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## **STRUCTURAL INTERRELATIONSHIPS OF VARIOUS SECTORS OF THE ECONOMY OF BANGLADESH WITH SPECIAL EMPHASIS ON AGRICULTURE**

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### **ABSTRACT**

There is a great interdependence between various sectors of an economy. An input-output table describes social accounts for the whole economy and reflects the interdependence of industries. The total change of economy from any specified change in final demand in an industry is assessed by the extent of interaction of the sectors. Sectoral output, income and employment generated in the economy are used to policy decision regarding investment or other government expenditure on sectoral output, income and employment. Thus, the present study was undertaken with a view to find out the structural interrelationships among the different sectors and to assess the sectoral potentiality of the economy. The latest input-output table containing 79 sectors constructed by the Bangladesh Planning Commission was used. Manufacturing uses higher amounts of intermediate agricultural inputs and it is a dominant sector producing the highest total output (36.9 per cent of the total output). Among the agricultural production sectors, wheat, oilseeds, tobacco and major spices have high import contents whereas the agro-based manufacturing sectors have low import requirements. A strong interrelation exists between the manufacturing sectors and primary agricultural sectors which supply the basic raw materials to manufacturing sectors. The agro-processing industries generate higher income and employment whereas most of the manufacturing sectors other than agro-processing sectors show comparatively lower employment generation. The income and employment multiplier values were relatively much smaller for most of the primary sectors, service sectors and trade sectors.

### **I. INTRODUCTION**

Leontief (1936) developed a general theory of production based on the concept of interdependence. He concentrated on deriving a set of parameters for his model, from a single set of observations of inter-industry transaction in the economy. He first published the input-output table for the US economy in 1936 using an open static model in which final demand is related to other sectors. Since then this model has been used extensively for regional, interregional and national planning and economic analysis in many countries. Chenery and Watanabe (1958) divided the economy into distinct activities to answer their concern for technological interdependence and sectoral interactions. Later on, the works of Kuznets

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(1971) on national income and output and the research by Chenery and Syrquin (1976) provided the necessary background to the structural view. According to this approach, it is important to identify the specific rigidities, lags and other structural features of developing economies that exert influence on economic adjustments and development policies. The input-output technique is well suited to analyzing the structure of development.

Input-output technique studies the conditions of mutual consistency of the outputs of the various branches of the national economy, which result from the fact that the output of one branch is the source of input of other branch. Over the past few decades this technique has been refined considerably and is now available for long term planning with a wide variety of applications. Generally an input-output table, the basic tool of this analytical technique, provides a descriptive set of social accounts for the whole economy and thereby reflects the interdependence of industries (or sectors/sub-sectors). An input-output table splits up the production sector into industrial sub-sectors and records flows of output between them. In practice, knowledge of input-output relationships has been found useful in growth and planning exercises of only those countries where manufacturing sector is considerably developed, as a result of which there is great interdependence between various productive activities. Input-output analysis is of greatest use when growth is based on the expansion of domestic demand. The input-output technique serves little purposes in economic planning in most underdeveloped countries where manufacturing sector remains unsatisfied like Bangladesh due to lack of considerable backward and forward linkages between sectors. Bangladesh is considered as one of the least developed countries where all common problems related to output, income and employment exist. The present study has been taken as an exercise for identification of different input-output indicators for the Bangladesh economy.

On the basis of the concept of input-output analysis one finds inter-industry relations and interdependence in the entire economy because the input of one industry is the output of another. For instance, coal is input for the steel industry while steel is the input for the coal industry, both commodities are also the outputs for their respective industries. Interdependence is the central theme of input-output analysis. In an input-output model production is concerned as a system of interdependence parts i.e. sectors of production. Interdependence between two sectors where one sector creates demand for other sector's output. A number of measures have been developed to measure the technological interdependence as exhibited by an input-output model, the most popular among them is one suggested by Chenery and Watanabe (1958).

The final demand components such as private and government consumption, investment, export and changes in stock have different importance for different industries. The importance of any particular component of final demand for any industry can not be measured simply by observing the direct demand for the industry's output, since indirect demand may also be significant. For example, the output of edible oil industry indirectly utilized by the private consumption component via its demand for chemical products can quite often be substantial. It is hoped that the findings of the study will show some light in the pattern of inter-industry

relations i.e. the extent of interdependence between agriculture and the rest of the economy. The policy implications of input-output analysis of this kind for Bangladesh, in which economic interrelationships are becoming increasingly complex, are sufficiently obvious to require any further comment.

The multiplier analysis essentially assesses the extent of interrelation between the sectors in an economy. A change in sales to final demand by any industry will have indirect and induced repercussions throughout the economy. It may be useful for many purposes to estimate the total change in activity resulting from any specified change in final demand in a particular industry. Input-output analysis can be used to calculate direct and indirect sectoral output, income and employment generated in the economy as a result of increases in consumption, government expenditure, investment, or exports. This analysis can be used by planners to obtain an idea of the overall impact of their policy decisions regarding investment or other government expenditure on sectoral outputs, incomes and employment.

Empirical studies on input-output relation of Bangladesh economy are scanty. This may be due to lack of expertise in input-output analytical techniques. Nonetheless, Alauddin and Mules (1980), Alauddin and Tisdell (1988), Alauddin and Tisdell (1989) and Mujeri and Alauddin (1994) pioneering effects in this area have been made, for instance. This study has been based on the 1993-94 input-output table for Bangladesh considering comparatively normal economic conditions and availability of statistical information for the year. This table is superior to the previous one, especially, in terms of increasing numbers of sub-sectors recorded under separate heads in the national income accounts.

This research examines the nature and extent of sectoral interdependence through calculation of the direct and indirect input use and output disposal of each sector. Also quantify the relationship between agriculture and the non-agricultural sectors of the Bangladesh economy. The coefficient table in an input-output matrix give the direct income and employment generated per unit of output in the different sectors in the production process. Income and employment sectoral multipliers can be calculated using Leontief inverse matrix. The main objectives of this study, therefore, are: (i) to determine how a sector's input flows to the output of all other sectors and final demand; (ii) to examine the structural interrelationships among the different sectors of the economy; (iii) to estimate sectoral output, income and employment generated in the economy; and (iv) to compute the multipliers to assess the sectoral potentiality of the economy.

In this paper, theoretical background of input-output table and multipliers are described in the next section. In the third section, data source and estimation methods are described. Before an in-depth analysis of the nature and extent of sectoral interdependence, aggregating the 79 sectors into only 5 major sectors provides an overview of the relationship among the various sectors in Bangladesh economy. Then, the structural interrelationships among the different sectors of the economy of Bangladesh in terms of intermediate transaction, primary input content of final demand and final markets of industries are examined. Finally, empirical



estimates of output, income, wage income and employment multipliers are discussed in the results and discussion section. Some conclusions with policy implications are made in the final section.

## II. THEORETICAL BACKGROUND OF INPUT-OUTPUT TABLE AND MULTIPLIERS

The basic features of input-output analysis is to determine what amounts of different inputs must be used up in the production process for getting a certain output of a commodity, given the supply of productive factors and the state of technology. Secondly, input-output analysis devotes itself to empirical investigation and finally, attempts to investigate how are the various sectors, sub-sectors or industries constituting an economy interrelated. Leontief makes a far stronger assumption of fixed coefficients of production that implies that it takes a certain invariant minimal input of each commodity per unit of output of each commodity. A static and open Leontief input-output model describing an economy of industries can be expressed in a set of simultaneous equations as follows:

$$X_i = \sum_{j=1}^n x_{ij} + Y_i, \quad (i = 1, 2, \dots, n) \quad (1)$$

Where

$X_i$  = Gross output of the  $i$ th sector

$x_{ij}$  = Output of the  $i$ th industry used as an intermediate input by the  $j$ th industry

$Y_i$  = Output of the  $i$ th industry consumed by final demand sectors (i.e. consumption, investment, exports, etc.)

This gives the balancing equation between gross output, intermediate output and final demand. The corresponding balance equation between gross input, intermediate input and primary input may be written as:

$$X_j = \sum_{i=1}^n x_{ij} + V_j + m_j, \quad (j = 1, 2, \dots, n) \quad (2)$$

Where,

$X_j$  = Gross input of the  $j$ th sector

$V_j$  = Value added in sector  $j$

$m_j$  = Imports in sector  $j$

The meaning of other variables remains unchanged.

We get a set of linear equations linking the output of each sector with input requirements from all the sectors by means of technical coefficients of production:

$$a_{ij} = \frac{x_{ij}}{X_j} \quad (3)$$

Where  $a_{ij}$  is the technical coefficient of production.

This allows us to rewrite the system of equation (1) and (2) as:

$$X_i = \sum_{j=1}^n a_{ij} X_j + Y_i, \quad (i = 1, 2, \dots, n) \quad (4)$$

Equation (4) can be written as matrix notations

$$X = AX + Y \quad (5)$$

Where  $X$  = a vector

And

$$(I - A)X = Y \quad (6)$$

Equation (6) yields  $n$  general equilibrium relationships between output and final demand. If the latter is known, then the equilibrium level of output which satisfy this demand can be easily obtained by the following relationship by multiplying both sides of equation (6) by  $(I - A)^{-1}$ .

$$X = (I - A)^{-1}Y \quad (7)$$

Provided matrix  $(I - A)$  is non-singular and  $(I - A)^{-1}$  is the Leontief inverse matrix.

Lange (1943) defined the multiplier as "the marginal effect of a change of one economic variable upon the another economic variable, of which the first is a component". A high level of intermediate inputs, i.e., those purchased from local firms, suggests strong linkages within the economy. Increased output in such a sector (direct effect) will tend to have important knock-on effects (indirect effects) in supplying sectors. Type I output, income and employment multipliers quantify these. The Type I multiplier represents total requirement per unit of final demand, whereas Type II multiplier takes into account the repercussion effects of secondary rounds of consumer spending in addition to the direct and indirect inter-industry effects. The multipliers that are found by using direct and indirect effects are known as simple multiplier (Type I), when direct, indirect and induced effects are used, they are called total multiplier (Type II).

Output multiplier of a sector is calculated by measuring the total change in output for a unit change in sales to final demand by a given sector. The multiplier is the number of times the direct change in output (as measured by the change in final demand sales) must be multiplied to obtain the total change in output. Hence a multiplier value of 3 for a sector

means that the total change in output will be thrice the direct change in final demand sales of that sector. Type I output multipliers are defined to be multipliers derived with households excluded from the intermediate sector, while Type II multipliers are derived with households included in the intermediate sector. Thus, Type I multipliers include only indirect effects, while Type II multipliers include indirect and induced effects. An output multiplier for sector  $j$  is obtained by Miller and Blair (1985) as the total value of production in all sectors of the economy that is necessary in order to satisfy a dollar's worth of final demand for sector  $j$ 's output. Formally, the output multiplier is the ratio of the direct and indirect effect to the initial effect alone. The output multiplier is the column sum of the Leontief inverse matrix.

