 0.31 mt. Pakistan showed the highest surplus of wheat in South Asia. The country produced 22.8 mt and consumed 20.2 mt, leaving a surplus of 2.6 mt. Nepal was self-sufficient in wheat with 1.5 mt of

**Table 12.14 Production, utilisation and surplus of vegetable oil in South Asian countries during 2007–09, million tonne**

	Production	Domestic use	Surplus or deficit	Surplus or deficit as % of production
India	7.405	10.979	-3.575	-48.28
Bangladesh	0.148	1.316	-1.168	-788.89
Pakistan	1.032	2.550	-1.517	-146.97
Sri Lanka	0.071	0.406	-0.334	-468.42
Maldives	0.000	0.004	-0.004	-
Nepal	0.059	0.104	-0.045	-76.56

**Source:** FAO Food Balance Sheet and FAOSTAT (2007)

production. Sri Lanka does not produce any wheat but it consumed close to 1 mt, thus it had a deficit of the same magnitude. The case of Maldives is similar, which showed a deficit of 20,000 tonnes of wheat.

All South Asian countries consumed more pulses than they produced. Pulse production in India during 2007–09 was 14.4 mt and consumption was 17.1 mt. This leaves a deficit of 2.66 mt of pulses in India. Bangladesh produced 0.22 mt and consumed 0.67 mt resulting in a deficit of 0.45 mt. Pakistan produced 1.06 mt and consumed 1.48 mt showing a deficit of 0.43 mt. Sri Lanka consumed 180,000 tonnes of pulses and produced only 20,000 tonnes showing a gap of 160,000 tonnes. Nepal produced 240,000 tonnes and consumed 250,000 tonnes and faced a deficit of 10,000 tonnes. Pulses are not a part of the regular diet in Maldives.

### 12.5.2 Livestock products

India showed surplus production of milk, whereas all other countries in the region showed consumption exceeding production. Average production in India was 107.6 mt and domestic use was 106.6 mt. India showed a surplus of 1.03 mt of milk. Milk consumption in Bangladesh exceeded production by 0.37 mt. Pakistan produced 33.3 mt of milk and consumed 33.40 mt, thus having a deficit of 0.12 mt. Milk production in Sri Lanka is below 0.2 mt, whereas consumption was 0.8 mt. Sri Lanka has a milk deficit of more than 500,000 tonnes. Both Maldives and Nepal showed a milk deficit of 20,000 tonnes each.

In the case of meat, India showed a surplus, whereas Bangladesh and Pakistan were just balanced. Nepal showed a small deficit and Sri Lanka consumes 4 per cent more than it produced. The magnitude of surplus of meat in India was 62,000 tonnes. The country produced 5.3 mt and consumed 4.70 mt of meat during 2007–09.

Except India, all South Asian countries showed an excess of consumption of eggs over production. India showed a surplus production of 0.10 mt, which corresponds to 3.20 per cent of total egg production in the country. Egg production and consumption in Bangladesh is about 250,000 tonnes. Pakistan produces and consumes a little more than 500,000 tonnes of eggs.

### 12.5.3 Horticultural products

Fruit production in agriculture in India was 66.7 mt and domestic use was 66.56 mt. Production exceeded domestic consumption by a small amount of 0.14 mt. Bangladesh produced 3.56 mt of fruits and consumed 3.68 mt. The country had a deficit of about 120,000 tonnes. Pakistan produced 6.5 mt of fruit and consumes almost all of it. Sri Lanka, Maldives and Nepal showed a deficit of 10,000 to 90,000 tonnes of fruits.

Vegetable production and consumption exceeds production and consumption of fruits in India, Sri Lanka and Nepal, whereas it was lower in Bangladesh and Pakistan. India had a surplus of 1.95 mt of vegetables, which was 2.2 per cent of its total production. Bangladesh showed a deficit with production at 3.36 mt and consumption at 3.56 mt. Nepal consumed 67,000 tonnes more vegetables than it produces. Pakistan, Sri Lanka and Maldives showed small to moderate deficits of vegetables.

### 12.5.4 Sugar

In South Asia sugar is produced on a large scale in India and Pakistan, while some production also takes place in Bangladesh and Nepal. During 2007–09 India produced 25.5 mt of raw sugar equivalent and utilised 20.5 mt of it. This leaves close to 20 per cent production consisting of an equivalent 5 mt of raw sugar as a surplus in India. Pakistan produced 3.8 mt of sugar, which is 14.5 per cent less than domestic use (Table 12.13). Thus, Pakistan and all other countries, except India, in the region are having a deficit production as compared with domestic absorption.

