Economic Reforms and Agriculture in Bangladesh: Assessment of Impacts using Economy-wide Simulation Models

Raihan, Selim

South Asian Network on Economic Modeling (SANEM), Department of Economics, University of Dhaka, Dhaka , Bangladesh

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[1] Dr. Selim Raihan is Associate Professor, Department of Economics, University of Dhaka, Bangladesh and Executive Director, South Asian Network on Economic Modeling (SANEM)

I. INTRODUCTION

Agriculture is a major economic activity in Bangladesh. It currently employs around 50 percent of country's labor force and contributes around 20 percent of country's GDP. It is increasingly becoming established in economic literature that the development of a growing economy critically depends on the development of the agricultural sector. As poor people are concentrated in the agricultural sector, alleviation of poverty also calls for reducing poverty in the rural areas with utmost importance. In Bangladesh, around 70 percent of the poor people live in the rural areas.

Growth in agricultural sector has important linkages with the overall economy through various channels. Firstly, agriculture provides critical supply of raw materials to many non-agricultural sectors. Secondly, consumptions of agricultural commodities have important implications for poverty of the households both in rural and urban areas. Therefore, the demand and supply of agricultural commodities, especially food items, and their prices influence much of the welfare of the poor households. Thirdly, rural sector is the dominant source of supply of unskilled labor to the economy.

Crop is the major agricultural sub sector, which accounts for about 14 percent of the country's GDP. There are a number of agricultural crops produced in Bangladesh. Rice is the most important crop in Bangladesh. It is by far the staple food for 160 million people and the major means of livelihood for 13 million farm households in the country. The dependence of the poor people on cereals (rice and wheat) for their livelihood is clearly understood from the fact that the bottom 40 percent of the rural households, in the per capita income scale, in Bangladesh spends nearly 52 percent of their budget on the crop sector output, with 35 percent on rice and wheat alone. The corresponding numbers for the urban areas are 42 percent and 25 percent, respectively. The top 10 percent households also allocate some significant proportions of their budget on crop sector output both in the rural and urban areas. Bangladesh is the fourth largest rice producing country in the world, and it also happens to be the fourth biggest rice consuming country. Because of the huge domestic consumption, the country turns out to be a net rice importing country. Bangladesh is also a large exporter of jute. There are other agricultural crops, i.e., wheat, potato, lentils, vegetables, spices, tea, which are partly produced and the rest are imported to meet the domestic demand.

It is important to note that, at the WTO, Bangladesh, as an LDC, is not bound to undertake any liberalisation in its domestic agricultural sector in terms of tariff cut or subsidy withdrawal. However, there are concerns that actions taken by the developed and developing countries in terms of reduction in agricultural domestic support measures might have important negative implications for the net food importing countries like Bangladesh. It can however be noted that agriculture has been at the centre stage of multilateral trade

negotiations during the past 25 years. Despite having a major progress in improving the rules for trade, the overall achievement, in terms of increasing market access for agricultural goods, was considered to be 'disappointing' at the end of the Uruguay Round. Although under the WTO Agreement on Agriculture members committed to carrying on reforms, not much progress has so far been made in further opening-up of the markets. Nevertheless, agriculture continues to be an active area of negotiation. While the modalities for future liberalisation in the sector are being negotiated, the potential implications arising from such liberalisation have drawn a lot of attention. Several studies predict that, with the elimination of export and production subsidies, prices of agricultural commodities are likely to increase. This will be beneficial to a number of developing countries that have clear comparative advantage in the sector. Liberalisation will also imply further market access opportunities for these countries as a result of reduced tariff barriers in the developed country markets. However, not all developing countries are net-exporters of agricultural products, and many of them actually depend on the world market for their supplies. Consequently, a global agricultural trade liberalisation under WTO could adversely affect these countries.

It is also important to note that under bilateral trading arrangements, such as India-Bangladesh bilateral FTA, there are scopes for increased trade in agricultural products between Bangladesh and India. Bangladesh's market access for its agricultural exports in India is likely to increase whereas there will be increased imports of agricultural products from India. Therefore, liberalisation in the trade in agriculture has important implications for the agricultural commodities which are either exported or imported. Increased market access of agricultural exports from Bangladesh under such trade agreement will lead to rise in production and employment in those export-oriented sectors; whereas, domestic liberalisation in the agricultural sectors may dampen output and employment in the import-competing agricultural sectors.

It thus appears that the growth in the domestic agricultural sector doesn't only rely on the domestic policies and programs, rather global and regional trade policies have important implications for this sector. Moreover, the various economic policies and programs, such as domestic fiscal policies, import policies and programs for growth in agricultural productivity also affect the development of the agricultural sector in an economy.

Against the backdrop of the aforementioned discussion, this study explores the links between major economic policy reforms and growth the agricultural sector in Bangladesh. The overall objective of this study is to explore how economic policy reforms affect the agricultural sector in Bangladesh in terms of output, import, export and employment. The study explores three trade liberalization scenarios (a global agricultural trade liberalization scenario under WTO-Doha agreement, Bangladesh – India bilateral FTA, and domestic

agricultural trade liberalization), one fiscal policy scenario (rise in agricultural subsidy) and one technological change scenario (rise in agricultural productivity).

The organisation of the paper is as follows: Section II discusses on the methodology of the research; Section III presents and analysis of the structure of the Bangladesh economy; Section IV discusses the issues of economic reforms in Bangladesh; Section V provides the results from the GTAP model; Section VI presents the results from the multiplier model; Section VII presents the results from the Bangladesh CGE model; and Section VIII suggests the policy implications and concludes.

II. METHODOLOGY

This study uses several models such as GTAP global general equilibrium model, SAM multiplier model, CGE model and an employment satellite matrix to explore the employment effects in Bangladesh due to different scenarios. For the global agricultural trade liberalisation and Bangladesh – India bilateral FTA scenarios, at first, the scenarios are run in the GTAP model. The changes in demand for exports, export prices and import prices, as obtained from the GTAP model, are matched to the 41 SAM sectors of Bangladesh. The percentage changes in demand for exports are introduced in the SAM multiplier model as exogenous shock. However, in the context of the SAM multiplier model, simulating shocks on export prices and import prices and on imports are not possible since the SAM multiplier model is a fixed-price model and import is considered as 'leak' not an exogenous account in this model. In contrast, under the CGE model, the shocks on export demands, export prices, import prices and tariff rates are possible.

The advantage with this approach is that, since there are limitations of a single country SAM multiplier or CGE model in undertaking simulations for global and bilateral trade reform scenarios, establishment of such links with the global model can enable the single country model to conduct such simulations.

For the subsidy and productivity scenarios, the shocks are introduced directly to the CGE model and subsequent macro, sectoral and meso implications are explored.

In the context of the SAM multiplier model, assuming unit employment elasticity of output, the changes in output are linked to the employment satellite matrix to obtain the export-induced employment effect. However, in the context of the CGE model the employment effects of the simulations are derived in the following way: the base value addition by labour is divided by the base number of employment of labour to calculate the base 'derived wage rate'. Now, the CGE simulation produces new vector of value addition of labour and percentage change in wage rate. The percentage change in wage rate is used to derive the

'new derived wage rate'. Now, dividing the new value addition of labour with the 'new derived wage rate' produces the new number of employment. The change in the employment is the difference between the base number of employment and the new number of employment.

2.1. The GTAP Model

The global computable general equilibrium (CGE) modelling framework of the Global Trade Analysis Project (GTAP) (Hertel, 1997), is the best possible way for the *ex ante* analysis of the economic and trade consequences of multilateral or bilateral trade agreements. The GTAP model is a comparative static model, and is based on neoclassical theories.[2] The GTAP model is a linearised model, and it uses a common global database for the CGE analysis. The model assumes perfect competition in all markets, constant returns to scale in all production and trade activities, and profit and utility maximising behaviour of firms and households respectively. The model is solved using the software GEMPACK (Harrison and Pearson, 1996).

In the GTAP model each region has a single representative household, termed as the regional household. The income of the regional household is generated through factor payments and tax revenues (including export and import taxes) net of subsidies. The regional household allocates expenditure over private household expenditure, government expenditure and savings according to a Cobb Douglas per capita utility function.[3] Thus each component of final demand maintains a constant share of total regional income.

The private household buys commodity bundles to maximise utility subject to its expenditure constraint. The constrained optimising behaviour of the private household is represented in the GTAP model by a Constant Difference of Elasticity (CDE) expenditure function. The private household spends its income on consumption of both domestic and imported commodities and pays taxes. The consumption bundles are Constant Elasticity of Substitution (CES) aggregates of domestic and imported goods, where the imported goods are also CES aggregates of imports from different regions. Taxes paid by the private household cover commodity taxes for domestically produced and imported goods and the income tax net of subsidies.

The government also spends its income on domestic and imported commodities and also pays taxes. For the government, taxes consist of commodity taxes for domestically produced

[2] Full documentation of the GTAP model and the database can be found in Hertel (1997) and also in Dimaranan and McDougall (2002).
[3] Savings enter in the static utility function as a proxy for future consumption.

and imported commodities. Like the private household, government consumption is a CES composition of domestically produced goods and imports.

The GTAP model considers the demand for investment in a particular region as savings driven. In the multi country setting the model is closed by assuming that regional savings are homogenous and contribute to a global pool of savings (global savings). This is then allocated among regions for investment in response to the changes in the expected rates of return in different regions. If all other markets in the multi regional model are in equilibrium, if all firms earn zero profits, and if all households are on their budget constraint, such a treatment of savings and investment will lead to a situation where global investment must equal global savings, and Walras' Law will be satisfied.

In the GTAP model, producers receive payments for selling consumption goods and intermediate inputs both in the domestic market and to the rest of the world. Under the zero profit assumption employed in the model, these revenues must be precisely exhausted by spending on domestic intermediate inputs, imported intermediate inputs, factor income and taxes paid to regional household (taxes on both domestic and imported intermediate inputs and production taxes net of subsidies).

The GTAP model considers a nested production technology with the assumption that every industry produces a single output, and constant returns to scale prevail in all markets. Industries have a Leontief production technology to produce their outputs. Industries maximise profits by choosing two broad categories of inputs namely, a composite of factors (value added) and a composite of intermediate inputs. The factor composite is a CES function of labour, capital, land and natural resources. The intermediate composite is a Leontief function of material inputs, which are in turn a CES composition of domestically produced goods and imports. Imports are sourced from all regions.

The GTAP model employs the Armington assumption which provides the possibility to distinguish imports by their origin and explains intra-industry trade of similar products. Following the Armington approach import shares of different regions depend on relative prices and the substitution elasticity between domestically and imported commodities.

The version 7 of the GTAP database has 2004 as the base year. Several pre-simulations are conducted to update the base year to reflect the situation in 2007 using updated national, economic and trade data and updated protection data. GTAP Data on regions and commodities are aggregated to meet the objectives of this study. The version 7 of GTAP database covers 57 commodities, 107 regions/countries, and 5 factors of production. The current study has aggregated 57 commodities into 27, and 129 regions into 12 as shown in Tables 1 and 2 respectively. In the GTAP database, each industry produces one commodity. So there is a one to one relation between industries and commodities. Given the focus of

the present study Bangladesh, other South Asian countries and other LDCs have been considered as separated countries/regions.

Table 1: GTAP Commodity Aggregation in the Present Study

Sector code	Constructed broad sectors consisted with SAM sectors of Bangladesh	GTAP sectors included
CRC	Cereal Crop sectors	Paddy rice; Other cereal grains; Wheat
CMC	Commercial crops	Vegetables, fruit, nuts; Oil seeds; Sugar cane, sugar beet; Plant-based fibers; Other crops
LIV	Livestock Rearing and Poultry Rearing	Cattle, sheep, goats, horses; Other animal products
SHP	Fishing	Fishing
FST	Forestry	Forestry
RCE	Rice Milling	Processed rice
FOD	Grain Milling and Food Process	Raw milk; Meat: cattle, sheep, goats, horse; Other meat products; Vegetable oils and fats; Dairy products; Sugar; Other food products
LEA	Leather Industry	Leather products
CLT	Cloth milling	Textiles
RMG	Woven and Knit RMG	Wearing apparel
CIG	Cigarette Industry	Beverages and tobacco products
FUR	Furniture Industry	Wood products.
PRN	Paper, printing & publishing	Paper products, publishing
PET	Petroleum	Petroleum, coal products
CHE	Chemical Industry	Chemical, rubber, plastic products
MET	Metal	Ferrous metals; Other metals; Metal products
MIS	Toiletries, Pharmaceuticals, Fertilizer Industry, Glass Industry, Earth-ware and clay industry, Cement, Miscellaneous Industry	Wool, silk-worm cocoons; Motor vehicles and parts; Other transport equipment; Electronic equipment; Machinery and equipment; Other manufactures; Other mineral products
MNQ	Mining and Quarrying	Coal; Oil; Gas; Other minerals;
CON	Construction	Construction
ELW	Electricity and Water	Electricity; Water
GDT	Gas Extraction & Distribution	Gas manufacture, distribution
TRD	Wholesale and retail trade	Trade
TRN	Transport	Other transport; Sea transport; Air transport
PUB	Public Administration, Defence, Health Service, Education Service	Public administration, defence, health and education
BNK	Bank, Insurance and Real est.	Other financial services; Insurance; Dwellings
COM	Communication and IT and ECom	Communication
OSR	Hotel and Restaurant and Other Services	Other business services, Recreation and other services

Source: GTAP Database 7.1

Table 2: GTAP Region Aggregation in the Present Study

Aggregated regions	Comprising regions
Bangladesh	Bangladesh
India	India
Pakistan	Pakistan
Sri Lanka	Sri Lanka
Rest of South Asia	Comprising Bhutan, Nepal and Maldives
Thailand	Thailand
Other Developed countries	Other developed countries excluding North America and EU25
Other Developing Countries	Other developing countries excluding India, Pakistan, Sri Lanka and Thailand
LDCs	Other LDCs
North America	USA, Canada, Mexico
EU25	European Union
ROW	Rest of the World

Source: GTAP Database 7.1

2.2. The Multiplier Model

The move from a SAM data framework to a multiplier framework requires decomposing the SAM accounts into "exogenous" and "endogenous" as well as to introduce a set of assumptions pertaining to the Generalized Leontief Model (Alarcon, 2002). Generally accounts intended to be used as policy instruments (e.g. government expenditure, investment, exports) are made exogenous and accounts a priory specified as objectives or targets must be made endogenous (e.g. activity, commodity demand, factor return and household income).

For any given injection into the exogenous accounts (i.e. instruments) of the SAM, influence is transmitted through the interdependent SAM system among the endogenous accounts. The interwoven nature of the system implies that the incomes of factors, households and production are all derived from exogenous injections into the economy via a multiplier process. The multiplier process is developed here on the assumption that when an endogenous income account receives an exogenous expenditure injection, it spends it in the same proportions as shown in the matrix of average propensities to spend (APS). The elements of the APS matrix is calculated by dividing each cell by its corresponding column sum totals.

The multiplier analysis using the SAM framework helps to understand the linkages between the different sectors and the institutional agents at work within the economy. Accounting multipliers have been calculated according to the standard formula for accounting (impact) multipliers, as follows:

$$\mathbf{Y} = A\,Y + \mathbf{X} = (I - A)^{-1}\mathbf{X} = M_a\,\mathbf{X}$$

Where:

Y is a vector of incomes of endogenous variables

X is a vector of expenditures of exogenous variables

A is the matrix of average expenditure propensities for endogenous accounts

$M_a = (I - A)^{-1}$ is a matrix of aggregate accounting multipliers (generalized Leontief inverse).

Variations in any one of the exogenous account (i.e. in this case ΔX) will produce total impacts (ΔY) of endogenous entries via the multipliers. More specifically they are expressed as:

$$\Delta Y = M_a \times \Delta X.$$

The economy wide effect is thus equal to $\Delta Y = M_a \times \Delta X$. Thus ΔY captures the economy wide impacts on the four endogenous accounts namely: (i) gross output; (ii) commodity demand; (iii) factor returns and (iv) household. Table 3 provides the description of the endogenous and exogenous accounts and multiplier effects.

Table 3: Description of the Endogenous and Exogenous Accounts and Multiplier Affects

Endogenous (y)	Exogenous (x)
The activity (gross output multipliers), indicates the total effect on the sectoral gross output of a unit-income increase in a given account *i* in the SAM, and is obtained via the association with the commodity production activity account *i*.	
The consumption commodity multipliers, which indicates the total effect on the sectoral commodity output of a unit-income increase in a given account *i* in the SAM, is obtained by adding the associated commodity elements in the matrix along the column for account *i*.	Intervention into through activities (x = i + g + e), where i= GFCF + ST Exports (e) Government Expenditure (g) Investment Demand (i) Inventory Demand (i) Gross Fixed Capital Formation (GFCF) Stock (ST)
The value added or GDP multiplier, giving the total increase in GDP resulting from the same unit-income injection, is derived by summing up the factor-payment elements along account *i*'s column.	
Household income multiplier shows the total effect on household and enterprise income, and is obtained by adding the elements for the household groups along the account i column.	Intervention via households (x = r + gt + ct), where Remittance (r) Government Transfers (gt) Corporation Transfers (ct)

The economy-wide impacts of the rise in exports are examined by changing the total exogenous injection vector. More specifically, the total exogenous account is manipulated to estimate their effects on output (through an output multiplier), value-added or GDP (through the GDP multiplier), and household income (through household income multiplier) and commodity demand (via commodity multipliers). The calculated multipliers are provided in Annex 1.

2.3. The CGE Model for the Bangladesh Economy

All trade liberalisation scenarios are run in a Computable General Equilibrium (CGE) framework, whose advantage is that it traces the price effects of the exogenous shock. In an increasingly market oriented economy, the variations in prices may be the most important sources of re-allocation of resources among competing activities which then may alter the factorial income and hence personal income distribution. A SAM prepared for the year 2006-07 serves as the consistent and comprehensive database for the above-mentioned exercises.

The Bangladesh CGE model is built using the PEP standard static model.[4] In the Bangladesh CGE model representative firm in each industry maximizes profits subject to its production technology. The sectoral output follows a Leontief production function. Each industry's

[4] See www.pep-net.org

value added consists of composite labour and composite capital, following a constant elasticity of substitution (CES) specification. Different categories of labour are combined following a constant elasticity of substitution (CES) technology with imperfect substitutability between different types of labour. Composite capital is a CES combination of the different categories of capital. It is assumed that intermediate inputs are perfectly complementary, and are combined following a Leontief production function.

Household incomes come from labour income, capital income, and transfers received from other agents. Subtracting direct taxes yields household's disposable income. Household savings are a linear function of disposable income, which allows for the marginal propensity to save being different from the average propensity.

Corporation income consists of its share of capital income and of transfers received from other agents. Deducting business income taxes from total income yields the disposable income of each type of business. Likewise, business savings are the residual that remains after subtracting transfers to other agents from disposable income.

The government draws its income from household and business income taxes, taxes on products and on imports, and other taxes on production. Income taxes are described as a linear function of total income, whether it be for households or for businesses. The current government budget surplus or deficit (positive or negative savings) is the difference between its revenue and its expenditures. The latter consist of transfers to agents and current expenditures on goods and services.

The rest of the world receives payments for the value of imports, part of the income of capital, and transfers from domestic agents. Foreign spending in the domestic economy consists of the value of exports, and transfers to domestic agents. The difference between foreign receipts and spending is the amount of rest-of-the-world savings, which are equal in absolute value to the current account balance, but of opposite sign.

The demand for goods and services, whether domestically produced or imported, consists of household consumption demand, investment demand, demand by government, and demand as transport or trade margins. It is assumed that households have Stone-Geary utility functions (from which derives the Linear Expenditure System). Investment demand includes both gross fixed capital formation (GFCF) and changes in inventories. .

Producers' supply behaviour is represented by nested CET functions: on the upper level, aggregate output is allocated to individual products; on the lower level, the supply of each product is distributed between the domestic market and exports. The model departs from the 'pure' form of the small-country hypothesis. A local producer can increase his share of the world market only by offering a price that is advantageous relative to the (exogenous)

world price. The ease with which his share can be increased depends on the degree of substitutability of the proposed product to competing products; in other words, it depends on the price-elasticity of export demand. Commodities demanded on the domestic market are composite goods, combinations of locally produced goods and imports. The imperfect substitutability between the two is represented by a constant elasticity of substitution (CES) aggregator function. Naturally, for goods with no competition from imports, the demand for the composite commodity is the demand for the domestically produced good.

The system requires that there is equilibrium between the supply and demand of each commodity on the domestic market. Also there is equilibrium between total demand for capital and its available supply. However, the model works with two different labour market closures. The first closure involves flexible wage rates of unskilled and skilled labour and fixed supply of labour of these two categories. This closure is termed as "full employment closure". The second closure considers fixed wage rate of unskilled labour and flexible wage rate of skilled labour. Therefore, the supply unskilled labour is not fixed. This closure is termed as "unemployment closure". Total investment expenditure must be equal to the sum of agents' savings. The sum of supplies of every commodity by local producers must be equal to domestic demand for that commodity produced locally. And finally, supply to the export market of each good must be matched by demand.

III. STRUCTURE OF THE BANGLADESH ECONOMY AS REFLECTED IN THE SAM 2007

The structure of the Bangladesh economy in 2007 is briefly presented in Table 4. Colum 1 shows the shares of sectoral value-added in total value added. The share of agriculture in total valued added is 19.88 percent with cereal crop and commercial crop sectors as the leading sectors. The share of industry is 18 percent and the sectors with high shares are rice milling, woven readymade garments (woven RMG) and knit readymade garments (knit RMG). The share of services sector (including construction) is 62.12 percent and the leading services sectors are wholesale and retail trade, construction and other services.

Column 2 of Table 4 shows the sectoral export orientation. The woven and knit RMG sectors are more than 80 percent export oriented. The other major export oriented sectors are jute, leather, Information technology, public administration and defence, fishing, furniture industry and fertiliser industry.

Bangladesh's export basket is highly concentrated as is evident from the fact that around 74 percent of the total export comes from woven and knit RMG (Column 3 of Table 4). The share of fishing is 5.3 percent. Leather and miscellanies industries constitute 1.7 and 6.9 percent of the total exports respectively. In the services sectors, public administration and defence constitute 5 percent of the total export and the IT sector has a very low share, only 0.16 percent.