The type I income multiplier for any sector  $j$ , has direct and indirect income effect, or the simple household income multiplier as a numerator, and uses as a denominator rather is initial labor income effect. To interest in ranking or ordering the sectors, simple or Type I multipliers are useful. The results of an input-output analysis in which households remain exogenous tend to underestimate total effects Type II multipliers may be more useful than simple Type I multipliers. If it is possible to estimate relationships between the value of output of a sector and employment in that sector (in physical, not monetary, terms), then one can calculate employment multipliers, rather than income multipliers.

### III. DATA SOURCE AND ESTIMATION METHODS

#### Data Source

Bangladesh Planning Commission constructs input-output table for the Bangladesh economy in each Five Years Plan. The latest input-output table was constructed for the fiscal year 1993-94 as the base year considering comparatively normal economic conditions and availability of statistical information for the year. This input-output table contained 79 sectors of which 20 were in agriculture, 39 in manufacturing industry, 6 in construction, 3 in energy and 11 in services. Bangladesh Institute of Development Studies (BIDS) compiled this table in printed form. This table was the source of data for this research.

The analytical framework of the input-output table is embedded with the three broad accounts namely, the inter-industry flows, final demand accounts and accounts for return to primary sectors of production. The general methodology for the construction of the input-output table involved finalization of the definition, identification of the sectors, valuation of inter-industry flows, supply demand balances and the estimates of capital coefficient matrix, import and employment. The values of intermediate inputs are the values at market price. The estimation of gross output and intermediate inputs was based on various methods depending on the availability of data and other considerations. The components of final demand were estimated in terms of macro-categories e.g. consumption, investment, exports and changes in stock along with public-private differentiation in appropriate cases.

The system of input-output equations can be expressed in terms of the well-known formulation:

$$Q = [I - A]^{-1}F \quad (7)$$



Where,  $Q$  is the vector of gross production

$I$  is an identity matrix of the required order

$A$  is the matrix of input-output coefficients

$F$  is the final demand vector

$[I-A]^{-1}$  gives both direct and indirect requirements of inputs. While direct inputs are those purchased by the sector under consideration, indirect inputs are those purchased by all other sectors in which production has to adjust in order to supply inputs to the specific sector.

Final demand is partitioned into private consumption, public consumption, investment, stocks of commodities and exports. Final demand may be defined mathematically as follows:

$$F_i^t = C_{p_i}^t + C_{g_i}^t + I_i^t + S_i^t + X_i^t \quad (8)$$

Where  $F_i^t$  = Final demand for the products of sector  $i$  during period  $t$ .

$C_{p_i}^t$  = Private consumption of  $i$ th sector's products during period  $t$ .

$C_{g_i}^t$  = Public consumption of sector  $i$  during period  $t$ .

$I_i^t$  = Gross fixed investments of sector  $i$  during period  $t$ .

$S_i^t$  = Changes in stock of sector  $i$  during period  $t$ .

$X_i^t$  = Exports from sector  $i$  during period  $t$ .

In our study, we have made necessary adjustments as far as possible to take care of the various deficiencies inherent in the data.

### Estimation Methods

#### Intermediate Transaction

The structural interdependence between industries may be examined by analysing the contribution of each industry to total supply and demand (Aziz and Rahman, 1987). On the supply side, the direct dependence of each industry on all industries for its inputs is given by

$$W_j = \frac{U_j}{X_j} \quad (9)$$

Where  $U_j$  is the aggregate of value of intermediate inputs of industry  $j$  and  $X_j$  is total inputs.

On the demand side, the dependence of industry  $j$  on all other industries for the sale of its output is measured by

$$W_i = \frac{U_i}{X_i} \quad (10)$$

Where  $U_i$  is the aggregate value of industry  $i$ 's output sold to other industries and  $X_i$  is its total output.

### Primary Input Content of Final Demand

The derivation of the primary input content of a unit of final demand for any industry may be explained as follows. Let  $X_{pj}$  be the value of primary input  $p$  used in the  $j$ th industry and  $X_j$  be the value of output of industry  $j$ . Then the relationship between  $X_{pj}$  and  $X_j$  is given by the following expression.

$$X_{pj} / X_j = a_{pj} \quad (11)$$

Here  $a_{pj}$  is the  $p$ th primary input content of final demand in the  $j$ th industry.

### Final Markets

The varying importance of each final demand component in generating direct and indirect output of any particular industry may be calculated as follows. Let the column vectors of final demand components be specified by the matrix  $F$  as shown below:

$$F = \begin{bmatrix} f_{11} & \dots & f_{1m} \\ \vdots & & \vdots \\ f_{n1} & \dots & f_{nm} \end{bmatrix}$$

Where  $f$  denotes the final demand component of type  $m$  (such as private consumption and investment) relating to industry  $n$ . Accordingly, post-multiplication of the rows of the inverse matrix by the columns of the final demand matrix gives the direct and indirect requirements generated by the different final demand components. Algebraically, this may be expressed as follows:

$$(I - A)^{-1} F, \quad A \text{ is the coefficient matrix}$$

The industrial dependence on any final demand component, expressed in percentage terms, is given by the following quantity:

$$X^{-1} (I - A)^{-1} F$$

Where  $X^{-1}$  is the inverse of diagonal matrix formed from the total output of each industry. Each of the elements from the above expression will, therefore, show the ratio of the total demand stimulated in an industry by a particular final demand component to the industry's aggregate output.

**Multipliers**

Let the Leontief's inverse matrix

$$(I - A)^{-1} = \begin{bmatrix} A_{11} & A_{12} & \dots & A_{1n} \\ A_{21} & A_{22} & \dots & A_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ A_{n1} & A_{n2} & \dots & A_{nn} \end{bmatrix} \quad (12)$$

F is a column vector of final demand, so that

$$F = \begin{bmatrix} f_1 \\ f_2 \\ \vdots \\ f_n \end{bmatrix} \quad (13)$$

The relevant vector represents the levels of direct and indirect output in the various sectors associated with a unit of final demand in any sector. Thus, one unit of final demand from sector 1 will lead to the following production levels.

$$\begin{bmatrix} A_{11} & A_{12} & \dots & A_{1n} \\ A_{21} & A_{22} & \dots & A_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ A_{n1} & A_{n2} & \dots & A_{nn} \end{bmatrix} \begin{bmatrix} 1 \\ 0 \\ \vdots \\ 0 \end{bmatrix} = \begin{bmatrix} A_{11} \\ A_{12} \\ \vdots \\ A_{n1} \end{bmatrix} \quad (14)$$

$$\text{Let } V = \{V_1, V_2, \dots, V_1, \dots, V_n\} \quad (15)$$

Where  $V_1, V_2, \dots, V_n$  represent value added per unit of output in the respective sectors.

Therefore, the direct and indirect income generated by one unit of final demand in sector 1 will be

$$\begin{bmatrix} V_1 & V_2 & \dots & V_1 & \dots & V_n \end{bmatrix} \begin{bmatrix} A_{11} \\ A_{21} \\ \vdots \\ A_{n1} \end{bmatrix} = [V_1 A_{11} + V_2 A_{21} + \dots + V_n A_{n1}] \quad (16)$$

Similarly, the direct and indirect income generated by one unit of final demand in sector 1 will be



$$V_1 A_{11} + V_2 A_{21} + \dots + V_n A_{n1} \quad (17)$$

Direct and indirect sectoral income multipliers per unit of final demand are given by dividing (17) by the respective elements in (15). Since one unit of final demand in sector  $i$  gives  $A_{ij}$  units of output in the sector  $j$ ,  $1/A_{ij}$  units of final demand would yield one unit of output in sector  $i$ . Hence, direct and indirect income generated per unit of output in sector  $i$  would be given by

$$\frac{1}{A_{ij}} [V_1 A_{11} + V_2 A_{21} + \dots + V_n A_{n1}] \quad (18)$$

Where,  $A_{ij}$  is the diagonal elements of the  $(I-A)^{-1}$  matrix.

The direct and indirect sectoral income multipliers per unit of output are given by dividing each element of (18) by the corresponding element in (15). Direct and indirect sectoral wage income and employment multipliers are obtained similarly.

To derive induced multipliers, an assumption is considered that a certain proportion of net value added in each sector is devoted to consumption (Bhalla et al., 1990). This proportion is derived from the average propensity to consume. The augmented column was the coefficient vector for total consumption and the augmented row was obtained by multiplying the net value added by the average propensity to consume. The  $(n+1, n+1)$  th term of the inverted matrix gives the consumption multipliers. The respective elements in the last row in the inverted matrix give direct, indirect, and induced income generated per unit of final demand in the sector. Let this be denoted by

$$V'_1 \quad V'_2 \quad \dots \quad V'_n \quad (19)$$

The direct, indirect, and induced sectoral income multipliers per unit of final demand are obtained by dividing the elements of (19) by their respective direct income given in (15). Further dividing these elements by the diagonal output levels yields direct, indirect, and induced sectoral incomes per unit of output. These are

$$\frac{V'_1}{A'_{11}} \quad \frac{V'_2}{A'_{22}} \quad \dots \quad \frac{V'_n}{A'_{nn}} \quad (20)$$

Where,  $A'_{11}, A'_{22}, \dots, A'_{nn}$  are diagonal elements in the inverted augmented matrix. Direct, indirect, and induced sectoral income multipliers per unit of output are obtained by dividing each element of (20) by the direct sectoral income given in the corresponding elements in (15). The direct, indirect, and induced sectoral wage income and employment multipliers are obtained similarly.