The level of deficit of sugar is a little more than 500,000 tonnes in Bangladesh, Pakistan and Sri Lanka each. Nepal showed a deficit of 20,000 tonnes. Maldives does not produce any sugar, therefore, the entire domestic use consisted of 10,000 tonnes is a deficit.

### 12.5.5 Vegetable oil

All South Asian countries consumed more vegetable oil than what they produce (Table 12.14). Domestic use of vegetable oil in India is 48 per cent more than domestic production. While Nepal showed a deficit of 76 per cent, Pakistan used 147 per cent more vegetable oil than it produced. The deficit level of vegetable oil was very high in Sri Lanka and Bangladesh. Sri Lanka consumed more than five times and Bangladesh consumed more than eight times their domestic production of vegetable oil. India produced 7.4 mt of vegetable oil and it consumed about 11 mt, leaving behind a deficit of 3.5 mt. The deficit level of Pakistan and Bangladesh were 1.52 and 1.17 mt. Sri Lanka had a deficit of 330,000 tonnes while Nepal showed a deficit of 50,000 tonnes.

### 12.5.6 Per capita food supply

The FAO food balance sheet for the year 2007 shows significant variations in per capita supply and use of various food items as food in various countries in South Asia (Table 12.15). Per capita annual supply and use of cereals as food among the

**Table 12.15 Per capita supply of various food items in South Asian countries, 2007, kg/year**

Item	India	Bangladesh	Pakistan	Sri Lanka	Nepal	China	World
Cereals excluding beer	152.6	180.9	129.8	143.5	171.3	152.5	146.6
Rice (milled equivalent)	70.9	159.7	14.5	97.3	78.0	76.8	52.9
Wheat	60.2	14.7	106.1	44.1	37.9	67.4	65.9
Pulses	12.9	4.8	8.1	8.0	8.4	1.3	6.5
Vegetables	64.8	19.7	30.0	40.1	77.9	279.9	119.4
Fruits – excluding wine	45.1	20.7	36.5	27.2	38.8	64.4	69
Eggs	2.1	1.3	2.4	2.2	1.0	17.4	8.6
Meat	3.3	3.6	13.4	6.8	9.8	53.4	40.1
Milk – excluding butter	68.7	16.2	159.0	36.1	40.9	28.7	85.1
Sugar (raw equivalent)	17.3	5.3	23.9	24.6	4.3	8.3	20.3
Vegetable oils	8.2	6.2	11.5	4.1	6.8	9.4	11.4

**Source:** FAO Food Balance Sheet and FAOSTAT (2007)

five major countries of South Asia was lowest in Pakistan, which showed highest prevalence of an undernourished population. Furthermore, cereal consumption in Pakistan was highly concentrated in favour of wheat, which accounts for more than 80 per cent use of all cereals in country. However, Pakistan topped in per capita supply of milk. The level of supply of next country in the ranking of per capita supply of milk was not even half of that in Pakistan. Similarly, Pakistan also topped in per capita supply of sugar, meat and vegetable oils. Bangladesh topped in per capita supply of cereals, 88 per cent of which consists of rice. Except rice, cereal and meat, per capita supply of all other food items in Bangladesh was lowest in the region. India topped in consumption of pulses, vegetables and fruits. Per capita supply of these items was 13 kg of pulses, 65 kg of vegetables and 45 kg of fruits. India was at the bottom in per capita supply of meat, closely followed by Bangladesh.

Per capita supply, which is the same as absorption of food, showed very wide variation across countries. The minimum variation was found in cereals. Per capita absorption varied between 5 and 13 kg for pulses, 16 and 159 kg for milk, 4 and 24 kg for sugar and 4 and 11.5 kg for vegetable oil. Sri Lanka comes last in per capita absorption of vegetable oil and Nepal last in per capita absorption of eggs and sugar.

It is interesting to compare intake of various food items in South Asia with the world average and with China, which has a very low level of undernourishment. The undernourished population in China is reported to be 10 per cent, which is less than half of the incidence of under nutrition in South Asia (World Development Indicators (WDI) 2011: 110). Per capita supply and use of vegetables and fruits was extremely low in Bangladesh, Pakistan and Sri Lanka as compared with China and the world average. Cereals accounted for close to 70 per cent of physical supply of

food in Bangladesh. In other South Asian countries this share varied between 31 and 49 per cent. The world average for share of cereals in total food supply for food was 29 per cent.

These results show that food intake in South Asia is highly skewed toward cereals. Bangladesh shows the highest per capita supply of cereals and lowest supply of vegetables, fruits, eggs and pulses, indicating a dominance of calorie but poor supply of protein in consumption. Except for milk in Pakistan, per capita supply in all the South Asian countries needs to change in favour of livestock products and horticultural products for a balanced diet and to achieve the required level of proteins, nutrients and minerals.