Column 4 of Table 4 suggests that the major import-oriented sectors are chemical industry, petroleum, fertilizer industry, paper-printing and publishing industry, miscellaneous industry, toiletries, mill cloth and yarn. According to Column 5, the sectors with high import shares are miscellaneous industry, petroleum, food process and commercial crops. Finally, Column 6 presents the sectors with respective tariff rates. The leading protected sectors (the sectors with high tariff rates) are toiletries, cigarette industry, furniture industry, paper, printing and publishing industry, yarn, cloth milling, woven RMG, poultry rearing, fishing and grain milling.

Table 4: Structure of the Bangladesh Economy in 2007 as reflected in SAM 2007

	1	2	3	4	5	6
Sectors	**Vi/TV**	**Ei/Oi**	**Ei/TE**	**Mi/Oi**	**Mi/TM**	**TAR**
Cereal Crop sectors	7.44	0.00	0.00	4.91	2.44	6.33
Commercial crops	4.53	2.73	1.13	26.03	7.56	5.53
Livestock Rearing	1.45	0.01	0.00	0.01	0.00	6.78
Poultry Rearing	0.90	0.00	0.00	0.58	0.06	15.09
Fishing	4.03	9.77	5.11	0.07	0.03	33.35
Forestry	1.54	0.00	0.00	0.00	0.00	0.00
Agriculture	**19.88**		**6.47**		**10.00**	
Rice Milling	3.09	0.03	0.02	1.22	0.70	6.23
Grain Milling	0.36	0.08	0.01	0.11	0.01	24.28
Food Process	1.24	0.93	0.36	29.58	8.07	12.07
Leather Industry	0.39	23.42	1.73	4.45	0.23	11.74
Yarn	0.03	42.21	0.38	508.65	3.18	18.23
Cloth milling	1.72	0.00	0.00	17.97	3.79	27.43
Woven RMG	2.39	91.71	37.61	11.68	3.36	21.27
Knitting	3.26	90.49	36.37	1.29	0.36	1.17
Toiletries	0.00	5.92	0.02	166.71	0.32	31.97
Cigarette Industry	0.09	1.79	0.10	2.49	0.10	30.40
Furniture Industry	0.21	28.38	1.13	31.16	0.87	16.31
Paper, printing and publishing Industry	0.06	4.99	0.05	209.81	1.51	20.76
Pharmaceuticals	0.34	2.22	0.15	20.03	0.96	2.05
Fertilizer Industry	0.05	42.01	0.31	328.09	1.71	4.04
Petroleum	0.05	14.14	0.43	654.70	13.91	16.63
Chemical Industry	0.11	12.04	0.28	395.22	6.49	14.62
Glass Industry	0.04	5.86	0.05	33.97	0.20	21.03
Earth-ware and clay industry	0.19	0.06	0.00	14.46	0.31	7.22
Cement	0.16	0.28	0.02	6.70	0.39	11.07
Metal	0.96	3.38	0.76	16.10	2.53	14.12
Miscellaneous Industry	2.08	25.20	6.87	145.63	27.89	14.40
Mining and Quarrying	1.19	0.06	0.01	0.52	0.05	20.12
Industry	**18.00**		**86.43**		**76.32**	
Construction	8.42	0.00	0.00	0.00	0.00	0.00
Electricity and Water Generation	0.89	0.00	0.00	0.00	0.00	0.00
Gas Extraction and Distribution	0.28	0.00	0.00	0.00	0.00	0.00
Wholesale and retail trade	14.63	0.00	0.00	0.00	0.00	0.00
Transport	9.44	1.32	0.83	18.46	8.20	0.00
Health Service	2.30	0.00	0.00	0.00	0.00	0.00
Education Service	2.63	0.00	0.00	0.00	0.00	0.00
Public Administration and Defense	2.84	21.32	5.08	13.27	2.22	0.00
Bank Insurance and Real estate	1.63	1.29	0.16	15.41	1.35	0.00
Hotel and Restaurant	0.70	0.00	0.00	0.00	0.00	0.00
Communication	1.32	3.34	0.32	2.29	0.16	0.00
Information Technology and E-Commerce	0.07	29.65	0.16	7.57	0.03	0.00
Other Services	16.98	0.49	0.54	1.33	1.03	0.00
Services	**62.12**		**7.11**		**13.68**	
Total	**100.00**		**100.00**		**100.00**	

Note: Vi = sectoral value added, TV = total value added, Ei = sectoral export, Oi = sectoral output, TE = total export, Mi = sectoral import, TM = total import, TAR = tariff rate. All figures are expressed in percentage

Source: Social Accounting Matrix of Bangladesh for 2007

Table 5 presents the structure of employment in the economy of Bangladesh. Despite the fact that agricultural sector contributes less than 20 percent of the value-addition (Table 4), it constitutes nearly 47 percent of the total employed labour force of the country. The shares of industry and services sectors are 11.1 percent and 41.9 percent respectively.

Table 5: Sectoral Employment Numbers and Shares from the Employment Satellite Matrix

	Number		% Share in Total		% Share in Total
Sectors	**UL**	**SL**	**UL**	**SL**	**(UL+SL)**
Cereal Crop sectors	13165730	9270	29.91	0.28	27.83
Commercial crops	3239420	1580	7.36	0.05	6.85
Livestock Rearing	2077557	356443	4.72	10.70	5.14
Poultry Rearing	1562291	238709	3.55	7.17	3.80
Fishing	943285	151715	2.14	4.56	2.31
Forestry	423142	76858	0.96	2.31	1.06
Agriculture	**21411425**	**834575**	**48.65**	**25.06**	**46.99**
Rice Milling	248550	450	0.56	0.01	0.53
Grain Milling	10590	3910	0.02	0.12	0.03
Food Process	245770	21130	0.56	0.63	0.56
Leather Industry	91960	7040	0.21	0.21	0.21
Yarn	61420	6580	0.14	0.20	0.14
Cloth milling	650190	23810	1.48	0.72	1.42
Woven RMG	1008370	103630	2.29	3.11	2.35
Knitting	93170	4830	0.21	0.15	0.21
Toiletries	14990	2010	0.03	0.06	0.04
Cigarette Industry	121660	7340	0.28	0.22	0.27
Furniture Industry	946720	19280	2.15	0.58	2.04
Paper, printing and publishing Industry	89640	28360	0.20	0.85	0.25
Pharmaceuticals	54700	9300	0.12	0.28	0.14
Fertilizer Industry	38540	10460	0.09	0.31	0.10
Petroleum	7460	2540	0.02	0.08	0.02
Chemical Industry	113060	13940	0.26	0.42	0.27
Glass Industry	5700	2800	0.01	0.08	0.02
Earth-ware and clay industry	243920	3000	0.55	0.09	0.52
Cement	37100	2900	0.08	0.09	0.08
Metal	190540	29460	0.43	0.88	0.46
Miscellaneous Industry	615460	72540	1.40	2.18	1.45
Industry	**4892210**	**375810**	**11.12**	**11.29**	**11.13**
Construction	1453000	71000	3.30	2.13	3.22
Electricity and Water Generation	48510	11490	0.11	0.35	0.13
Gas Extraction and Distribution	4770	3230	0.01	0.10	0.02
Mining and Quarrying	2700	500	0.01	0.02	0.01
Wholesale and retail trade	7035780	72220	15.99	2.17	15.01
Transport	3316660	29540	7.54	0.89	7.07
Health Service	61920	272080	0.14	8.17	0.71
Education Service	247020	1058980	0.56	31.80	2.76
Public Administration and Defense	784890	96110	1.78	2.89	1.86
Bank Insurance and Real estate	291529	216471	0.66	6.50	1.07
Hotel and Restaurant	695680	16320	1.58	0.49	1.50
Communication	136380	1620	0.31	0.05	0.29
Information Technology and E-Commerce	4250	4750	0.01	0.14	0.02
Other Services	3626440	265560	8.24	7.98	8.22
Services	**17706829**	**2119371**	**40.23**	**63.65**	**41.88**
Total	**44010464**	**3329756**	**100.00**	**100.00**	**100.00**

Note: UL = unskilled labour; SL = skilled labour

Source: Employment Satellite Matrix (data from Labour Force Survey 2005-06)

IV. ISSUES OF ECONOMIC REFORMS

This study considers several scenarios related to economic reforms at the global, regional and domestic level which have important implications for the agriculture and overall economy of Bangladesh. As mentioned before, the scenarios are related to global agricultural trade liberalization under WTO's Doha agreement, a bilateral FTA between Bangladesh and India, domestic agricultural trade liberalization government's subsidy policy, and growth in agricultural productivity.

4.1. Global Agricultural Trade Liberalisation under WTO-Doha Agreement

Agricultural trade liberalisation is likely to affect the current pattern of global production and trade of many agricultural commodities. Rise in prices following liberalisation will be, on the whole, welfare-enhancing for a net exporting country, while for a net-importing country this will be translated into a terms of trade shock with adverse welfare consequences. Foreseeing the price rise as the ultimate outcome, concerns have been expressed about the food security and poverty situation in the food-import dependent countries. Since tariff reduction and removal of subsidies are two inherent components of the global agricultural trade liberalisation, they should be considered simultaneously in assessing the welfare consequences. While tariff reductions under the WTO rule will potentially depress prices, subsidy cuts will tend to exert an opposite effect with the net result depending on the relative strength of these two differing forces.

In WTO terminology, subsidies in general are identified by "boxes" which are given the colours of traffic lights: green (permitted), amber (slow down — i.e. be reduced), red (forbidden). In agriculture, things are, as usual, more complicated. The Agriculture Agreement has no red box, although domestic support exceeding the reduction commitment levels in the amber box is prohibited; and there is a blue box for subsidies that are tied to programmes that limit production. There are also exemptions for developing countries (sometimes called an "S&D box", including provisions in Article 6.2 of the agreement).

While the Uruguay Round Agreement on Agriculture made some significant progress on rules of trade in agriculture by replacing the QRs with tariffs and for specifying initial commitments on reduction of tariffs and subsidies, the momentum could not be maintained under the WTO-sponsored negotiations. The domestic support, given to agriculture in the developed countries, has not come down since the implementation of the commitments of the Uruguay Round began in 1995 (Naik, 2005). Although in the Doha Ministerial Declaration member countries, vowed to achieve substantial improvements in market access through phasing out of all forms of export subsidies and substantial reductions in

trade-distorting domestic support (WTO 2001, para. 13), no major breakthrough has been made after the conclusion of the Hong Kong Ministerial conference, held in December 2005. While members are still negotiating modalities for further liberalisation, consensus has been reached on abolishing all export subsidies only by 2013 (WTO 2005, para 6).[5] Export subsidies in fact constitute very insignificant portion of the total domestic support measures given to agriculture in the developed countries.

Despite the lack of progress related to agricultural liberalisation in the post Uruguay Round period, there is no denying that, since most of the agricultural commodities have long been the most protected commodities in world trade, any significant liberalisation measure in this sector will likely to have huge welfare implications. It has, therefore, become a big concern to what extent future liberalisation in this sector will affect the livelihood and food security in the poor food-import dependent developing countries.

4.2. Bilateral FTA between Bangladesh and India

Bangladesh has entered into several regional FTA agreements and is in the process of signing bilateral FTA agreements with a number of countries. In recent years, there has been increased interest in regional economic integration in South Asia. With the stalemate of the World Trade Organisation (WTO) negotiations, it is expected that the interest in regional trading arrangements will increase further. Regional integration in South Asia got the momentum in 1995 when the South Asian Association for Regional Cooperation (SAARC) Preferential Trading Arrangement (SAPTA) was signed. In early 2004, the SAARC member countries agreed to form a South Asian Free Trade Area (SAFTA), which has come into force since July 01, 2006. Bangladesh is also a member of the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) comprising countries from South Asia and South-East Asia. Recently, Bangladesh is negotiating with India and Malaysia for bilateral FTAs.

Any FTA deal has two important aspects: the market access aspect (the export side) and the trade liberalisation aspect (the import side). The employment effects of these two aspects might be in different directions. While increased exports may create new employment in the export oriented sectors, increased import through liberalisation of trade may contract employment in the import competing sectors. The net effect may depend on the relative strength of the aforementioned two effects.

Bangladesh and India are now negotiating to form a bilateral Free Trade Area (FTA) which will allow tariff free trade between these two South Asian countries. Despite the fact that there is a South Asian Free Trade Area (SAFTA), the progress in SAFTA is quite slow which

[5] In the case of cotton, export subsidies by the developed countries were supposed to be abolished in 2006.

compelled the South Asian member countries like India and Bangladesh to negotiate for a bilateral FTA deal. This bilateral FTA deal is supposed to increase the market access of Bangladesh's export products in India, whereas, there will be increased import flow from India to Bangladesh. Since 1996-97, Indian exports to Bangladesh have been growing at 9.1 percent annually, above the general rate of growth of its total merchandise exports (8.4 percent). However, India's imports from Bangladesh over the same period have grown on average at only 3 percent annually, compared to average growth of its total imports of 9.2 percent. Consequently Bangladesh's bilateral trade deficit with India has been increasing rapidly, on average at about 9.5 percent annually.

4.3. Domestic Agricultural Trade Liberalization

Trade liberalization also affects sectoral allocation of resources, factor returns and thus poverty of the households. In Bangladesh, trade liberalization has been one of the major policy reforms during 1990s and 2000s. There are debates related to the impacts of further liberalization of trade on increase in efficiency, enhancing the performance of the export sectors and poverty in Bangladesh.

Trade policy during 1972-1980 consisted significant import controls. During the 1980s, moderate import liberalization took place. In 1984, a significant change was made in the import policy regime with the abolition of the import-licensing system, and imports were permitted against letters of credit (L/C). Since 1986, there had been significant changes in the import procedures and in the IPOs with respect to their contents and structure. Whereas, prior to 1986, the IPOs contained a lengthy *Positive List* of importables, in 1986 the *Positive List* was replaced by two lists, namely the *Negative List* (for banned items) and the *Restricted List* (for items importable on fulfillment of certain prescribed conditions). Imports of any items outside the lists were allowed. These changes might be considered as significant moves towards import liberalization, since no restrictions were then imposed on the import of items that did not appear in the IPOs. With the aim to increase the elements of stability and certainty of trade policy, IPOs with relatively longer periods replaced the previous practice of issuing import policy annually. Since 1990, the Negative and Restricted Lists of importables had been consolidated into one list, namely the 'Consolidated List' (Raihan, 2007).

The range of products subject to import ban or restriction has been curtailed substantially from as high as 752 in 1985-86 to only 63 in 2003-06. Import restrictions have been imposed on two grounds: either for trade-related reasons (i.e., to provide protection to domestic industries) or for non-trade reasons (e.g., to protect environment, public health and safety, and security). Therefore, only the trade-related restrictions should be of interest to policy reforms and liberalization.

Beginning from the late 1980s the tariff regime has become increasingly liberalized. Between 1991-92 and 2004-05 the un-weighted average rate of tariff fell from 70 percent to 13.5 percent. Much of this reduced protection was achieved through the reduction in the maximum rate. In 1991-92 the maximum tariff rate was 350 percent, which came down to only 25 percent in 2004-2005. The number of tariff bands was 24 in the 1980s, 18 in the early 1990s and only 4 at present. The percentage of duty free tariff lines has more than doubled between 1992-93 and 1999-2000 (from 3.4 percent to 8.4 percent). Bangladesh has no tariff quotas, seasonal tariffs and variable import levies. All these measures have greatly simplified the tariff regime and helped streamline customs administration procedures. A drastic reduction in un-weighted tariff rates during the 1990s also resulted in the fall in import-weighted tariff rates. The import-weighted average tariff rate declined from 42.1 percent in 1990-91 to 13.8 percent in 1999-00, and further to 11.48 percent in 2003-04.

Import-weighted average rates for agricultural products (HS code 01 to HS code 15) are presented in Table 6. It appears for the HS codes 01, 05, 07, 08, 09, 11, 12, 13 and 15 there have been significant cuts in tariff rates during 2002 and 2007.

Table 6: Import-weighted Tariff Rates on Agricultural Products in Bangladesh

HS code	Product name	2002	2003	2004	2005	2006	2007
01	Live animals	17.36	8.69	10.38	11.47	11.47	11.45
02	Meat and edible meat offal	25.04	22.51	22.55	25.00	25.00	25.00
03	Fish and crustaceans, molluscs and other aquatic invertebrates	24.98	32.47	29.82	24.85	24.85	24.85
04	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	26.94	26.89	25.43	23.57	23.57	23.46
05	Products of animal origin, not elsewhere specified or included	23.05	21.08	16.35	13.69	13.69	13.31
06	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	2.34	1.70	2.42	2.29	2.29	2.11
07	Edible vegetables and certain roots and tubers	8.09	10.71	10.52	7.88	7.88	6.87
08	Edible fruit and nuts; peel of citrus fruits or melons	34.21	28.55	28.56	24.87	24.81	25.25
09	Coffee, tea, mat and spices	34.98	30.76	28.34	8.63	20.81	18.52
10	Cereals	4.34	12.64	6.85	4.56	5.48	4.57
11	Products of the milling industry; malt; starches; insulin; wheat gluten	11.18	10.92	9.62	2.49	7.79	6.88
12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder	5.40	7.31	3.76	0.17	0.13	0.12
13	Lac; gums, resins and other vegetable saps and extracts	15.98	10.27	8.88	7.72	7.37	6.37
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included	16.97	16.72	18.02	23.79	15.42	15.40
15	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	15.46	22.65	9.09	6.22	6.24	5.26

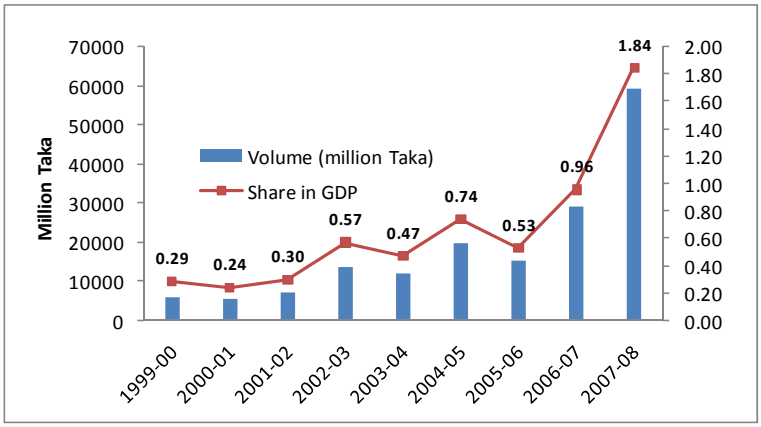
Source: Calculated from UN COMTRADE

4.4. Agricultural Subsidy Policy

Government's subsidy policy towards agriculture affect the production pattern in the agricultural sector and the livelihood of the people involved in this sector. In addition, increased allocation of subsidy in the agricultural sector also affects the pattern of overall allocation of resources among different sectors in the economy. In Bangladesh, subsidy towards the agricultural sector got prominence from time to time. There has also been increased allocation of subsidy over time.

In general, economic theories hold that subsidies distort the market and produce inefficiencies. However, there are a number of cases where governments opt for subsidies with a view to achieving an equitable and 'efficient' solution of economic problems. The Bangladesh government allocates a significant portion of its fiscal budget each year for subsidies. The total amount of subsidies provided by the government exceeded Tk. 20 billion in 2006-07, when it rose sharply by about 93 percent to Tk. 28.95 billion. This trend continued in 2007-08 when the amount soared by about 105 percent to Tk. 59.29 billion (Figure 1). These dramatic increased can be attributed mainly to the rapid rise in the international prices of food, fuel and fertilizer, which are three of the main sectors targeted for the government's subsidies.

Figure 1: Volume and Share of Subsidies



Source: Ministry of Finance, Government of Bangladesh

Along with the huge increase in the total amount of subsidies provided, the share received by various sectors as a portion of the total amount of subsidies provided has also changed significantly over the past decade. As seen in Table 7, fertilizer and other agricultural subsidies made up about 12.2 percent in 1998-99, but in 2007-08 this sector made up the lion's share of subsidies at about 65.8 percent. Export subsidies were nil or negligible until 2002-03, when this sector suddenly received about 53 percent of all subsidies. In 2007-08 this sector received 18.6 percent of the subsidy. The shares of food and jute products have

shrunk considerably over the years, while that of rural electrification, which was a small portion to begin with, has increased.

Table 7: Share of Subsidies by Sectors

Items	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Food	60.39	61.84	60.08	49.50	30.51	25.44	22.16	18.20	14.02	12.41
Rural electrification	2.31	1.36	1.53	1.18	0.59	0.67	0.41	0.53	0.28	0.13
Jute goods	18.78	22.13	18.22	19.21	3.70	5.88	5.08	5.00	3.45	2.87
Export subsidy	0.00	0.09	0.00	0.00	53.05	49.87	33.05	36.24	24.61	18.55
Fertilizer and other agricultural activities	12.25	14.02	19.28	29.55	12.09	16.87	39.03	39.67	35.92	65.78
Others	6.26	0.57	0.88	0.57	0.05	1.27	0.28	0.37	21.71	0.26
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

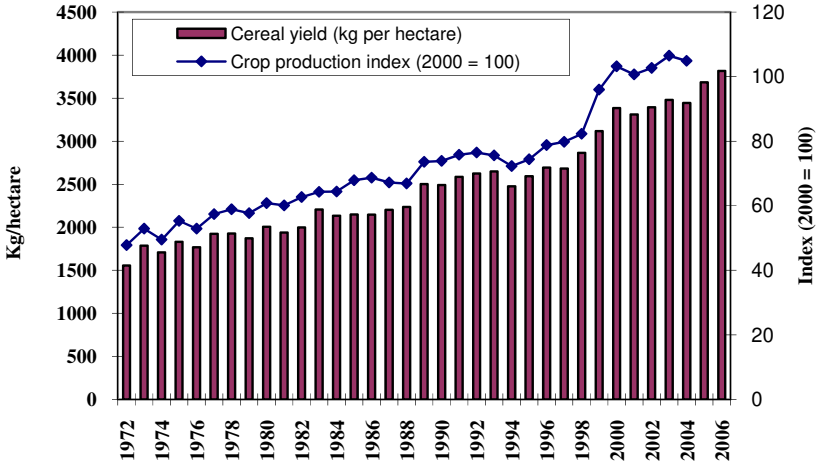
Source: Ministry of Finance, Government of Bangladesh

4.5. Agricultural Productivity

The issue of food security is linked to the increased production of cereal crops, especially rice, in the context of Bangladesh. Therefore, rise in productivity in the agricultural sector affects agricultural production, pattern of allocation of resources between agricultural and non-agricultural sectors, households' income and poverty.