#### IV. EMPIRICAL RESULTS

##### An Overview of the Relationships among Various Economic Sectors

The production structure of major sectors in Bangladesh is brought out by a comparison of the condensed five sector input-output flow and coefficient tables for 1993-94 which provides a snapshot summary of the inter industrial flows and patterns of final demand. Each entry in the table reflects the flow of goods from the row sector to the column sector. Thus, for example, row (1) reflects the delivers from the agricultural sector to all other sectors and to final demand and also represents a nominal payment by a column sector to a row sector. Entry (1,2) indicates that agriculture delivers Tk.209246 million worth of agricultural products to the manufacturing sector or, equivalently, that the manufacturing sector pays the agricultural sector Tk.209246 million. The transaction matrix (Table 1) suggests that manufacturing remained as a dominant sector producing the highest total output, which forms 36.9 per cent of the total output. In general, there exists interdependence among only a few sectors. Agriculture sector supplies Tk.317896 million to different sectors and manufacturing sector supplies Tk.426568 million to different sectors including it self. The first column shows how the agriculture sector utilizes goods and services from other sectors, for example, respectively. Tk.805 million and Tk.134598 million was obtained from energy

**Table 1. Inter-Industrial flows and patterns of final demand in Bangladesh, 1993-94 (in million Tk.)**

Major Sectors	Agriculture	Manufacturing	Construction	Energy	Services	Total intermediate	
Agriculture	75198	209246	24938	0	8514	317896	
Manufacturing	53835	208110	60225	3643	100755	426568	
Construction	506	17024	85	173	16475	34263	
Energy	805	23564	4502	3623	6564	39058	
Services	134598	64117	22096	4208	156374	381393	
Total inputs	264942	522061	111846	11647	28868	1199178	
Taxes	13179	373045	0	4624	0	390848	
Value added	285320	151169	113404	28948	666367	1345208	
Gross output	563441	1046275	225250	45219	955049	2835234	
	Private Consumption	Public Consumption	Gross fixed	Export	Stock Change	Final Demand	Gross output
Agriculture	210517	0	0	8597	26431	245545	563441
Manufacturing	385924	0	54768	90142	88873	619707	1046275
Construction	0	0	190987	0	0	190987	225250
Energy	6161	0	0	0	0	6161	45219
Services	1459571	57137	0	0	56948	573656	955049
Total input	1062173	57137	245755	98739	172252	1636056	2835234



and services sectors. Consequent to adoption of the new technology in agriculture, the share of industrial inputs in the value of agriculture output was much greater, and that of agricultural inputs much smaller. Industrial inputs constituted 9.6 per cent of the value of agriculture output and much as 20.3 per cent of the total value of inputs used in agricultural production in Bangladesh. Similarly, agricultural inputs constituted 20 per cent of the value of manufacturing output and as much as 40 per cent of the total value of inputs used in industrial production. Thus agricultural inputs constituted comparatively higher amount of manufacturing output whereas industrial inputs constituted comparatively lower amount of agricultural output.

When some inter-relationship existed between different sectors of the economy, an increase in the final demand for the product of one sector would in turn result in an increase in the output of the dependent sectors also (Goswami, 1994). To work out this relationship the interdependence coefficients (Leontief's inverse matrix) for different sectors were estimated. The estimation was done through inverting the matrix  $(I-A)$ , where 'A' is the coefficient matrix and 'I' is the identity matrix of the same order. The values of coefficient matrix 'A' are shown in table 2. The interdependence coefficients represented the sum of the direct and indirect requirements of each industry's output. The column entries in this matrix indicated the output required from sector 'i' per Taka worth of produce of sector 'j' delivered to the final demand. The proportion of agricultural output used as inter-industry input is much lower, and that allocated to final consumption much greater, than is the case with manufacturing. Manufacturing uses much higher amounts of intermediate inputs as a proportion of output than does agriculture. Thus, increases in final demand from manufacturing lead to notably higher levels of direct and indirect output in all the sectors and particularly in manufacturing. The Leontief's inverse matrix for the Bangladesh inter-industry table (Table 3) interpret that an increase of Tk1.00 in final demand from manufacturing resulted in a direct and indirect output of as much as Tk.1.32 in manufacturing, Tk.0.31 in agriculture, and Tk.0.25 in other sectors. With changes in final demand, using the Leontief inverse considerably reduces the direct and indirect increase in the output of various sectors. Thus, a Tk.1.00 increases in final demand from agriculture led to a direct and indirect output of Tk.1.20 and manufacturing output was reduced to Tk.0.20.

**Table 2. Inter-industry coefficient Table 1993-94**

	Agriculture	Manufacturing	Construction	Energy	Services
Agriculture	0.1335	0.2000	0.1107	0.0000	0.0089
Manufacturing	0.0955	0.1989	0.2674	0.0806	0.1055
Construction	0.0009	0.0163	0.0004	0.0038	0.0173
Energy	0.0014	0.0225	0.0200	0.0801	0.0069
Services	0.2389	0.0613	0.0981	0.0931	0.1637
Total input	0.4702	0.4990	0.4965	0.2576	0.3023
Taxes	0.0234	0.3565	0.0000	0.1023	0.0000
Value added	0.5064	0.1445	0.5035	0.6402	0.6977
Gross output	1.0000	1.0000	1.0000	1.0000	1.0000

**Table 3. Leontief inverse for the Bangladesh inter-industry Table 1993-94**

	Agriculture	Manufacturing	Construction	Energy	Services
Agriculture	1.2042	0.3105	0.2227	0.0339	0.0569
Manufacturing	0.1956	1.3226	0.3956	0.1355	0.1782
Construction	0.0105	0.0253	1.0109	0.0089	0.0242
Energy	0.0096	0.0349	0.0336	1.0917	0.0142
Services	0.3606	0.1924	0.2149	0.1421	1.2295

### Structural Interrelationships of the Economy

Intermediate values of  $W_j$  and  $W_i$  are shown in Table 4. Twenty-three out of a total number of seventy-nine industries sell three-fourth or more of their output directly to final demand, mainly to private consumption and export. Further, ten of these industries comprise manufacturing industries. Most of the agricultural sectors as major suppliers of inputs for the agro-based manufacturing industries are reflected by the fact that they sell over three-fourth of their output to intermediate demand. In the case of other grains, oil seeds, tobacco, tea and cotton almost all of their output are for intermediate demand. However, it is to be noted that one or only a limited number of manufacturing industries utilizes the products of most of the agricultural industries.

Three primary input content (wages, imports and taxes) of the individual industries are presented in Table 4. The wage content of agricultural sectors together constitutes 38 per cent of the total wages. Specially, paddy, wheat, other grains, vegetables, oilseeds, livestock and poultry constitute higher wages in which these seven agro-based sectors constitutes 18 per cent wages of total wages and 47 per cent of total agro-based wages. Accordingly, these seven sectors are more labour intensive. Most of the service sector provided higher wages compare to any other sector. Trade, transport, education, public administration and professional services are the best of them. Considering the non-agricultural manufacturing sectors, textiles, cloth industry, glass and glass products, furniture and printing and publishing are the wageintensive sectors.

Cotton, mill cloth, other chemicals, glass and glass products, cement, machinery and transport equipment are the high import requirement industries and their import cost is higher than output. Among the non-agricultural manufacturing industries other than the above industries that have high import contents are yarn, other textiles, paper and board, petroleum products, china and ceramic, iron and steel industry, fabricated metal products, and miscellaneous industries.

Table 4. Proportion of intermediate transactions per unit of production

Sectors	Intermediate input	Intermediate output	Wages	Imports	Taxes
1 Paddy	0.45	0.81	.3811	0	0
2 Wheat	0.57	0.88	.3762	.5058	0
3 Other Grains	0.37	1.03	.3382	.0126	0
4 Jute	0.46	0.86	.2124	0	0
5 Sugarcane	0.50	0.91	.1701	0	0
6 Potato	0.47	0.28	.1305	.0014	0
7 Vegetables	0.50	0.06	.2769	.1177	0
8 Pulses	0.38	0.13	.1684	0	0
9 Oilseeds	0.53	1.21	.4119	.2855	0
10 Fruits	0.33	0.06	.0863	.0327	0
11 Cotton	0.46	1.38	.1650	1.8336	0
12 Tobacco	0.54	1.15	.2260	.2608	0
13 Tea	0.35	1.00	.1732	0	0
14 Major Spices	0.41	0.36	.2511	.2045	0
15 Other Crops	0.49	0.25	.1913	.0345	0
16 Livestock	0.48	0.54	.4730	.0006	0
17 Poultry	0.58	0.19	.3795	0	0
18 Shrimp	0.54	0.72	.1891	0	.0133
19 Other Fish	0.52	0.06	.2463	0	0
20 Forestry	0.56	0.44	.6632	0	0
21 Rice Milling	0.85	0.02	.0192	.0025	0
22 Ata & Flour Milling	0.78	0.43	.0301	.0016	0
23 Fish & Seafood Processing	0.73	0.00	.0232	.0001	0
24 Edible Oil	0.80	0.38	.0196	.1966	.0107
25 Sugar and Gur	0.80	0.10	.1893	.0128	.0204
26 Tea (Processing /Blending)	0.62	0.05	.2047	.0012	.0432
27 Salt	0.11	0.45	.1104	0	0
28 Other Food	0.73	0.52	.1239	.1120	.0186
29 Tanning & Leather Finishing	0.88	0.06	.0304	.0011	.0113
30 Leather Products	0.69	0.01	.0823	.0440	.0194
31 Jute Baling	0.87	0.00	.0417	0	.0258
32 Jute Textile	0.80	0.16	.1635	.0147	.0168
33 Yarn	0.75	0.97	.1950	.3427	0
34 Mill Cloth	0.72	0.86	.1547	2.3313	0
35 Handloom Cloth	0.80	0.00	.1707	0	0
36 Dyeing & Bleaching	0.49	0.99	.0502	0	0
37 Readymade Garments	0.81	0.01	.1097	.0168	.0008
38 Knitting & Hosiery	0.80	0.00	.0195	.0098	.0037
39 Other Textiles	0.65	0.54	.3187	.7281	.0106
40 Cigarettes	0.52	0.02	.0177	.0098	.9122
41 Bidi	0.43	0.01	.1633	0	.0644
42 Saw & Planing Mills	0.58	0.99	.1571	0	0
43 Wooden /Furniture	0.78	0.22	.2212	0	.0008
44 Pulp, Paper & Board	0.73	0.73	.0948	.3331	.0304
45 Printing and Publishing	0.57	0.99	.2064	.1246	0
46 Drugs & Pharmaceuticals	0.68	0.37	.0675	.0885	.0496
47 Fertilizer	0.88	0.92	.0572	.1350	0
48 Other Chemicals	0.81	0.98	.0942	2.1097	.0339
49 Petroleum Products	0.57	0.62	.0108	.8865	.0371
50 Pottery & Earthenware	0.61	0.04	.0604	0	0
51 China & Ceramic	0.69	0.08	.0652	.8127	.0857
52 Glass & Glass Products	0.57	0.55	.2141	2.8497	.1721
53 Bricks, Tiles & Clay Products	0.52	1.00	.1575	.1407	.0397
54 Cement	0.78	0.60	.1571	3.2768	.0298
55 Iron & Steel Basic Industry	0.81	0.89	.0386	.6260	.0161
56 Fabricated Metal Products	0.59	0.47	.1653	.5528	.0079
57 Machinery	0.81	0.54	.1551	4.4301	.0728
58 Transport Equipment	0.46	0.64	.0871	2.0367	.0130
59 Miscellaneous Industries	0.53	0.71	.0679	.4744	.0131
60 Urban Building	0.59	0.33	.1494	0	0
61 Rural Building	0.43	0.12	.0106	0	0
62 Construction: Electricity & Gas	0.78	0.00	.0297	0	0
63 Construction: Rural Road	0.58	0.00	.1074	0	0

Table 4. Cont'd.