## 12.6 International trade at regional and country level

Regional export, import and net trade in different food items are presented in Table 12.16. It is interesting to point out that some of the items are exported as well as imported. This could be due to year-to-year fluctuations or composition of the group. During 2007–09 the total export of cereal from the region was 10.8 mt and import was 7.7 mt. The region has net trade (export–import) of 3.1 mt of cereals. Average export of rice from the region was 6.6 mt. The region also imported small amounts of rice. Net trade of rice was 5.8 mt. The trade scenario of wheat is almost the reverse of what is witnessed in rice. The average import of wheat exceeded 6 mt and net trade in wheat was – 5.6 mt.

South Asia imported more than 4 mt of pulses and more than 10 mt of vegetable oil each year during 2007–09. The region also exported a small quantity (0.51 mt) of vegetable oil. The level of export of sugar was 2.94 mt and imports were 3.2 mt. The region exported 2.6 mt of vegetables and 1.4 mt of fruits. The level of export was higher than for import for vegetables, whereas the reverse holds true for fruits. Among livestock products, South Asia exported 7,000 tonnes and imported 2,000

**Table 12.16 Export, import and net trade in various food items, total of South Asia during 2007–09, million tonne**

Item	Export	Import	Net trade
Cereals – excluding beer	10.794	7.702	3.092
Rice (milled equivalent)	6.572	0.766	5.807
Wheat	0.756	6.380	–5.625
Pulses + (total)	0.156	4.246	–4.090
Vegetable oils + (total)	0.516	10.249	–9.733
Sugar (raw equivalent)	2.937	3.171	–0.233
Vegetables	2.572	1.911	0.661
Fruits – excluding wine	1.413	1.714	–0.300
Eggs	0.068	0.002	0.066
Meat	0.550	0.020	0.530
Milk – excluding butter	0.686	1.221	–0.535

**Source:** FAO Food Balance Sheet and FAOSTAT (2007)

tonnes of eggs. Export of meat was 0.55 mt with net trade of 0.53 mt. Milk import exceeded export by 500,000 tonnes.

### 12.6.1 Country-wise trade

Country-wise information on quantities of export, import and net trade in selected food items is presented in Tables 12.17–12.22. Trade in wheat during 2007–09 shows that Pakistan was the highest exporter of wheat in the region. Its average export of wheat was a little more than 500,000 tonnes. However, Pakistan also showed an average import of wheat close to 1.7 mt. A country exporting and importing a particular food product at a large scale is the result of sharp year-to-year fluctuations in production and self-sufficiency at the margin. For instance, in the case of Pakistan, it exported more than 1 mt of wheat during 2007 but imported 1.8 and 3.1 mt of wheat during 2008 and 2009. As countries import in some years and export in others, this chapter has used a three-year average to estimate levels of trade and surplus. During the three-year period, i.e. 2007–09, Pakistan remained a net importer of wheat to the tune of 1.1 mt.

The level of fluctuation in production and in net trade of wheat in India is much lower than that of Pakistan, even though, similar to Pakistan, sometimes India imports and sometimes it exports. On average, India shows net import of wheat of 0.9 mt. Bangladesh was the largest importer of wheat in the region. Its average import amounts of wheat to 2.7 mt. Sri Lanka has an average import of 1 mt of wheat. Nepal imports as well as exports around 2,000 tonnes of wheat. It is interesting to point out that all South Asian countries are net importers of wheat to varying degrees.

Rice is the largest traded agricultural food commodity in the region. Both India and Pakistan figure among top exporters of rice not only in the region but also in the world. The average exports of rice from India are around 3.7 mt and from Pakistan 2.8 mt. Bangladesh showed average imports close to 500,000 tonnes (Table 12.17). Nepal and Sri Lanka imported 147,000 and 87,000 tonnes of rice on average, respectively.

As all South Asian countries have a deficit of pulses, they import moderate to large quantities of pulses to meet their domestic requirements (Table 12.18). India imported on average 3 mt of pulses during 2007–09. The country also showed a small amount of export (137 mt). The level of import of pulses in other countries was 0.52 mt in

**Table 12.17 Export, import and net trade in wheat and rice, in South Asian countries during 2007–09, thousand tonnes**

Country	Wheat			Rice		
	Export	Import	Net trade	Export	Import	Net trade
India	64	952	–888	3,707	7	3,700
Bangladesh	1	2,705	–2,704	11	496	–485
Pakistan	536	1,692	–1,156	2,849	4	2,845
Sri Lanka	153	1,003	–850	5	87	–83
Maldives	0	26	–26	0	24	–24
Nepal	2	2	–1	0	147	–146