The productivity in Bangladesh agriculture has increased quite significantly over the last three decades or so. Figure 2 suggests that there has been remarkable increase in cereal yield in terms of kg per hectare during this time. In 1972, cereal yield was around 1500 kg per hectare which increased to around 3800 kg per hectare in 2006. This rise in productivity has resulted in increased crop production during this period. The crop production index (considering 2000 as the base) was less than 50 in 1972 which increased to around 105 in 2004.

Figure 2: Cereal Yield (kg per hectare) and Crop Production Index (2000 = 100)



Data Source: WDI

However, the importance of further increase in agricultural productivity still remains to be very critical for ensuring food security in Bangladesh. The productivity of agriculture depends on various factors like use of High Yielding Varieties (HYV), improved management practices, efficient use of irrigation water, pest management, soil health management and other related factors such as research and technological innovation for increased productivity, seed production and supply system, efficient use of input, reduction in yield gap, crop diversification, adoption of integrated crop production technologies, farm mechanization and subsidy in agriculture. Further increase in agricultural productivity is also constrained by a number of challenges which include climate change, soil degradations, pest infestation, lack of infrastructure and power supply, global warming and sea-level rise, high population growth and land scarcity, etc.

V. RESULTS FROM THE GTAP MODEL

The GTAP model is used to simulate one global and one regional trade liberalisation scenarios. The global scenario is the global agricultural trade liberalisation under WTO's Doha negotiation and the regional scenario is the bilateral FTA been Bangladesh and India. The results from the GTAP model are provided in Tables 8-11.

Table 8 shows that the agricultural trade reform under Doha would lead to welfare loss for Bangladesh. This GTAP simulation result is consistent with the fact that as a net importer of agricultural products Bangladesh would suffer from rise in the prices of such products in the international market due to agricultural trade reform under the Doha agreement. The GTAP simulation results also show that other developing countries and other LDCs who are net exporters of agricultural products would experience welfare gain. North America and EU25, who are the major providers of agricultural subsidies, would experience large welfare gains due to rise in allocative efficiency.

Table 8: Impacts on Welfare (EV in Million US$)

	Doha agriculture	Bangladesh-India FTA
Bangladesh	-21.17	-175.33
India	127.41	402.99
Pakistan	32.93	-9.2
Sri Lanka	10.16	-4.11
Rest of South Asia	3.57	-2.42
Thailand	195.82	-9.97
Other Developed countries	2071.92	-49.16
Other Developing Countries	1045.26	-79.3
Other LDCs	27.08	-2.13
North America	1056.01	-35.85
EU25	490.34	-47.18
ROW	-298.12	-34.69

Source: GTAP simulation results

It should however be mentioned that under the Doha-agriculture trade liberalisation scenario there would be no domestic tariff cut in Bangladesh. In contrast, under the

Bangladesh-India FTA scenario, Bangladesh will cut its tariffs on imports from India to zero. Under this scenario, Bangladesh would incur a sizeable welfare loss mainly because of a larger trade diversion effect than the trade creation effect.

There will also be negative impacts on real GDP in Bangladesh from these two scenarios. However, the negative impact on Bangladesh would be larger under the bilateral FTA scenario than the Doha-agriculture scenario (Table 9).

Table 9: Impacts on Real GDP (% Change from the Base)

	Doha agriculture	Bangladesh-India FTA
Bangladesh	-0.01	-0.18
India	0.02	0.01
Pakistan	0.02	0
Sri Lanka	0.06	0
Rest of South Asia	0.01	0
Thailand	0.01	0
Other Developed countries	0.04	0
Other Developing Countries	0	0
LDCs	-0.01	0
North America	0	0
EU25	0.01	0
ROW	-0.01	0

Source: GTAP simulation results

Table 10 provides the GTAP results for changes in export demands, export prices, import prices and imports under the aforementioned two scenarios. In the case of Doha-agriculture scenario, the GTAP simulation results suggest rise in export demand of agricultural products. Also, import prices of major agricultural and food products would rise and their imports would fall. Under the FTA scenario there would be some rises in export demand, but there would be considerable rises in imports for most of the agricultural and industrial products. These changes in export demands, export prices, import prices and imports are introduced as shocks in the Bangladesh CGE model.

Table 10: Impacts on Export Demand, Export Price, Import Price and Import (% Change from the Base)

	Doha agriculture				Bangladesh-India FTA			
Sectors	Export Demand	Export Price	Import Price	Import	Export Demand	Export Price	Import Price	Import
Cereal Crop	85.3	0.68	3.35	-6.38	3.63	-0.64	0.19	1.35
Commercial crops	4.94	0.58	0.88	-0.8	15.52	-0.54	0.09	6.13
Livestock and Poultry	0.19	0.57	0.7	-0.32	4.19	-0.53	0.01	-1.97
Fishing	2.12	-0.01	-0.02	-0.05	1.28	-0.46	0.22	27.26
Rice Milling	11.57	0.45	3.85	-8.09	1.71	-0.34	0.23	58.95
Food Process	-0.76	0.4	0.41	-0.11	4.41	-0.55	0.05	2.97
Leather Industry	-1.45	0.31	0.11	0.19	4.89	-0.49	0.01	1.86
Cloth milling	-0.5	0.2	0.12	-0.06	6.02	-0.7	0.05	12.8
Woven and Knit RMG	-0.33	0.14	0.06	0.17	7.14	-0.98	0.12	44.22
Cigarette Industry	0.02	0.18	0.17	-0.04	2.82	-0.16	0.02	2.63
Furniture Industry	0.15	0.04	0.06	-0.06	9.67	-0.25	0.03	10.61
Paper, printing & publishing	0.02	0.04	0.04	-0.06	4.7	-0.54	0.03	6.29
Petroleum	-0.01	0.04	0.04	0.01	23.81	-1.46	0	1.94
Chemical Industry	0.09	0.05	0.07	-0.02	25.71	-0.63	0.03	4.26
Metal	0.02	0.04	0.03	0.03	37.15	-0.76	0.05	9.94
Miscellaneous Industry	-0.02	0.04	0.04	-0.01	3.3	-0.21	0.02	3.18
Mining and Quarrying	0.07	0.03	0.04	0	417.41	-1.23	0.02	5.1
Transport	0.11	0.03	0.04	-0.06	-0.41	0.12	-0.01	-0.48

Sectors	Doha agriculture				Bangladesh-India FTA			
	Export Demand	Export Price	Import Price	Import	Export Demand	Export Price	Import Price	Import
Public Administration, Defence, Health Service, Education Service	0.1	0.03	0.04	0	-0.62	0.16	0	-0.68
Financial Service	0.02	0.04	0.03	-0.03	-1.86	0.49	0	0.48
Communication	0.04	0.03	0.04	-0.02	-1.41	0.37	0	0.24
Other Services	0.04	0.04	0.05	-0.05	-0.55	0.14	0	-0.35

Source: GTAP simulation results

Table 11 shows the changes in overall sectoral tariff rates due to the FTA between Bangladesh and India. These changes in tariff rates are introduced as shock in the Bangladesh CGE model while running the simulation for Bangladesh-India bilateral FTA.

Table 11: Change in Overall Sectoral Tariff Rates in Bangladesh due to the FTA between Bangladesh and India (% Change from the Base)

Sectors	% change in overall tariff rates
Cereal Crop	-44.70
Commercial crops	-57.65
Livestock and Poultry	-0.66
Fishing	-85.20
Food Process	-16.21
Leather Industry	-10.37
Cloth milling	-28.73
Woven and Knit RMG	-68.21
Cigarette Industry	-12.83
Furniture Industry	-23.31
Paper, printing & publishing	-26.64
Petroleum	-18.06
Chemical Industry	-29.67
Metal	-40.70
Miscellaneous Industry	-20.95
Mining and Quarrying	-35.56

Source: Calculated from GTAP simulation results

VI. RESULTS FROM THE MULTIPLIER MODEL

6.1. The Bangladesh Social Accounting Matrix

This study uses the latest available Social Accounting Matrix (SAM) of Bangladesh for the year 2007. The 2007 SAM identifies the economic relations through *four types of accounts*: (i) production activity and commodity accounts for 41 sectors; (ii) 4 factors of productions with 2 different types of labour and 2 types of capital; (iii) current account transactions between 4 main institutional agents; household-members and unincorporated capital, corporation, government and the rest of the world; and (iv) two consolidated capital accounts distinguished by public and private origins to capture the flows of savings and investment. The 2007 SAM has 86 sectors which have been aggregated to 41 sectors. The mapping is provided in Annex 2. The disaggregation of activities, commodities, factors and institutions in the 41-sector SAM is given in Table 12.

Table 12: Disaggregation and Description of Bangladesh SAM Accounts

Set	Description of Elements
Commodities (41)	
Agriculture (6)	Cereal crop; commercial crop; Livestock Rearing; Poultry Rearing; Fishing; and Forestry
Manufacturing (22)	Rice Milling; Grain Milling; Food products; Leather Industry; Yarn Industry; Cloth Industry; Woven RMG; Knit RMG; Toiletries; Cigarette and Bidi Industry; Furniture Industry; Paper, Printing and Publishing industry; Pharmaceuticals; Fertiliser Industry; Petroleum; Chemical Industry; Glass Industry; Earth-ware Industry; Cement; Metal Industry; Miscellaneous Industry; Mining and Quarrying
Services (13)	Construction; Electricity and Water Generation; Gas Extraction and Distribution; Wholesale and Retail Trade; Transport; Health Service; Education Service; Public Administration and Defence; Bank Insurance and Real estate; Hotel and Restaurant; Communication; Information Technology and E-Communication; and Other Services
Factors of Production (4)	
Labour (2)	Labour Unskilled, and Labour Skilled
Capital (2)	Capital and Land
Current Institutions (11)	
Households (7)	Rural: landless, Agricultural marginal, Agricultural small, Agricultural large, Non-farm Urban: Households with low educated heads, and households with high educated heads
Others (3)	Government, Corporation and Rest of the World
Capital Institution (1)	
Consolidated Capital Account	

Source: The Bangladesh SAM 2007

6.2. Changes in Endogenous Accounts due to Exogenous Shock

Table 13 reports the changes in endogenous accounts in the SAM under two different trade scenarios, such as global agricultural trade liberalisation under the WTO agreement and Bangladesh – India bilateral FTA, as a result of net export shock. The net export shock is calculated as the difference between change in exports and change in imports as percentage of base exports.

The impacts on gross output, commodity demand, value-added and household consumption appear to be minimal under both scenarios. Under the Doha-agriculture scenario, positive impacts on gross output and commodity demand in agricultural sector are observed. Due to positive net export demand, all the agricultural sectors would experience expansion. The overall impacts on industrial and services sectors are minimal.

Under the Bangladesh-India FTA scenario, there will be negative impact on gross output of overall agricultural sector, with cereal crop and commercial crop sectors would contract and export oriented sectors such as fishing would expand. There will be positive impact on gross output of overall industrial sector with expansion of the export oriented sectors, though the major import competing sectors would contract. However, in the case of commodity demand, the overall impact on the industrial sector would be negative primarily driven by sizeable contraction of the miscellaneous industry, which is highly import-oriented (145 percent). The impact on services sectors would be minimal.

In terms of the impact on the overall value-addition, both the scenarios would generate small but positive impacts. However, under Doha-agriculture scenario, the change in value-addition of the unskilled labour would be higher than that of the skilled labour, which is the

reverse in the case of Bangladesh-India FTA. Also, under the former scenario, the value-addition by land would experience largest positive change among all factors, which under the later scenario is negative.

In the case of impact on household consumption, all household categories would experience rise under the Doha-agriculture scenario, whereas under the Bangladesh-India FTA scenario, rural large farmers would experience some small reduction. The overall household consumption effects are positive under both scenarios and slightly higher under the Bangladesh-India FTA scenario.

Table 13: Changes in Endogenous Accounts of SAM due to Net Export Shock (Percent change over base)

Endogenous accounts	Doha-Agriculture	Bangladesh-India FTA
Activity		
Cereal Crop sectors	0.60	-0.55
Commercial crops	0.36	-0.39
Livestock Rearing	0.13	0.14
Poultry Rearing	0.11	0.16
Fishing	0.43	0.26
Forestry	0.05	0.04
Agriculture	**0.38**	**-0.15**
Rice Milling	0.22	-0.58
Grain Milling	0.11	0.15
Food Process	0.16	-0.61
Leather Industry	-0.40	1.50
Yarn	-0.16	-6.05
Cloth milling	-0.02	-1.74
Woven RMG	-0.28	1.25
Knitting	-0.29	5.89
Toiletries	0.10	0.14
Cigarette Industry	0.11	0.14
Furniture Industry	0.15	-0.50
Paper, printing and publishing Industry	0.13	-3.57
Pharmaceuticals	0.10	0.13
Fertilizer Industry	0.46	-0.39
Petroleum	0.08	-0.85
Chemical Industry	0.07	-2.64
Glass Industry	0.08	0.02
Earth-ware and clay industry	0.05	0.07
Cement	0.00	0.00
Metal	0.03	-0.51
Miscellaneous Industry	0.06	-1.37
Mining and Quarrying	0.03	0.12
Industry	**0.01**	**0.30**
Construction	0.00	0.00
Electricity and Water Generation	0.10	0.13
Gas Extraction and Distribution	0.09	0.14
Wholesale and retail trade	0.09	0.21
Transport	0.10	0.24
Health Service	0.09	0.13
Education Service	0.06	0.08
Public Administration and Defence	0.03	-0.02
Bank Insurance and Real estate	0.09	0.01
Hotel and Restaurant	0.10	0.14
Communication	0.07	0.07
Information Technology and E-Commerce	0.07	-0.32
Other Services	0.09	0.14
Services	**0.07**	**0.12**
TOTAL GROSS OUTPUT	**0.11**	**0.13**
Commodity		
Cereal Crop sectors	0.60	-0.55
Commercial crops	0.36	-0.39

Endogenous accounts	Doha-Agriculture	Bangladesh-India FTA
Livestock Rearing	0.13	0.14
Poultry Rearing	0.11	0.16
Fishing	0.43	0.26
Forestry	0.05	0.04
Agriculture	**0.38**	**-0.17**
Rice Milling	0.22	-0.58
Grain Milling	0.11	0.15
Food Process	0.16	-0.61
Leather Industry	-0.40	1.50
Jute and Yarn	-0.16	-6.05
Cloth milling	-0.02	-1.74
Woven RMG	-0.28	1.25
Knitting	-0.29	5.89
Toiletries	0.10	0.14
Cigarette Industry	0.11	0.14
Furniture Industry	0.15	-0.50
Paper, printing and publishing Industry	0.13	-3.57
Pharmaceuticals	0.10	0.13
Fertilizer Industry	0.46	-0.39
Petroleum	0.08	-0.85
Chemical Industry	0.07	-2.64
Glass Industry	0.08	0.02
Earth-ware and clay industry	0.05	0.07
Cement	0.00	0.00
Metal	0.03	-0.51
Miscellaneous Industry	0.06	-1.37
Mining and Quarrying	0.03	0.12
Industry	**0.02**	**-0.11**
Construction	0.00	0.00
Electricity and Water Generation	0.10	0.13
Gas Extraction and Distribution	0.09	0.14
Wholesale and retail trade	0.09	0.21
Transport	0.10	0.24
Health Service	0.09	0.13
Education Service	0.06	0.08
Public Administration and Defence	0.03	-0.02
Bank Insurance and Real estate	0.09	0.01
Hotel and Restaurant	0.10	0.14
Communication	0.07	0.07
Information Technology and E-Commerce	0.07	-0.32
Other Services	0.09	0.14
Services	**0.07**	**0.12**
TOTAL COMMODITY DEMAND	**0.11**	**-0.03**
Value-Added		
VA Labour Unskilled	0.14	0.17
VA Labour Skilled	0.09	0.25
VA Capital	0.08	0.23
VA Land	0.49	-0.48
TOTAL VALUE-ADDED	**0.12**	**0.17**
Households		
Rural Landless	0.09	0.19
Rural Marginal Farmers	0.11	0.15
Rural Small Farmers	0.14	0.09
Rural Large Farmers	0.20	-0.01
Rural Non Farm	0.10	0.17
Urban Low Education	0.11	0.15
Urban High Education	0.09	0.20
TOTAL HOUSEHOLD CONSUMPTION	**0.11**	**0.15**

Source: The Multiplier Model

6.3. Employment Effects of Multiplier Simulations: Link with Employment Satellite Matrix

The output effects of the multiplier model are linked to the employment satellite matrix with the assumption of 'unit employment elasticity of output' and the results are shown in Table 14. Under Doha-agriculture scenario, as far as the total employment is concerned, there would be 113510 additional number of employment of unskilled labour (0.26 percent rise over base) and 2783 additional number of skilled labour (0.08 percent rise over base). Under this scenario, the positive impact on agricultural output leads to rise in employment in all agricultural sectors and there would be additional employment of 99310 unskilled and 1469 skilled labours. In the industrial sector the overall impact is negligible. Though the RMG sectors would experience some fall in employment, there would be rise in employment in the fertiliser industry, rice milling, miscellaneous and mining industries. In the case of services sectors, the overall impact is positive.

The total employment effects of Bangladesh-India FTA would be negative and 64262 number of unskilled labour (0.15 percent of base) would lose their jobs. However, there would be employment of additional 1241 number of skilled labour (0.04 percent of base). Under this scenario, there would be employment loss in agriculture due to contraction of cereal crop and commercial crop sectors. In the case of industrial sector, though employment would expand in the export oriented sector, employment loss in the import competing sectors would be large enough to result in a net employment loss of 16938 unskilled labours and 1828 skilled labours. There would be employment of additional 29148 unskilled and 1800 skilled labour in the services sectors.

Table 14: Changes in Number of Employment out of Net Export Shock

Sectors	Doha-Agriculture		Bangladesh-India FTA	
	UL	SL	UL	SL
Cereal Crop sectors	79076	56	-71945	-51
Commercial crops	11611	6	-12680	-6
Livestock Rearing	2628	451	2952	506
Poultry Rearing	1712	262	2544	389
Fishing	4061	653	2493	401
Forestry	231	42	164	30
Agriculture: Number	**99319**	**1469**	**-76473**	**1269**
Percent change over base	**0.46**	**0.18**	**-0.36**	**0.15**
Rice Milling	535	1	-1431	-3
Grain Milling	12	4	16	6
Food Process	381	33	-1499	-129
Leather Industry	-365	-28	1377	105
Yarn	-99	-11	-3718	-398
Cloth milling	-138	-5	-11331	-415
Woven RMG	-2852	-293	12627	1298
Knitting	-271	-14	5486	284
Toiletries	14	2	21	3
Cigarette Industry	132	8	167	10
Furniture Industry	1377	28	-4743	-97
Paper, printing and publishing Industry	115	36	-3200	-1013
Pharmaceuticals	56	10	69	12
Fertilizer Industry	176	48	-151	-41
Petroleum	6	2	-64	-22
Chemical Industry	80	10	-2984	-368
Glass Industry	5	2	1	0

Sectors	Doha-Agriculture		Bangladesh-India FTA	
	UL	SL	UL	SL
Earth-ware and clay industry	115	1	161	2
Cement	1	0	1	0
Metal	55	9	-967	-150
Miscellaneous Industry	359	42	-8456	-997
Mining and Quarrying	400	20	1679	82
Industry: Number	**93**	**-95**	**-16938**	**-1828**
Percent change over base	**0.00**	**-0.02**	**-0.27**	**-0.41**
Construction	1	0	1	0
Electricity and Water Generation	5	3	6	4
Gas Extraction and Distribution	2	0	4	1
Wholesale and retail trade	6077	62	15024	154
Transport	3266	29	7905	70
Health Service	56	247	79	346
Education Service	137	589	198	847
Public Administration and Defence	240	29	-150	-18
Bank Insurance and Real estate	254	189	27	20
Hotel and Restaurant	713	17	957	22
Communication	93	1	96	1
Information Technology and E-Comm	3	4	-14	-15
Other Services	3250	238	5014	367
Services: Number	**14098**	**1409**	**29148**	**1800**
Percent change over base	**0.09**	**0.07**	**0.18**	**0.09**
Total: Number	**113510**	**2783**	**-64262**	**1241**
Percent change over base	**0.26**	**0.08**	**-0.15**	**0.04**

Note: UL = unskilled labour; SL = skilled labour

Source: Employment Satellite Matrix

VII. RESULTS FROM THE BANGLADESH CGE MODEL

In the Bangladesh CGE model two trade scenarios are run considering changes in export demands, export prices, import prices and tariff rates calculated from the GTAP simulation results. In addition three other scenarios involving domestic agricultural trade liberalisation, agricultural subsidy and agricultural productivity are also considered. Therefore, in total, five scenarios are run and they are as follows:

1. Global agricultural trade liberalisation under WTO-Doha agreement: shocks on export demands, export prices, import prices are taken from GTAP simulation results.
2. Bangladesh – India bilateral FTA: shocks on export demand, export prices, import prices and tariff rates are taken from the GTAP simulation results.
3. Domestic agricultural trade liberalisation: tariffs on agricultural sectors are cut by 50 percent in the Bangladesh CGE model
4. Rise in agricultural subsidy: Subsidies in agricultural sectors are increased by 25 percent.
5. Rise in total factor productivity in the cereal crop sector: the total factor productivity in the cereal crop sector is increased by 10 percent.

All the five scenarios are run in the Bangladesh CGE model under two labour market closures. The first closure considers flexibility of the wage rates of the unskilled and skilled

labour which allow clearing of these labour markets. This is termed as the "full employment closure". The second closure considers fixation of the wage rate of the unskilled labour and flexibility of the wage rate of the skilled labour. Therefore, under this closure, there is unemployment of unskilled labour. This closure is termed as "unemployment closure".