Sectors	Intermediate input	Intermediate output	Wages	Imports	Taxes
64 Construction: Other Transport	0.67	0.01	.2613	0	0
65 Other Construction	0.79	0.43	.1904	0	0
66 Electricity	0.33	0.88	.1169	0	0
67 Gas	0.10	0.70	.0424	0	0
68 Mining & Quarrying	0.49	1.00	.1290	0	0
69 Trade Service	0.24	0.83	.5863	0	0
70 Transport Service	0.34	0.29	.5239	0	0
71 Housing Service	0.25	0.18	.0000	0	0
72 Health Service	0.48	0.02	.1539	0	0
73 Education Service	0.30	.00	.6381	0	0
74 Public Administration & Defense	0.33	0.28	.5435	0	0
75 Banking & Insurance	0.34	0.80	.3773	0	0
76 Professional Service	0.43	0.04	.6052	0	0
77 Hotels & Restaurants	0.69	0.05	.1971	0	0
78 Communications	0.18	0.96	.3935	0	0
79 Other Services	0.11	0.17	.5368	0	0

The agro-based manufacturing industries have low import requirements per unit of final demand except edible oil and other food. Among the agricultural production sectors that have high import contents are wheat, oilseeds, tobacco and major spices. The majority of the manufacturing industries tend to have a high indirect tax content per unit of final demand compared with either agricultural or service sectors. However, a large proportion of it is made up of indirect tax generated internally. This reflects the comparatively low indirect tax content of the domestic intermediate inputs used by these industries.

The individual sectors are ranked in a four-way classification of industries according to Chenery and Clark (1957) and the results are shown in Table 5. The ranking is based on whether the industrial shares in total supply and demand are above or below the corresponding economy-wide averages. The industries included under category II and category III are characterized by high (direct) backward linkage values and they depend heavily on other domestic industries for their inputs. Changes in their level of activity would concomitantly generate repercussions on the economy than those included in either category I or category IV. Category II sectors are also characterized by high (direct) forward linkage values. The sectors characterized by low forward linkage measures (category III) are a reflection of the limitedness of secondary manufacturing in the country. This category consists largely of agro-based manufacturing industries. Taking an overall measure of direct interdependence, the sectors with comparatively high backward and forward indices (category II) would possess the most extensive structural linkages in the economy. A total of sixteen sectors fall under this category, fourteen of which are non-agro-based manufacturing industries. Some of the industries compress those that process inputted inputs for domestic or export market such as Mill Cloth, Other textiles, fertilizer, petroleum products, cement etc. The sectors with low backward and forward linkage values would be negatively independent of other industries for both their inputs and outputs. A large number of agriculture and service sectors belong to this group.

The proportionate share of industrial output destined directly and indirectly to the various final demand components is given in Table 6. A significant proportion of the output of



agricultural and agro-based manufacturing industries is destined, directly and indirectly, for private consumption. In some of the industries, for example other grains, potato, oil seeds, cotton, tobacco, printing and publication, other chemicals, petroleum products, glass and glass products, iron and steel, electricity, gas, banking and insurance, more than 100 per cent of their total output are attributable to private consumption demand. Whereas, a weak reliance of all the sectors was observed to their output on the public consumption. A number of agricultural and agro-based manufacturing industries, particularly, cotton, shrimp, jute, baling, mill-cloth, readymade garments, knitting and hosiery indicate a relatively strong reliance of their output on the export component of final demand. In these industries, more than 70 per cent of their production are directly or indirectly exported. Hence, any favourable trend in the export sector will have a strong impact on their production. Table 6 shows that the capital formation component of final demand in general does not constitute a significant final market for agricultural products. A strong dependence on the investment component is indicated only by saw and planing mills, wooden furniture, glass and glass products, iron and steel industry, fabricated metal products, machinery, urban and rural building, constructions and mining and quarrying.

**Table 5. Indexes of inter-sector use ( $\bar{w}_j = -0.56$ ,  $\bar{w}_i = -0.46$ )**

No.	Sectors	$\bar{w}_j$	$\bar{w}_i$
I. Primary production for intermediate use (Low $w_j$ and High $w_i$ )			
1	Paddy	0.45	0.81
3	Other Grains	0.37	1.03
4	Jute	0.46	0.86
5	Sugarcane	0.50	0.91
9	Oilseeds	0.53	1.21
11	Cotton	0.46	1.38
12	Tobacco	0.54	1.15
13	Tea	0.35	1.00
16	Livestock	0.48	0.54
18	Shrimp	0.54	0.72
36	Dyeing & Bleaching	0.49	0.99
53	Bricks, tiles & Clay Products	0.52	1.00
58	Transport Equipment	0.46	0.64
59	Miscellaneous Industries	0.53	0.71
66	Electricity	0.33	0.88
67	Gas	0.10	0.70
68	Mining & Quarrying	0.49	1.00
69	Trade Service	0.24	0.83
75	Banking & Insurance	0.34	0.80
78	Communications	0.18	0.96
II. Secondary production for intermediate use (High $w_j$ and High $w_i$ )			
2	Wheat	0.57	0.88
28	Other Food	0.73	0.52
33	Yarn	0.75	0.97
34	Mill Cloth	0.72	0.68
39	Other Textiles	0.65	0.54
42	Saw & Planing Mills	0.58	0.99

Table 5. Cont'd.

No.	Sectors	$\bar{w}_j$	$\bar{w}_i$
44	Pulp, Paper & Board	0.73	0.73
45	Printing and Publishing	0.57	0.99
47	Fertilizer	0.88	0.92
48	Other Chemicals	0.81	0.98
49	Petroleum Products	0.57	0.62
52	Glass & Glass products	0.57	0.55
54	Cement	0.78	0.60
55	Iron & Steel Basic Industry	0.81	0.89
56	Fabricated Metal Products	0.59	0.47
57	Machinery	0.81	0.54
III. Secondary production for final use (High $w_j$ and Low $w_i$ )			
17	Poultry	0.58	0.19
21	Rice Milling	0.85	0.02
22	Ata & Flour Milling	0.78	0.43
23	Fish & Seafood Processing	0.73	.00
24	Edible Oil	0.80	0.38
25	Sugar and Gur	0.80	0.10
26	Tea (Processing /Blending)	0.62	0.05
29	Tanning & Leather Finishing	0.88	0.06
30	Leather Products	0.69	0.01
31	Jute Baling	0.87	.00
32	Jute Textile	0.80	0.16
35	Handloom Cloth	0.80	0.00
37	Readymade Garments	0.81	0.01
38	Knitting & Hosiery	0.80	.00
43	Wooden/Furniture	0.78	0.22
46	Drugs & Pharmaceuticals	0.68	0.37
50	Pottery & Earthenware	0.61	0.04
51	China & Ceramic	0.69	0.08
60	Urban Building	0.59	0.33
62	Construction: Electric. & Gas	0.78	.00
63	Construction: Rural Road	0.58	.00
64	Construction: Other Transport	0.67	0.01
65	Other Construction	0.79	0.43
77	Hotels & Restaurants	0.69	0.05
IV. Primary production for final use (Low $w_j$ and Low $w_i$ )			
6	Potato	0.47	0.28
7	Vegetables	0.50	0.06
8	Pulses	0.38	0.13
10	Fruits	0.33	0.06
14	Major spices	0.41	0.36
15	Other Crops	0.49	0.25
19	Other Fish	0.52	0.06
20	Forestry	0.56	0.44
27	Salt	0.11	0.45
40	Cigarettes	0.52	0.02



Table 5. Cont'd.

No.	Sectors	$\bar{w}_j$	$\bar{w}_i$
41	Bidi	0.43	0.01
61	Rural Building	0.43	0.12
70	Transport Service	0.34	0.29
71	Housing Service	0.25	0.18
72	Health Service	0.48	0.02
73	Education Service	0.30	0.00
74	Public Administr. & Defense	0.33	0.28
76	Professional Service	0.43	0.04
79	Other Service	0.11	0.17

Table 6. Final markets of industries (%)

SL	Sectors	Private consumption	Public consumption	Investment	Export	Stock change
1	Paddy	75.79	0.02	0.02	0.68	24.67
2	Wheat	85.99	0.28	1.07	1.82	23.25
3	Other Grains	133.31	0.27	0.11	0.05	-33.20
4	Jute	33.14	0.12	1.83	40.24	29.34
5	Sugarcane	71.74	0.20	0.61	0.59	38.64
6	Potato	100.07	0.02	0.02	0.01	0.02
7	Vegetables	97.82	0.04	0.03	2.40	0.03
8	Pulses	99.93	0.06	0.05	0.03	0.13
9	Oilseeds	161.59	0.36	1.19	2.57	20.98
10	Fruits	97.30	0.01	0.01	0.33	0.24
11	Cotton	264.72	1.25	1.60	229.31	27.64
12	Tobacco	108.00	0.01	0.02	1.79	-8.51
13	Tea	64.22	0.07	0.04	39.49	0.03
14	Major Spices	113.32	0.27	0.39	0.23	0.56
15	Other Crops	99.67	0.04	0.04	0.67	1.38
16	Livestock	84.77	0.15	0.18	7.47	14.24
17	Poultry	99.92	0.21	0.11	0.05	0.11
18	Shrimp	35.99	0.01	0.01	76.45	-12.43
19	Other Fish	98.54	0.03	0.02	0.56	0.91
20	Forestry	74.14	0.70	37.82	1.86	3.84
21	Rice Milling	94.98	0.01	0.01	0.22	4.94
22	Ata & Flour Milling	92.56	0.29	1.10	2.01	11.63
23	Fish & Seafood Processing	13.80	0.00	0.00	15.76	70.44
24	Edible Oil	89.47	0.17	0.53	1.42	24.78
25	Sugar and Gur	62.73	0.20	0.62	0.60	39.27
26	Tea (Processing/Blending)	61.92	0.07	0.04	38.08	0.03
27	Salt	89.01	0.85	5.06	3.22	10.97
28	Other Food	89.65	1.32	6.17	3.77	11.28
29	Tanning & Leather Finishing	5.07	0.01	0.04	49.02	46.33
30	Leather Products	78.17	0.03	0.33	21.29	0.78
31	Jute Baling	0.02	0.00	0.00	99.96	0.01
32	Jute Textile	40.92	0.13	1.12	37.59	22.57
33	Yarn	71.52	0.34	0.42	54.23	17.93
34	Mill Cloth	29.13	0.65	0.80	72.36	4.83
35	Handloom Cloth	77.41	0.01	0.00	0.00	22.58
36	Dyeing & Bleaching	77.66	0.01	0.00	0.00	22.33
37	Readymade Garments	8.27	0.00	0.00	89.21	2.54
38	Knitting & Hosiery	35.32	0.00	0.00	56.73	7.95
39	Other Textiles	5.31	0.00	0.02	95.82	1.54
40	Cigarettes	84.79	0.01	0.03	0.01	15.21
41	Bidi	97.69	.00	.00	0.05	2.26
42	Saw & Planing Mills	55.28	3.09	74.98	3.59	7.37
43	Wooden/Furniture	29.39	2.23	67.56	0.77	2.69
44	Pulp, Paper & Board	111.38	4.12	28.20	8.52	21.34
45	Printing and Publishing	134.97	11.95	35.92	21.79	30.43
46	Drugs & Pharmaceuticals	68.26	5.04	0.42	2.91	30.44

Table 6. Cont'd.