Source: FAOSTAT

**Table 12.18 Export, import and net trade in pulses in South Asian countries during 2007–09, thousand tonnes**

	Export	Import	Net trade
India	137	3,099	-2,962
Bangladesh	0	528	-528
Pakistan	9	412	-403
Sri Lanka	8	165	-157
Maldives	0	1	-1
Nepal	2	41	-39

Source: FAOSTAT

**Table 12.19 Export, import and net trade in vegetables and fruits in South Asian countries during 2007–09, thousand tonnes**

Country	Vegetables			Fruits		
	Export	Import	Net trade	Export	Import	Net trade
India	2,297	570	1,727	868	1,009	-142
Bangladesh	16	571	-555	14	232	-219
Pakistan	235	393	-158	434	294	140
Sri Lanka	18	258	-240	79	43	36
Maldives	0	21	-21	0	22	-22
Nepal	6	97	-90	18	112	-95

Source: FAOSTAT

**Table 12.20 Export, import and net trade in eggs and meat in South Asian countries during 2007–09, thousand tonnes**

Country	Eggs			Meat		
	Export	Import	Net trade	Export	Import	Net trade
India	67.5	0.0	67.5	525.7	1.4	524.4
Bangladesh	0.0	0.0	0.0	0.1	0.5	-0.4
Pakistan	0.4	0.0	0.4	19.7	7.5	12.1
Sri Lanka	0.1	0.5	-0.3	1.6	3.2	-1.6
Maldives	0.0	1.3	-1.3	0.0	7.6	-7.6
Nepal	0.0	0.0	0.0	3.4	0.1	3.3

Source: FAOSTAT

Bangladesh, 0.41 mt in Pakistan and 0.16 mt in Sri Lanka. Nepal imported around 41,000 tonnes of pulses per year.

Trade in vegetables showed that India was a large net exporter and the other South Asian countries are large net importers (Table 12.19). Average export of vegetables from India was 2.3 mt. India also imported 0.57 mt of vegetables. Vegetable exports exceeded imports by 1.7 mt. Bangladesh imported some amounts of vegetables, like India, but its exports of vegetables were only 16,000 tonnes. Thus, Bangladesh was

**Table 12.21 Export, import and net trade in milk in South Asian countries during 2007–09, thousand tonnes**

	Export	Import	Net trade
India	598.5	99.6	498.9
Bangladesh	0.3	353.9	-353.5
Pakistan	55.9	190.7	-134.8
Sri Lanka	4.7	516.9	-512.2
Maldives	0.0	29.6	-29.6
Nepal	26.6	30.3	-3.7

Source: FAOSTAT

**Table 12.22 Export, import and net trade in vegetable oils and sugar in South Asian countries during 2007–09, thousand tonnes**

Country	Vegetable oils			Sugar		
	Export	Import	Net trade	Export	Import	Net trade
India	388.7	6,737.7	-6,349.0	2,814.0	1,001.9	1,812.1
Bangladesh	1.0	1,265.3	-1,264.2	0.0	1,281.9	-1,281.9
Pakistan	39.3	1,888.6	-1,849.2	117.2	289.7	-172.5
Sri Lanka	41.5	188.2	-146.7	0.4	559.4	-559.1
Maldives	0.0	7.7	-7.7	0.0	11.2	-11.2
Nepal	45.7	161.8	-116.0	5.8	26.8	-21.0

Source: FAOSTAT

a net importer of vegetables, exceeding 500,000 tonnes. Pakistan exported 235,000 tonnes of vegetables but at the same time imported close to 400,000 tonnes. This renders Pakistan with negative trade balance in vegetables to the extent of 158,000 tonnes. Sri Lankan import and net trade of vegetables was close to 250,000 tonnes during 2007–09. Nepal was net importer of vegetables to the extent of 90,000 tonnes. Net export of vegetables from India was 70 per cent more than the combined net import of other South Asian countries.

Fruits figure on both sides of trade, export and import. As there is a diverse composition of fruit, a country may be exporting some fruits and importing other fruits. The average export of fruit from India during 2007–09 was 0.87 mt, which was lower than import, which was placed at 1 mt. Thus, India remains a net importer of fruit to the extent of 142,000 tonnes. Bangladesh exports a small quantity of fruit but its imports are much higher (232,000 tonnes). Pakistan and Sri Lanka were net exporters of fruit. Nepal is involved in more than 100,000 tonnes of fruit imports and its exports are around 18,000 tonnes.

Trade in eggs and meat showed that, except India, other countries had very small trade. India exported 68,000 tonnes of eggs and more than 500,000 tonnes of meat (Table 12.20). The import of these two items by India was less than 1,000 tonnes. Pakistan exported on an average 20,000 tonnes of meat and imported 8,000 tonnes.