7.1. Global Agricultural Trade Liberalisation under WTO-Doha Agreement

The macroeconomic effects of the Doha-agricultural scenario under two different closures are reported in Table 15. Under the "full employment closure" there would be a small negative impact on real GDP. Consumer price index would rise and aggregate consumption would fall by small margin. There would be small but negative impacts on overall imports and exports. The return to all factors would rise and the largest rise would be for the return to land. Under the "unemployment closure" a small but positive impact on real GDP is observed. CPI would also rise but less than that under the "full employment closure". Also, aggregate consumption would rise by small margin. There would still be some negative but smaller impacts on imports and exports. The impact on return to skilled labour would be positive and higher. The return to land would increase but the magnitude would be smaller.

Table 15: Macroeconomic Effects of Doha-Agriculture Simulation (% change from the base year value)

Variable	Full Employment Closure	Unemployment Closure
GDP at market price	0.18	0.19
Real GDP	-0.01	0.05
Consumer Price Index (CPI)	0.23	0.19
Aggregate consumption	-0.04	0.01
Imports	-0.21	-0.19
Exports	-0.24	-0.17
Return to unskilled labor	0.23	0.00
Return to skilled labor	0.11	0.17
Return to capital	0.13	0.13
Return to land	0.61	0.56

Source: Bangladesh CGE Model

The sectoral price and volume effects of the Doha-agriculture scenario for two different labour market closures are reported in Table 16 and Table 17 respectively. The price effects under the two closures are similar, though the magnitudes are smaller under the "unemployment closure". In general, prices of all products would rise and larger impacts would be observed for the agricultural and food products.

Table 16: Effects on Sectoral Prices of Doha-Agriculture Simulation (% change from the base year value)

	Full Employment Closure					Unemployment Closure				
	PD	PC	PE_FOB	PL	PVA	PD	PC	PE_FOB	PL	PVA
Cereal crop	0.37	0.52	13.65	0.37	0.40	0.29	0.44	13.59	0.29	0.29
Commercial crop	0.33	0.45	1.44	0.33	0.47	0.26	0.40	1.40	0.27	0.37
Livestock rearing	0.22	0.22	0.83	0.22	0.16	0.18	0.18	0.81	0.18	0.10
Poultry rearing	0.24	0.24	0.11	0.24	0.16	0.19	0.19	0.08	0.19	0.10
Shrimp farming and fishing	0.10	0.10	0.39	0.10	0.14	0.08	0.08	0.37	0.08	0.12
Forestry	0.14	0.14		0.14	0.14	0.11	0.11		0.11	0.12
Rice milling	0.36	0.40	2.65	0.36	0.16	0.30	0.34	2.61	0.30	0.10
Grain milling	0.29	0.29	0.13	0.29	0.15	0.24	0.24	0.10	0.24	0.11

	Full Employment Closure					Unemployment Closure				
	PD	PC	PE_FOB	PL	PVA	PD	PC	PE_FOB	PL	PVA
Food process	0.19	0.24	0.14	0.19	0.15	0.16	0.23	0.12	0.16	0.11
Leather industry	0.25	0.24	-0.06	0.25	0.16	0.21	0.20	-0.10	0.21	0.10
Yarn industry	0.40	0.14	0.38	0.40	0.16	0.35	0.16	0.32	0.35	0.10
Cloth milling	0.15	0.15	0.07	0.15	0.16	0.11	0.12	0.04	0.11	0.10
Woven RMG	0.21	0.12	0.14	0.21	0.16	0.17	0.11	0.10	0.17	0.10
Knit RMG	0.32	0.29	0.18	0.32	0.16	0.26	0.24	0.14	0.28	0.11
Toiletries	0.11	0.03	0.08	0.11	0.14	0.10	0.04	0.05	0.09	0.12
Cigarette industry	0.14	0.14	0.20	0.14	0.14	0.19	0.20	0.18	0.11	0.12
Furniture industry	-0.05	-0.01	0.44	-0.05	0.15	-0.07	-0.03	0.42	-0.07	0.12
Paper, printing and publishing industry	0.12	0.06	0.15	0.12	0.15	0.10	0.06	0.12	0.09	0.11
Pharmaceuticals	0.14	0.12	0.07	0.14	0.15	0.13	0.11	0.05	0.12	0.12
Fertiliser industry	0.17	0.02	0.08	0.17	0.14	0.15	0.02	0.05	0.15	0.12
Petroleum	0.10	0.06	0.06	0.10	0.13	0.10	0.08	0.04	0.09	0.13
Chemical industry	0.10	0.07	0.32	0.10	0.15	0.08	0.08	0.29	0.08	0.12
Glass industry	0.14	0.10	0.08	0.14	0.15	0.11	0.08	0.04	0.10	0.11
Earth ware and clay industry	0.14	0.12	0.06	0.14	0.15	0.12	0.10	0.04	0.11	0.12
Cement	0.13	0.12	0.05	0.13	0.14	0.11	0.10	0.01	0.11	0.12
Metal	0.13	0.12	0.07	0.13	0.15	0.11	0.10	0.03	0.11	0.11
Miscellaneous industry	0.18	0.08	0.08	0.18	0.15	0.15	0.08	0.05	0.15	0.11
Mining and quarrying	0.14	0.14	0.26	0.14	0.13	0.11	0.11	0.23	0.11	0.13
Construction	0.14	0.14		0.14	0.16	0.10	0.10		0.10	0.10
Electricity and water generation	0.12	0.12		0.12	0.13	0.12	0.12		0.12	0.13
Gas extraction and distribution	0.13	0.13		0.13	0.13	0.13	0.13		0.13	0.13
Trade	0.14	0.14		0.14	0.14	0.12	0.12		0.12	0.13
Transport	0.15	0.13	0.13	0.15	0.16	0.10	0.09	0.09	0.10	0.10
Health service	0.13	0.13		0.13	0.13	0.12	0.12		0.12	0.15
Education service	0.12	0.12		0.12	0.12	0.14	0.14		0.14	0.16
Public administration and defense	0.13	0.12	0.14	0.13	0.12	0.13	0.12	0.14	0.13	0.15
Bank insurance and real estate	0.14	0.12	0.14	0.14	0.13	0.14	0.12	0.13	0.13	0.15
Hotel and restaurant	0.22	0.22		0.22	0.15	0.18	0.18		0.18	0.11
Communication	0.13	0.13	0.19	0.13	0.13	0.15	0.15	0.18	0.13	0.14
Information technology	0.15	0.14	0.08	0.15	0.13	0.15	0.14	0.07	0.15	0.14
Other services	0.16	0.16	0.21	0.16	0.17	0.09	0.09	0.16	0.09	0.09

Note: PD = Price of local product (including all taxes and margins); PC = Purchaser price of composite commodity (including all taxes and margins); PE_FOB = FOB price of exported commodity; PL = Price of local product (excluding all taxes on products); PVA = Price of industry value added

Source: Bangladesh CGE Model

Table 17 shows that under the "unemployment closure" there will be greater positive effects or less negative effects on sectoral outputs than those under the "full employment closure". In general, agricultural sectors and some industrial and services sectors would expand. Also, imports will decline more or rise less under the former closure. The effects of exports and composite demand are also larger under this closure.

Table 17: Effects on Sectoral Volumes of Doha-Agriculture Simulation (% change from the base year value)

	Full Employment Closure					Unemployment Closure				
	O	M	DD	E	Q	O	M	DD	E	Q
Cereal crop	0.33	-5.64	0.33	28.63	0.03	0.41	-5.73	0.41	28.81	0.10
Commercial crop	0.19	-0.95	0.13	2.35	-0.11	0.27	-1.01	0.21	2.48	-0.06
Livestock rearing	-0.01	-0.96	-0.01	1.21	-0.01	0.03	-1.00	0.03	1.28	0.03
Poultry rearing	-0.04	0.45	-0.04	-0.32	-0.04	0.00	0.39	0.00	-0.23	0.01
Shrimp farming and fishing	0.13	0.68	0.07	0.64	0.07	0.16	0.66	0.10	0.69	0.10
Forestry	0.05		0.05		0.05	0.10		0.10		0.10
Rice milling	-0.07	-6.68	-0.07	4.54	-0.16	-0.01	-6.73	-0.01	4.66	-0.10
Grain milling	-0.08	0.49	-0.08	-0.39	-0.08	-0.03	0.45	-0.03	-0.30	-0.02
Food process	0.09	-0.31	0.09	0.01	-0.01	0.14	-0.31	0.14	0.07	0.03
Leather industry	-0.28	0.11	-0.15	-0.71	-0.13	-0.22	0.09	-0.09	-0.64	-0.08
Yarn industry	-0.74	-0.23	-0.73	-0.75	-0.28	-0.60	-0.17	-0.58	-0.63	-0.21
Cloth milling	-0.11	-0.05	-0.11	-0.25	-0.10	-0.04	-0.05	-0.04	-0.18	-0.05
Woven RMG	-0.31	0.08	-0.19	-0.32	-0.02	-0.24	0.07	-0.13	-0.25	0.00

	Full Employment Closure					Unemployment Closure				
	O	M	DD	E	Q	O	M	DD	E	Q
Knit RMG	-0.38	0.33	-0.14	-0.40	-0.09	-0.31	0.30	-0.09	-0.33	-0.04
Toiletries	-0.11	0.08	-0.11	-0.16	0.02	-0.04	0.12	-0.04	-0.10	0.07
Cigarette industry	0.03	-0.03	0.03	0.15	0.03	0.07	-0.04	0.07	0.20	0.06
Furniture industry	0.54	0.10	0.29	1.18	0.22	0.60	0.11	0.35	1.24	0.27
Paper, printing and publishing industry	-0.09	0.04	-0.10	-0.03	0.01	-0.02	0.07	-0.03	0.03	0.04
Pharmaceuticals	-0.02	0.25	-0.01	-0.14	0.03	0.02	0.24	0.03	-0.10	0.06
Fertiliser industry	-0.06	0.32	0.01	-0.16	0.27	0.02	0.38	0.10	-0.09	0.34
Petroleum	-0.06	0.02	-0.05	-0.12	0.01	0.00	0.06	0.01	-0.08	0.06
Chemical industry	0.01	0.02	-0.04	0.36	0.01	0.09	0.06	0.05	0.42	0.06
Glass industry	-0.05	0.21	-0.04	-0.16	0.03	0.01	0.21	0.02	-0.09	0.08
Earth ware and clay industry	0.01	0.26	0.01	-0.12	0.04	0.06	0.26	0.06	-0.07	0.09
Cement	0.05	0.29	0.05	-0.10	0.07	0.14	0.33	0.14	-0.03	0.15
Metal	-0.02	0.17	-0.02	-0.14	0.01	0.06	0.21	0.07	-0.07	0.09
Miscellaneous industry	-0.15	0.15	-0.10	-0.28	0.07	-0.07	0.17	-0.02	-0.21	0.11
Mining and quarrying	0.04	0.21	0.04	0.25	0.04	0.10	0.23	0.10	0.30	0.10
Construction	0.06		0.06		0.06	0.12		0.12		0.12
Electricity and water generation	0.01		0.01		0.01	0.05		0.05		0.05
Gas extraction and distribution	0.00		0.00		0.00	0.03		0.03		0.03
Trade	-0.04		-0.04		-0.04	0.02		0.02		0.02
Transport	-0.06	0.12	-0.06	-0.09	-0.03	0.01	0.11	0.01	-0.01	0.03
Health service	-0.02		-0.02		-0.02	0.01		0.01		0.01
Education service	-0.04		-0.04		-0.04	-0.04		-0.04		-0.04
Public administration and defense	-0.12	0.03	-0.12	-0.11	-0.10	-0.11	0.04	-0.11	-0.11	-0.09
Bank insurance and real estate	-0.02	0.15	-0.02	-0.01	0.00	0.03	0.20	0.03	0.02	0.06
Hotel and restaurant	-0.04		-0.04		-0.04	0.01		0.01		0.01
Communication	-0.03	0.12	-0.03	0.07	-0.03	0.02	0.16	0.02	0.10	0.02
Information technology	-0.07	0.22	-0.03	-0.16	-0.01	-0.04	0.24	-0.01	-0.14	0.02
Other services	-0.01	0.17	-0.01	0.07	0.00	0.06	0.12	0.06	0.17	0.06

Note: O = production; M = import; DD = domestic demand; E = export; Q = composite commodity demand

Source: Bangladesh CGE Model

The effects on households' incomes are almost same under both the labour market closures, though, the effects on real consumption are different. Under the "full employment closure" the rises in incomes of the rural landless households, rural marginal farmers, rural non-farm households and urban high educated households are smaller than the rise in CPI, thus resulting in reduction in real consumption of these categories of households. The other categories of households would however experience rise in real consumption. In contrast, under the "unemployment closure" expect rural non-farm and urban high educated households, all categories of households would experience rises in real consumption.

Table 18: Effects on Household Income and Real Consumption of Doha-Agriculture Simulation (% change from the base year value)

	Full Employment Closure		Unemployment Closure	
	% change in income	% change in real consumption	% change in income	% change in real consumption
Rural Landless	0.17	-0.05	0.18	0.00
Rural Marginal Farmers	0.20	-0.04	0.20	0.01
Rural Small Farmers	0.23	0.00	0.23	0.04
Rural Large Farmers	0.30	0.05	0.30	0.09
Rural Non-Farm	0.18	-0.05	0.18	-0.01
Urban Low Education	0.21	0.01	0.22	0.05
Urban High Education	0.15	-0.07	0.17	-0.01

Source: Bangladesh CGE Model

The effects on sectoral employment are reported in Table 19. Under the "full employment closure", in the case of unskilled labour there would be rise in employment in the

agricultural sectors, though there would be employment loss in the industrial and services sectors, thus resulting in a net overall employment loss. In the case of skilled labour there would be employment loss in all sectors. Under the "unemployment closure", in the case of unskilled labour, there would be expansion of employment for overall agricultural, industrial and services sectors. However, there would be loss of employment of the skilled labour in these three broad sectors.

Table 19: Effects on Employment of Doha-Agriculture Simulation

	Full Employment Closure				Unemployment Closure			
	Change in Number		% Change from base		Change in Number		% Change from base	
Sectors	**UL**	**SL**	**UL**	**SL**	**UL**	**SL**	**UL**	**SL**
Cereal Crop sectors	48419	54	0.37	0.58	106633	46	0.81	0.50
Commercial crops	10643	9	0.33	0.55	26215	8	0.81	0.50
Livestock Rearing	-6872	-411	-0.33	-0.12	3170	-554	0.15	-0.16
Poultry Rearing	-5762	-366	-0.37	-0.15	2067	-419	0.13	-0.18
Fishing	-1724	50	-0.18	0.03	2483	-68	0.26	-0.05
Forestry	-1225	-57	-0.29	-0.07	1044	-47	0.25	-0.06
Rice Milling	-940	-1	-0.38	-0.16	243	-1	0.10	-0.21
Grain Milling	-41	-7	-0.39	-0.17	8	-9	0.08	-0.23
Food Process	-548	-2	-0.22	-0.01	598	-14	0.24	-0.06
Leather Industry	-539	-26	-0.59	-0.37	-111	-30	-0.12	-0.43
Yarn	-634	-54	-1.03	-0.82	-316	-54	-0.51	-0.82
Cloth milling	-2616	-45	-0.40	-0.19	296	-62	0.05	-0.26
Woven RMG	-6187	-413	-0.61	-0.40	-1486	-471	-0.15	-0.45
Knitting	-634	-23	-0.68	-0.47	-196	-25	-0.21	-0.52
Toiletries	-64	-4	-0.43	-0.21	10	-5	0.07	-0.24
Cigarette Industry	-347	-5	-0.29	-0.07	223	-9	0.18	-0.13
Furniture Industry	2156	86	0.23	0.44	6733	77	0.71	0.40
Paper, printing and publishing Industry	-362	-53	-0.40	-0.19	77	-63	0.09	-0.22
Pharmaceuticals	-182	-11	-0.33	-0.12	74	-16	0.14	-0.17
Fertilizer Industry	-148	-18	-0.38	-0.17	55	-17	0.14	-0.17
Petroleum	-26	-4	-0.35	-0.14	6	-6	0.08	-0.23
Chemical Industry	-343	-12	-0.30	-0.09	232	-14	0.20	-0.10
Glass Industry	-21	-4	-0.36	-0.14	7	-5	0.12	-0.19
Earth-ware and clay industry	-742	-3	-0.30	-0.09	428	-4	0.18	-0.13
Cement	-99	-1	-0.27	-0.05	95	-2	0.26	-0.05
Metal	-635	-35	-0.33	-0.12	322	-41	0.17	-0.14
Miscellaneous Industry	-2792	-173	-0.45	-0.24	183	-202	0.03	-0.28
Mining and Quarrying	-7	0	-0.27	-0.06	5	-1	0.20	-0.11
Construction	-3687	-27	-0.25	-0.04	3359	-55	0.23	-0.08
Electricity and Water Generation	-142	-9	-0.29	-0.08	70	-19	0.14	-0.16
Gas Extraction and Distribution	-15	-3	-0.31	-0.09	6	-6	0.13	-0.18
Wholesale and retail trade	-24221	-93	-0.34	-0.13	8880	-131	0.13	-0.18
Transport	-12097	-44	-0.36	-0.15	3852	-57	0.12	-0.19
Health Service	-202	-300	-0.33	-0.11	73	-515	0.12	-0.19
Education Service	-892	-1542	-0.36	-0.15	193	-2431	0.08	-0.23
Public Administration and Defense	-3378	-207	-0.43	-0.22	27	-292	0.00	-0.30
Bank Insurance and Real estate	-963	-249	-0.33	-0.12	417	-357	0.14	-0.16
Hotel and Restaurant	-2385	-21	-0.34	-0.13	743	-33	0.11	-0.20
Communication	-456	-2	-0.33	-0.12	172	-3	0.13	-0.18
Information Technology and E-Commerce	-16	-8	-0.38	-0.16	3	-12	0.06	-0.25
Other Services	-11404	-263	-0.31	-0.10	5978	-380	0.16	-0.14
Agriculture	**43479**	**-721**	**0.20**	**-0.09**	**141611**	**-1035**	**0.66**	**-0.12**
Industry	**-15751**	**-807**	**-0.32**	**-0.21**	**7486**	**-973**	**0.15**	**-0.26**
Services	**-59858**	**-2767**	**-0.34**	**-0.13**	**23774**	**-4291**	**0.13**	**-0.20**
Total	**-32130**	**-4295**	**-0.07**	**-0.13**	**172871**	**-6299**	**0.39**	**-0.19**

Note: UL = unskilled labour; SL = skilled labour

Source: Bangladesh CGE Model and Employment Satellite Matrix

7.2. Bilateral FTA between Bangladesh and India

The macroeconomic effects of the bilateral FTA between Bangladesh and India are reported in Table 20. Under the "full employment" closure there would be negative impact on real GDP, consumer price index would fall, consumption would rise, and both imports and exports would rise. Returns of all factors of production will increase. Under the "unemployment closure", there would be similar effects on real GDP and CPI but with lesser magnitudes. Consumption, imports and exports would rise more under this closure than under the "full employment closure". The return to skilled labour would rise more and the return to land would rise less under this closure.

Table 20: Macroeconomic Effects of Bilateral FTA between Bangladesh and India Simulation

Variable	Full Employment Closure	Unemployment Closure
GDP at market price	0.00	0.05
Real GDP	-0.77	-0.58
Consumer Price Index (CPI)	-0.94	-0.23
Aggregate consumption	0.81	0.91
Imports	2.89	2.92
Exports	3.57	3.80
Return to unskilled labor	0.78	0.00
Return to skilled labor	0.92	1.13
Return to capital	0.74	0.74
Return to land	0.46	0.30

Source: Bangladesh CGE Model

The effects on sectoral prices suggest that there would be rise in domestic prices of the agricultural and fall in the prices of the industrial and services sectors.