SL	Sectors	Private consumption	Public consumption	Investment	Export	Stock change
47	Fertilizer	82.60	0.08	0.25	12.91	20.08
48	Other Chemicals	153.34	4.76	54.47	24.30	42.71
49	Petroleum Products	104.38	2.04	9.24	5.25	8.15
50	Pottery & Earthenware	53.28	0.01	0.03	0.26	46.98
51	China & Ceramic	75.48	0.14	0.79	9.00	15.06
52	Glass & Glass Products	199.47	7.75	117.87	24.04	35.44
53	Bricks, Tiles & Clay Products	14.60	1.84	87.46	1.34	1.78
54	Cement	16.94	1.96	51.75	1.52	37.47
55	Iron & Steel Basic Industry	122.20	6.56	214.60	20.39	49.50
56	Fabricated Metal Products	66.94	1.84	84.17	12.89	12.63
57	Machinery	92.74	4.15	84.17	16.71	18.29
58	Transport Equipment	65.90	1.37	39.77	3.07	8.08
59	Miscellaneous Industries	71.45	5.82	20.10	10.97	24.05
60	Urban Building	32.07	7.80	75.98	4.77	5.91
61	Rural Building	11.23	0.15	88.43	0.36	0.63
62	Construction: Electricity & Gas	.00	0.00	100.00	0.00	0.00
63	Construction: Rural Road	0.12	0.00	99.90	0.00	0.01
64	Construction: Other Transport	0.51	0.00	99.50	0.02	0.04
65	Other Construction	33.72	0.38	64.37	2.25	8.92
66	Electricity	100.95	3.81	16.65	17.07	15.54
67	Gas	125.58	3.23	29.62	17.16	18.89
68	Mining & Quarrying	77.71	6.01	147.54	11.00	42.57
69	Trade Service	74.25	2.28	13.88	6.20	26.19
70	Transport Service	92.50	0.86	7.57	2.45	7.53
71	Housing Service	96.73	0.54	1.67	0.84	3.06
72	Health Service	67.95	32.26	0.87	0.31	0.54
73	Education Service	44.83	55.53	0.62	0.08	0.15
74	Public Administrat. & Defense	23.20	74.06	5.51	2.00	4.42
75	Banking & Insurance	149.23	3.06	34.79	16.93	25.73
76	Professional Service	98.72	0.91	0.96	0.28	0.51
77	Hotels & Restaurants	99.78	0.87	0.72	0.32	0.59
78	Communications	79.77	19.74	20.71	8.89	19.15
79	Other Services	97.57	0.44	1.35	0.59	2.22

#### Empirical Estimation of Multipliers

Type I and Type II output multipliers for Bangladesh are presented in Table 7. The output multipliers are of limited usefulness, their main function being to give a summary statistic of the degree of local interdependence of each sector. Of more interest to planners and policy-makers is the degree to which variations in final demand will affect the levels of household incomes. This information can be obtained by calculating sectoral income multipliers. Type I and Type II multipliers, as defined before, are given in Table 8 along with the corresponding income generation per Tk.10000 of output. The introduction of consumption in the structural matrix captures the induced effects of consumption activity along with that of indirect income. The results indicate that the built-in consumption induced effects bring about substantially higher values for direct, indirect and induced income and their multipliers (Table 8).

In terms of indirect income, all the agro-processing industries except edible oil generate the higher income per unit of output than the agricultural sectors. The industries, such as, china and ceramic, bricks and tiles, cement and fertilizer generated very high income. The contribution of other industries, such as, all the cloth industries; saw mill and wooden furniture; pottery/earthenware; and glass and glass products is also quite high. Mining and quarrying show the highest indirect income-generating sector followed by the sector



construction of rural road. Urban building and construction of other transport, gas, electricity and health sector generate comparatively higher income. Indirect and induced income generation were evenly distributed among the various sectors except pulses, other chemicals and basic industry. Pulses show highest indirect and induced income generation per unit of output. Indirect and induced income generation was quite high in agro-processing industries, cloth industries, energy and construction sectors.

The highest values of income multipliers both per unit of final demand and output were obtained in the fertilizer; cloth industries such as readymade garments, handloom cloth and knitting and hosiery; and some agro-processing sectors such as leather finishing, jute bailing rice milling and sugar/gur. The other sectors, which were behind but recorded relatively large multiplier values, were ata and flour milling, fish processing, edible oil, other food, leather products, jute textiles, yarn, mill cloth, wooden/furniture, pulp/paper, other chemicals, china and ceramic, machinery, construction of gas/electricity, other construction and hotels/restaurants. The multiplier values were relatively much smaller for most of the primary sectors, power sectors, service sectors and trade sectors. The highest ranking of various sectors in terms of direct, indirect and induced income multipliers per unit of final demand and output was pulses followed by leather finishing. However, most of the sectors were ranked more or less same for both the direct and indirect (Type I) and direct, indirect and induced (Type II) multipliers.

**Table 7. Type I and Type II output multiplier impacts on the Bangladesh economy 1993-94**

Sl No	Sectors	Type I Multipliers		Type II Multipliers	
		Index	Rank	Index	Rank
1	Paddy	1.9657	51	1.8314	59
2	Wheat	2.2938	38	2.3673	35
3	Other Grains	1.9861	49	1.6044	66
4	Jute	1.8401	61	1.8537	56
5	Sugarcane	1.9220	56	1.9877	51
6	Potato	1.9488	53	1.8809	54
7	Vegetables	1.9293	54	1.9959	49
8	Pulses	1.6401	69	1.6253	65
9	Oilseeds	2.0972	45	2.1461	46
10	Fruits	1.6275	70	1.5024	69
11	Cotton	1.8318	62	1.8500	57
12	Tobacco	1.9795	50	2.1868	43
13	Tea	1.9596	52	1.5607	67
14	Major Spices	1.7662	66	1.6843	63
15	Other Crops	1.9031	57	1.9726	52
16	Livestock	2.0106	47	1.9092	53
17	Poultry	2.1841	39	2.2690	39
18	Shrimp	2.1531	41	2.1707	45
19	Other Fish	1.8225	63	2.0721	48
20	Forestry	1.8596	59	2.2879	38
21	Rice Milling	2.6314	23	6.5966	4
22	Ata & Flour Milling	2.7041	20	4.6078	16
23	Fish Processing	2.4950	28	3.6996	22
24	Edible Oil	2.8732	11	4.9208	14
25	Sugar and Gur	2.7536	17	5.0696	9
26	Tea Processing /Blending	2.2962	37	2.6671	30
27	Salt	1.2323	78	1.1284	78
28	Other Food	2.8674	12	3.8011	20
29	Leather Finishing	2.9168	10	8.6938	1
30	Leather Products	2.8394	14	3.2990	25

Sl No	Sectors	Type I Multipliers		Type II Multipliers	
		Index	Rank	Index	Rank
31	Jute Baling	2.6217	24	7.9364	3
32	Jute Textile	2.5722	25	4.9934	13
33	Yarn	2.4577	29	3.9957	19
34	Mill Cloth	2.7097	19	3.5783	23
35	Handloom Cloth	2.9306	8	5.0200	12
36	Dyeing & Bleaching	2.3446	34	1.9882	50
37	Readymade Garments	3.1128	7	5.3781	6
38	Knitting & Hosiery	2.9271	9	5.0261	11
39	Other Textiles	2.4282	32	2.0536	29
40	Cigarettes	2.0192	46	2.1042	47
41	Bidi	1.8835	58	1.7644	60
42	Saw & Planing Mills	2.1044	44	2.3848	34
43	Wooden /Furniture	2.7648	16	4.5521	17
44	Pulp, Paper & Board	2.8208	15	3.7846	21
45	Printing &Publishing	2.4963	27	2.3517	37
46	Drugs & Pharmaceuticals	2.7355	18	3.1296	27
47	Fertilizer	3.2338	6	8.3528	2
48	Other Chemicals	3.2652	5	5.2643	8
49	Petroleum Products	2.3062	36	2.3548	36
50	Pottery & Earthenware	2.1385	43	2.6215	31
51	China & Ceramic	2.6683	21	3.4647	24
52	Glass & Glass Products	2.4451	31	2.3897	33
53	Bricks, Tiles & Clay	1.9279	55	2.2263	42
54	Cement	2.5297	26	5.0488	10
55	Iron & Steel Industry	3.5996	1	5.3264	7
56	Fabricated Metal Products	2.8408	13	2.4529	32
57	Machinery	2.4154	3	5.4850	5
58	Transport Equipment	2.3405	35	1.8696	55
59	Miscellaneous Industries	2.1391	42	2.1856	44
60	Urban Building	2.4235	33	2.2599	40
61	Rural Building	1.9 946	48	1.7441	61
62	Construction: Electricity	3. 3640	4	4.2633	18
63	Construction: Rural Road	2.1769	40	2.2424	41
64	Construction: Transport	2.6558	22	2.9392	28
65	Other Construction	3.4253	2	4.7541	15
66	Electricity	1.5945	71	1.4735	72
67	Gas	1.1964	79	1.1044	79
68	Mining & Quarrying	1.7754	65	1.6600	64
69	Trade Service	1.4692	74	1.3187	75
70	Transport Service	1.6519	68	1.4980	71
71	Housing Service	1.4301	75	1.3309	74
72	Health Service	1.8437	60	1.8480	58
73	Education Service	1.5644	73	1.4258	73
74	Public Ad & Defense	1.6882	67	1.5016	70
75	Banking & Insurance	1.5689	72	1.5281	68
76	Professional Service	1.7931	64	1.7419	62
77	Hotels & Restaurants	2.4524	30	3.2448	26
78	Communications	1.2909	76	1.2157	76
79	Other Services	1.2570	77	1.1865	77

Table 8. Direct, indirect and induced income multiplier impact on the Bangladesh economy 1993-94

Sl No	Sectors	Income generation per Tk. 10,000 of output		Index and rank of multipliers							
				Type I multipliers per unit of				Type II multipliers per unit of			
				Final Demand		Output		Final Demand		Output	
		Type I	Type II	Index	Rank	Index	Rank	Index	Rank	Index	Rank
1	Paddy	9082	12001	1.8314	59	1.6588	60	2.4201	59	2.1920	62
2	Wheat	8876	11711	2.3673	35	2.0923	41	3.1235	35	2.7607	39
3	Other Grains	9774	12889	1.6044	66	1.5607	63	2.1156	66	2.0579	64
4	Jute	9704	12845	1.8537	56	1.7970	55	2.4537	57	2.3787	55
5	Sugarcane	8910	11780	1.9877	51	1.7672	56	2.6279	51	2.3364	56
6	Potato	7335	9692	1.8809	54	1.3758	72	2.4855	55	1.8181	72
7	Vegetables	9872	13042	1.9959	49	1.9646	49	2.6368	49	2.5954	50



Table 8. Cont'd.