Trade in milk shows that India exported 0.6 mt and imported 0.1 mt, thus having a net export of 500,000 tonnes (Table 12.21). Bangladesh does not have any export of milk and it imports 354,000 tonnes. Sri Lanka was the largest importer of milk in the region with more than 500,000 tonnes imported. Pakistan imported 191,000 tonnes and exported 56,000 tonnes. Nepal was involved in a small amount of export and import in milk with net trade in favour of import.

Trade data in vegetable oils and sugar is presented in Table 12.22. All South Asian countries imported large volumes of vegetable oil, while India also exported close to 0.4 mt of vegetable oil. The level of import was 6.7 mt for India, 1.9 mt for Pakistan and 1.3 mt for Bangladesh. Sri Lanka and Nepal imported 188,000 and 162,000 tonnes of vegetable oil, respectively.

Like wheat, sugar production and trade in India and Pakistan showed large fluctuations and shifts between positive and negative net trade. In 2007, India exported 4.9 mt of sugar, a value that plummeted to less than 44,000 tonnes in the 2009. On the import side, the quantity of imports of sugar by India was 2.6 mt in 2009 compared with just 25,000 tonnes in 2007. During the three-year period of the study, India's exports were close to three times its imports with a net trade of 1.8 mt. Average exports of sugar from Pakistan were 117,000 tonnes and imports were 290,000 tonnes. Sri Lanka imported more than 500,000 tonnes of sugar. The sugar imports of Nepal were 27,000 tonnes. The three-year average of trade data shows that India's net exports were almost the same as the total net imports of other South Asian countries. Thus, at a regional level there was a perfect balance between import and export. However, to meet the deficiency of some countries from the surplus of other countries year-to-year fluctuations in production and trade need to be smoothed.

### 12.6.2 India's food export to South Asia and the world

India's position in the region is highly strategic because of (a) the size of the country, population, and economy and (b) because of its geographic contiguity with SAARC countries. No two countries in South Asia share common land borders a part from with India. India is closest to Sri Lanka, which does not share a land border with any other country. Therefore, in terms of geography, India has a strong advantage over other countries in South Asia for intra-regional trade. The level of surplus and net trade in various agricultural products from India shows that India can meet the level of deficit in supply over demand in South Asia for most of the products (see Table 12.23).

Table 12.24 presents India's agricultural exports to the world and South Asian countries during the three-year period from 2008–09 to 2010–11. It reveals the potential for meeting regional deficit of food and improving food availability through intra-regional trade. India's average rice export during this period was 2.3 mt, out of which 0.26 mt was exported to South Asia. South Asia imported 0.66 mt of coarse cereals, mainly maize, out of 3.37 mt of export from India. Even though India itself is the largest importer of pulses in the world, it also exports some pulses. Out of a total export of 147,000 tonnes of pulses from India, 39 per cent were exported to South Asia and about 80 per cent of were imported by Pakistan. Some countries in South Asia imported a large quantity of fruits

**Table 12.23 Correlation coefficient between producers' prices in South Asian countries**

Commodity	Country	India	Nepal	Pakistan	Sri Lanka
I. Rice	Bangladesh	0.89	0.84	0.89	0.85
	India		0.67	0.74	0.88
	Nepal			0.80	0.56
	Pakistan				0.65
II. Wheat	Bangladesh	0.88	0.88	0.73	
	India		0.99	0.61	
	Nepal			0.58	
III. Maize	Bangladesh	0.61	0.63	0.53	0.86
	India		0.74	0.76	0.85
	Nepal			0.73	0.75
	Sri Lanka			0.60	
IV. Chickpea	Bangladesh	-0.04	0.92		
	India		-0.13		0.13
	Sri Lanka				
V. Groundnut	Bangladesh	0.11		0.21	-0.10
	India			0.36	0.91
	Sri Lanka			0.22	
VI. Mustard	Bangladesh	0.44		0.64	
	India			0.92	
VII. Onion	Bangladesh	-0.28	-0.43	0.07	-0.46
	India		0.91	0.74	0.69
	Nepal			0.66	0.89
	Pakistan				0.49
VIII. Potato	Bangladesh	-0.33	0.95	0.40	-0.14
	India		-0.30	0.62	0.05
	Nepal			0.42	0
	Pakistan				0.06
IX. Cow Milk	Bangladesh	-0.20	-0.25	-0.17	-0.15
	India		0.73	0.85	
	Nepal			0.74	0.84
	Sri Lanka			0.53	
X. Eggs	Bangladesh	0	-0.27	-0.10	0.16
	India		0.92	0.94	0.95
	Nepal			0.81	0.82
	Sri Lanka			0.88	

Source: FAOSTAT

and vegetables, sugar and dairy products from India. Despite this, South Asia's share in total exports of these products from India remains less than 45 per cent. Bangladesh imported 810,000 tonnes of fruits and vegetables and 428,000 tonnes of sugar from India. India was the major supplier of these products to Pakistan, Sri Lanka and Nepal. By importing 5,700 tonnes of dairy products, Bangladesh constitutes about 12 per cent of total overseas supply of dairy products from India.