Table 21: Effects on Sectoral Prices of Bilateral FTA between Bangladesh and India Simulation (% change from the base year value)

	Full Employment Closure					Unemployment Closure				
	PD	PC	PE_FOB	PL	PVA	PD	PC	PE_FOB	PL	PVA
Cereal crop	0.49	0.34	0.52	0.49	0.65	0.20	0.07	0.36	0.21	0.28
Commercial crop	0.30	-0.43	2.86	0.30	0.58	0.08	-0.60	2.71	0.08	0.28
Livestock rearing	0.44	0.44	0.63	0.44	0.77	0.30	0.30	0.55	0.30	0.58
Poultry rearing	0.31	0.31	0.06	0.31	0.77	0.14	0.14	-0.04	0.14	0.59
Shrimp farming and fishing	0.60	0.57	0.21	0.60	0.80	0.51	0.48	0.16	0.52	0.73
Forestry	0.51	0.51		0.51	0.76	0.42	0.42		0.42	0.67
Rice milling	0.42	0.41	0.21	0.42	0.79	0.21	0.21	0.09	0.21	0.61
Grain milling	0.42	0.42	0.08	0.42	0.80	0.25	0.25	-0.03	0.25	0.65
Food process	0.07	-0.38	0.60	0.07	0.80	-0.02	-0.46	0.53	-0.02	0.67
Leather industry	0.06	-0.01	0.86	0.06	0.79	-0.08	-0.15	0.74	-0.08	0.58
Yarn industry	0.10	0.05	-0.55	0.10	0.82	-0.06	0.05	-0.75	-0.06	0.62
Cloth milling	0.12	-1.10	1.41	0.12	0.82	-0.01	-1.25	1.29	-0.01	0.62
Woven RMG	-5.08	-9.46	0.34	-5.08	0.81	-5.12	-10.50	0.22	-5.20	0.63
Knit RMG	-1.03	-0.99	0.52	-1.03	0.81	-1.13	-1.07	0.40	-1.19	0.65
Toiletries	-0.51	-0.15	-0.51	-0.51	0.79	-0.66	-0.24	-0.60	-0.57	0.72
Cigarette industry	0.01	-0.09	0.49	0.01	0.79	-0.15	-0.31	0.41	-0.08	0.70
Furniture industry	-1.25	-1.92	1.78	-1.25	0.79	-1.33	-2.08	1.68	-1.33	0.68
Paper, printing and publishing industry	-0.46	-3.46	1.93	-0.46	0.79	-0.55	-4.09	1.83	-0.54	0.68
Pharmaceuticals	-0.44	-0.36	-0.47	-0.44	0.78	-0.55	-0.46	-0.54	-0.51	0.69
Fertiliser industry	0.50	0.07	0.47	0.50	0.77	0.45	0.07	0.36	0.45	0.71
Petroleum	-1.34	-2.45	-0.35	-1.34	0.76	-1.49	-3.06	-0.42	-1.37	0.76
Chemical industry	-1.20	-3.35	6.33	-1.20	0.78	-1.28	-3.78	6.22	-1.27	0.69
Glass industry	0.19	0.13	0.07	0.19	0.79	0.07	0.05	-0.04	0.07	0.68
Earth ware and clay industry	0.40	0.34	0.41	0.40	0.79	0.33	0.28	0.32	0.31	0.69
Cement	0.51	0.48	0.94	0.51	0.77	0.44	0.41	0.83	0.43	0.71

	Full Employment Closure					Unemployment Closure				
	PD	PC	PE_FOB	PL	PVA	PD	PC	PE_FOB	PL	PVA
Metal	-0.41	-1.17	9.39	-0.41	0.80	-0.51	-1.28	9.26	-0.50	0.67
Miscellaneous industry	-0.15	-1.87	1.27	-0.15	0.80	-0.26	-2.09	1.15	-0.26	0.65
Mining and quarrying	0.52	0.48	45.72	0.52	0.78	0.45	0.40	45.59	0.45	0.79
Construction	0.19	0.19		0.19	0.78	0.06	0.06		0.06	0.59
Electricity and water generation	0.05	0.05		0.05	0.77	0.04	0.04		0.04	0.77
Gas extraction and distribution	0.69	0.69		0.69	0.77	0.69	0.69		0.69	0.77
Trade	0.48	0.48		0.48	0.83	0.41	0.41		0.41	0.78
Transport	0.54	0.44	0.15	0.54	0.80	0.38	0.30	0.01	0.38	0.62
Health service	0.52	0.52		0.52	0.83	0.49	0.49		0.49	0.89
Education service	0.57	0.57		0.57	0.88	0.61	0.61		0.61	1.01
Public administration and defense	0.72	0.62	0.42	0.72	0.88	0.73	0.62	0.42	0.73	0.97
Bank insurance and real estate	0.74	0.64	0.19	0.74	0.84	0.76	0.66	0.13	0.73	0.91
Hotel and restaurant	0.37	0.37		0.37	0.81	0.22	0.22		0.22	0.66
Communication	0.68	0.66	0.44	0.68	0.82	0.80	0.78	0.40	0.67	0.83
Information technology	0.78	0.70	0.37	0.78	0.82	0.77	0.69	0.34	0.77	0.83
Other services	0.66	0.65	0.21	0.66	0.78	0.43	0.43	0.05	0.42	0.51

Note: PD = Price of local product (including all taxes and margins); PC = Purchaser price of composite commodity (including all taxes and margins); PE_FOB = FOB price of exported commodity; PL = Price of local product (excluding all taxes on products); PVA = Price of industry value added

Source: Bangladesh CGE Model

In terms of impacts on sectoral volumes, there would be increased imports in almost all sectors. The sectors with high import-penetration would experience contraction. There would be rise in exports of major export categories such as woven and knit RMG and leather, and these sectors would expand. Impacts on sectoral outputs are greater under the "unemployment closure" than the "full employment closure".

Table 22: Effects on Sectoral Volumes of Bilateral FTA between Bangladesh and India Simulation (% change from the base year value)

	Full Employment Closure					Unemployment Closure				
	O	M	DD	E	Q	O	M	DD	E	Q
Cereal crop	0.02	6.19	0.02	0.09	0.32	0.27	5.86	0.27	0.57	0.54
Commercial crop	-0.54	6.05	-0.68	4.44	0.78	-0.27	5.87	-0.41	4.89	0.95
Livestock rearing	0.25	1.19	0.25	0.64	0.25	0.38	1.04	0.38	0.87	0.38
Poultry rearing	0.32	0.95	0.32	-0.18	0.33	0.47	0.76	0.47	0.12	0.48
Shrimp farming and fishing	-0.03	62.78	0.05	-0.73	0.11	0.07	62.67	0.14	-0.58	0.20
Forestry	-0.92		-0.92		-0.92	-0.77		-0.77		-0.77
Rice milling	0.44	0.81	0.44	0.03	0.44	0.66	0.61	0.66	0.41	0.66
Grain milling	0.45	1.29	0.45	-0.23	0.45	0.65	1.15	0.65	0.09	0.65
Food process	-0.08	3.18	-0.08	0.87	0.73	0.10	3.18	0.09	1.09	0.86
Leather industry	0.99	2.74	0.65	2.10	0.78	1.19	2.67	0.84	2.34	0.95
Yarn industry	1.79	2.38	2.29	1.10	2.37	2.25	2.58	2.78	1.51	2.60
Cloth milling	-0.65	11.59	-0.65	1.66	1.57	-0.44	11.57	-0.44	1.89	1.74
Woven RMG	3.91	8.26	-5.25	4.72	3.15	4.15	8.24	-5.05	4.96	3.22
Knit RMG	4.07	0.79	1.46	4.35	1.38	4.32	0.68	1.65	4.60	1.53
Toiletries	1.01	0.09	1.01	1.02	0.36	1.25	0.22	1.25	1.20	0.53
Cigarette industry	0.64	6.25	0.63	1.50	0.80	0.78	6.23	0.77	1.66	0.94
Furniture industry	1.37	3.50	-0.22	5.34	1.02	1.56	3.54	-0.03	5.54	1.16
Paper, printing and publishing industry	-4.26	3.04	-4.47	-0.31	0.96	-4.03	3.13	-4.24	-0.11	1.09
Pharmaceuticals	0.99	0.20	1.00	0.94	0.86	1.13	0.20	1.13	1.08	0.97
Fertiliser industry	-0.90	0.01	-0.88	-0.93	-0.12	-0.63	0.23	-0.56	-0.72	0.12
Petroleum	-0.83	1.18	-1.08	0.71	0.95	-0.65	1.32	-0.89	0.84	1.09
Chemical industry	-2.12	0.83	-3.81	9.79	0.07	-1.87	0.98	-3.56	10.02	0.23
Glass industry	0.06	0.42	0.08	-0.14	0.18	0.27	0.40	0.28	0.08	0.32
Earth ware and clay industry	-0.84	-0.13	-0.84	-0.82	-0.74	-0.67	-0.11	-0.67	-0.65	-0.59
Cement	-2.62	-1.72	-2.62	-1.86	-2.56	-2.34	-1.59	-2.34	-1.64	-2.29
Metal	-2.59	5.33	-3.22	14.61	-1.88	-2.30	5.47	-2.93	14.88	-1.62
Miscellaneous industry	-1.59	2.27	-2.23	0.29	0.86	-1.34	2.33	-1.98	0.54	0.98
Mining and quarrying	-1.75	10.66	-1.81	91.57	-1.74	-1.54	10.74	-1.61	91.92	-1.53
Construction	-1.93		-1.93		-1.93	-1.73		-1.73		-1.73

	Full Employment Closure					Unemployment Closure				
	O	M	DD	E	Q	O	M	DD	E	Q
Electricity and water generation	0.41		0.41		0.41	0.53		0.53		0.53
Gas extraction and distribution	0.14		0.14		0.14	0.25		0.25		0.25
Trade	0.35		0.35		0.35	0.56		0.56		0.56
Transport	0.15	1.18	0.16	-0.46	0.32	0.39	1.17	0.40	-0.19	0.52
Health service	0.14		0.14		0.14	0.25		0.25		0.25
Education service	-0.09		-0.09		-0.09	-0.09		-0.09		-0.09
Public administration and defense	-0.76	0.49	-0.66	-1.13	-0.49	-0.75	0.52	-0.65	-1.14	-0.48
Bank insurance and real estate	-0.40	0.79	-0.39	-1.26	-0.23	-0.22	0.97	-0.21	-1.16	-0.05
Hotel and restaurant	0.33		0.33		0.33	0.50		0.50		0.50
Communication	-0.20	0.90	-0.18	-0.56	-0.16	-0.03	1.06	-0.02	-0.46	0.00
Information technology	-0.28	1.15	-0.09	-0.74	0.03	-0.20	1.23	0.00	-0.68	0.12
Other services	0.01	1.07	0.01	-0.70	0.03	0.23	0.91	0.23	-0.37	0.24

Note: O = production; M = import; DD = domestic demand; E = export; Q = composite commodity demand

Source: Bangladesh CGE Model

All the household categories would experience rise in real consumption and the effects are larger under "unemployment closure".

Table 23: Effects on Household Income and Real Consumption of Bilateral FTA between Bangladesh and India Simulation (% change from the base year value)

	Full Employment Closure		Unemployment Closure	
	% change in income	% change in real consumption	% change in income	% change in real consumption
Rural Landless	0.81	0.96	0.75	1.03
Rural Marginal Farmers	0.77	0.86	0.69	0.92
Rural Small Farmers	0.73	0.79	0.64	0.84
Rural Large Farmers	0.70	0.77	0.59	0.79
Rural Non-Farm	0.77	0.85	0.68	0.90
Urban Low Education	0.76	0.86	0.69	0.92
Urban High Education	0.84	0.88	0.83	1.00

Source: Bangladesh CGE Model

Under The "full employment closure" there would be loss in employment in all three broad sectors and the overall employment for unskilled labour and skilled labour will decline by 362753 and 35057 numbers respectively. In contrast, under the "unemployment closure" there would be rise in employment for unskilled labour by 325661 number and loss in employment for skilled labour by 41828 number.

Table 24: Effects on Employment of Bilateral FTA between Bangladesh and India Simulation

	Full Employment Closure				Unemployment Closure			
	Change in Number		% Change from base		Change in Number		% Change from base	
Sectors	UL	SL	UL	SL	UL	SL	UL	SL
Cereal Crop sectors	-128162	-113	-0.97	-1.22	66416	-139	0.50	-1.50
Commercial crops	-52422	-29	-1.62	-1.87	-664	-32	-0.02	-2.02
Livestock Rearing	-11588	-2881	-0.56	-0.81	22296	-3365	1.07	-0.94
Poultry Rearing	-7637	-1765	-0.49	-0.74	18812	-1947	1.20	-0.82
Fishing	-7844	-1641	-0.83	-1.08	6276	-2039	0.67	-1.34
Forestry	-7354	-1526	-1.74	-1.99	217	-1495	0.05	-1.95
Rice Milling	-894	-3	-0.36	-0.61	3105	-3	1.25	-0.77
Grain Milling	-36	-23	-0.34	-0.59	130	-31	1.23	-0.79
Food Process	-2143	-237	-0.87	-1.12	1708	-278	0.69	-1.31
Leather Industry	177	-4	0.19	-0.06	1634	-18	1.78	-0.25
Yarn	620	50	1.01	0.75	1715	49	2.79	0.74
Cloth milling	-9185	-395	-1.41	-1.66	565	-455	0.09	-1.91
Woven RMG	31268	2944	3.10	2.84	47722	2738	4.73	2.64

	Full Employment Closure				Unemployment Closure			
	Change in Number		% Change from base		Change in Number		% Change from base	
Sectors	**UL**	**SL**	**UL**	**SL**	**UL**	**SL**	**UL**	**SL**
Knitting	3041	145	3.26	3.00	4578	136	4.91	2.82
Toiletries	27	-1	0.18	-0.07	280	-3	1.87	-0.16
Cigarette Industry	-221	-32	-0.18	-0.43	1710	-45	1.41	-0.62
Furniture Industry	5225	58	0.55	0.30	20736	29	2.19	0.15
Paper, printing and publishing Industry	-4505	-1493	-5.03	-5.27	-3092	-1525	-3.45	-5.38
Pharmaceuticals	92	-8	0.17	-0.08	963	-25	1.76	-0.27
Fertilizer Industry	-667	-207	-1.73	-1.98	9	-206	0.02	-1.97
Petroleum	-128	-50	-1.72	-1.97	-22	-58	-0.29	-2.28
Chemical Industry	-3304	-441	-2.92	-3.17	-1416	-449	-1.25	-3.22
Glass Industry	-42	-28	-0.74	-0.99	50	-32	0.88	-1.14
Earth-ware and clay industry	-4018	-57	-1.65	-1.90	-114	-61	-0.05	-2.04
Cement	-1272	-106	-3.43	-3.67	-636	-107	-1.71	-3.68
Metal	-6413	-1063	-3.37	-3.61	-3272	-1084	-1.72	-3.68
Miscellaneous Industry	-14581	-1897	-2.37	-2.62	-4724	-1993	-0.77	-2.75
Mining and Quarrying	-70	-14	-2.58	-2.83	-28	-15	-1.04	-3.01
Construction	-39509	-2105	-2.72	-2.96	-16237	-2195	-1.12	-3.09
Electricity and Water Generation	-222	-81	-0.46	-0.71	494	-115	1.02	-1.00
Gas Extraction and Distribution	-35	-32	-0.73	-0.98	35	-41	0.73	-1.28
Wholesale and retail trade	-29167	-481	-0.41	-0.67	82643	-610	1.17	-0.84
Transport	-21349	-264	-0.64	-0.89	32409	-307	0.98	-1.04
Health Service	-404	-2457	-0.65	-0.90	522	-3182	0.84	-1.17
Education Service	-1984	-11150	-0.80	-1.05	1663	-14149	0.67	-1.34
Public Administration and Defense	-11552	-1653	-1.47	-1.72	-191	-1941	-0.02	-2.02
Bank Insurance and Real estate	-3399	-3063	-1.17	-1.41	1229	-3426	0.42	-1.58
Hotel and Restaurant	-3128	-114	-0.45	-0.70	7434	-155	1.07	-0.95
Communication	-1346	-20	-0.99	-1.24	763	-23	0.56	-1.45
Information Technology and E-Commerce	-46	-63	-1.07	-1.32	17	-77	0.39	-1.61
Other Services	-28574	-2756	-0.79	-1.04	29928	-3152	0.83	-1.19
Agriculture	**-215006**	**-7955**	**-1.00**	**-0.95**	**113352**	**-9018**	**0.53**	**-1.08**
Industry	**-7031**	**-2864**	**-0.14**	**-0.76**	**71601**	**-3437**	**1.46**	**-0.91**
Services	**-140715**	**-24237**	**-0.79**	**-1.14**	**140708**	**-29373**	**0.79**	**-1.39**
Total	**-362753**	**-35057**	**-0.82**	**-1.05**	**325661**	**-41828**	**0.74**	**-1.26**

Note: UL = unskilled labour; SL = skilled labour

Source: Bangladesh CGE Model and Employment Satellite Matrix

7.3. Domestic Agricultural Trade Liberalization

The impacts on real GDP are negative under both closures, though the magnitude is higher under the “unemployment closure”. There would be fall in CPI under both the closures, but aggregate consumption would rise under the “full employment closure” and would fall under the “unemployment closure”. Imports and exports would rise under both the closures tough the magnitudes are less under the “unemployment closure”.

Table 25: Macroeconomic Effects of Domestic Agricultural Trade Liberalization Simulation

Variable	Full Employment Closure	Unemployment Closure
GDP at market price	-0.48	-0.51
Real GDP	-0.07	-0.19
Consumer Price Index (CPI)	-0.43	-0.34
Aggregate consumption	0.02	-0.07
Imports	0.08	0.05
Exports	0.63	0.49
Return to unskilled labor	-0.48	0.00
Return to skilled labor	-0.26	-0.38
Return to capital	-0.35	-0.34
Return to land	-1.00	-0.90

Source: Bangladesh CGE Model

Sectoral prices would fall and greater impacts would be observed for the agricultural products because of trade liberalisation. The price impacts are greater under the "full employment closure".

Table 26: Effects on Sectoral Prices of Domestic Agricultural Trade Liberalization Simulation (% change from the base year value)

	Full Employment Closure					Unemployment Closure				
	PD	**PC**	**PE_FOB**	**PL**	**PVA**	**PD**	**PC**	**PE_FOB**	**PL**	**PVA**
Cereal crop	-0.62	-0.74	-0.20	-0.62	-0.70	-0.45	-0.57	-0.10	-0.45	-0.48
Commercial crop	-0.71	-1.14	-0.17	-0.71	-0.80	-0.57	-1.03	-0.08	-0.57	-0.62
Livestock rearing	-0.45	-0.45	-0.18	-0.45	-0.38	-0.36	-0.36	-0.13	-0.36	-0.26
Poultry rearing	-0.48	-0.52	-0.18	-0.48	-0.37	-0.38	-0.42	-0.12	-0.38	-0.27
Shrimp farming and fishing	-0.37	-0.39	-0.15	-0.37	-0.35	-0.32	-0.33	-0.11	-0.32	-0.30
Forestry	-0.32	-0.32		-0.32	-0.36	-0.27	-0.27		-0.27	-0.31
Rice milling	-0.56	-0.60	-0.24	-0.56	-0.37	-0.43	-0.47	-0.16	-0.44	-0.26
Grain milling	-0.48	-0.49	-0.20	-0.48	-0.36	-0.37	-0.39	-0.14	-0.37	-0.27
Food process	-0.37	-0.28	-0.17	-0.37	-0.36	-0.31	-0.24	-0.12	-0.31	-0.28
Leather industry	-0.38	-0.36	-0.21	-0.38	-0.37	-0.29	-0.28	-0.13	-0.29	-0.24
Yarn industry	-0.94	-0.08	-1.00	-0.94	-0.36	-0.85	-0.09	-0.88	-0.85	-0.24
Cloth milling	-0.31	-0.26	-0.22	-0.31	-0.36	-0.24	-0.20	-0.15	-0.24	-0.24
Woven RMG	-0.38	-0.14	-0.29	-0.38	-0.36	-0.29	-0.12	-0.22	-0.30	-0.25
Knit RMG	-0.68	-0.60	-0.40	-0.68	-0.36	-0.55	-0.48	-0.33	-0.58	-0.26
Toiletries	-0.21	-0.06	-0.15	-0.21	-0.35	-0.20	-0.07	-0.10	-0.17	-0.31
Cigarette industry	-0.31	-0.30	-0.14	-0.31	-0.35	-0.44	-0.43	-0.09	-0.25	-0.30
Furniture industry	-0.32	-0.21	-0.20	-0.32	-0.36	-0.27	-0.19	-0.14	-0.27	-0.29
Paper, printing and publishing industry	-0.27	-0.07	-0.22	-0.27	-0.36	-0.23	-0.07	-0.16	-0.22	-0.28
Pharmaceuticals	-0.28	-0.23	-0.13	-0.28	-0.36	-0.25	-0.20	-0.09	-0.23	-0.30
Fertiliser industry	-0.36	-0.05	-0.24	-0.36	-0.35	-0.32	-0.05	-0.17	-0.32	-0.31
Petroleum	-0.15	-0.01	-0.11	-0.15	-0.35	-0.14	-0.02	-0.07	-0.12	-0.34
Chemical industry	-0.27	-0.04	-0.21	-0.27	-0.35	-0.23	-0.04	-0.15	-0.22	-0.30
Glass industry	-0.32	-0.22	-0.16	-0.32	-0.36	-0.24	-0.18	-0.10	-0.24	-0.29
Earth ware and clay industry	-0.32	-0.27	-0.10	-0.32	-0.36	-0.27	-0.24	-0.04	-0.26	-0.29
Cement	-0.30	-0.28	0.01	-0.30	-0.35	-0.26	-0.24	0.08	-0.25	-0.31
Metal	-0.31	-0.26	-0.08	-0.31	-0.36	-0.25	-0.22	-0.01	-0.25	-0.28
Miscellaneous industry	-0.40	-0.13	-0.22	-0.40	-0.36	-0.34	-0.11	-0.15	-0.34	-0.27
Mining and quarrying	-0.33	-0.33	-0.06	-0.33	-0.34	-0.28	-0.28	-0.01	-0.28	-0.34
Construction	-0.32	-0.32		-0.32	-0.37	-0.24	-0.24		-0.24	-0.25
Electricity and water generation	-0.28	-0.28		-0.28	-0.34	-0.29	-0.29		-0.27	-0.34
Gas extraction and distribution	-0.34	-0.34		-0.34	-0.34	-0.33	-0.33		-0.33	-0.34
Trade	-0.31	-0.31		-0.31	-0.33	-0.27	-0.27		-0.27	-0.30
Transport	-0.34	-0.29	-0.19	-0.34	-0.37	-0.24	-0.21	-0.11	-0.24	-0.26
Health service	-0.31	-0.31		-0.31	-0.31	-0.29	-0.29		-0.29	-0.35
Education service	-0.28	-0.28		-0.28	-0.28	-0.31	-0.31		-0.31	-0.36
Public administration and defense	-0.32	-0.28	-0.23	-0.32	-0.29	-0.33	-0.28	-0.23	-0.33	-0.35
Bank insurance and real estate	-0.32	-0.28	-0.14	-0.32	-0.31	-0.33	-0.28	-0.11	-0.32	-0.35
Hotel and restaurant	-0.47	-0.47		-0.47	-0.36	-0.38	-0.38		-0.38	-0.26
Communication	-0.32	-0.32	-0.16	-0.32	-0.33	-0.38	-0.37	-0.13	-0.32	-0.33
Information technology	-0.37	-0.33	-0.19	-0.37	-0.33	-0.36	-0.33	-0.17	-0.36	-0.33
Other services	-0.37	-0.37	-0.16	-0.37	-0.39	-0.23	-0.23	-0.06	-0.22	-0.22

Note: PD = Price of local product (including all taxes and margins); PC = Purchaser price of composite commodity (including all taxes and margins); PE_FOB = FOB price of exported commodity; PL = Price of local product (excluding all taxes on products); PVA = Price of industry value added

Source: Bangladesh CGE Model

There would be increased imports of agricultural products and this would result in the contraction of the agricultural sectors. Under the "full employment closure" overall industrial and services sectors would expand. However, under the "unemployment closure" overall industrial and services sectors would contract.