Sl No	Sectors	Income generation per Tk. 10,000 of output		Index and rank of multipliers							
				Type I multipliers per unit of				Type II multipliers per unit of			
				Final Demand		Output		Final Demand		Output	
		Type I	Type II	Index	Rank	Index	Rank	Index	Rank	Index	Rank
8	Pulses	9079	85412	1.6253	65	1.4743	66	15.291	1	13.870	1
9	Oilseeds	9515	12568	2.1461	46	2.0357	46	2.8348	43	2.6889	44
10	Fruits	9749	12888	1.5024	69	1.4613	68	1.9862	69	1.9319	67
11	Cotton	9974	13187	1.8500	57	1.8413	53	2.4460	58	2.4344	53
12	Tobacco	9970	13184	2.1868	43	2.1760	39	2.8918	41	2.8774	36
13	Tea	9971	13140	1.5607	67	1.5477	64	2.0568	67	2.0397	65
14	Major Spices	7489	9902	1.6843	63	1.2587	75	2.2269	64	1.6642	76
15	Other Crops	8330	11018	1.9726	52	1.6404	62	2.6093	52	2.1698	63
16	Livestock	9696	12805	1.9092	53	1.8451	52	2.5214	54	2.4367	52
17	Poultry	9180	12106	2.2690	39	2.0731	43	2.9923	40	2.7341	41
18	Shrimp	8570	11301	2.1707	45	1.8514	50	2.8624	42	2.4413	51
19	Other Fish	9847	13042	2.0721	48	2.0395	45	2.7444	46	2.7012	42
20	Forestry	9972	13197	2.2879	38	2.2787	33	3.0279	39	3.0157	34
21	Rice Milling	10045	13213	6.5966	4	6.5784	4	8.6771	5	8.6531	5
22	Ata & Flour Milling	9995	13178	4.6078	16	4.5826	12	6.0752	17	6.0420	13
23	Fish Processing	10051	13249	3.6996	22	3.6994	18	4.8767	23	4.8765	19
24	Edible Oil	7229	9546	4.9208	14	3.5451	20	6.4983	14	4.6816	21
25	Sugar and Gur	10066	13234	5.0696	9	5.0636	6	6.6650	10	6.6571	7
26	Tea Processing /Blen.	10094	13228	2.6671	30	2.6626	28	3.4951	31	3.4892	29
27	Salt	10029	13246	1.1284	78	1.1281	77	1.4904	78	1.4900	77
28	Other Food	10033	13198	3.8011	20	3.7861	17	5.0000	20	4.9803	18
29	Leather Finishing	10067	13250	8.6938	1	8.6937	1	11.442	2	11.442	2
30	Leather Products	10085	13250	3.2990	25	3.2989	23	4.3343	27	4.3342	25
31	Jute Baling	10024	13250	7.9364	3	7.9364	3	10.491	4	10.491	4
32	Jute Textile	10025	13170	4.9934	13	4.9631	10	6.5594	13	6.5196	10
33	Yarn	10043	13236	3.9957	19	3.9915	16	5.2663	19	5.2608	16
34	Mill Cloth	10061	13238	3.5783	23	3.5752	19	4.7086	24	4.7045	20
35	Handloom Cloth	10042	13240	5.0200	12	5.0162	9	6.6184	12	6.6134	9
36	Dyeing & Bleaching	10104	13250	1.9882	50	1.9882	48	2.6072	53	2.6072	49
37	Readym. Garments	9973	13126	5.3781	6	5.3276	5	7.0780	7	7.0115	6
38	Knitting & Hosiery	10051	13241	5.0261	11	5.0228	8	6.6217	11	6.6172	8
39	Other Textiles	9911	13063	2.8536	29	2.8133	27	3.7610	29	3.7080	27
40	Cigarettes	10022	13250	2.1042	47	2.1041	40	2.7819	45	2.7818	38
41	Bidi	9939	13127	1.7644	60	1.7480	57	2.3303	60	2.3086	59
42	Saw & Planing Mills	10040	13216	2.3848	34	2.3786	31	3.1391	34	3.1310	32
43	Wooden /Furniture	10046	13213	4.5521	17	4.5394	13	5.9873	18	5.9706	14
44	Pulp, Paper & Board	9235	10292	3.7846	21	3.4538	22	4.9551	22	4.5220	22
45	Printing & Publishing	9349	12261	2.3517	37	2.1762	38	3.0843	38	2.8541	37
46	Drugs & Pharmaceut.	7818	10276	3.1296	27	2.4273	30	4.1136	28	3.1904	31
47	Fertilizer	10202	13243	8.3528	2	8.3482	2	10.843	3	10.837	3
48	Other Chemicals	5922	7735	5.2643	8	3.0730	25	6.8760	9	4.0139	26
49	Petroleum Products	8578	11285	2.3548	36	2.0056	47	3.0980	37	2.6386	46
50	Pottery & Earthenw.	10161	13250	2.6215	31	2.6214	29	3.4185	32	3.4183	30
51	China & Ceramic	10564	13237	3.4647	24	3.4614	21	4.3414	26	4.3372	24
52	Glass & Gl. Products	10125	13136	2.3897	33	2.390	32	3.1001	36	3.0734	33
53	Bricks, Tiles & Clay	10763	13243	2.2263	42	2.2251	37	2.7393	47	2.7378	40
54	Cement	10916	13208	5.0488	10	5.0329	7	6.1088	16	6.0897	12
55	Iron & Steel Industry	4005	5180	5.3264	7	2.0824	42	6.8903	8	2.6938	43
56	Fabri. Metal Products	9293	12131	2.4529	32	2.2458	34	3.2020	33	2.9316	35
57	Machinery	7736	10079	5.4850	5	4.1724	15	7.1467	6	5.4364	15
58	Transport Equipment	9888	12985	1.8696	55	1.8322	54	2.4551	56	2.4059	54
59	Miscell. Industries	9625	12385	2.1856	44	2.0130	44	2.8126	44	2.6291	48
60	Urban Building	10894	13072	2.2599	40	2.2295	36	2.7118	48	2.6754	45
61	Rural Building	10310	13241	1.7441	61	1.7430	58	2.2401	63	2.2386	60
62	Constrn: Electricity	10436	10660	4.2633	18	4.2633	14	4.3546	25	4.3546	23
63	Constrn: Rural Road	11275	13250	2.2424	41	2.2424	35	2.6352	50	2.6352	47
64	Constrn: Transport	10866	13249	2.9392	28	2.9391	26	3.5840	30	3.5838	28
65	Other Construction	10204	13246	4.7541	15	4.7528	11	6.1714	15	6.1697	11
66	Electricity	10499	13166	1.4735	72	1.4641	67	1.8477	73	1.8360	71
67	Gas	10655	13228	1.1044	79	1.1025	79	1.3711	79	1.3688	79
68	Mining & Quarrying	12451	13215	1.6600	64	1.6557	61	1.7620	74	1.7574	73
69	Trade Service	9683	12827	1.3187	75	1.2766	74	1.7469	75	1.6911	75
70	Transport Service	9591	12582	1.4980	71	1.4224	71	1.9650	70	1.8659	70
71	Housing Service	10067	13149	1.3309	74	1.3208	73	1.7384	76	1.7251	74

Sl No	Sectors	Income generation per Tk. 10,000 of output		Index and rank of multipliers							
				Type I multipliers per unit of				Type II multipliers per unit of			
				Final Demand		Output		Final Demand		Output	
		Type I	Type II	Index	Rank	Index	Rank	Index	Rank	Index	Rank
72	Health Service	10521	13249	1.8480	58	1.8478	51	2.3270	61	2.3268	57
73	Education Service	10016	13248	1.4258	73	1.4256	70	1.8859	72	1.8856	69
74	Public Ad & Defense	9844	12876	1.5016	70	1.4593	69	1.9641	71	1.9087	68
75	Banking & Insurance	9905	13088	1.5281	68	1.5095	65	2.0192	68	1.9946	66
76	Professional Service	9970	13238	1.7419	62	1.7403	59	2.3128	62	2.3107	58
77	Hotels & Restaurants	10051	15444	3.2448	26	3.2434	24	4.9855	21	4.9834	17
78	Communications	9192	12185	1.2157	76	1.1180	78	1.6115	77	1.4819	78
79	Other Services	7065	13240	1.1865	77	1.1856	76	2.2235	65	2.2218	61

Direct, indirect and induced wage income multiplier impact on the Bangladesh economy is shown in Table 9. In terms of indirect wage income, the highest value of wage income was generated by professional service followed by education service. Besides this, most of the trade services, such as, trade service, transport service, public administration and defense, hotels/restaurants and other services, and a few agriculture and agro-processing sectors such as rice, wheat, oilseeds, livestock, poultry, leather finishing, jute textiles, and other textiles generated comparatively higher values of wage income. Very low wage income generation was observed in manufacturing sectors (salt, petroleum products and iron/steel industry) and construction sectors (electricity and gas). The values of indirect and induced wage income gain were comparatively higher than that of indirect wage income for all the sectors. Very high values of indirect induced wage income were observed for the sector other construction, education service and professional service. Besides this, most of the agricultural and agro-processing sectors generated comparatively higher values of indirect and induced wage income like indirect wage income. Some of the agro-processing sectors (rice milling, ata/flour milling, fish processing, edible oil and leather finishing), other manufacturing sectors (knitting/hosiery, cigarettes and petroleum products) and construction sectors (rural building and construction of electricity) show very high values of wage income multipliers for the Type I multipliers.

Direct, indirect and induced employment multiplier impact on the Bangladesh economy is shown in Table 10. The highest indirect employment was generated in the livestock sector followed by poultry. Some of the agriculture (Paddy, wheat, other grains, jute, vegetables and oilseeds) and manufacturing sectors (Ata/flour milling, leather finishing, jute bailing, other textiles and pottery/earthenware) show higher employment generation. Most of the manufacturing sectors other than agro-processing sectors show comparatively lower employment generation. The sectors like petroleum products, iron/steel industry, electricity, gas and housing service generated lower values of indirect employment per unit of output. Whereas the sectors like potato, fruits, salt, dyeing/bleaching, other chemicals, petroleum products, rural building, electricity, gas and housing service generated lower values of the induced employment per unit of output.

The values of multipliers per unit of final demand and output were more or less, similar for both Type I and Type II multipliers. The highest and the second highest values of



employment multipliers (Type I) both per unit of final demand and output were obtained in the housing service and petroleum products, respectively. The sectors edible oil, leather finishing, rice milling, ata/flour milling, fish processing and knitting/hosiery were recorded relatively large multiplier values. The multiplier values were relatively much smaller for most of the primary sectors, service and trade sectors. The highest value of employment multiplier (Type II) both per unit of final demand and output was obtained in the housing service. The second highest value of employment multiplier (Type II) per unit of final demand was obtained in the edible oil and per unit of output in the rice milling. The ranks of indirect and induced employment multipliers (Type II) were nearly same as Type I multipliers.