Export to South Asia constituted 11 per cent to 45 per cent of India's total export of cereals, pulses, fruits and vegetables, sugar, poultry and dairy products. South Asia

**Table 12.24 India's agricultural exports to South Asian countries from 2008–9 to 2010–11, metric tonne**

Country	Rice	Coarse cereals	Pulses	Fruits and vegetables	Sugar	Poultry	Meat	Dairy product
Bangladesh	203.0	483.5	0.0	809.8	427.8	1.8	0.1	5.7
Bhutan	4.1	1.3	0.0	0.3	3.1	3.2	0.1	0.5
Maldives	16.8	0.1	0.0	16.6	7.2	61.3	0.4	0.0
Nepal	24.7	70.4	0.2	191.6	12.9	0.5	0.1	2.6
Pakistan	1.0	64.9	43.7	190.3	338.9	65.6	3.1	0.7
Sri Lanka	14.7	43.5	13.6	170.2	190.9	6.2	0.0	0.6
South Asia	264.3	663.6	57.6	1,378.9	980.8	138.6	3.8	10.1
World	2,309.1	3,371.3	147.6	3,115.1	2,205.8	897.7	590.9	47.1
South Asia share %	11.45	19.68	39.00	44.27	44.46	15.44	0.64	21.44

is the final destination for close to one-quarter of India's agricultural (excluding fish) exports. As this share is very small, India can easily meet substantial increases in import demand from South Asian countries.

## 12.7 Price and market integration

Price and market integration in South Asian countries was studied by examining the association between producer prices expressed in US\$ during the last ten years covering the period 2000–09. Producer prices represent the overall price situation for the whole country and are thus not restricted to a single market.

There are several ways to study integration. This chapter examines market integration by estimating simple correlation between producer prices for various pairs of countries in South Asia. It is important to mention here that prices expressed in US\$ did not show any common trend between two countries. Nor did they exhibit rising or falling trends, in most cases, when these prices are expressed in US\$. For this kind of data series, simple correlation can be used to find the presence and strength of market integration.

The correlation coefficient between price series of various items in South Asian countries is presented in Table 12.23. The critical values of correlation, below which the results were not statistically significant, was 0.73 at 1 per cent of level of significance and 0.60 at 5 per cent of level of significance. The first panel in the table provides correlation coefficients for prices of rice. The table shows that producer prices of rice in all South Asian countries were strongly correlated. The degree of correlation was more than 0.85 in most cases. Except correlation between Sri Lanka and Nepal prices, all other price series were statistically significant at either 1 per cent or 5 per cent level. Among the different countries, rice prices in Bangladesh showed the strongest relationship with prices in other countries. These results can be used to infer that rice markets in South Asia, in terms of producer prices, are strongly integrated.

The results for wheat are presented in panel 2 of the table. Similar to rice, the producer price series for wheat also showed significant positive correlation across countries. Except for Pakistan and Nepal, wheat prices were statistically significant in all other pairs. Producer prices for wheat in Nepal showed a correlation of 0.99 with wheat prices in India. Similarly, wheat prices for Bangladesh–India and Bangladesh–Nepal were also strongly integrated.

The results for maize price are presented in panel 3. Like rice and wheat, maize prices also showed significant positive correlation in prices prevalent in various countries. Except the correlation between Bangladesh and Pakistan, price series in all other countries showed significant correlation.

Price data for chickpeas was available only for Bangladesh, India, Nepal and Sri Lanka. Among these four countries, only the Bangladesh and Nepal markets showed significant correlation. The correlation between prices for India–Bangladesh and India–Nepal was close to zero.

Data on groundnut prices were not available for Nepal. Among the other countries, Sri Lankan and Indian prices alone showed significant correlation, which was more than 0.9. The results showed that there was no integration in groundnut markets in South Asia, except for between Sri Lanka and India.

Correlation coefficients for onion prices are presented in panel 6. Onion prices in Bangladesh showed either negative or close to zero correlation with prices in other countries. This indicates that the onion market in Bangladesh did not have any integration with markets in other countries in the region. In contrast to this, onion prices for India–Nepal, India–Pakistan, India–Sri Lanka, Nepal–Pakistan and Nepal–Sri Lanka were significantly correlated. Onion prices in Sri Lanka and Pakistan showed positive but non-significant correlation.