Table 27: Effects on Sectoral Volumes of Domestic Agricultural Trade Liberalization Simulation (% change from the base year value)

	Full Employment Closure					Unemployment Closure				
	O	M	DD	E	Q	O	M	DD	E	Q
Cereal crop	-0.25	4.65	-0.25	0.60	-0.01	-0.40	-5.73	-0.40	0.30	-0.14
Commercial crop	-0.55	3.35	-0.58	0.50	0.28	-0.72	-1.01	-0.75	0.24	0.17
Livestock rearing	0.01	5.73	0.01	0.54	0.01	-0.06	-1.00	-0.06	0.40	-0.06
Poultry rearing	-0.07	13.35	-0.07	0.54	0.02	-0.16	0.39	-0.16	0.35	-0.07
Shrimp farming and fishing	0.04	29.65	-0.01	0.44	0.02	-0.03	0.66	-0.07	0.35	-0.04
Forestry	-0.27		-0.27		-0.27	-0.37		-0.37		-0.37
Rice milling	0.08	5.03	0.08	0.73	0.14	-0.05	-6.73	-0.05	0.49	0.01
Grain milling	0.06	21.72	0.06	0.61	0.08	-0.06	0.45	-0.07	0.41	-0.04
Food process	0.15	-0.52	0.14	0.51	-0.02	0.04	-0.31	0.03	0.37	-0.11
Leather industry	0.17	-0.59	0.10	0.41	0.05	0.05	0.09	-0.02	0.27	-0.05
Yarn industry	2.10	0.42	2.15	2.03	0.57	1.82	-0.17	1.84	1.78	0.43
Cloth milling	0.28	-0.29	0.28	0.44	0.17	0.15	-0.05	0.15	0.30	0.07
Woven RMG	0.58	-0.24	0.44	0.59	0.01	0.43	0.07	0.31	0.45	-0.03
Knit RMG	0.76	-0.91	0.31	0.81	0.16	0.61	0.30	0.19	0.65	0.07
Toiletries	0.21	-0.18	0.20	0.30	-0.07	0.06	0.12	0.05	0.19	-0.17
Cigarette industry	-0.04	-0.60	-0.04	0.27	-0.06	-0.12	-0.04	-0.13	0.17	-0.14
Furniture industry	0.24	-0.40	0.18	0.40	-0.02	0.12	0.11	0.06	0.28	-0.10
Paper, printing and publishing industry	0.35	-0.14	0.35	0.44	-0.01	0.21	0.07	0.20	0.31	-0.09
Pharmaceuticals	0.01	-0.49	0.00	0.26	-0.08	-0.07	0.24	-0.08	0.18	-0.15
Fertiliser industry	0.35	-0.39	0.25	0.47	-0.30	0.17	0.38	0.05	0.34	-0.44
Petroleum	0.17	-0.10	0.16	0.22	-0.07	0.06	0.06	0.04	0.14	-0.16
Chemical industry	0.34	-0.16	0.33	0.43	-0.08	0.18	0.06	0.16	0.30	-0.18
Glass industry	0.07	-0.51	0.06	0.33	-0.12	-0.05	0.21	-0.07	0.19	-0.20
Earth ware and clay industry	-0.20	-0.76	-0.20	0.20	-0.27	-0.30	0.26	-0.30	0.09	-0.37
Cement	-0.59	-1.13	-0.59	-0.02	-0.63	-0.76	0.33	-0.76	-0.17	-0.79
Metal	-0.22	-0.79	-0.24	0.17	-0.33	-0.40	0.21	-0.42	0.02	-0.49
Miscellaneous industry	0.20	-0.61	0.12	0.45	-0.39	0.04	0.17	-0.05	0.29	-0.46
Mining and quarrying	-0.35	-0.93	-0.35	0.13	-0.35	-0.47	0.23	-0.47	0.02	-0.48
Construction	-0.49		-0.49		-0.49	-0.62		-0.62		-0.62
Electricity and water generation	-0.02		-0.02		-0.02	-0.10		-0.10		-0.10
Gas extraction and distribution	0.02		0.02		0.02	-0.05		-0.05		-0.05
Trade	0.09		0.09		0.09	-0.04		-0.04		-0.04
Transport	0.16	-0.39	0.15	0.39	0.07	0.01	0.11	0.00	0.22	-0.06
Health service	0.04		0.04		0.04	-0.02		-0.02		-0.02
Education service	0.10		0.10		0.10	0.10		0.10		0.10
Public administration and defense	0.33	-0.22	0.30	0.46	0.22	0.33	0.04	0.29	0.46	0.22
Bank insurance and real estate	0.00	-0.52	0.00	0.29	-0.07	-0.11	0.20	-0.12	0.22	-0.19
Hotel and restaurant	0.09		0.09		0.09	-0.02		-0.02		-0.02
Communication	0.06	-0.47	0.05	0.32	0.04	-0.04	0.16	-0.05	0.26	-0.06
Information technology	0.17	-0.51	0.08	0.37	0.02	0.12	0.24	0.02	0.34	-0.03
Other services	0.00	-0.60	-0.01	0.33	-0.01	-0.14	0.12	-0.14	0.12	-0.15

Note: O = production; M = import; DD = domestic demand; E = export; Q = composite commodity demand

Source: Bangladesh CGE Model

The effects on household incomes are negative under both the closures. However, under the "full employment closure" rural landless, rural marginal farmers, rural nonfarm households would experience rise in real consumption. In contrast, under the "unemployment closure" all household categories would experience fall in real consumption.

Table 28: Effects on Household Income and Real Consumption of Domestic Agricultural Trade Liberalization Simulation (% change from the base year value)

	Full Employment Closure		Unemployment Closure	
	% change in income	% change in real consumption	% change in income	% change in real consumption
Rural Landless	-0.38	0.04	-0.41	-0.06
Rural Marginal Farmers	-0.42	0.02	-0.43	-0.08

	Full Employment Closure		Unemployment Closure	
	% change in income	% change in real consumption	% change in income	% change in real consumption
Rural Small Farmers	-0.47	-0.03	-0.47	-0.11
Rural Large Farmers	-0.57	-0.11	-0.55	-0.18
Rural Non-Farm	-0.40	0.04	-0.40	-0.05
Urban Low Education	-0.44	-0.03	-0.45	-0.13
Urban High Education	-0.33	0.09	-0.38	-0.04

Source: Bangladesh CGE Model

The overall employment effect under the "full employment closure" is positive, with employment loss in the agricultural sector being compensated by the rise in employment in the industrial and services sectors. However, under the "unemployment closure", there is a large employment loss of the unskilled labour.

Table 29: Effects on Employment of Domestic Agricultural Trade Liberalization Simulation

	Full Employment Closure				Unemployment Closure			
	Change in Number		% Change from base		Change in Number		% Change from base	
Sectors	UL	SL	UL	SL	UL	SL	UL	SL
Cereal Crop sectors	-19173	-50	-0.15	-0.54	-138874	-34	-1.05	-0.37
Commercial crops	-19278	-16	-0.60	-0.99	-51132	-14	-1.58	-0.90
Livestock Rearing	12755	761	0.61	0.21	-8136	1061	-0.39	0.30
Poultry Rearing	8357	322	0.53	0.13	-7919	433	-0.51	0.18
Fishing	5838	331	0.62	0.22	-2905	579	-0.31	0.38
Forestry	1464	-41	0.35	-0.05	-3241	-61	-0.77	-0.08
Rice Milling	1652	1	0.66	0.26	-811	2	-0.33	0.36
Grain Milling	68	9	0.64	0.24	-35	14	-0.33	0.36
Food Process	1797	70	0.73	0.33	-588	95	-0.24	0.45
Leather Industry	693	25	0.75	0.35	-200	33	-0.22	0.47
Yarn	1653	150	2.69	2.28	975	151	1.59	2.29
Cloth milling	5564	108	0.86	0.45	-513	146	-0.08	0.61
Woven RMG	11724	788	1.16	0.76	1871	911	0.19	0.88
Knitting	1256	46	1.35	0.94	335	51	0.36	1.05
Toiletries	118	8	0.79	0.39	-36	9	-0.24	0.45
Cigarette Industry	667	11	0.55	0.15	-518	19	-0.43	0.26
Furniture Industry	7832	82	0.83	0.43	-1651	100	-0.17	0.52
Paper, printing and publishing Industry	843	153	0.94	0.54	-73	173	-0.08	0.61
Pharmaceuticals	326	18	0.60	0.19	-208	29	-0.38	0.31
Fertilizer Industry	361	56	0.94	0.54	-62	55	-0.16	0.53
Petroleum	52	8	0.70	0.30	-15	13	-0.20	0.49
Chemical Industry	1049	73	0.93	0.53	-149	78	-0.13	0.56
Glass Industry	38	7	0.66	0.26	-19	10	-0.34	0.35
Earth-ware and clay industry	951	0	0.39	-0.01	-1479	2	-0.61	0.08
Cement	-1	-12	0.00	-0.40	-402	-12	-1.08	-0.40
Metal	686	-12	0.36	-0.04	-1301	1	-0.68	0.00
Miscellaneous Industry	4829	278	0.78	0.38	-1376	339	-0.22	0.47
Mining and Quarrying	6	-1	0.21	-0.18	-20	0	-0.75	-0.07
Construction	1344	-217	0.09	-0.31	-13244	-160	-0.91	-0.23
Electricity and Water Generation	258	15	0.53	0.13	-183	36	-0.38	0.31
Gas Extraction and Distribution	27	6	0.57	0.17	-16	12	-0.33	0.36
Wholesale and retail trade	47886	202	0.68	0.28	-21028	282	-0.30	0.39
Transport	24533	100	0.74	0.34	-8691	126	-0.26	0.43
Health Service	390	624	0.63	0.23	-183	1075	-0.29	0.40
Education Service	1810	3516	0.73	0.33	-451	5382	-0.18	0.51
Public Administration and Defense	7499	532	0.96	0.55	386	713	0.05	0.74
Bank Insurance and Real estate	1743	428	0.60	0.20	-1129	654	-0.39	0.30
Hotel and Restaurant	4666	44	0.67	0.27	-1848	69	-0.27	0.42
Communication	877	4	0.64	0.24	-430	6	-0.32	0.37
Information Technology and E-Commerce	32	17	0.75	0.35	-7	25	-0.16	0.53
Other Services	21066	480	0.58	0.18	-15081	726	-0.42	0.27

Sectors	Full Employment Closure				Unemployment Closure			
	Change in Number		% Change from base		Change in Number		% Change from base	
	UL	SL	UL	SL	UL	SL	UL	SL
Agriculture	**-10037**	**1307**	**-0.05**	**0.16**	**-212207**	**1964**	**-0.99**	**0.24**
Industry	**42163**	**1866**	**0.86**	**0.50**	**-6274**	**2219**	**-0.13**	**0.59**
Services	**112131**	**5749**	**0.63**	**0.27**	**-61905**	**8946**	**-0.35**	**0.42**
Total	**144257**	**8923**	**0.33**	**0.27**	**-280386**	**13129**	**-0.64**	**0.39**

Note: UL = unskilled labour; SL = skilled labour

Source: Bangladesh CGE Model and Employment Satellite Matrix

7.4. Agricultural Subsidy Policy

The macroeconomic effects are similar under both closures. There would be negative impact on real GDP. CPI would fall and aggregate consumption would rise. There will be small but negative impact in imports and positive impact on exports. Return to land would have the highest rise among the factors. The return to capital would fall.

Table 30: Macroeconomic Effects of Agricultural Subsidy Policy Simulation

Variable	Full Employment Closure	Unemployment Closure
GDP at market price	-0.08	-0.08
Real GDP	-0.11	-0.09
Consumer Price Index (CPI)	-0.10	-0.11
Aggregate consumption	0.11	0.12
Imports	-0.03	-0.02
Exports	0.02	0.03
Return to unskilled labor	0.05	0.00
Return to skilled labor	0.02	0.03
Return to capital	-0.02	-0.02
Return to land	0.27	0.26

Source: Bangladesh CGE Model

Due to increased subsidy in the agricultural sectors, prices in these sectors would fall and very small effect on the prices of industrial and services sectors would be observed. The price of value-added would be increased more for the agricultural sectors. The impact would be relatively larger under the “unemployment closure”.

Table 31: Effects on Sectoral Prices of Agricultural Subsidy Policy Simulation (% change from the base year value)

	Full Employment Closure					Unemployment Closure				
	PD	PC	PE_FOB	PL	PVA	PD	PC	PE_FOB	PL	PVA
Cereal crop	-0.26	-0.27	-0.05	0.01	0.15	-0.28	-0.28	-0.06	-0.01	0.13
Commercial crop	-0.13	-0.15	0.03	0.09	0.19	-0.14	-0.16	0.02	0.07	0.17
Livestock rearing	-0.05	-0.05	-0.03	-0.05	0.00	-0.06	-0.06	-0.04	-0.06	-0.01
Poultry rearing	-0.08	-0.08	-0.05	-0.08	0.00	-0.09	-0.09	-0.05	-0.09	-0.01
Shrimp farming and fishing	-0.27	-0.27	-0.08	-0.11	0.00	-0.28	-0.28	-0.08	-0.11	0.00
Forestry	-0.03	-0.03		-0.01	-0.01	-0.03	-0.03		-0.01	-0.02
Rice milling	-0.31	-0.31	-0.12	-0.15	0.01	-0.32	-0.32	-0.12	-0.16	-0.01
Grain milling	-0.23	-0.23	-0.08	-0.10	0.01	-0.24	-0.24	-0.09	-0.11	0.00
Food process	-0.02	-0.02	-0.03	-0.02	0.00	-0.03	-0.02	-0.03	-0.03	0.00
Leather industry	0.00	0.00	-0.01	0.00	0.01	-0.01	-0.01	-0.02	-0.01	-0.01
Yarn industry	-0.12	-0.01	-0.11	-0.12	0.01	-0.13	-0.01	-0.12	-0.12	0.00
Cloth milling	0.00	0.00	0.00	0.00	0.02	-0.01	0.00	-0.01	-0.01	0.00
Woven RMG	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Knit RMG	-0.01	-0.01	-0.02	-0.01	0.01	-0.02	-0.02	-0.03	-0.02	0.00

	Full Employment Closure					Unemployment Closure				
	PD	PC	PE_FOB	PL	PVA	PD	PC	PE_FOB	PL	PVA
Toiletries	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	-0.01	0.00	-0.01
Cigarette industry	0.00	0.00	-0.01	0.00	0.00	-0.01	-0.01	-0.02	-0.01	-0.01
Furniture industry	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.01
Paper, printing and publishing industry	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	-0.02	0.00	-0.01
Pharmaceuticals	0.00	0.00	-0.02	0.00	0.00	-0.01	-0.01	-0.02	-0.01	-0.01
Fertiliser industry	0.02	0.00	-0.03	0.02	-0.01	0.02	0.00	-0.04	0.02	-0.01
Petroleum	0.00	0.00	0.00	0.00	-0.02	0.00	0.00	-0.01	0.00	-0.02
Chemical industry	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	-0.01
Glass industry	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	-0.01
Earth ware and clay industry	0.00	0.00	0.05	0.00	0.00	-0.01	-0.01	0.04	-0.01	-0.01
Cement	0.00	0.00	0.14	0.00	-0.01	0.00	0.00	0.13	0.00	-0.01
Metal	0.00	0.00	0.09	0.00	0.00	-0.01	-0.01	0.08	-0.01	-0.01
Miscellaneous industry	-0.02	-0.01	0.03	-0.02	0.01	-0.02	-0.01	0.02	-0.02	0.00
Mining and quarrying	0.00	0.00	0.08	0.00	-0.01	-0.01	-0.01	0.08	-0.01	-0.01
Construction	0.00	0.00		0.00	0.00	-0.01	-0.01		-0.01	-0.01
Electricity and water generation	-0.01	-0.01		-0.01	-0.01	-0.01	-0.01		-0.01	-0.01
Gas extraction and distribution	-0.01	-0.01		-0.01	-0.01	-0.01	-0.01		-0.01	-0.02
Trade	0.01	0.01		0.01	0.01	0.00	0.00		0.00	0.00
Transport	0.00	0.00	-0.01	0.00	0.01	0.00	0.00	-0.01	0.00	0.00
Health service	0.00	0.00		0.00	0.00	0.00	0.00		0.00	0.00
Education service	0.01	0.01		0.01	0.01	0.01	0.01		0.01	0.02
Public administration and defense	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.02
Bank insurance and real estate	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Hotel and restaurant	-0.07	-0.07		-0.07	0.01	-0.07	-0.07		-0.07	0.00
Communication	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Information technology	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00
Other services	0.01	0.01	0.00	0.01	0.01	-0.01	-0.01	-0.01	-0.01	-0.01

Note: PD = Price of local product (including all taxes and margins); PC = Purchaser price of composite commodity (including all taxes and margins); PE_FOB = FOB price of exported commodity; PL = Price of local product (excluding all taxes on products); PVA = Price of industry value added

Source: Bangladesh CGE Model

Production in the agricultural sectors would increase and some of the industrial and services sectors would contract. The impacts would be larger under the “unemployment closure”.

Table 32: Effects on Sectoral Volumes of Agricultural Subsidy Policy Simulation (% change from the base year value)

	Full Employment Closure					Unemployment Closure				
	O	M	DD	E	Q	O	M	DD	E	Q
Cereal crop	0.26	0.28	0.26	0.14	0.26	0.27	0.26	0.27	0.17	0.27
Commercial crop	0.03	0.21	0.04	-0.08	0.08	0.05	0.20	0.05	-0.06	0.09
Livestock rearing	0.06	-0.03	0.06	0.10	0.06	0.07	-0.04	0.07	0.11	0.07
Poultry rearing	0.07	-0.08	0.07	0.14	0.07	0.08	-0.09	0.08	0.15	0.08
Shrimp farming and fishing	0.16	-0.06	0.16	0.23	0.16	0.17	-0.06	0.16	0.23	0.16
Forestry	-0.20		-0.20		-0.20	-0.19		-0.19		-0.19
Rice milling	0.28	-0.02	0.28	0.35	0.28	0.29	-0.03	0.29	0.37	0.29
Grain milling	0.22	0.02	0.22	0.25	0.22	0.23	0.01	0.23	0.27	0.23
Food process	0.09	0.04	0.09	0.08	0.08	0.10	0.04	0.10	0.10	0.08
Leather industry	0.03	0.04	0.04	0.02	0.04	0.04	0.04	0.05	0.03	0.05
Yarn industry	0.22	0.01	0.22	0.23	0.03	0.25	0.02	0.25	0.25	0.04
Cloth milling	0.02	0.03	0.02	0.01	0.02	0.04	0.03	0.04	0.02	0.03
Woven RMG	-0.01	0.02	0.00	-0.01	0.01	0.00	0.02	0.01	0.00	0.02
Knit RMG	0.04	0.03	0.05	0.04	0.05	0.05	0.03	0.06	0.05	0.06
Toiletries	0.02	0.02	0.02	0.01	0.02	0.03	0.03	0.03	0.02	0.03
Cigarette industry	0.05	0.05	0.05	0.03	0.05	0.06	0.05	0.06	0.04	0.06
Furniture industry	0.00	-0.01	0.00	0.00	-0.01	0.01	-0.01	0.01	0.01	0.00
Paper, printing and publishing industry	0.04	0.04	0.04	0.02	0.04	0.05	0.05	0.05	0.03	0.05
Pharmaceuticals	0.05	0.04	0.05	0.03	0.05	0.06	0.04	0.06	0.04	0.06
Fertiliser industry	0.11	0.19	0.15	0.06	0.18	0.13	0.20	0.17	0.07	0.20
Petroleum	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.02
Chemical industry	-0.06	-0.07	-0.07	-0.04	-0.07	-0.05	-0.06	-0.05	-0.02	-0.06

	Full Employment Closure					Unemployment Closure				
	O	M	DD	E	Q	O	M	DD	E	Q
Glass industry	-0.01	-0.01	-0.01	-0.01	-0.01	0.00	-0.01	0.00	0.00	0.00
Earth ware and clay industry	-0.18	-0.18	-0.18	-0.09	-0.18	-0.17	-0.18	-0.17	-0.08	-0.17
Cement	-0.53	-0.53	-0.53	-0.28	-0.53	-0.51	-0.52	-0.51	-0.27	-0.51
Metal	-0.33	-0.34	-0.33	-0.17	-0.33	-0.31	-0.33	-0.32	-0.16	-0.32
Miscellaneous industry	-0.12	-0.18	-0.14	-0.06	-0.17	-0.11	-0.17	-0.13	-0.04	-0.16
Mining and quarrying	-0.31	-0.32	-0.31	-0.16	-0.31	-0.30	-0.31	-0.30	-0.15	-0.30
Construction	-0.40		-0.40		-0.40	-0.39		-0.39		-0.39
Electricity and water generation	0.03		0.03		0.03	0.04		0.04		0.04
Gas extraction and distribution	0.03		0.03		0.03	0.04		0.04		0.04
Trade	0.03		0.03		0.03	0.04		0.04		0.04
Transport	0.03	0.03	0.03	0.01	0.03	0.04	0.03	0.04	0.03	0.04
Health service	0.04		0.04		0.04	0.04		0.04		0.04
Education service	0.02		0.02		0.02	0.02		0.02		0.02
Public administration and defense	-0.01	0.00	-0.01	-0.01	0.00	-0.01	0.00	0.00	-0.01	0.00
Bank insurance and real estate	-0.06	-0.06	-0.06	-0.03	-0.06	-0.05	-0.05	-0.05	-0.03	-0.05
Hotel and restaurant	0.08		0.08		0.08	0.09		0.09		0.09
Communication	-0.03	-0.03	-0.03	-0.01	-0.03	-0.02	-0.02	-0.02	-0.01	-0.02
Information technology	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.02
Other services	0.00	0.01	0.00	-0.01	0.00	0.01	0.00	0.01	0.01	0.01

Note: O = production; M = import; DD = domestic demand; E = export; Q = composite commodity demand

Source: Bangladesh CGE Model

There would be positive impacts on income and real consumption under both the closures though the impacts would be larger under the “unemployment closure”.

Table 33: Effects on Household Income and Real Consumption of Agricultural Subsidy Policy Simulation (% change from the base year value)

	Full Employment Closure		Unemployment Closure	
	% change in income	% change in real consumption	% change in income	% change in real consumption
Rural Landless	0.00	0.11	0.01	0.12
Rural Marginal Farmers	0.01	0.13	0.02	0.14
Rural Small Farmers	0.03	0.14	0.03	0.15
Rural Large Farmers	0.08	0.20	0.08	0.21
Rural Non-Farm	0.00	0.11	0.00	0.12
Urban Low Education	0.02	0.10	0.02	0.11
Urban High Education	0.00	0.08	0.00	0.09

Source: Bangladesh CGE Model

Under the “full employment closure” there would be rise in employment of skilled labour in the agricultural sector and the overall industrial and services sectors would experience fall in employment in this labour category. The net effect will be a rise in employment by 28481 numbers of unskilled labours. However, there would be fall in employment of skilled labour by 1022numbers. Under the “unemployment closure” there would be rise in overall employment of unskilled labour by 69129 numbers because of larger employment generation in the agricultural sectors and lesser loss in employment in the industrial and services sectors. The effect on the employment of skilled labour would still be negative and larger.