**Table 9. Direct, indirect and induced wage income multiplier impact on the Bangladesh economy 1993-94**

Sl	Sectors	Income generation per Tk. 10,000 of output		Index and rank of multipliers							
				Type I multipliers per unit of				Type II multipliers per unit of			
				Final Demand		Output		Final Demand		Output	
		Type I	Type II	Index	Rank	Index	Rank	Index	Rank	Index	Rank
1	Paddy	6052	8433	1.7532	68	1.5880	67	2.4429	68	2.2127	67
2	Wheat	6636	9236	1.9958	63	1.7640	65	2.7778	63	2.4551	64
3	Other Grains	5367	7441	1.6314	69	1.5870	68	2.2620	69	2.2003	68
4	Jute	5030	6970	2.4430	50	2.3683	49	3.3851	50	3.2816	49
5	Sugarcane	4230	5859	2.7970	41	2.4867	47	3.8742	41	3.4444	47
6	Potato	2574	3577	2.6967	43	1.9726	62	3.7471	44	2.7410	62
7	Vegetables	5949	8248	2.1829	59	2.1486	55	3.0264	59	2.9789	55
8	Pulses	3682	5098	2.4105	52	2.1866	53	3.3373	52	3.0273	53
9	Oilseeds	7295	10102	1.8673	66	1.7712	64	2.5856	66	2.4525	65
10	Fruits	2782	3852	3.3146	34	3.2240	32	4.5886	35	4.4632	33
11	Cotton	4613	6400	2.8092	40	2.7959	39	3.8970	40	3.8785	39
12	Tobacco	5797	8040	2.5778	46	2.5651	44	3.5752	47	3.5575	45
13	Tea	3499	4879	2.0369	61	2.0199	59	2.8406	61	2.8170	59
14	Major Spices	3537	4895	1.8846	64	1.4084	72	2.6085	65	1.9494	72
15	Other Crops	4014	5563	2.5235	47	2.0984	56	3.4971	48	2.9081	56
16	Livestock	7342	10176	1.6062	70	1.5523	70	2.2262	70	2.1514	70
17	Poultry	6369	8826	1.8369	67	1.6784	66	2.5455	67	2.3258	66
18	Shrimp	3783	5237	2.3457	55	2.0006	60	3.2470	55	2.7693	60
19	Other Fish	5781	8002	2.3845	53	2.3470	50	3.3009	53	3.2489	50
20	Forestry	4452	6165	7.0726	15	7.0442	14	9.7943	16	9.7549	15
21	Rice Milling	5307	7390	27.716	3	27.640	2	38.594	3	38.478	2
22	Ata & Flour Milling	5846	8135	19.529	8	19.422	8	27.176	8	27.028	8
23	Fish Processing	3791	5250	16.340	10	16.340	10	22.629	10	22.628	10
24	Edible Oil	4033	5591	28.559	2	20.575	6	39.592	2	28.524	6
25	Sugar and Gur	5694	7881	3.0113	36	3.0078	34	4.1680	36	4.1631	34
26	Tea Processing /Blen.	4522	6269	2.2126	57	2.2089	51	3.0679	57	3.0627	51
27	Salt	1702	2359	1.5420	72	1.5415	71	2.1377	72	2.1370	71
28	Other Food	5251	7281	4.2549	25	4.2381	22	5.8999	26	5.8766	23
29	Leather Finishing	6366	8830	20.943	6	20.942	5	29.046	6	29.046	5
30	Leather Products	4784	6630	5.8132	18	5.8130	16	8.0559	19	8.0557	17
31	Jute Baling	4984	6910	11.980	12	11.980	12	16.611	13	16.611	13
32	Jute Textile	5709	7912	3.5128	28	3.4915	27	4.8685	29	4.8390	28
33	Yarn	5341	7402	2.7420	42	2.7391	40	3.8000	42	3.7960	40
34	Mill Cloth	5281	7324	3.4103	32	3.4074	30	4.7290	33	4.7249	31
35	Handloom Cloth	5894	8164	3.4552	29	3.4526	28	4.7862	30	4.7826	29
36	Dyeing & Bleaching	2762	3830	5.5012	20	5.5012	18	7.6295	21	7.6295	19
37	Readym. Garments	5460	7558	5.0225	22	4.9753	19	6.9529	23	6.8876	20
38	Knitting & Hosiery	4485	6216	23.016	5	23.001	3	31.897	5	31.876	3
39	Other Textiles	6312	8745	2.0090	62	1.9807	61	2.7832	62	2.7439	61
40	Cigarettes	3280	4540	18.530	9	18.529	9	25.650	9	25.649	9
41	Bidi	3930	5449	2.4294	51	2.4068	48	3.3680	51	3.3367	48
42	Saw & Planing Mills	4139	5735	2.6411	45	2.6343	42	3.6601	46	3.6507	43
43	Wooden /Furniture	5515	7639	2.5004	48	2.4934	46	3.4629	49	3.4533	46
44	Pulp, Paper & Board	3797	5266	4.3887	24	4.0051	23	6.0865	25	5.5545	24
45	Printing & Publishing	4234	5867	2.2165	56	2.0511	58	3.0717	56	2.8425	58
46	Drugs & Pharmaceut.	3135	4343	5.9882	16	4.6442	20	8.2963	17	6.4344	21
47	Fertilizer	4659	6466	8.1488	14	8.1443	13	11.311	15	11.305	14

Table 9. Cont'd.

Sl	Sectors	Income generation per Tk. 10,000 of output		Index and rank of multipliers							
				Type I multipliers per unit of				Type II multipliers per unit of			
				Final Demand		Output		Final Demand		Output	
		Type I	Type II	Index	Rank	Index	Rank	Index	Rank	Index	Rank
48	Other Chemicals	2777	3847	5.0503	21	2.9481	36	6.9958	22	4.0838	36
49	Petroleum Products	2465	3415	26.797	4	22.823	4	37.130	4	31.624	4
50	Pottery & Earthenw.	3544	4910	5.8674	17	5.6871	15	8.1291	18	8.1288	16
51	China & Ceramic	3736	5185	5.7437	19	5.7382	17	7.9724	20	7.9647	18
52	Glass & Gl. Products	4428	6147	2.0860	60	2.0680	57	2.8958	60	2.8709	57
53	Bricks, Tiles & Clay	4166	5767	2.6468	44	2.6454	41	3.6635	45	3.6615	42
54	Cement	5399	7486	3.4475	30	3.4367	29	4.7804	31	4.7654	30
55	Iron & Steel Industry	1365	1896	9.0687	13	3.5455	26	12.597	14	4.9251	27
56	Fabri. Metal Products	3568	4944	2.3574	54	2.1583	54	3.2668	54	2.9909	54
57	Machinery	4016	5568	3.4041	33	2.5894	43	4.7195	34	3.5901	44
58	Transport Equipment	2938	4077	3.4426	31	3.3737	31	4.7761	32	4.6805	32
59	Miscell. Industries	3130	4337	4.9319	23	4.6101	21	6.8336	24	6.3877	22
60	Urban Building	4324	5988	2.9340	38	2.8946	37	4.0629	38	4.0083	37
61	Rural Building	2104	2918	19.863	7	19.850	7	27.547	7	27.529	7
62	Constrn: Electricity	4053	5850	13.648	11	13.648	11	19.697	11	19.697	11
63	Constrn: Rural Road	4079	5690	3.7977	26	3.7977	24	5.2980	27	5.2979	25
64	Constrn: Transport	5735	7940	2.1950	58	2.1949	52	3.0387	58	3.0385	52
65	Other Construction	6127	32081	3.2187	35	3.2178	33	16.854	12	16.849	12
66	Electricity	2171	3120	1.8703	65	1.8584	63	2.6884	64	2.6713	63
67	Gas	1058	1607	2.5002	49	2.4960	45	3.7972	43	3.7908	41
68	Mining & Quarrying	4641	6423	3.6068	27	3.5974	25	4.9922	28	4.9792	26
69	Trade Service	6647	9206	1.1711	78	1.1337	77	1.6220	78	1.5703	77
70	Transport Service	6530	9030	1.3125	74	1.2463	76	1.8152	74	1.7237	76
71	Housing Service	1334	1846	-	1	-	1	186.00	1	-	1
72	Health Service	4341	6009	2.8209	39	2.8205	38	3.9051	39	3.9047	38
73	Education Service	8028	11119	1.2583	76	1.2581	75	1.7427	76	1.7425	75
74	Public Ad & Defense	6840	9475	1.2951	75	1.2586	74	1.7939	73	1.7433	74
75	Banking & Insurance	5888	8149	1.5797	71	1.5605	69	2.1866	71	2.1599	69
76	Professional Service	8353	11569	1.3814	73	1.3802	73	1.9134	73	1.9117	73
77	Hotels & Restaurants	5865	8127	2.9767	37	2.9754	35	4.1248	37	4.1231	35
78	Communications	4307	5959	1.1902	77	1.0945	79	1.6468	77	1.5143	79
79	Other Services	5931	8214	1.1057	79	1.1048	78	1.5313	79	1.5301	78

Table 10. Direct, indirect and induced employment multiplier impact on the Bangladesh economy 1993-94

Sectors	Income generation per Tk. 10,000 of output		Index and rank of multipliers							
			Type I multipliers of				Type II multipliers of			
			Final Demand		Output		Final Demand		Output	
	Type I	Type II	Index	Rank	Index	Rank	Index	Rank	Index	Rank
1. Paddy	48.807	.8433	1.6156	63	1.4633	64	2.4429	68	2.2127	67
2. Wheat	65.309	.9236	1.6608	62	1.4679	63	2.7778	63	2.4551	64
3. Other Grains	44.924	.7441	1.5175	65	1.4761	62	2.2620	69	2.2003	68
4. Jute	59.253	.6970	1.4982	66	1.4524	65	3.3851	50	3.2816	49
5. Sugarcane	27.491	.5859	2.0244	50	1.7998	51	3.8742	41	3.4444	47
6. Potato	20.076	.3577	2.3605	41	1.7267	53	3.7471	44	2.7410	62
7. Vegetables	41.539	.8248	1.7210	58	1.6940	54	3.0264	59	2.9789	55
8. Pulses	26.358	.5098	1.9140	53	1.7362	52	3.3373	52	3.0273	53
9. Oilseeds	61.216	1.0102	1.7402	57	1.6506	58	2.5856	66	2.4525	65
10. Fruits	15.487	.3852	2.3087	42	2.2455	41	4.5886	35	4.4632	33
11. Cotton	26.371	.6400	1.9615	52	1.9522	49	3.8970	40	3.8785	39
12. Tobacco	38.289	.8040	1.8459	56	1.8368	50	3.5752	47	3.5575	45
13. Tea	18.366	.4879	1.5829	64	1.5697	61	2.8406	61	2.8170	59
14. Major Spices	30.733	.4895	1.8623	55	1.3918	68	2.6085	65	1.9494	72
15. Other Crops	27.897	.5563	1.9921	51	1.6566	57	3.4971	48	2.9081	56
16. Livestock	101.18	1.0176	1.2320	76	1.1907	76	2.2262	70	2.1514	70
17. Poultry	82.935	.8826	1.3505	70	1.2339	73	2.5455	67	2.3258	66
18. Shrimp	24.221	.5237	1.8753	54	1.5994	60	3.2470	55	2.7693	60
19. Other Fish	31.908	.8002	1.6769	59	1.6506	59	3.3009	53	3.2489	50
20. Forestry	19.411	.6165	3.8017	27	3.7864	24	9.7943	16	9.7549	15
21. Rice Milling	38.465	.7390	24.415	7	24.348	7	38.594	3	38.487	2
22. Ata & Flour	49.946	.8135	37.214	5	37.011	5	27.176	8	27.028	8
23. Fish Processing	20.419	.5250	25.746	6	25.745	6	22.629	10	22.628	10
24. Edible Oil	31.164	.5591	73.365	3	52.855	4	39.592	2	28.524	6



Table 10. Cont'd.