Similar to onions, potato prices in Bangladesh did not show significant correlation with prices in India, Pakistan and Sri Lanka. However, potato prices in Bangladesh had a very high correlation with potato prices in Nepal. Potato prices in Sri Lanka also did not show any significant correlation with other countries in the region (Table 12.23). The correlation matrix for potato prices shows that the Bangladesh–Nepal and India–Pakistan markets had significant correlation.

Producer price data for mustard were available only for Bangladesh, Pakistan and India. Prices of mustard in Bangladesh showed significant correlation with Pakistan but not with India. Mustard prices in Pakistan and India were much more strongly correlated.

The correlation coefficient between milk prices in different countries indicates that Bangladesh prices were not linked to any other country in the region. The milk markets for India–Nepal, Pakistan–Nepal, Sri Lanka–Nepal, India–Pakistan and India–Sri Lanka were strongly integrated.

The egg markets in India, Nepal, Pakistan and Sri Lanka were strongly integrated. The correlation between producer prices in these countries ranged between 0.81 and 0.95. However, egg prices in Bangladesh did not show any significant association with any other country.

It is concluded from the correlation matrix in price series that the rice, wheat and maize markets in South Asian countries are strongly integrated with each other. Integration was selective and generally missing in the case of chickpeas and groundnut. Onion prices were integrated except for Bangladesh. Potato markets were integrated only in a few cases. Milk and egg prices are integrated across countries except for the Bangladesh markets, which did not show any co-movement with prices in the region.

## 12.8 Trade liberalisation: Potential and constraints

Regional integration in trade and investment has become an increasing feature of world trade and globalisation. Particularly following the WTO agreement, it was expected that the regionalism bill would gradually give way to multilateralism. However, the number of regional trading agreements/preferential trading agreements has seen explosive growth. Even those countries that previously adopted a cautious approach to regionalism are gravitating towards regional integration and seeking deeper integration with neighbouring countries. South Asia remains the least integrated region in Asia. Intra-regional trade in South Asia constitutes 5 per cent of total trade in the region.

One of the major factors for low volume and low share of intra-regional trade seems to be the poor trade facilitation for intra-regional trade. The Asian Development Bank prepared a very valuable report on intra-regional trade and investment in South Asia, which quantified the impact of logistics on trade in these countries (ADB 2009). The report prepares a logistics index based on existing customs procedures, infrastructure and timeliness to analyse the impact of these factors on trade. The results of the study showed that the effect of importers' trade facilitation on trade was quite significant, whereas the effect of exporters' trade facilitation was non-significant. Further, the effect of trade facilitation factors was much stronger on agriculture trade than trade in manufacturing, textiles and clothing, and automobiles. Another very interesting result of this study was that the effect of tariffs on agriculture trade was much smaller than the effect of trade facilitation factors (ADB 2009, Table 2.5). Trade facilitation was also found to be a major factor in the growth of intra-regional and total trade from South Asia in other studies (Jain and Singh 2009; Wilson and Otsuki 2006).

Using a computable general equilibrium (CGE) model, the ADB study estimated the direct and indirect impact of enhancing trade facilitation on trade in South Asia as well as trade with the rest of the world. The results show that trade facilitation has a very large impact on trade flows. The estimated effect for agriculture is presented in Table 12.25. The study projects a 20 per cent increase in inter-regional trade and a 63 per cent increase in intra-regional trade. The distribution of intra-regional trade over different countries shows more than a doubling of trade in respect of Bangladesh. India is projected to witness a 66 per cent increase in intra-regional trade and a 5 per cent increase in inter-regional trade. Pakistan shows a higher increase for inter-regional trade than intra-regional trade. The results for Sri Lanka are mixed – a decrease in inter-regional trade and an increase in intra-regional trade in agriculture. The rest of South Asia is showing about a 50 per cent increase in both types of trade.

**Table 12.25 Macro economic effect of trade facilitation reforms obtained from CGE model: Change in trade volume (%)**

Country	Agriculture		All sectors	
	Intra-regional	Inter-regional	Intra-regional	Inter-regional
All South Asian countries	63	20	75	22
Bangladesh	109	102	103	62
India	66	5	75	14
Pakistan	32	57	97	33
Sri Lanka	7	-27	38	17
Rest of South Asia	50	49	60	39

**Source:** Table 2.9, ADB (2009)

Similar results were reported by Wilson and Otuski (2007), who projected a gain of US\$2.6 billion in intra-regional trade from capacity development in trade facilitation. The gain was US\$1,224 million due to service infrastructure, US\$712 million due to port efficiency, US\$429 million due to custom modernisation and US\$278 million due to regulatory reforms.