Table 34: Effects on Employment of Agricultural Subsidy Policy Simulation

	Full Employment Closure				Unemployment Closure			
	Change in Number		% Change from base		Change in Number		% Change from base	
Sectors	**UL**	**SL**	**UL**	**SL**	**UL**	**SL**	**UL**	**SL**
Cereal Crop sectors	48864	39	0.37	0.43	60401	38	0.46	0.41
Commercial crops	6750	4	0.21	0.26	9830	4	0.30	0.25
Livestock Rearing	-966	26	-0.05	0.01	1027	-2	0.05	0.00
Poultry Rearing	-617	34	-0.04	0.01	937	24	0.06	0.01
Fishing	590	177	0.06	0.12	1425	153	0.15	0.10
Forestry	-1371	-208	-0.32	-0.27	-922	-206	-0.22	-0.27
Rice Milling	451	1	0.18	0.24	687	1	0.28	0.23
Grain Milling	13	7	0.12	0.18	23	6	0.21	0.16
Food Process	-31	9	-0.01	0.04	197	6	0.08	0.03
Leather Industry	-59	-1	-0.06	-0.01	26	-2	0.03	-0.02
Yarn	86	13	0.14	0.19	150	13	0.24	0.19
Cloth milling	-384	-1	-0.06	-0.01	195	-5	0.03	-0.02
Woven RMG	-996	-47	-0.10	-0.04	-61	-58	-0.01	-0.06
Knitting	-48	0	-0.05	0.00	39	0	0.04	-0.01
Toiletries	-14	-1	-0.09	-0.04	1	-1	0.00	-0.05
Cigarette Industry	-70	0	-0.06	0.00	43	-1	0.04	-0.02
Furniture Industry	-1022	-10	-0.11	-0.05	-119	-12	-0.01	-0.06
Paper, printing and publishing Industry	-59	-3	-0.07	-0.01	28	-5	0.03	-0.02
Pharmaceuticals	-32	0	-0.06	0.00	19	-1	0.03	-0.02
Fertilizer Industry	-3	5	-0.01	0.05	37	5	0.10	0.05
Petroleum	-8	-1	-0.11	-0.06	-2	-2	-0.02	-0.07
Chemical Industry	-197	-17	-0.17	-0.12	-83	-17	-0.07	-0.12
Glass Industry	-7	-2	-0.12	-0.06	-1	-2	-0.02	-0.07
Earth-ware and clay industry	-696	-7	-0.29	-0.23	-464	-7	-0.19	-0.24
Cement	-239	-17	-0.64	-0.59	-201	-17	-0.54	-0.59
Metal	-817	-111	-0.43	-0.38	-628	-112	-0.33	-0.38
Miscellaneous Industry	-1337	-119	-0.22	-0.16	-747	-124	-0.12	-0.17
Mining and Quarrying	-12	-2	-0.43	-0.37	-9	-2	-0.33	-0.38
Construction	-7373	-322	-0.51	-0.45	-5981	-328	-0.41	-0.46
Electricity and Water Generation	-43	-4	-0.09	-0.03	-1	-6	0.00	-0.05
Gas Extraction and Distribution	-4	-1	-0.09	-0.03	0	-2	0.00	-0.05
Wholesale and retail trade	-4275	-5	-0.06	-0.01	2295	-13	0.03	-0.02
Transport	-2330	-5	-0.07	-0.02	836	-7	0.03	-0.02
Health Service	-38	-19	-0.06	-0.01	17	-62	0.03	-0.02
Education Service	-148	-64	-0.06	-0.01	67	-241	0.03	-0.02
Public Administration and Defense	-669	-30	-0.09	-0.03	7	-47	0.00	-0.05
Bank Insurance and Real estate	-445	-214	-0.15	-0.10	-171	-235	-0.06	-0.11
Hotel and Restaurant	-70	7	-0.01	0.04	551	5	0.08	0.03
Communication	-169	-1	-0.12	-0.07	-45	-1	-0.03	-0.08
Information Technology and E-Commerce	-4	-1	-0.08	-0.03	0	-2	0.00	-0.05
Other Services	-3722	-130	-0.10	-0.05	-274	-153	-0.01	-0.06
Agriculture	**53249**	**73**	**0.25**	**0.01**	**72697**	**10**	**0.34**	**0.00**
Industry	**-5479**	**-304**	**-0.11**	**-0.08**	**-870**	**-338**	**-0.02**	**-0.09**
Services	**-19289**	**-790**	**-0.11**	**-0.04**	**-2697**	**-1093**	**-0.02**	**-0.05**
Total	**28481**	**-1022**	**0.06**	**-0.03**	**69129**	**-1420**	**0.16**	**-0.04**

Note: UL = unskilled labour; SL = skilled labour

Source: Bangladesh CGE Model and Employment Satellite Matrix

7.5. Agricultural Productivity

The rise in productivity of cereal crop production would lead to rise in real GDP under both the closures, though the impact would larger under the “full employment closure” as the price of unskilled labour is held fixed under the “unemployment closure”, whereas its price

declines under the “full employment closure”. CPI would fall and consumption would rise and such changes would be more prominent under the “full employment closure”. Imports would fall and exports would rise under the “full employment closure”. The rise in exports is facilitated by the fall in the price of unskilled labour. However, under the “unemployment closure” exports would fall by small margin mainly because of the rise in relative price of unskilled labour. The return to land would fall by great margin because of rise in productivity of the cereal crop sector.

Table 35: Macroeconomic Effects of Agricultural Productivity Simulation

Variable	Full Employment Closure	Unemployment Closure
GDP at market price	-0.22	-0.26
Real GDP	0.71	0.52
Consumer Price Index (CPI)	-1.08	-0.96
Aggregate consumption	0.75	0.61
Imports	-0.31	-0.35
Exports	0.18	-0.03
Return to unskilled labor	-0.74	0.00
Return to skilled labor	0.29	0.10
Return to capital	0.29	0.30
Return to land	-3.99	-3.84

Source: Bangladesh CGE Model

Rise in productivity of the cereal crop sector would result in fall in the domestic prices most of the agricultural and foods products and rise in the prices of industrial and services products.

Table 36: Effects on Sectoral Prices of Agricultural Productivity Simulation (% change from the base year value)

	Full Employment Closure					Unemployment Closure				
	PD	PC	PE_FOB	PL	PVA	PD	PC	PE_FOB	PL	PVA
Cereal crop	-7.88	-7.52	-3.98	-7.88	-11.08	-7.56	-7.23	-3.84	-7.64	-10.77
Commercial crop	-1.77	-1.38	-0.99	-1.77	-2.78	-1.54	-1.22	-0.86	-1.56	-2.51
Livestock rearing	-0.92	-0.92	-0.46	-0.92	0.03	-0.79	-0.79	-0.39	-0.79	0.21
Poultry rearing	-1.78	-1.77	-0.86	-1.78	0.05	-1.62	-1.61	-0.76	-1.62	0.22
Shrimp farming and fishing	0.07	0.07	0.04	0.07	0.13	0.15	0.15	0.09	0.15	0.20
Forestry	0.10	0.10		0.10	0.18	0.19	0.19		0.19	0.27
Rice milling	-4.29	-4.23	-2.35	-4.29	0.01	-4.07	-4.03	-2.23	-4.10	0.18
Grain milling	-2.89	-2.88	-1.58	-2.89	0.03	-2.72	-2.72	-1.48	-2.73	0.17
Food process	-0.13	-0.10	-0.07	-0.13	0.06	-0.03	-0.03	0.00	-0.03	0.19
Leather industry	-0.11	-0.11	-0.08	-0.11	-0.03	0.02	0.02	0.04	0.02	0.17
Yarn industry	-1.12	-0.10	-1.07	-1.12	-0.06	-0.97	-0.10	-0.88	-0.97	0.13
Cloth milling	-0.06	-0.04	-0.03	-0.06	-0.07	0.07	0.06	0.08	0.07	0.13
Woven RMG	0.00	0.00	0.01	0.00	-0.02	0.13	0.05	0.12	0.13	0.15
Knit RMG	-0.30	-0.26	-0.19	-0.30	0.00	-0.13	-0.12	-0.07	-0.14	0.16
Toiletries	0.04	0.01	0.01	0.04	0.16	0.11	0.04	0.10	0.10	0.23
Cigarette industry	0.01	0.01	0.02	0.01	0.15	0.16	0.16	0.09	0.09	0.23
Furniture industry	0.06	0.04	0.05	0.06	0.11	0.14	0.10	0.14	0.14	0.21
Paper, printing and publishing industry	0.06	0.02	-0.03	0.06	0.09	0.14	0.04	0.06	0.14	0.20
Pharmaceuticals	0.01	0.01	0.01	0.01	0.13	0.09	0.08	0.08	0.09	0.22
Fertiliser industry	0.43	0.06	-0.38	0.43	0.19	0.49	0.07	-0.27	0.49	0.25
Petroleum	0.05	0.01	-0.03	0.05	0.29	0.09	0.01	0.03	0.08	0.29
Chemical industry	0.07	0.01	0.02	0.07	0.13	0.14	0.02	0.12	0.14	0.22
Glass industry	0.04	0.03	0.03	0.04	0.09	0.16	0.12	0.14	0.16	0.20
Earth ware and clay industry	0.10	0.08	0.07	0.10	0.12	0.19	0.16	0.16	0.18	0.22
Cement	0.07	0.07	0.07	0.07	0.18	0.16	0.15	0.18	0.15	0.25
Metal	0.07	0.05	0.02	0.07	0.07	0.15	0.13	0.13	0.15	0.19

	Full Employment Closure					Unemployment Closure				
	PD	PC	PE_FOB	PL	PVA	PD	PC	PE_FOB	PL	PVA
Miscellaneous industry	-0.06	-0.02	-0.06	-0.06	0.03	0.05	0.02	0.05	0.05	0.17
Mining and quarrying	0.12	0.12	0.07	0.12	0.26	0.20	0.20	0.16	0.20	0.26
Construction	0.03	0.03		0.03	0.01	0.16	0.16		0.16	0.19
Electricity and water generation	0.19	0.19		0.19	0.27	0.22	0.22		0.21	0.27
Gas extraction and distribution	0.26	0.26		0.26	0.27	0.27	0.27		0.27	0.28
Trade	0.08	0.08		0.08	0.10	0.14	0.14		0.14	0.16
Transport	0.00	0.00	-0.18	0.00	0.00	0.15	0.13	-0.05	0.15	0.18
Health service	0.15	0.15		0.15	0.27	0.17	0.17		0.17	0.20
Education service	0.17	0.17		0.17	0.24	0.13	0.13		0.13	0.13
Public administration and defense	0.12	0.10	0.08	0.12	0.22	0.11	0.10	0.08	0.11	0.13
Bank insurance and real estate	0.13	0.11	-0.03	0.13	0.24	0.14	0.12	0.03	0.14	0.18
Hotel and restaurant	-0.90	-0.90		-0.90	0.01	-0.76	-0.76		-0.76	0.15
Communication	0.18	0.17	0.05	0.18	0.20	0.22	0.21	0.10	0.18	0.20
Information technology	0.19	0.17	0.11	0.19	0.20	0.20	0.18	0.14	0.20	0.20
Other services	-0.06	-0.06	-0.07	-0.06	-0.08	0.17	0.17	0.09	0.17	0.17

Note: PD = Price of local product (including all taxes and margins); PC = Purchaser price of composite commodity (including all taxes and margins); PE_FOB = FOB price of exported commodity; PL = Price of local product (excluding all taxes on products); PVA = Price of industry value added

Source: Bangladesh CGE Model

Cereal crop sector would experience large expansion. Also, other agricultural sectors and food sectors such as rice milling and grain milling would experience expansion. Import will fall in all these sectors. The industrial and services sectors would experience some expansion. The impacts are similar but lower in magnitudes under “unemployment closure”.

Table 37: Effects on Sectoral Volumes of Agricultural Productivity Simulation (% change from the base year value)

	Full Employment Closure					Unemployment Closure				
	O	M	DD	E	Q	O	M	DD	E	Q
Cereal crop	3.97	-11.77	3.97	12.96	3.16	3.73	-11.51	3.73	12.45	2.95
Commercial crop	1.47	-2.12	1.43	3.03	0.64	1.21	-1.96	1.17	2.62	0.48
Livestock rearing	0.47	-1.36	0.47	1.40	0.47	0.36	-1.22	0.36	1.17	0.36
Poultry rearing	0.72	-2.84	0.72	2.62	0.69	0.57	-2.66	0.57	2.33	0.55
Shrimp farming and fishing	-0.05	0.10	-0.04	-0.11	-0.04	-0.14	0.17	-0.13	-0.26	-0.13
Forestry	-0.07		-0.07		-0.07	-0.21		-0.21		-0.21
Rice milling	3.17	-5.48	3.17	7.39	3.06	2.96	-5.31	2.96	7.01	2.85
Grain milling	2.11	-3.70	2.11	4.88	2.10	1.92	-3.58	1.92	4.57	1.91
Food process	0.11	-0.12	0.11	0.21	0.05	-0.05	-0.12	-0.06	0.00	-0.07
Leather industry	0.10	-0.13	0.08	0.15	0.07	-0.09	-0.06	-0.10	-0.07	-0.09
Yarn industry	2.13	0.05	2.09	2.18	0.23	1.69	-0.14	1.62	1.78	0.01
Cloth milling	0.01	-0.09	0.01	0.06	-0.01	-0.19	-0.07	-0.19	-0.17	-0.17
Woven RMG	-0.01	-0.01	-0.02	-0.01	-0.01	-0.23	0.01	-0.22	-0.24	-0.07
Knit RMG	0.37	-0.33	0.20	0.39	0.13	0.14	-0.23	0.02	0.15	-0.01
Toiletries	0.02	0.10	0.02	-0.03	0.07	-0.20	-0.03	-0.20	-0.20	-0.08
Cigarette industry	-0.05	-0.04	-0.05	-0.03	-0.05	-0.18	-0.02	-0.18	-0.19	-0.18
Furniture industry	-0.08	0.03	-0.08	-0.10	-0.04	-0.26	-0.01	-0.26	-0.27	-0.18
Paper, printing and publishing industry	0.22	0.33	0.23	0.07	0.30	-0.01	0.25	0.00	-0.13	0.18
Pharmaceuticals	-0.03	0.00	-0.03	-0.03	-0.03	-0.16	0.00	-0.15	-0.16	-0.13
Fertiliser industry	1.63	3.06	2.25	0.77	2.94	1.36	2.85	1.94	0.55	2.71
Petroleum	0.18	0.29	0.20	0.06	0.28	0.01	0.17	0.02	-0.07	0.15
Chemical industry	0.03	0.16	0.04	-0.04	0.14	-0.22	0.03	-0.22	-0.24	-0.01
Glass industry	-0.06	0.01	-0.06	-0.07	-0.04	-0.26	0.03	-0.26	-0.28	-0.17
Earth ware and clay industry	-0.10	0.08	-0.10	-0.14	-0.08	-0.27	0.06	-0.27	-0.31	-0.22
Cement	-0.13	-0.01	-0.13	-0.14	-0.12	-0.40	-0.13	-0.40	-0.36	-0.38
Metal	0.05	0.17	0.06	-0.03	0.07	-0.22	0.05	-0.22	-0.26	-0.18
Miscellaneous industry	0.14	0.04	0.14	0.13	0.07	-0.11	-0.02	-0.11	-0.11	-0.04
Mining and quarrying	-0.06	0.17	-0.06	-0.15	-0.06	-0.25	0.10	-0.25	-0.32	-0.25
Construction	-0.09		-0.09		-0.09	-0.28		-0.28		-0.28
Electricity and water generation	0.07		0.07		0.07	-0.04		-0.04		-0.04
Gas extraction and distribution	-0.09		-0.09		-0.09	-0.19		-0.19		-0.19

	Full Employment Closure					Unemployment Closure				
	O	M	DD	E	Q	O	M	DD	E	Q
Trade	0.83		0.83		0.83	0.63		0.63		0.63
Transport	0.64	0.64	0.64	0.36	0.64	0.41	0.66	0.41	0.10	0.45
Health service	0.08		0.08		0.08	-0.02		-0.02		-0.02
Education service	-0.16		-0.16		-0.16	-0.16		-0.16		-0.16
Public administration and defense	-0.11	0.10	-0.09	-0.16	-0.07	-0.12	0.07	-0.11	-0.16	-0.08
Bank insurance and real estate	0.29	0.50	0.30	0.05	0.32	0.12	0.34	0.12	-0.05	0.15
Hotel and restaurant	0.53		0.53		0.53	0.37		0.37		0.37
Communication	0.09	0.38	0.10	-0.10	0.10	-0.06	0.24	-0.06	-0.20	-0.05
Information technology	-0.14	0.19	-0.10	-0.22	-0.07	-0.22	0.12	-0.19	-0.28	-0.16
Other services	0.15	0.06	0.15	0.14	0.15	-0.06	0.21	-0.05	-0.18	-0.05

Note: O = production; M = import; DD = domestic demand; E = export; Q = composite commodity demand

Source: Bangladesh CGE Model

All household categories, except the rural large farmers, would experience rise in real consumption. The rural large farmers would incur large loss in income because of large fall in the return to land and such fall in income would be higher than the fall in CPI. The impacts under both the closures are similar.

Table 38: Effects on Household Income and Real Consumption of Agricultural Productivity Simulation (% change from the base year value)

	Full Employment Closure		Unemployment Closure	
	% change in income	% change in real consumption	% change in income	% change in real consumption
Rural Landless	-0.22	0.96	-0.26	0.79
Rural Marginal Farmers	-0.44	0.85	-0.45	0.70
Rural Small Farmers	-0.76	0.49	-0.76	0.35
Rural Large Farmers	-1.38	-0.01	-1.36	-0.12
Rural Non-Farm	-0.25	1.00	-0.25	0.87
Urban Low Education	-0.62	0.26	-0.64	0.11
Urban High Education	0.03	0.86	-0.05	0.66

Source: Bangladesh CGE Model

Under the "full employment closure", overall agricultural sector would experience large fall in employment of unskilled labour because of the rise in productivity in the cereal crop sector. Therefore, despite that employment would increase in the overall industrial and services sectors, the net employment effect of the unskilled labour would be negative. In the case of skilled labour, overall employment will decline. Under the "unemployment closure" employment of unskilled labour would decline by greater magnitude. However, there would be a net positive effect on the employment of skilled labour.

Table 39: Effects on Employment of Agricultural Productivity Simulation

	Full Employment Closure				Unemployment Closure			
	Change in Number		% Change from base		Change in Number		% Change from base	
Sectors	UL	SL	UL	SL	UL	SL	UL	SL
Cereal Crop sectors	-922891	-809	-7.01	-8.72	-1094406	-786	-8.31	-8.47
Commercial crops	-34940	-46	-1.08	-2.90	-83801	-44	-2.59	-2.76
Livestock Rearing	46445	1258	2.24	0.35	13727	1722	0.66	0.48
Poultry Rearing	39531	1533	2.53	0.64	13955	1708	0.89	0.72
Fishing	14716	-471	1.56	-0.31	1102	-91	0.12	-0.06
Forestry	8080	25	1.91	0.03	717	-6	0.17	-0.01
Rice Milling	11932	13	4.80	2.87	7984	14	3.21	3.03

	Full Employment Closure				Unemployment Closure			
	Change in Number		% Change from base		Change in Number		% Change from base	
Sectors	**UL**	**SL**	**UL**	**SL**	**UL**	**SL**	**UL**	**SL**
Grain Milling	391	70	3.69	1.78	228	77	2.15	1.97
Food Process	4187	-36	1.70	-0.17	473	3	0.19	0.02
Leather Industry	1518	-16	1.65	-0.22	129	-3	0.14	-0.04
Yarn	2196	110	3.58	1.67	1140	110	1.86	1.68
Cloth milling	9215	-107	1.42	-0.45	-218	-50	-0.03	-0.21
Woven RMG	14898	-406	1.48	-0.39	-370	-221	-0.04	-0.21
Knitting	1741	0	1.87	-0.01	312	8	0.33	0.16
Toiletries	256	-3	1.71	-0.16	15	-2	0.10	-0.08
Cigarette Industry	1987	-18	1.63	-0.24	140	-5	0.11	-0.06
Furniture Industry	14904	-57	1.57	-0.30	161	-31	0.02	-0.16
Paper, printing and publishing Industry	1659	-7	1.85	-0.02	234	24	0.26	0.08
Pharmaceuticals	910	-19	1.66	-0.21	79	-3	0.14	-0.03
Fertilizer Industry	1328	161	3.45	1.54	659	160	1.71	1.53
Petroleum	133	-2	1.78	-0.10	28	5	0.38	0.20
Chemical Industry	1951	-21	1.73	-0.15	87	-14	0.08	-0.10
Glass Industry	89	-8	1.57	-0.30	1	-5	0.01	-0.17
Earth-ware and clay industry	3856	-9	1.58	-0.29	66	-4	0.03	-0.15
Cement	602	-7	1.62	-0.25	-25	-7	-0.07	-0.24
Metal	3162	-63	1.66	-0.21	61	-43	0.03	-0.14
Miscellaneous Industry	10378	-135	1.69	-0.19	719	-43	0.12	-0.06
Mining and Quarrying	43	-1	1.58	-0.29	2	-1	0.07	-0.11
Construction	22565	-225	1.55	-0.32	-241	-137	-0.02	-0.19
Electricity and Water Generation	837	-17	1.73	-0.15	149	15	0.31	0.13
Gas Extraction and Distribution	75	-9	1.58	-0.29	8	0	0.17	-0.01
Wholesale and retail trade	165586	338	2.35	0.47	57535	462	0.82	0.64
Transport	73371	97	2.21	0.33	21381	138	0.64	0.47
Health Service	1032	-557	1.67	-0.20	140	135	0.23	0.05
Education Service	3436	-5041	1.39	-0.48	-77	-2195	-0.03	-0.21
Public Administration and Defense	11180	-426	1.42	-0.44	142	-152	0.02	-0.16
Bank Insurance and Real estate	5432	-27	1.86	-0.01	946	319	0.32	0.15
Hotel and Restaurant	14089	24	2.03	0.15	3908	63	0.56	0.38
Communication	2278	-3	1.67	-0.20	240	0	0.18	0.00
Information Technology and E-Commerce	61	-20	1.44	-0.43	1	-7	0.02	-0.15
Other Services	63274	-342	1.74	-0.13	6900	36	0.19	0.01
Agriculture	**-849059**	**1491**	**-3.97**	**0.18**	**-1148706**	**2505**	**-5.36**	**0.30**
Industry	**87337**	**-562**	**1.79**	**-0.15**	**11904**	**-28**	**0.24**	**-0.01**
Services	**363218**	**-6210**	**2.05**	**-0.29**	**91032**	**-1324**	**0.51**	**-0.06**
Total	**-398503**	**-5281**	**-0.91**	**-0.16**	**-1045770**	**1152**	**-2.38**	**0.03**

Note: UL = unskilled labour; SL = skilled labour

Source: Bangladesh CGE Model and Employment Satellite Matrix

VIII. POLICY IMPLICATIONS

Global agricultural trade liberalisation under WTO-Doha agreement will have some mixed effects on the sectoral production and employment in Bangladesh. There would be positive effect on agricultural sectors. However, the impacts on industrial and services sectors would vary depending on the type of labour market closure considered in the model. Under the "full employment closure", these two broad sectors would contract, whereas under the "unemployment closure" these two broad sectors would expand.