Sectors	Income generation per Tk. 10,000 of output		Index and rank of multipliers							
			Type I multipliers of				Type II multipliers of			
			Final Demand		Output		Final Demand		Output	
	Type I	Type II	Index	Rank	Index	Rank	Index	Rank	Index	Rank
25. Sugar and Gur	25.820	.7881	4.2052	22	4.2003	20	4.1680	36	4.1631	34
26. Tea Processing /Blen.	15.011	.6269	3.6860	31	3.6798	28	3.0679	57	3.0627	51
27. Salt	9.4617	.2359	1.3550	69	1.3546	69	2.1377	72	2.1370	71
28. Other Food	31.592	.7281	5.9505	17	5.9270	16	5.8999	26	5.8766	23
29. Leather Finishing	70.920	.8830	61.838	4	61.837	3	29.046	6	29.046	5
30. Leather Products	30.235	.6630	11.522	13	11.522	13	8.0559	19	8.0557	17
31. Jute Baling	51.482	.6910	21.821	10	21.821	10	16.611	13	16.611	13
32. Jute Textile	37.695	.7912	5.4885	19	5.4552	17	4.8685	29	4.8390	28
33. Yarn	26.342	.7402	2.9332	35	2.9302	35	3.8000	42	3.7960	40
34. Mill Cloth	23.761	.7324	3.7504	29	3.7471	25	4.7290	33	4.7249	31
35. Handloom Cloth	37.713	.8164	2.1467	47	2.1451	45	4.7862	30	4.7826	29
36. Dyeing & Bleaching	11.152	.3830	4.0208	23	4.0208	21	7.6295	21	7.6295	19
37. Readym. Garments	28.799	.7558	3.9989	24	3.9613	22	6.9529	23	6.8876	20
38. Knitting & Hosiery	21.888	.6216	23.643	8	23.627	8	31.897	5	31.876	3
39. Other Textiles	50.540	.8745	1.4501	67	1.4297	66	2.7832	62	2.7439	61
40. Cigarettes	14.522	.4540	22.727	9	22.726	9	25.650	9	25.649	9
41. Bidi	34.436	.5449	1.6747	60	1.6592	56	3.3680	51	3.3367	48
42. Saw & Planing Mills	19.583	.5735	2.2348	43	2.2291	43	3.6601	46	3.6507	43
43. Wooden Furniture	26.276	.7639	2.2342	44	2.2279	44	3.4629	49	3.4533	46
44. Pulp, Paper & Board	13.098	.5266	5.8340	18	5.3241	18	6.0865	25	5.5545	24
45. Printing & Publishing	15.698	.5867	2.2016	46	2.0374	47	3.0717	56	2.8425	58
46. Drugs & Pharmaceut.	13.832	.4343	8.6367	16	6.6984	15	8.2963	17	6.4344	21
47. Fertilizer	15.486	.6466	17.522	11	17.512	11	11.311	15	11.305	14
48. Other Chemicals	10.380	.3847	5.4576	20	3.1859	33	6.9958	22	4.0838	36
49. Petroleum Products	7.6164	.3415	155.52	2	132.46	2	37.130	4	31.624	4
50. Pottery & Earthenw.	64.614	.4910	1.4283	75	1.2483	71	8.1291	18	8.1288	16
51. China & Ceramic	14.554	.5185	4.6583	21	4.6538	19	7.9724	20	7.9647	18
52. Glass & Gl. Products	12.399	.6147	3.2861	33	3.2577	31	2.8958	60	2.8709	57
53. Bricks, Tiles & Clay	34.081	.5767	1.4246	68	1.4239	67	3.6635	45	3.6615	42
54. Cement	19.726	.7486	3.7149	30	3.7033	27	4.7804	31	4.7654	30
55. Iron & Steel Industry	4.8770	.1896	9.1228	15	3.5667	29	12.597	14	4.9251	27
56. Fabri. Metal Products	14.151	.4944	2.1382	48	1.9576	48	3.2668	54	2.7909	54
57. Machinery	13.133	.5568	3.9345	26	2.9929	34	4.7195	34	3.5901	44
58. Transport Equipment	10.101	.4077	3.7931	28	3.7172	26	4.7761	32	4.6805	32
59. Miscell. Industries	15.827	.4337	2.7429	36	2.5639	38	6.8336	24	6.3877	22
60. Urban Building	19.388	.5988	2.6188	38	2.5836	37	4.0629	38	4.0083	37
61. Rural Building	9.6945	.2918	10.749	14	10.742	14	27.547	7	27.529	7
62. Constrn. Electricity	15.053	.5850	17.408	12	17.408	12	19.697	11	19.697	11
63. Constrn. Rural Road	24.437	.5690	2.2311	45	2.2311	42	5.2980	27	5.2979	25
64. Constrn. Transport	33.390	.7940	1.6699	61	1.6699	55	3.0387	58	3.0385	52
65. Other Construction	30.989	.32081	2.0636	49	2.0631	46	16.854	12	16.849	12
66. Electricity	6.0032	.3120	2.4430	39	2.4275	39	2.6884	64	2.6713	63
67. Gas	3.2898	.1607	3.5415	32	3.5355	30	3.7972	43	3.7908	41
68. Mining & Quarrying	17.472	.6423	3.9552	25	3.9449	23	4.9922	28	4.9792	26
69. Trade Service	24.221	.9206	1.2193	77	1.1804	77	1.6220	78	1.5703	77
70. Transport Service	28.124	.9030	1.2872	73	1.2223	74	1.8152	74	1.7237	76
71. Housing Service	4.9819	.1846	502031	1	498188	1	186.00	1	184.58	1
72. Health Service	17.984	.6009	2.6367	37	2.6364	36	3.9051	39	3.9047	38
73. Education Service	44.192	1.1119	1.1732	78	1.1730	78	1.7427	76	1.7425	75
74. Public Ad & Defense	29.971	.9475	1.2822	74	1.2460	72	1.7939	75	1.7433	74
75. Banking & Insurance	14.683	.8149	2.4076	40	2.3783	40	2.1866	71	2.1599	69

Table 10. Cont'd.

Sectors	Income generation per Tk. 10,000 of output		Index and rank of multipliers							
			Type I multipliers of				Type II multipliers of			
			Final Demand		Output		Final Demand		Output	
	Type I	Type II	Index	Rank	Index	Rank	Index	Rank	Index	Rank
76. Professional Service	43.694	1.1569	1.2955	72	1.2943	70	1.9134	73	1.9117	73
77. Hotels & Restaurants	48.900	.8127	3.1975	34	3.1961	32	4.1248	37	4.1231	35
78. Communications	11.208	.5959	1.2972	71	1.1929	75	1.6468	77	1.5143	79
79. Other Services	62.991	.8214	1.0396	79	1.0388	79	1.5313	79	1.5301	78

## V. CONCLUSIONS AND POLICY IMPLICATIONS

There have some drawbacks of the methodology used for constructing the present input-output table. Imports were not partitioned between competitive and non-competitive components, which could be tackled by preparing industry by industry import matrices for the import of competitive and non-competitive intermediate goods. The calculation of indirect tax on domestic production should be consistent in the input-output table. The present data bears the effect of nearly ten years old data. More effective results could be found if we had recent data.

Bangladesh economy is basically import based but manufacturing industries make a little contribution to export due to significant garment export in the recent years whereas agricultural sector contributes as an export component of final demand. Expansion of labour intensive agro-based industries has greater impact as a wage income generation in the economy. Agro-based manufacturing activity is narrow-based and it would be widen through formulation of new manufacturing activities or through the development of new technologies. There is a need to measure modern technology and research on agricultural policies to induce the process of agricultural modernization. However, there is a need for selective import-substitution and export promotion policies dealing with modern farm inputs and processed agriculture. Inducing and strengthening sectoral growth linkages can accelerate the process of agricultural transformation and, hence, lead to self-sustaining economic growth in Bangladesh dominated by the agricultural sector.

Primary input content of final demand shows that agricultural and agro-based manufacturing industries generate more direct imports per units of production compared with other industries, which reflects the low import content of the domestic intermediate inputs by these industries. Agro-based sectors paddy, wheat, other grains, vegetables, oilseeds, livestock and poultry constitutes higher portion of the total wages. Thus, any expansion or contraction of these industries would have a comparatively greater impact on the amount of wage income generated in the economy through their demand for wage-intensive domestic intermediate inputs. Set up of the most agro-based manufacturing industries may be profitable as they required low import per unit of final demand compare to high import requirement industries, like, machinery, cement, transport equipment, glass and glass products, other chemicals, etc. High exportable agricultural and agro-processing products have a strong impact on their production.



The multiplier analysis essentially assesses the extent of interrelation between the sectors in an economy. The output multipliers measure the contribution of any sector to total output. Most of the manufacturing sectors possessed higher value of output multipliers due to availability of endogenous raw materials in Bangladesh. The high value of (Type I) multipliers in the case of manufacturing and construction sectors indicates that the knock on effects are relatively large compared with the initial impact of increased output. A strong interrelation exists between the manufacturing sectors having high value of Type I output multipliers and the primary agricultural sectors which supply the basic raw materials (i.e. livestock, forestry, jute, fruits and sugarcane) to manufacturing sectors. Most of the trade services and some of the agricultural and agro-processing sectors generated comparatively higher values of wage income as well as higher values of wage income multipliers. Livestock, poultry and major crops are the higher employment generation sectors. Manufacturing sectors are income inducements whereas agro-processing and construction sectors possess wage-income inducements. The sectors housing, petroleum and edible oil are the employment inducements.

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