There seems to be a tremendous potential to raise intra-regional trade in agriculture and food. It is shown above that some countries have a surplus and some a deficit in the same products. Similarly, some countries are net importers and some are net exporters of the same product. Trade in sugar, vegetables, fruits and milk can be increased by simply synchronising deficits and surpluses in SAARC countries. A second way to increase intra-regional trade is to meet the shortages and demand and supply imbalances arising from seasonal or year-to-year fluctuations from within the region. Seasonal shocks in the supply of various food products are being experienced frequently. Neighbourhood trade is a very efficient and time-effective source for moderating the effects of such shocks. Third, improvements in per capita income brought by growth of these economies will accelerate dietary diversification and changes in consumption patterns. This will create demand which may not be economical to meet from domestic production. Harnessing this potential for intra-regional trade will depend upon trade facilitation, foreign direct investment (FDI), the dismantling of non-tariff barriers (NTBs) and the elimination of negative lists in SAFTA. Out of these, some progress is being made for improving trade facilitation and removing tariff and NTBs, but there is hardly any focus on regional FDI in agriculture and the food sector.

India's expanding domestic market and the rapid growth of organised retail in the country have created great potential for sourcing from within the SAARC region to meet the opportunities created by growing local demand. This requires efficient value chains. The existing agricultural marketing system in the whole region is very inefficient, fragmented and outdated. It serves the interests of neither producers nor consumers. Modernisation of the agricultural marketing supply system requires development of new supply chains and production networks in the region. This is

not possible without investment by an organised private sector. Regional FDIs can play an important role in this. As South Asian countries have lots of similarities in production portfolios, regional FDI can also serve as an instrument for the transfer of technology in the region.

Agriculture is now being received with renewed importance and emphasis globally and in almost all the South Asian countries. This is for several reasons. The global food crisis of 2007–08 has awakened the world from complacency on the adequacy of food supply in meeting demand. Contrary to their historical behaviour and defying several predictions, agri-food prices have been increasing in real terms and they have not returned to pre-2005 levels. The global community is seriously concerned about meeting future growth in agri-food demand. There is a rising preference towards 'bios' – bio-energy, bio-pesticides, bio-medicine, bio-cosmetics, bio-fertiliser, bio-remediation. Agricultural crop-based innovations are likely to create a lot of new opportunities in commerce, trade and manufacturing. Addressing the various challenges in the agriculture sector and harnessing emerging opportunities require investments in various spheres of agriculture spanning from inputs to output supply to consumers. No single country in the region has expertise or comparative advantage in all the areas of agriculture. Therefore cross-border investments in the region are needed for harnessing the potential of agriculture in the region.

## 12.9 The way forward

SAFTA has resulted in bringing down tariffs, but it could not achieve much progress in improving trade facilitation for regional trade. There is large scope for extending regional trade in food and agriculture and promoting investment in this sector in South Asia. There is also a large volume of informal trade in the region which reflects the need for increasing formal trade. Economic gains from regional integration are generally complemented by the build-up of political goodwill, which helps in creating a stable environment. India, being a large country and having a dominant economic position in the region, has a special responsibility to consolidate South Asian economic integration. This requires action to improve trade facilitation through improved linkages by road, rail, air and shipping, and better connectivity, for example, providing landlocked Nepal with transit facilities to promote its trade. South Asian countries can enhance their growth and development through trade-promotion strategies. This requires action in such areas as trade facilitation, reducing barriers to FDI, further lowering of tariffs, pruning of the negative list and removal of NTBs.

Out of all the above-mentioned areas, trade facilitation, in the form of simplification of customs and other border formalities; transport linkages; transparency of regulation; improved logistics for rail, road, air and maritime transport; information networks, etc., is most important for increasing intra-regional trade. Improved trade facilitation and logistics will reduce the transaction costs of trade to a more significant extent than cutting tariffs. South Asian countries must promptly take up measures individually and as a group for achieving higher trade facilitation.

Reducing barriers to regional FDI and trade facilitation are complementary to each other. Thus, along with trade facilitation, there is a need to provide a liberal and

conducive environment for FDI in the area of food chain development and food processing. These will be beneficial for producers as well as consumers and for improving food security.

Due to year-to-year fluctuations in production at a country level, a surplus in a South Asian country is not considered to be a reliable source of supply to meet deficits and import demands by other countries. This needs to be overcome by building regional stocks of food under SAFTA. SAFTA could also be used as an appropriate forum, not only to address intra-regional trade disputes but also for taking a collective stand on agriculture and food security-related issues in WTO.

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