Bangladesh – India bilateral FTA would result in rise in limited expansion in the agricultural and some export-oriented sectors, though most of the import competing sectors would

contract as far as the “full employment closure” is concerned. This will result in net employment loss. However, under the “unemployment closure” expansion of the agricultural and export-oriented sectors would be larger enough to result in a net employment generation.

The domestic agricultural trade liberalisation would lead to increased imports of agricultural products and this would result in the contraction of the agricultural sectors. Overall industrial and services sectors would expand under the “full employment closure”. In contrast, under the “unemployment closure” overall industrial and services sectors would contract. The overall employment effect under the “full employment closure” would be positive, with employment loss in the agricultural sector being compensated by the rise in employment in the industrial and services sectors. However, under the “unemployment closure”, there would be a large employment loss of the unskilled labour.

Rise in subsidies in agricultural sectors would lead to rise in the production in the agricultural sectors and some of the industrial and services sectors would contract. The impacts would be larger under the “unemployment closure”. Under the “full employment closure” there would be rise in employment of skilled labour in the agricultural sector and the overall industrial and services sectors would experience fall in employment in this labour category. The net effect will be a rise in employment unskilled labours. However, there would be fall in employment of skilled labour. Under the “unemployment closure” there would be rise in overall employment of unskilled labour because of larger employment generation in the agricultural sectors and lesser loss in employment in the industrial and services sectors. The effect on the employment of skilled labour would still be negative and larger.

Rise in total factor productivity in the cereal crop sector would lead to large expansion of the cereal crop sector. Also, rice milling and grain milling would experience expansion. Import will fall in all these sectors. The industrial and services sectors would experience some expansion. The impacts are similar but lower in magnitudes under “unemployment closure”. Under the “full employment closure”, overall agricultural sector would experience large fall in employment of unskilled labour because of the rise in productivity in the cereal crop sector. Therefore, despite that employment would increase in the overall industrial and services sectors, the net employment effect of the unskilled labour would be negative. In the case of skilled labour, overall employment will decline. Under the “unemployment closure” employment of unskilled labour would decline by greater magnitude. However, there would be a net positive effect on the employment of skilled labour.

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Annex 1: SAM based Multiplier Modules

The shift from a 'data' SAM structure to a SAM based Multiplier Module requires the introduction of assumptions and the separation of the SAM accounts into 'exogenous' and 'endogenous' components.

Table A1: General SAM Modular Structure

		1a-PA	**1b-CM**	**2-FP**	**3a-HH-OI**	**4-KHH-OI**	**5-ROW**	**TDD**
1a	PA		$T_{1a, 1b}$		0			$\mathbf{Y_{1a}}$
1b	CM	$T_{1b, 1a}$			$T_{1b, 3}$	$T_{1b, 4}$	$T_{1b, 5}$	$\mathbf{Y_{1b}}$
2	FP	$T_{2, 1a}$					$T_{2, 5}$	$\mathbf{Y_2}$
3	HH-IO	$T_{3, 1a}$	$T_{3, 1b}$	$T_{3, 2}$	$T_{3, 3}$		$T_{3, 5}$	$\mathbf{Y_3}$
4	KHH-OI	$T_{4, 1a}$			$T_{4, 3a}$		$T_{4, 5}$	$\mathbf{Y_4}$
5	ROW		$T_{5, 1b}$	$T_{5\,2}$	$T_{5, 3}$	0	0	$\mathbf{Y_5}$
	TSS	$\mathbf{E_{1a}}$	$\mathbf{E_{1b}}$	$\mathbf{E_2}$	$\mathbf{E_3}$	$\mathbf{E_4}$	$\mathbf{E_5}$	

Where: by definition $Y_i = E_j$ and **1 Production (1a PA** = Production Activities and **1b CM** = Commodities); **2 FP** = Factors of Production; **3 HH-IO** = Households and Other Institutions (incl. Government); **4 KHH-OI** = Capital Account Households and Other Institutions (incl. government); **5 ROW** = Rest of the World (Current and capital account). **Blank entries** indicate that there are no transactions by definition.

The separation is needed to gain entry into the system, allowing some variables within the SAM structure to be manipulated exogenously (via injection instruments) to assess the subsequent impacts on the endogenous accounts as well as on the exogenous accounts.

Generally, accounts intended to be used as policy instruments are classified as exogenous and accounts specified *a priory* as objectives (or targets) are classified as endogenous.

Three accounts are designated as endogenous accounts: *(1) Production (Production Activities and Commodities) account, (2) Factors of Production account, (3a) Households and Other Institutions (excl. the Government)*.

The exogenous accounts comprises *3a Government (expenditure, transfer, remittances); 4 Capital account of institutions (savings and demand for houses, investment demand, infrastructure and machinery and equipment); and* 5 ROW *transfers, remittances, export demand and capital.* The SAM Flows and the categorization into endogenous and exogenous accounts are shown below.

Table A2: Endogenous and Exogenous Accounts

		1a-PA	1b-CM	2-FP	3a-HH-OI	3b-Gov	4-KHH-OI	5-ROW	TDD
1a	PA		$T_{1a, 1b}$		0				$\mathbf{Y_{1a}}$
1b	CM	$T_{1b, 1a}$			$T_{1b, 3a}$	$T_{1b, 3b}$	$T_{1b, 4}$	$T_{1b,5}$	$\mathbf{Y_{1b}}$
2	FP	$T_{2, 1a}$						$T_{2, 5}$	$\mathbf{Y_2}$
3a	HH-OI			$T_{3a, 2}$	$T_{3a, 3a}$	$T_{3a, 3b}$		$T_{2, 5}$	$\mathbf{Y_3}$
3b	Gov	$T_{3b, 1a}$	$T_{3b, 1b}$		$T_{3b, 3a}$	$T_{3b, 3b}$		$T_{3a, 5}$	
4	KHH-OI	$T_{4, 1a}$			$T_{4, 3}$			$T_{4, 5}$	$\mathbf{Y_4}$
5	ROW		$T_{5, 1b}$	$T_{5, 2}$	$T_{5, 3a}$	$T_{5, 3b}$	$T_{5, 4}$	0	$\mathbf{Y_5}$
	TSS	$\mathbf{E_{1a}}$	$\mathbf{E_{1b}}$	$\mathbf{E_2}$	$\mathbf{E_{3a}}$	$\mathbf{E_{3b}}$	$\mathbf{E_4}$	$\mathbf{E_5}$	

Where Endogenous: **1 Production (1a PA** = Production Activities and **1b CM** = Commodities); **2 FP** = Factors of Production; **3a HH** = Households and Other Institutions (excl. Government); Where Exogenous: **3b** Government; **4 KHH-OI** = Capital Account of Households and of Other Institutions (incl. government); **5 ROW** = Rest of the World (Current and capital account). **Blank** entries indicate that there are no transactions by definition.

Table A3: Endogenous and Components of Exogenous Accounts

	PA	CM	FP	3a HH&OI	EXO	INCOME	Exogenous Accounts (EXO) used as injections Column Vectors
1a PA		$T_{1a\ 1b}$		0	X_{1a}	$\mathbf{Y_{1a}}$	$X_{1a} = 0$
1b CM	$T_{1b\ 1a}$			$T_{1b\ 3a}$	X_{1b}	$\mathbf{Y_{1b}}$	X_{1b} = Government Consumption Subsidies -Taxes + Exports + Gov. Investment (capital formation in infrastructure and machinery and equipment) + Gross Capital Stock formation
2 FP	$T_{2\ 1a}$				X_2	$\mathbf{Y_2}$	X_2 =Factor Remittances from ROW
3a HH&OI			$T_{3a\ 2}$	$T_{3a\ 3a}$	X_{3a}	$\mathbf{Y_{3a}}$	X_{3a} = Factor Remittances from ROW
3b-5 Leaks	L_{1a}	L_{1b}	L_2	L_{3a}	$L_{3b\text{-}5} = X_{3b\text{-}5}$	$Y_{3b\text{-}5}$	3b =Aid to Government from ROW
EXPN	$\mathbf{E_{1a}}$	$\mathbf{E_{1b}}$	$\mathbf{E_2}$	$\mathbf{E_{3a}}$	$\mathbf{E_{3b\text{-}5}}$		Where $\mathbf{E_i = Y_j}$
L_{1a} = Activity Tax					L_{3a} = Income Tax + Household Savings + Corporate Savings		
L_{1b} = Commodity Tax + Import Duty + Imports					$L_{3b\text{-}5}$ $X_{3b\text{-}5}$ and $Y_{3b\text{-}5}$ falls out of the model		
L_2 = Factor Remittances to ROW					Blank entries indicate that there are no transactions by definition.		

<u>Note on Injection</u>: For any given injection into the exogenous accounts X_i (i.e. instruments) of the SAM, influence is transmitted through the interdependent SAM system among the endogenous accounts. The interwoven nature of the system implies that the incomes of factors, institutions and production are all derived from exogenous injections into the economy via a multiplier process. Multiplier models may also be built on the input-output frameworks. The main shortcoming of the IO model is that the feedback between factor income generation (value added) and demand by private institutions (households) does not exist. In this case the circular economic flow is truncated. The problem can be partly tackled by endogenising household consumption within the I-O framework; this is typically referred to as a 'closed I-O model'. In this case, the circular economic flow is only partially truncated. A better solution is to extend the I-O to a SAM framework which captures the full circular economic flow.

SAM coefficient (Aij) are derived from payments flows by endogenous accounts to themselves (Tij) and other endogenous accounts as to the corresponding outlays (Ei = Yj); similarly, the leak coefficients (Bij) derived from flows reflecting payments from endogenous accounts to exogenous accounts. They are derived below.

Table A4: Coefficient Matrices and Vectors of the SAM Model

Account	1a - PA	1b – CM	2 – FP	3a - HH&OI	3b … 5 EXO	Income
1a – PA		$A_{1a,1b} = T_{1a,1b} / \mathbf{Y_{1b}}$			X_{1a}	$\mathbf{Y_{1a}}$
1b – CM	$A_{1b,1a} = T_{1b,1a} / \mathbf{Y_{1a}}$			$A_{1b,3a} = T_{1b,3a} / \mathbf{Y_{3a}}$	X_{1b}	$\mathbf{Y_{1b}}$
2 – FP	$A_{2,1a} = T_{2,1a} / \mathbf{Y_{1a}}$				X_2	$\mathbf{Y_2}$
3a - HH&OI			$A_{3a,2} = T_{3a,2} / \mathbf{Y_2}$	$A_{3a,3a} = T_{3a,3a} / \mathbf{Y_{3a}}$	X_{3a}	$\mathbf{Y_{3a}}$
3b … 5 Leaks	$B_{1a} = L_{1a} / \mathbf{Y_{1a}}$	$B_{1b} = L_{1b} / \mathbf{Y_{1b}}$	$B_2 = L_2 / \mathbf{Y_2}$	$B_{3a} = L_{3a} / \mathbf{Y_{3a}}$		
Expenditure	$\mathbf{E_{1a} = Y_{1a}}$	$\mathbf{E_{1b} = Y_{1b}}$	$\mathbf{E_2 = Y_2}$	$\mathbf{E_3 = Y_{3a}}$		

The multiplier analysis using the SAM framework helps to understand the linkages between the different sectors and the institutional agents at work within the economy. Accounting multipliers have been calculated according to the standard formula for accounting (impact) multipliers, as follows:

$\mathbf{Y} = A\,Y + \mathbf{X} = (I - A)^{-1}\,\mathbf{X} = M_a\,\mathbf{X}$

Where:

Y is a vector of incomes of endogenous variables

X is a vector of expenditures of exogenous variables

A is the matrix of average expenditure propensities for endogenous accounts

$M_a = (I - A)^{-1}$ is a matrix of aggregate accounting multipliers (generalized Leontief inverse).

Variations in any one of the exogenous account (i.e. in this case ΔX) will produce total impacts (ΔY) of endogenous entries via the multipliers.

The representation of economic structure of an economy as contained in a SAM is best understood by assessing the backward and forward linkage. To proceed with the analysis of multipliers and linkages it is necessary to calculate the matrix of technology coefficients (e.g. Leontief I-O technology coefficients). The inverse of the coefficient matrix after deducting for the identity matrix represents the so-called matrix of production multipliers.

Each of the columns of the matrix of accounting multipliers, as indicated before show the effects of each corresponding exogenous injection on the incomes of endogenous accounts. Analogously to the I-O model the sum total of a column or a row can be calculated and they will be equivalent to the backward and forward income or expenditure linkages. In SAM models within account sums of columns or rows is calculated for each of the four endogenous accounts as well as the total column and row sums of all the endogenous accounts taken together. The former can be called “partial backward or forward linkages” or within account backward or forward linkages and the latter “total backward or forward linkages". Partial backward linkages can also be named after their corresponding account multipliers such as backward and forward linkages for production, factors, and households[5.] Therefore in conclusion we can say that the basic idea of backward linkages is to trace the output increases which occur in supplying sectors or accounts when there is a change in the sector or account using their outputs as inputs, just as with forward linkages we trace the output increases which occur or might occur in using industries or accounts when there is a change in the sector or account supplying inputs[6.]

Calculated Backward and Forward Linkages from SAM based Multiplier Model

	Backward Linkage	**Forward Linkage**
Activity		
Cereal Crop sectors	11.3306441	25.5147105
Commercial crops	10.8513271	12.9238707
Livestock Rearing	11.516938	8.02960553
Poultry Rearing	12.0829671	8.58354803
Fishing	12.1329319	15.5638405
Forestry	11.6593762	6.26193988
Rice Milling	12.1273663	24.7054133
Grain Milling	11.9476909	5.26577117
Food Process	10.7673644	13.8284524
Leather Industry	11.8095484	4.05543968
Jute and Yarn	10.8493113	1.81586976
Cloth milling	10.7465313	7.8569688
Woven RMG	11.0978693	3.86750627
Knitting	10.6146316	3.00768112
Toiletries	6.14298765	1.57993207
Cigarette Industry	6.56284304	4.79017583
Furniture Industry	10.6891436	3.03811148
Paper, printing and publishing Industry	9.16467155	1.68760391
Pharmaceuticals	8.68398188	3.92194101

[5] The interpretation of partial (within account) backward and forward linkages within a SAM framework is also similar to that of I-O models. Although the sum of all the elements, in any column (row) of the accounting multipliers matrix, could be read as the backward (forward) linkages of the expenditure-injection multipliers, the interpretation in SAM is not so straight forward because the linkages are composites of the effects of several kinds of accounts.

[6] Bulmer–Thomas, V, (1982),“Input–Output Analysis in Developing Countries”, John Wiley & Sons Ltd., New York.

Fertilizer Industry	10.9976198	1.46608237
Petroleum	4.16184768	2.72052968
Chemical Industry	9.59976244	2.00441609
Glass Industry	10.3575646	1.9631831
Earth-ware and clay industry	11.0349898	2.36201403
Cement	11.6256462	2.91022483
Metal	11.3306136	5.98376065
Miscellaneous Industry	10.6537913	4.90937229
Construction	11.2768427	2.41381409
Electricity and Water Generation	8.87917562	3.98948534
Gas Extraction and Distribution	10.350345	2.44266977
Mining and Quarrying	11.2942285	4.55251641
Wholesale and retail trade	10.2662112	32.4088886
Transport	10.4682307	20.1949517
Health Service	10.659773	7.66138776
Education Service	10.5952403	4.67990272
Public Administration and Defense	10.9803236	2.80961952
Bank Insurance and Real estate	10.7278002	5.09276837
Hotel and Restaurant	12.1286086	5.08480482
Communication	9.37055653	5.66473337
Information Technology and E-Commerce	10.7858089	2.06377363
Other Services	10.6569633	33.1398236
Commodity		
Cereal Crop sectors	11.7577797	25.8201476
Commercial crops	9.50178471	15.2191365
Livestock Rearing	12.5156209	7.03040955
Poultry Rearing	13.0022033	7.63457837
Fishing	13.1213379	14.5777709
Forestry	12.6593762	5.26193988
Rice Milling	12.9708495	24.0153574
Grain Milling	12.9319487	4.27139914
Food Process	9.16694413	16.9131342
Leather Industry	12.2306304	3.21294189
Jute and Yarn	5.56503583	1.9390045
Cloth milling	9.53407738	8.63463341
Woven RMG	10.7162847	3.2752447
Knitting	11.4768703	2.03408029
Toiletries	3.48376421	1.43432115
Cigarette Industry	7.44342535	3.86042015
Furniture Industry	8.88534977	2.76280278
Paper, printing and publishing Industry	3.76777346	2.27679905
Pharmaceuticals	8.3057027	3.47318853
Fertilizer Industry	3.4919221	2.05696506
Petroleum	1.76682719	9.33793501
Chemical Industry	2.77156811	5.44272376
Glass Industry	8.40115618	1.34792875
Earth-ware and clay industry	10.5565787	1.5727188
Cement	11.9738209	2.02368877
Metal	10.8920337	5.70853962
Miscellaneous Industry	4.71951584	11.1975962
Construction	12.2039859	1.42300779
Electricity and Water Generation	9.17212501	3.24813501
Gas Extraction and Distribution	11.350345	1.44266977
Mining and Quarrying	12.2237341	3.57482918

Wholesale and retail trade	11.2662112	31.4088886
Transport	9.8374879	22.7369116
Health Service	11.659773	6.66138776
Education Service	11.5952403	3.67990272
Public Administration and Defense	10.6939481	2.04975389
Bank Insurance and Real estate	10.3437442	4.69901575
Hotel and Restaurant	13.1286086	4.08480482
Communication	10.1935661	4.75453675
Information Technology and E-Commerce	11.0264985	1.14433359
Other Services	11.5189259	32.5615869
Value-Added		
VA Labour Unskilled	10.4843233	36.2124331
VA Labour Skilled	9.68835773	37.9873437
VA Capital	9.25140458	66.4384532
VA Land	9.13266641	12.1476471
Households		
Rural Landless	11.4175525	10.1380701
Rural Marginal Farmers	10.3427284	9.70752861
Rural Small Farmers	10.1421592	17.5736425
Rural Large Farmers	5.79657962	16.2937773
Rural Non Farm	10.2832112	51.0081576
Urban Low Education	9.34924372	16.2617778
Urban High Education	7.40113968	29.702705

Source: Multiplier Model

Annex 2: Mapping and Classification Scheme

Activity-Commodity 41	Activity-Commodity 86
Cereal Crop sectors	Paddy Cultivation, wheat Cultivation, Other Grain Cultivation
Commercial crops	Jute Cultivation, Sugarcane Cultivation, Potato Cultivation, Vegetable Cultivation, Pulses Cultivation, Oilseed Cultivation, Fruit Cultivation, Cotton Cultivation, Tobacco Cultivation, Tea Cultivation, Spice Cultivation, Other Crop Cultivation
Livestock Rearing	Livestock Rearing
Poultry Rearing	Poultry Rearing
Fishing	Shrimp Farming, Fishing
Forestry	Forestry
Rice Milling	Rice Milling
Grain Milling	Grain Milling
Food Process	Fish Process, Oil Industry, Sweetener Industry, Tea Product, Salt Refining, Food Process
Leather Industry	Tanning and Finishing, Leather Industry
Yarn	Yarn Industry
Cloth milling	Cloth Milling, Handloom Cloth, Dyeing and Bleaching
RMG	RMG
Knitting	Knitting
Toiletries	Toiletries
Cigarette Industry	Cigarette Industry, Bidi Industry
Furniture Industry	Saw and Plane, Furniture Industry
Paper, printing & publishing	Paper Industry, Printing and Publishing
Pharmaceuticals	Pharmaceuticals
Fertilizer Industry	Fertilizer Industry
Petroleum	Petroleum
Chemical Industry	Basic Chemical, Chemical Industry
Glass Industry	Glass Industry
Earth-ware and clay industry	Earthware Industry, Clay Industry
Cement	Cement
Metal	Basic Metal, Metal Manufacturers
Miscellaneous Industry	Machinery and Equipments, Transport Equipments, Baling, Jute Fabrication, Miscellaneous Industry
Construction	Urban Building, Rural Building, Power Plant Building, Rural Road Building, Port Road Railway Building, Canal Dyke Other Buildings
Electricity and Water	Electricity and Water
Gas Extraction & Distribution	Gas Extraction & Distribution
Mining and Quarrying	Mining and Quarrying
Wholesale and retail trade	Wholesale trade, retail trade
Transport	Air Transport, Water Transport, Land Transport, Railway Transport, Other Transport
Health Service	Health Service
Education Service	Education Service
Public Administration & Def.	Public Administration & Def.
Bank Insurance and Real est.	Bank Insurance and Real est.
Hotel and Restaurant	Hotel and Restaurant
Communication	Communication
IT and ECom	IT and ECom
Other Services	Housing Service, Professional Service, Entertainment, Other Services